UNIWERSYTET
MIKOŁAJA KOPERNIKA
W TORUNIU
Wydział Nauk o Zdrowiu
Collegium Medicum w Bydgoszczy

Doctoral dissertation

THE RELATIONSHIP BETWEEN THE KNOWLEDGE MANAGEMENT PROCESS, INFRASTRUCTURE, MANAGERIAL COMPETENCE OF NURSE MANAGERS, AND JOB PERFORMANCE OF NURSING STAFF IN KOSOVO

December 2025 Adnan Hoxha

UNIWERSYTET
MIKOŁAJA KOPERNIKA
W TORUNIU
Wydział Nauk o Zdrowiu
Collegium Medicum w Bydgoszczy

Doctoral dissertation

THE RELATIONSHIP BETWEEN THE KNOWLEDGE MANAGEMENT PROCESS, INFRASTRUCTURE, MANAGERIAL COMPETENCE OF NURSE MANAGERS, AND JOB PERFORMANCE OF NURSING STAFF IN KOSOVO

Author: Adnan Hoxha
Supervisor: Dr hab. Prof. Mariola Głowacka
Co-supervisor: Prof. Ass. Dr. Naime Brajshori

December 2025

Author:	Adnan Hoxha
Title in Polish:	Zależność między procesem zarządzania wiedzą, infrastrukturą oraz kompetencjami menedżerskimi kierowniczek pielęgniarstwa a wynikami pracy personelu pielęgniarskiego w Kosowie.
Title in English:	The relationship between the knowledge management process, infrastructure, managerial competence of nurse managers, and job performance of nursing staff in Kosovo
Keywords:	Knowledge Management; Managerial Competence; Job Performance; Knowledge-Based View; Quantitative Study.
Editing of text and images:	Adnan Hoxha
Number of copies:	4
Place and date:	Torun, December 2025

Acknowledgment

“Më mirë me ditë, se sa me pasë” – is a widely spread proverb in Kosovo, which translates to “It is better to know than to have”, and metaphorically underscores the core idea of effective knowledge sharing over mere possession of wealth.

I dedicate this work to my Mother, Humidije Hoxha, a perfectly dedicated, and always ready to self-sacrifice parent for her child’s education.

Special thanks to the key “steps” of this journey:

- *My supervisors, Prof. Mariola Głowacka, and Prof. Ass. Dr. Naime Brajshori for their cooperation and flexibility.*
- *Colleagues: Prof. Katarzyna, and Justyna for patient and support in coordinating with all the PhD students.*
- *My better half, for being a supportive witness of every step in this journey. She inspires me with her unbeatable will to live life with full passion, justice, fairness, appreciation even for the smallest dedications, and tireless efforts to improve the lives of others. Bound eternally, souls aligned.*
- *A very special friend from Poland. My appreciation runs infinitely under sincere zeal.*
- *My family for pure the wholeheartedly and continuous support and trust on me.*
- *Friends, colleagues, and fellow PhD students for all the good memories.*
- *We thank the authors for permission to use their tools,*
    - *the 360-degree evaluation of the job-related skill perceptions of PHC nursing managers, reported in reference YTR, or Munyewende et al. [1].*
    - *the Job performance questionnaire Carlos [2].*
    - *the Knowledge Management Infrastructure, Kudozia [3].*
    - *the Knowledge Management Assessment Tool (Knowledge Management Process, Pealow* [4]*.*

Kind reminders to anyone reading this: hold on to your dearest values and beliefs, friendships, and family. No challenge is permanent and that every difficulty contains the potential for blessings and growth. A beautiful relevant quote in the Quran perfectly coins this advice:

94:6: "Surely with hardship comes ease"

Humbled,
Adnan Hoxha

The relationship between the knowledge management infrastructure and processes, managerial competence of nurse managers, and job performance of nursing staff in Kosovo

Keywords: Knowledge Management; Managerial Competence; Job Performance; Knowledge-Based View; Quantitative Study.

Abstract

Introduction: Nursing staff are the key to patient care, yet Kosovo's public healthcare system continues to face persistent challenges, including underdeveloped knowledge management systems and limited managerial support, which hamper nursing performance. This doctoral study explores the intricate relationships between these phenomena across public healthcare system. The study addresses a critical empirical gap in a transitional healthcare context. The Knowledge-Based View, Dynamic Capabilities Theory, Nursing Theory, and Organizational Capability Theory served as its theoretical frameworks.

Methods: A multi-stage stratified sample of 987 nurses, and nurse heads, and nurse directors was collected across primary, secondary, and tertiary care. Four validated instruments measured knowledge management processes, knowledge management infrastructure, managerial competence, and job performance. Data were analysed in STATA 17 using descriptive statistics, reliability tests, regression diagnostics, multiple regressions, and care-level–specific moderation models. Participants were licensed nurses aged 22–65 employed in Kosovo's public healthcare system.

Results: Main-effects analyses showed that among nurses, knowledge management infrastructure was the strongest predictor of performance in primary and secondary care, while knowledge management processes were significant only in secondary care. At the dimension level, information technology infrastructure, knowledge-sharing structures, and knowledge identification process consistently contributed

nursing performance, namely its dimensions of task performance and conscientiousness.

Among nurse managers, knowledge management processes were significantly associated with lower performance only at the primary care level. At the dimensional level, knowledge measurement emerged as the strongest predictor of cooperation and contextual performance, while knowledge management infrastructure emerged as an insignificant predictor.

Moderation analyses revealed that both the composite and specific dimensions of managerial competence, particularly leadership, staff development, and financial management, amplified the relationship between knowledge management processes and job performance for nurses exclusively in tertiary care. Conversely, among nurse managers, their managerial competence and dimensions of communication, leadership, and staff development weakened the relationship between knowledge management processes and job performance at the same healthcare level.

For the relationship between knowledge management infrastructure and job, performance of nurse managers, managerial competence and its dimensions of Staff Development, Planning & Organization, and Problem-Solving & Decision-Making strengthened performance in primary care but weakened it in secondary care through leadership, staff development, and problem-solving and decision-making dimensions. Distinctively, no significant moderation effects were observed for nurses in the relationship between knowledge management infrastructure and job performance.

Discussion and conclusion: The findings demonstrate that knowledge management plays a pivotal role in strengthening nursing performance across Kosovo's public healthcare institutions. Yet, its effectiveness is highly dependent on care-level context, work title, and the managerial competence of nurse managers. The managerial competence of nurse managers acts as a multiplicative, context and dimension-specific moderator of knowledge management effectiveness. Hence, strengthening specific knowledge management (sub) components, improving

knowledge-sharing cultures, and developing targeted managerial competencies emerge as critical strategies for enhancing performance within resource-constrained, transitional healthcare systems.

Zależność między procesem zarządzania wiedzą, infrastrukturą oraz kompetencjami menedżerskimi kierowniczek pielęgniarstwa a wynikami pracy personelu pielęgniarskiego w Kosowie.

Słowa kluczowe: Zarządzanie wiedzą; Kompetencje menedżerskie; Wyniki pracy; Koncepcja oparta na wiedzy; Badanie ilościowe.

Abstrakt

Wprowadzenie: Personel pielęgniarski stanowi kluczowy element opieki nad pacjentem, jednak publiczny system ochrony zdrowia w Kosowie nadal zmaga się z utrzymującymi się wyzwaniami, w tym z niedostatecznie rozwiniętymi systemami zarządzania wiedzą oraz ograniczonym wsparciem menedżerskim, które osłabiają efektywność pracy pielęgniarek. Niniejsze badanie doktorskie analizuje złożone zależności pomiędzy tymi zjawiskami w obrębie publicznego systemu ochrony zdrowia. Badanie odpowiada na istotną lukę empiryczną w kontekście systemu opieki zdrowotnej znajdującego się w fazie transformacji. Ramy teoretyczne badania stanowiły: koncepcja przedsiębiorstwa opartego na wiedzy (Knowledge-Based View), teoria dynamicznych zdolności, teoria pielęgniarstwa oraz teoria zdolności organizacyjnych.

Metody: Zastosowano wieloetapowy, warstwowy dobór próby obejmujący 987 pielęgniarek, pielęgniarek oddziałowych oraz dyrektorów pielęgniarstwa, zatrudnionych na poziomie podstawowej, wtórnej i trzeciorzędowej opieki zdrowotnej. Cztery zwalidowane narzędzia pomiarowe służyły do oceny procesów zarządzania wiedzą, infrastruktury zarządzania wiedzą, kompetencji menedżerskich oraz efektywności pracy. Dane analizowano w programie STATA 17 z wykorzystaniem statystyki opisowej, testów rzetelności, diagnostyki regresji, regresji wielokrotnej

oraz modeli moderacji specyficznych dla poziomu opieki. Uczestnikami były licencjonowane pielęgniarki w wieku 22–65 lat, zatrudnione w publicznym systemie ochrony zdrowia w Kosowie.

Wyniki: Analizy efektów głównych wykazały, że wśród pielęgniarek infrastruktura zarządzania wiedzą była najsilniejszym predyktorem efektywności pracy na poziomie podstawowej i wtórnej opieki zdrowotnej, natomiast procesy zarządzania wiedzą były istotne wyłącznie na poziomie opieki wtórnej. Na poziomie wymiarów infrastruktura technologii informacyjnych, struktury współdzielenia wiedzy oraz proces identyfikacji wiedzy w sposób konsekwentny przyczyniały się do poprawy efektywności pracy pielęgniarek, w szczególności w zakresie wykonywania zadań oraz sumienności.

Wśród menedżerów pielęgniarstwa procesy zarządzania wiedzą były istotnie związane z niższą efektywnością pracy wyłącznie na poziomie podstawowej opieki zdrowotnej. Na poziomie wymiarów pomiar wiedzy okazał się najsilniejszym predyktorem współpracy oraz efektywności kontekstowej, podczas gdy infrastruktura zarządzania wiedzą nie wykazała istotnego wpływu.

Analizy moderacji wykazały, że zarówno łączny wskaźnik kompetencji menedżerskich, jak i ich wybrane wymiary — w szczególności przywództwo, rozwój personelu oraz zarządzanie finansowe — wzmacniały zależność pomiędzy procesami zarządzania wiedzą a efektywnością pracy pielęgniarek wyłącznie na poziomie opieki trzeciorzędowej. Natomiast wśród menedżerów pielęgniarstwa ich kompetencje menedżerskie oraz wymiary komunikacji, przywództwa i rozwoju personelu osłabiały zależność pomiędzy procesami zarządzania wiedzą a efektywnością pracy na tym samym poziomie opieki.

W odniesieniu do relacji pomiędzy infrastrukturą zarządzania wiedzą a efektywnością pracy menedżerów pielęgniarstwa, kompetencje menedżerskie oraz ich wymiary — rozwój personelu, planowanie i organizacja oraz rozwiązywanie problemów i podejmowanie decyzji — wzmacniały efektywność pracy na poziomie podstawowej opieki zdrowotnej, natomiast osłabiały ją na poziomie opieki wtórnej poprzez wymiary przywództwa, rozwoju personelu oraz rozwiązywania problemów i

podejmowania decyzji. Co istotne, nie stwierdzono istotnych efektów moderacji wśród pielęgniarek w relacji pomiędzy infrastrukturą zarządzania wiedzą a efektywnością pracy.

Dyskusja i wnioski: Wyniki badań wskazują, że zarządzanie wiedzą odgrywa kluczową rolę w wzmacnianiu efektywności pracy pielęgniarskiej w publicznych instytucjach ochrony zdrowia w Kosowie. Jednocześnie jego skuteczność jest w dużym stopniu uzależniona od poziomu opieki, pełnionej roli zawodowej oraz kompetencji menedżerskich menedżerów pielęgniarstwa. Kompetencje menedżerskie pełnią funkcję multiplikatywnego moderatora skuteczności zarządzania wiedzą, zależnego od kontekstu i konkretnego wymiaru. W związku z tym wzmacnianie określonych (pod)komponentów zarządzania wiedzą, rozwijanie kultury współdzielenia wiedzy oraz ukierunkowany rozwój kompetencji menedżerskich stanowią kluczowe strategie poprawy efektywności pracy w systemach opieki zdrowotnej funkcjonujących w warunkach ograniczonych zasobów i transformacji systemowej.

TABLE OF CONTENT

1 PROBLEM DEFINITION 20

1.1 CONCEPT DEFINITIONS 24

1.1.1 Knowledge 24

1.1.2 Knowledge Management (KM) 24

1.1.3 Knowledge Management Process (KMP) 25

1.1.4 Knowledge Management Infrastructure (KMI) 26

1.1.5 Job Performance (JP) 27

1.1.6 Managerial Competence (MC) 27

1.2 LITERATURE REVIEW 29

1.2.1 International Literature review 29

1.2.2 Knowledge and nurses 29

1.2.3 Knowledge and nurse managers 30

1.2.4 Knowledge and JP 30

1.2.5 KM and JP 30

1.2.6 KMI and JP 32

1.2.7 KMP and JP 32

1.2.8 MC and JP 32

1.2.9 Contextual factors 33

1.3 DEMONSTRATION OF LACK OF RELEVANT DOMESTIC LITERATURE 36

1.4 JUSTIFICATION OF THE RESEARCH TOPIC (GAP IN THE LITERATURE) 37

1.5 THEORETICAL FOUNDATIONS 39

1.5.1 Florence Nightingale's Environmental Theory 39

1.5.2 Nursing Intellectual Capital Theory (NICT) 39

1.5.3 Knowledge-Based View (KBV) 40

1.5.4 Dynamic Capabilities Theory (DCT) 40

1.5.5 Organizational Capability Theory (OCT) 40

2 DOCTORAL DISSERTATION GOALS 42

3 DOCTORAL DISSERTATION THESIS 43

3.1 RESEARCH QUESTIONS AND HYPOTHESES 43

4 RESEARCH METHODS 47

4.1 RESEARCH PHILOSOPHY, METHODOLOGY, AND METHODS 48

4.1.1 Systematic literature review, analysis, and synthesis 50

4.1.2 The study design 54

4.2 PILOT METHOD 56

4.2.1 Objectives of the pilot phase 56

4.2.2 Sampling and participants 56

4.2.3 Reliability testing 57

4.2.4 Normality and regression diagnostics 57

4.2.5 Duration and completion of the pilot phase and questionnaires 58

4.3 QUANTITATIVE METHOD 59

4.3.1 Sampling and data collection 59

4.3.2 Data analyses 60

4.4 RESEARCH ENVIRONMENT AND SAMPLE 66

4.4.1 Pilot method 69

4.4.2 Quantitative method 69

4.5 RESEARCH INSTRUMENTS 74

4.5.1 Questionnaire for JP 74

4.5.2 Questionnaire for MC 75

4.5.3 Questionnaire for KMAT 77

4.5.4 Questionnaire for KMI 78

4.5.5 General adaptations of research instruments 79

4.6 DATA COLLECTION PROCEDURES 81

4.7 ETHICAL ASPECT 83

4.8 ASSUMPTIONS AND LIMITATIONS 84

5 RESULTS 87

5.1 PILOT PHASE 88

5.2 QUANTITATIVE DATA ANALYSES 114

5.2.1 Main effects of KMP and KMI 122
5.2.2 Moderation effects of MC 136
6 INTERPRETATION AND DISCUSSION 154
6.1 JUSTIFICATION OF THE STUDIED SUBJECT AND METHODOLOGY 155
6.2 JUSTIFICATION OF THE RESEARCH SAMPLE 157
6.3 JUSTIFICATION OF THE RESEARCH INSTRUMENTS 159
6.4 ADDRESSING THE RESEARCH QUESTIONS AND HYPOTHESES 161
6.5 EMPIRICAL RESULTS OVERVIEW BY RESEARCH QUESTION AND HYPOTHESES 163
6.5.1 RQ1: The relationship between KMP and JP 163
6.5.2 RQ2: The relationship between KMI and JP 164
6.5.3 RQ3: Effects of KMP and KMI dimensions on overall JP and its dimensions 165
6.5.4 RQ4: The moderating role of MC in the KMP–JP and KMI–JP relationships 167
6.5.5 RQ5: Moderating effects of MC dimensions on KMP/KMI and JP composite and dimensions 169
6.6 RESEARCH LIMITATIONS 172
6.7 UNIQUE SCIENTIFIC CONTRIBUTIONS 173
6.7.1 Theoretical contributions 173
6.7.2 Methodological contributions 174
6.7.3 Empirical contributions 174
6.7.4 Education contributions 174
6.7.5 Policy contributions 175
6.7.6 Practical contributions 175
7 CONCLUSION 177
7.1 FUNDAMENTAL RESEARCH FINDINGS 177
7.1.1 JP of nurses 177
7.1.2 JP of nurse managers 179
7.2 SUGGESTIONS FOR IMPROVEMENT 182

7.2.1 Education *182*
7.2.2 Research *183*
7.2.3 Policy *183*
7.2.4 Practice *184*
SOURCES AND LITERATURE 186

List of figures

FIGURE 4.1 PRISMA FLOW DIAGRAM [177] 53
FIGURE 4.2: A VISUAL MODEL OF THE QUANTITATIVE DESIGN 55
FIGURE 4.3: FLOWCHART OF RELEVANT POPULATION 70
FIGURE 4.4: FLOWCHART OF PARTICIPANT SELECTION AND INCLUSION PROCESS 73
FIGURE 5.1: NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL AND SCATTERPLOT LINEARITY FOR NURSES – PHC LEVEL – MAIN EFFECTS 94
FIGURE 5.2: NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL AND SCATTERPLOT LINEARITY FOR NURSES – SHC - MAIN EFFECTS 95
FIGURE 5.3: NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL AND SCATTERPLOT LINEARITY FOR NURSES – AT THE THC LEVEL – MAIN EFFECTS 95
FIGURE 5.4: NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL AND SCATTERPLOT LINEARITY FOR NURSES – PHC – MODERATION 96
FIGURE 5.5: NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL AND SCATTERPLOT LINEARITY FOR NURSES – AT THE SHC LEVEL – MODERATION 97
FIGURE 5.6: NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL AND SCATTERPLOT LINEARITY FOR NURSES – AT THE THC LEVEL – MODERATION 97
FIGURE 5.7: NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL AND SCATTERPLOT LINEARITY FOR NURSE MANAGERS - POOLED - MAIN EFFECTS 98
FIGURE 5.8: NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL AND SCATTERPLOT LINEARITY FOR NURSE MANAGERS - POOLED – MODERATION 99
FIGURE 5.9: VARIABILITY CONTENT STEPS 101

List of Tables

TABLE 4.1: INCLUSION AND EXCLUSION CRITERIA 50

TABLE 4.2: SEARCH STRATEGY 51

TABLE 4.3: SUMMARY OF EMPIRICAL STUDIES ON KM, PATIENT CARE AND NURSING PERFORMANCE 54

TABLE 5.1: PILOT SAMPLE CHARACTERISTICS 88

TABLE 5.2: RELIABILITY TEST OF QUESTIONNAIRES AND KMP DIMENSION 90

TABLE 5.3: MODEL SUMMARY AND ANOVA RESULTS FOR THE PREDICTION OF JP OF NURSES AND NURSE MANAGERS, REGRESSED BY KMI, KMP, AND MC. 92

TABLE 5.4: SHAPIRO–WILK W TEST FOR NORMAL DATA 100

TABLE 5.5: CONTENT VALIDITY OF THE JP QUESTIONNAIRE 101

TABLE 5.6: CONTENT VALIDITY OF THE MC QUESTIONNAIRE 104

TABLE 5.7: CONTENT VALIDITY OF THE KMAT QUESTIONNAIRE 106

TABLE 5.8: CONTENT VALIDITY OF THE KMI QUESTIONNAIRE 108

TABLE 5.9: SPEARMAN'S CORRELATION MATRIX – NURSES (N = 55) 111

TABLE 5.10: SPEARMAN'S CORRELATION MATRIX – NURSE MANAGERS (N = 15) 112

TABLE 5.11: INDEPENDENT T-TEST FOR MC, BY WORK-TITLE 112

TABLE 5.12: DESCRIPTIVE STATISTICS OF PARTICIPANTS, BY CARE LEVEL (N=987) 114

TABLE 5.13: SOCIODEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS 115

TABLE 5.14: SPEARMAN'S CORRELATION MATRIX – NURSES (N = 852) 119

TABLE 5.15: SPEARMAN'S CORRELATION MATRIX – NURSE MANAGERS (N = 135) 119

TABLE 5.16: VARIANCE INFLATION FACTOR, MAIN EFFECTS MODELS 120

TABLE 5.17: JOINT WALD TEST FOR WORKLOAD CATEGORIES AT THE PHC LEVEL REGRESSION MODEL OF NURSES 121

TABLE 5.18 JOINT WALD TEST FOR WORKLOAD CATEGORIES IN THE POOLED REGRESSION MODEL OF NURSE MANAGERS 122

TABLE 5.19: JP OF NURSES REGRESSED BY KMP, KMI, MC, AND CONTROL FACTORS, CARE-LEVEL–SPECIFIC EFFECTS 122

TABLE 5.20: JP OF NURSES REGRESSED BY MODERATION TERMS OF KMP X CARE LEVEL, AND KMI X CARE LEVEL, DIFFERENCES BETWEEN CARE LEVELS (N = 852, R^2 = .293) 123

TABLE 5.21 JOINT WALD F-TESTS FOR INTERACTION EFFECTS BETWEEN KMP X KMI AND CARE LEVEL ON JP OF NURSES (N = 852) 124
TABLE 5.22: JP OF NURSES REGRESSED BY DIMENSIONS OF KMP AT THE SHC LEVEL (N=276) 125
TABLE 5.23: DIMENSIONS OF JP OF NURSES REGRESSED BY DIMENSIONS OF KMP AT THE SHC LEVEL (N = 276) 126
TABLE 5.24: JP OF NURSES REGRESSED BY DIMENSIONS OF KMI AT THE PHC AND SHC LEVELS 127
TABLE 5.25: DIMENSIONS OF JP OF NURSES REGRESSED BY DIMENSIONS OF KMI AT THE PHC LEVEL (N=330) 129
TABLE 5.26: JP OF NURSE MANAGERS REGRESSED BY KMP AND KMI, BY CARE-LEVEL (LINCOM) (N = 135) 130
TABLE 5.27: JP OF NURSE MANAGERS REGRESSED BY MODERATION TERMS OF KMP X CARE LEVEL, AND KMI X CARE LEVEL, DIFFERENCES BETWEEN CARE LEVEL (N = 135, R^2 = .448) 131
TABLE 5.28: JOINT WALD F-TESTS FOR INTERACTION EFFECTS BETWEEN KMP X CARE LEVEL AND KMI X CARE LEVEL ON JP AMONG NURSE MANAGERS (TESTPARM) (N = 135) 132
TABLE 5.29: JP OF NURSE MANAGERS REGRESSED BY DIMENSIONS OF KMP, CARE-LEVEL–SPECIFIC EFFECTS (LINCOM RESULTS) (N = 135) 133
TABLE 5.30: JP OF NURSE MANAGERS REGRESSED BY KMP DIMENSION OF MEASUREMENT, DIFFERENCES BETWEEN CARE LEVELS (N = 135) 134
TABLE 5.31: DIMENSIONS OF JP OF NURSE MANAGERS REGRESSED BY KMP DIMENSION OF MEASUREMENT AT THE PHC LEVEL (N = 135) 135
TABLE 5.32: JP OF NURSES REGRESSED BY THE MODERATION TERM OF KMP X MC, BY CARE LEVEL 136
TABLE 5.33: JP OF NURSES REGRESSED BY THE TRIPLE MODERATION TERM OF KMP X MC X CARE LEVEL, DIFFERENCES BETWEEN CARE LEVELS (N = 852, R^2 = .287) 137
TABLE 5.34: JP OF NURSES REGRESSED BY MODERATION TERMS OF KMP COMPOSITE X MC DIMENSIONS AT THE THC LEVEL (N=246) 138
TABLE 5.35: DIMENSIONS OF JP OF NURSES REGRESSED BY MODERATION TERM OF KMP X MC DIMENSIONS AT THE THC LEVEL (N=246) 140
TABLE 5.36: JP OF NURSES REGRESSED BY THE MODERATION TERM OF KMI X MC X CARE LEVEL . 141

TABLE 5.37: JP OF NURSE MANAGERS REGRESSED BY THE MODERATION TERM OF KMP X MC X CARE LEVEL, CARE-LEVEL–SPECIFIC EFFECTS (LINCOM RESULTS) (N = 135)..... 142
TABLE 5.38: JP OF NURSE MANAGERS REGRESSED BY THE TRIPLE MODERATION TERM OF KMP, MC, AND CARE LEVEL, POOLED EFFECTS (N = 135, R^2 = .448) 143
TABLE 5.39: JP OF NURSE MANAGERS REGRESSED BY MODERATION TERMS OF KMP COMPOSITE AND MC DIMENSIONS AT THE THC LEVEL (LINCOM RESULTS) (N=135)..... 144
TABLE 5.40: JP OF NURSE MANAGERS REGRESSED BY MODERATION TERMS OF KMP COMPOSITE AND SIGNIFICANT MC DIMENSIONS AT THE THC LEVEL (LINCOM RESULTS) (N=135)..... 145
TABLE 5.41: JP OF NURSE MANAGERS REGRESSED BY THE MODERATION TERM OF KMI, MC, AND CARE LEVEL, CARE-LEVEL–SPECIFIC EFFECTS (LINCOM RESULTS) (N = 135)..... 146
TABLE 5.42: JP OF NURSE MANAGERS REGRESSED BY THE MODERATION TERM OF KMI AND MC, POOLED EFFECTS (N = 135) 147
TABLE 5.43: JP OF NURSE MANAGERS REGRESSED BY THE MODERATION TERM OF KMI AND MC DIMENSIONS AT THE PHC LEVEL (N = 135) 148
TABLE 5.44: DIMENSIONS OF JP OF NURSE MANAGERS REGRESSED BY MODERATION TERM OF KMI AND MC DIMENSIONS AT THE PHC LEVEL (N=135)..... 150
TABLE 5.45: DIMENSIONS OF JP OF NURSE MANAGERS REGRESSED BY MODERATION TERM OF KMI AND MC DIMENSIONS AT THE SHC LEVEL (N=132) 152
TABLE 0.1: SPEARMAN'S CORRELATION MATRIX – NURSES AT THE PHC LEVEL (N = 330)..... XXXIII
TABLE 0.2: SPEARMAN'S CORRELATION MATRIX – NURSES AT THE SHC LEVEL(N = 276)..... XXXIII
TABLE 0.3: SPEARMAN'S CORRELATION MATRIX – NURSES AT THE THC LEVEL (N = 246) XXXIII
TABLE 0.4: VARIANCE INFLATION FACTORS (VIF) FOR NURSES ACROSS CARE LEVEL XXXIV
TABLE 0.5: VARIANCE INFLATION FACTORS (VIF) FOR NURSE MANAGERS (POOLED) XXXV
TABLE 0.6: JOB PERFORMANCE OF NURSES REGRESSED BY KMP, KMI, MC, AND CONTROL FACTORS, CARE-LEVEL–SPECIFIC EFFECTS (LINCOM RESULTS) XXXVII
TABLE 0.7: JOB PERFORMANCE OF NURSES REGRESSED BY MODERATION TERMS OF KMP X CARE LEVEL, AND KMI X CARE LEVEL (N = 852, R^2 = .293)..... XXXIX
TABLE 0.8: JP OF NURSES REGRESSED BY DIMENSIONS OF KMP AT THE SHC LEVEL (N=276)..... XLI
TABLE 0.9: DIMENSIONS OF JOB PERFORMANCE OF NURSES REGRESSED BY DIMENSIONS OF KNOWLEDGE MANAGEMENT PROCESS, AT THE SHC LEVEL (N = 276)..... XLIII

TABLE 0.10: JOB PERFORMANCE OF NURSES REGRESSED BY DIMENSIONS OF KMI AT THE PHC AND SHC LEVELS..... XLVII
TABLE 0.11: DIMENSIONS OF JOB PERFORMANCE OF NURSES REGRESSED BY THE SIGNIFICANT DIMENSION KMI DIMENSION OF SHARED KNOWLEDGE AT THE PHC LEVEL L
TABLE 0.12: DIMENSIONS OF JOB PERFORMANCE OF NURSES REGRESSED BY THE SIGNIFICANT KMI DIMENSION OF IT-STRUCTURE AT THE PHC LEVEL LIII
TABLE 0.13: JP OF NURSE MANAGERS REGRESSED BY MODERATION TERMS OF KMP X CARE LEVEL, AND KMI AND CARE LEVEL, DIFFERENCES BETWEEN CARE LEVEL (N = 135, R^2 = .448)..... LVII
TABLE 0.14: JP OF NURSES REGRESSED BY THE MODERATION TERM OF KMP X MC, CARE-LEVEL–SPECIFIC EFFECTS (LINCOM RESULTS)..... LIX
TABLE 0.15: JP OF NURSES REGRESSED BY THE MODERATION TERM OF KMI X MC X CARE LEVEL. LXII
TABLE 0.16: JOB PERFORMANCE OF NURSE MANAGERS REGRESSED BY THE MODERATION TERM OF KMP AND MC, POOLED EFFECTS (N = 135, R^2 = .547)..... LXIV
TABLE 0.17: JOB PERFORMANCE OF NURSE MANAGERS REGRESSED BY THE MODERATION TERM OF KMI AND MC (N = 135, R^2 = .5113) LXVI
TABLE 0.18: INTERNAL CONSISTENCY (CRONBACH'S A) OF ALL STUDY SCALES AND SUBSCALES . LXVIII

Symbols and abbreviations used

AI – Artificial Intelligence

APQC – American Productivity & Quality Centre

B – Unstandardized Regression Coefficient

CFMC – Central Family Medicine Centre

CI – Confidence Interval

CPD – Continuing Professional Development

CRS – Cross-Sectional Research

DCT – Dynamic Capabilities Theory

EBP – Evidence-Based Practice

EU – European Union

GDPR – General Data Protection Regulation

HC – Heimerer College

HCT – Human Capital Theory

ICT – Information and Communication Technology

IT – Information Technology

JP – Job Performance

JPM – Job Performance of Nurse Managers

JPN – Job Performance of Nurses

KAS – Kosovo Agency of Statistics

KBV – Knowledge-Based View

KM – Knowledge Management

KMC – Knowledge Management Culture

KMI – Knowledge Management Infrastructure

KML – Knowledge Management Leadership

KMM – Knowledge Management Measurement

KMP – Knowledge Management Process

KMAT – Knowledge Management Assessment Tool

KMT – Knowledge Management Technology

MC – Managerial Competence

MoH – Ministry of Health

NICT – Nursing Intellectual Capital Theory

NIPHK – National Institute of Public Health of Kosovo

NT – Nursing Theory

OCT – Organizational Capability Theory

p – Probability Value (Statistical Significance)

PCC – Person-Centred Care

PHC – Primary Health Care

R^2 – Coefficient of Determination

RBV – Resource-Based View

RQ – Research Question

SECI – Socialization–Externalization–Combination–Internalization

SEM – Structural Equation Modelling

SHC – Secondary Health Care

SLR – Systematic Literature Review

SOP - Standard Operating Procedure

STATA – Statistical Software for Data Analysis

t – t-Statistic

THC – Tertiary Health Care

UCHSK – University Clinical and Hospital Service of Kosovo

UCCK – University Clinical Centre of Kosovo

WHO – World Health Organization

1 PROBLEM DEFINITION

Healthcare organizations, confronted with rapid technological and digital transformations, are constantly expected and pressured to improve their services and performance, which ultimately is contingent on the competence and effectiveness with which healthcare professionals execute their tasks [5,6]. Growing dissatisfaction with healthcare services among both caregivers and patients is often attributed to poor outcomes, lack of access to care, low quality combined with high costs, and limited transparency [7,8]. This challenge is particularly pronounced in nursing care, as nursing personnel constitute the backbone of all health systems and remain indispensable for life-preserving interventions [9]. The effectiveness of nurses directly determines the extent to which healthcare services overall attain desired outcomes [10,11].

Similarly, Kosovo, an independent state since 2008, continues to advance its healthcare infrastructure despite persistent economic and political obstacles. The healthcare system in Kosovo is characterized by constrained resources, shortages of healthcare personnel, and an urgent need for modernization [12]. In Kosovo and comparable transitioning economies, nurses play a decisive role in shaping patient care outcomes. They constitute the predominant group of healthcare professionals, accounting for approximately 50% of the total workforce, and are essential to global healthcare systems worldwide [13]. However, persistent systemic challenges in workforce management and knowledge utilization continue to hinder healthcare outcomes in Kosovo and comparable contexts. Low-and-middle-income countries have been struggling to retain qualified nursing personnel primarily due to inadequate education and professional training, few opportunities for advancement, low pay, and comparatively low enrolment in nursing programmes, all of which erode the nursing workforce [14]. Globally, this crisis has manifested in an estimated shortage of approximately 4.3 million healthcare professionals [15]. These shortages are further intensified by rising life expectancy, and the increasing complexity of healthcare issues on one hand, and on the other hand, by retirement and general attrition of nursing staff [16,17].

Beyond numerical shortages of nursing personnel, an equally significant constraining factor is the underutilization of nursing knowledge typically manifested in weak knowledge sharing practices, limited use of evidence-based protocols, fragmented communication, and cultural barriers [18]. Despite being knowledge-intensive organizations, healthcare institutions often fail to make knowledge readily available at the point of patient care [19]. Subsequently, the underuse of tacit and explicit knowledge within healthcare settings diminishes the nurses' ability to deliver high quality, integrated and coordinated care. Moreover, persistent tensions between various workforce groups of healthcare workers, especially nurses and physicians, followed by misperceptions of nursing as a profession lacking a strong theoretical foundation and knowledge base, maintain structural barriers against the normal flow of knowledge sharing [20]. These stereotypes are further reinforced by limited research on nursing theory and the lack of institutional recognition of nursing as a distinct discipline rooted in its own body of knowledge [21,22].

The departure of nurses from the healthcare workforce further exacerbates the problem, creating a self-reinforcing cycle of staff shortages, excessive workloads, burnout, and attrition [23]. Developing and transitioning countries are disproportionally affected by the "brain-drain" phenomenon, namely, nursing workforce shortages, as their available resources are often outpaced by the demands for healthcare, and they frequently serve as net exporters of health practitioners to the Middle East, Gulf, Western Europe, and Anglo-Saxon nations [24,25]. Despite these pressures, nursing staff are expected to cope effectively with the fast-paced dynamics of change and to function as lifelong learners [26]. This raises a critical question: How long and at what cost will societies sustain such healthcare systems without strengthening the knowledge foundations of nursing practice? Traditional cost-containment approaches have proved inadequate [25]. There is an urgent need for new, simpler, and more affordable healthcare delivery models, including decentralized or digitally supported care, which simultaneously improve both accessibility and quality [27].

According to Christensen [28], a leading scholar of disruptive innovation and growth strategy, the key prerequisites for transformative change in healthcare are: (i) empowering frontline professionals, especially nurses, to access and apply knowledge dynamically; (ii) fostering strategic and innovative leadership that translates knowledge into measurable performance outcomes; and (iii) aligning knowledge management (KM) initiatives with organizational contexts and realities.

Recent studies indicate a growing number of organizations implementing knowledge management initiatives that primarily emphasize data or information, while neglecting the more complex and essential elements of knowledge management frameworks and systems for sensing, generating, modifying, and disseminating knowledge [29]. This gap further underscores the need to explore this often overlooked research area within the healthcare context. This is particularly relevant in nursing care, given the rising need to reconceptualise the nursing profession not solely as an implementer of clinical tasks, but as a knowledge producer and critical thinker, capable of formulating and disseminating innovative solutions [30]. Additionally, healthcare strategies should be anchored in the expertise and knowledge of healthcare personnel, instead of position or level of education alone [31]. At the same time, healthcare systems need to enable nurses to leverage their intellectual capital primarily through indispensable components of knowledge-management-oriented measures i.e., supportive leadership, a conducive organizational culture [32], well-designed platforms and systems, and technological infrastructure that encourage and reward knowledge sharing [33].

Moreover, the managerial role in healthcare needs to evolve further from merely safeguarding intellectual capital to actively developing knowledge capabilities through investment in systems, infrastructure, and organizational cultures that embed both individual and collective knowledge into daily operations [34,35]. This is particularly important in the current and upcoming eras, as reliable, timely, and high-quality nursing care increasingly depends on knowledge-conducive processes and technologies that facilitate evidence-based decision-making and inter-professional coordination [36]. Moreover, improving overall healthcare performance, streamlining productivity, and

coordinating resource use require a deeper understanding of knowledge management as a strategic organizational capability [37]. Effective KM implementation, in turn, hinges on developing two interrelated capability dimensions: KM infrastructure (the structural, technological, and cultural enablers) and KM processes (the mechanisms through which knowledge is identified, shared, and applied) [18].

Despite its recognized importance in business and management research, knowledge management remains underexplored in the discipline of nursing [38,39]. Only a limited number of studies have examined the correlation between knowledge management and nursing performance [34,40]. Empirical evidence from the Western Balkans, especially Kosovo, remains sparse, limit the development of localized strategies to enhance nursing performance. Consequently, the potential of knowledge management measures to ease the burden of work of nursing staff as well as improve their quality and overall job performance has been underestimated [41,42].

The lack of standardized nursing language and taxonomy within many digital systems impedes clinical decision-making and undermines nursing workflows [43]. Because most software and data infrastructures were not designed for nursing-specific applications, they frequently disrupt rather than support professional practice [44]. As a result, nursing staff encounter interruptions and inefficiencies in clinical decision-making due to these digital systems' lack of standardized nursing language and taxonomy aligned with the nursing process [43]. Given that current digital infrastructures and knowledge management practices inadequately support nursing processes, and that knowledge management applications in nursing care remain underexplored, there is an urgent need to clarify and contextualize the role of KM within healthcare systems [34,38]. This study addresses this gap by empirically examining how the processes and infrastructure of knowledge management influence the job performance of nursing personnel, especially, nurses and nurse managers, and how managerial competence moderates this relationship within the public healthcare system of a transitioning economy such as Kosovo.

1.1 Concept definitions

This section briefly clarifies the main concepts used in the study ensuring that their meaning is applied consistently throughout the subsequent chapters. By explaining how the constructs of knowledge, knowledge management and its components, job performance, and managerial competence are conceptualised within healthcare settings, especially, the following subsections provide a shared conceptual foundation for interpreting the study's results.

1.1.1 Knowledge

Parse, one of the most well-known nurse theorists, defined nursing knowledge as "the scientific guide to living the art of nursing" [45]. Within the context of organizations, knowledge is typically understood as an intangible resource that provides its holders with a distinct competitive advantage [46]. It is generated through both formal and informal interactions, relationships, contacts, and perspectives of individuals or groups, as these often serves as the basis for the development of innovative ideas [47]. Such interactions are perceived to facilitate the exchange of tacit knowledge among individuals and its transformation from the individual level to the organizational level as explicit knowledge [48].

1.1.2 Knowledge Management (KM)

The concept of Knowledge Management (KM) was originally articulated by Nonaka, who developed the notion of a "knowledge-creating organization", emphasizing organizational activities directed towards the understanding, generation, transfer, and utilization of knowledge [49]. Within the healthcare setting, KM often refers to the systematic process of collecting, refining, disseminating, and effectively applying organizational knowledge [50,51]. KM integrates data and the information-processing capabilities of technology with the creative and cognitive potential of individuals [52], transforming information into knowledge and knowledge into actionable assets that enhance organizational value [53]. KM employs policies, processes, procedures, and digital technologies to harness the collective intelligence of individuals, while valuing

human knowledge and other intangible assets that are deeply embedded within the organization [54–56]. It comprises four fundamental elements: technical infrastructure, personnel who support and propel the KM system that endorses knowledge exchange, effective leadership that incentivizes knowledge exchange [57], and organizational structure and learning [58]. Furthermore, KM represents a strategic organizational capability that contributes to problem-solving, innovation, and overall organizational performance by identifying, mobilizing, and disseminating collective knowledge [53,59].

1.1.3 Knowledge Management Process (KMP)

Knowledge Management Process (KMP) is typically defined as an organizational process that aims to integrate individuals' creative and inventive potential with the information-processing capabilities of technology in order to enhance the creation, mobilisation, and utilisation of knowledge [51,60,61]. KMP encompasses the creation, transfer, storage, evaluation, and application of knowledge [37]. It also fosters a knowledge-sharing culture, which encouraging and reinforcing behaviours that enhance the acquisition and dissemination of knowledge [62,63]. Building on the KM Framework perspective, KMP includes several intricately related stages: knowledge goal setting, identification, acquisition, development, preservation, use, and measurement [64,65]. Knowledge goals delineate the strategic direction for KM activities, aligning knowledge initiatives with organizational priorities through clear and measurable objectives [65]. Knowledge identification entails evaluating existing knowledge assets, both explicit and tacit, within and outside the organization, facilitating the assessment of existing competencies and the identification of gaps where knowledge is inadequate or misaligned with strategic needs [66]. Knowledge acquisition emphasizes the integration of knowledge from external or internal collaborators, obtaining expert insights, best practices, tools, or resources from partners, stakeholders, specialists, or systems to bridge knowledge gaps [53]. Knowledge development involves creating, and transforming tacit and explicit insights into new, actionable forms of organizational knowledge [53]. Knowledge storage pertains to the frameworks and mechanisms that ensure the retention, availability, and its continued accessibility and organizational knowledge i.e., digital

repositories, document databases, and institutional memory systems [65]. Knowledge use engages knowledge through formal mechanisms, such as committees, media channels, and intranet features, or informal routines, to promote the incorporation of knowledge into daily tasks and decision-making by personnel [67]. Lastly, the primary objective of knowledge measurement is to assess the effectiveness of knowledge acquisition, sharing, dissemination, and utilization by employing specific indicators, tools, and evaluative metrics to determine the impact and value of organizational knowledge [66].

1.1.4 Knowledge Management Infrastructure (KMI)

Knowledge Management Infrastructure (KMI) represents the structural and technological foundations that support and enable knowledge management within an organisation. Its primary function is to optimize the roles of individuals and units, ensuring flexibility to facilitate and promote collaboration and knowledge sharing both across and within the organization [68]. KMI enables organizations not only to gather, store, and arrange knowledge assets, but also to create and implement databases, knowledge repositories, and information systems such as intranets and social networking applications [69]. More recently, KMI has increasingly been associated with automating knowledge extraction and discovery processes through technologies such as artificial intelligence and machine learning [70]. KMI comprises two broad dimensions: social and technical infrastructure [71]. The social dimension encompasses human resources, structure, and culture, while the technical dimension includes technology systems, physical infrastructure, and digital platforms [69]. Regarding its key components, structure, culture, and technology represent the core elements of KMI [72]. the term structure entails the presence of norms and trust mechanisms important for leveraging the organizational technological capabilities [73]. KMI culture is frequently regarded as a paramount aspect due to its substantial influence on the efficacy of an organization's KM capability [72]. The corporate values such as trust and openness, along with a clear organizational vision, are often cited as two fundamental components of organizational culture [72]. KMI rechnology is primarily responsible for

mobilizing social capital to facilitate the generation of knowledge. Technical capabilities such as business intelligence, shared knowledge mapping, information discovery, opportunity creation, and security, are recognized as critical enablers of KMI functions, especially the creation and sharing of knowledge [74].

1.1.5 Job Performance (JP)

Job Performance (JP) of nursing staff represents the set of behaviours, abilities/skills, and knowledge that constitute human capital within a workplace, aimed at achieving organisational objectives [75,76]. In the healthcare context, it primarily entails the delivery of safe, and high-quality services [77]. Specifically, JPN refers to the extent to which nurses perform their duties in compliance with established standards, while ensuring effective communication among healthcare personnel, particularly within the nursing team [78], and contingent on their knowledge base [79]. JPN is a dynamic and multifaceted construct encompassing two broad domains: task performance (core job responsibilities) and contextual performance (extra-role behaviors that support the organizational environment) [2,77,80]. The task performance domain includes job knowledge, organisational skills, efficiency and actions according to role expectations in exchange for compensation. Relevant examples include the formualtion, application, and assessment of patient treatment plans [2,81]. As for the contextual performance, it denotes persistent effort, cooperation, organisational consciousness and interpersonal and relational skills and duties that go beyond formal job requirements [2,82].

1.1.6 Managerial Competence (MC)

Managerial Competence (MC) has evolved in the nursing literature as a dynamic capability that enables nurse managers to respond effectiely to both complex clinical and administrative demands [83,84]. It encompasses leadership, planning, coordination, and ethical decision-making required to ensure the delivery of high-quality nursing care [85–87].

MC is usually conceptualized across six behavioural dimensions: communication, leadership and management, staff management, financial management, planning and

priority setting, and problem-solving [1]. It represents the combination of knowledge, skills, and attitudes that nurse managers employ to execute management functions proficiently within their designated roles (i.e., ward manager, head nurse, nurse) and clinical environments, and to translate organizational strategy into innovative practices as well as coordinated, team-based patient care [88].

1.2 Literature review

This section reviews the existing literature on how the core concepts of this study, namely Knowledge, KM, KMP, KMI, JPN, and MC, relate to one another, particularly within healthcare settings. It specifically outlines the current scientific understanding of these relationships, highlights areas of convergence or divergence in findings, and situates the topic within the broader scholarly landscape by integrating both conceptual and empirical evidence. Furthermore, this review highlights the lack of research on these relationships in Kosovo, thereby underlining the significance and contribution of the present study.

1.2.1 International Literature review

The literature review indicates that no studies have yet examined how KM investments, in terms of KMI and KMP, influence the JP of nursing personnel across public healthcare levels in Kosovo, nor how MC moderates these effects when contextual factors (demographic and workplace) are controlled. Organisational knowledge stocks and the capacity to exchange them are argued to be positively associated with performance [28,89]. In healthcare, timely access to and adequate application of knowledge are critical for clinical effectiveness [19,42]. Yet, designing knowledge-integration systems remains an arduous task due to regulatory constraints and the coexistence of general and highly specialized knowledge across professional, organizational, and external network levels [19,90].

1.2.2 Knowledge and nurses

While nurses provide unique services to community members, their relationship with knowledge is usually examined from two primary perspectives [91]. On one hand, nurse theorists and practitioners who integrate research with nursing theory argue that, comprehending their ideas and actions within a framework informed by nursing theory is essential. This necessity arises from the distinctive nature of nursing work, which pertains to human health processes and quality of life, often rendering knowledge

produced by other disciplines inadequate for the nurse-person/family/community dynamic [92].

A contrary view contends that nurses can rely on knowledge derived from theories of other professions in the nurse-client process, and thus need not have an exclusive theory of their own [93]. Despite these differing perspectives, there is consensus that nurses provide evidence-based care amid a continuous influx of new evidence and technologies, necessitating a complex integration of knowledge, skills, and judgment [79,94].

1.2.3 Knowledge and nurse managers

Regarding the relationship between knowledge and nurse managers is concerned, it is increasingly evident that they need to be equipped with robust knowledge and skills to navigate today's complex, volatile, and unpredictable healthcare environment. This enables them both to effectively mobilize team knowledge, and to ensure the delivery of high quality and safe care for their clients [84].

1.2.4 Knowledge and JP

Nurses require continuous updates to their clinical, procedural, and contextual knowledge to effectively address client needs, making access to and utilization of relevant knowledge of paramount importance [37]. To deliver superior nursing care, they must operate based on state-of-the-art scientific knowledge while considering the specific needs of each patient [20]. Even knowledge of the ethical and legal aspects has been shown to enhance performance by reducing medical errors [95]. In parallel, nurses generate knowledge during patient interactions and archive it in the KM system, rendering it accessible to other nurses, physicians, and specialists for future patient encounters, while also providing patients with access to the same system [96].

1.2.5 KM and JP

Existing literature predominantly aligns conceptually and empirically on the significant positive influence of KM on JP [75]. Conceptually, KM enhances the productivity, creativity, and cost-effectiveness of nursing on the one hand, and on the other hand

prepares nurses for their upcoming challenges [19]. It facilitates organizational adaptability, survival, and competency in response to evolving internal and external dynamics [97], especially amid the exponential growth of patient and administrative data [38]. Moreover, KM supports clinical judgement in high-pressure scenarios, by enhancing responsiveness, reduced bias, and fostering innovation, collectively contributing to higher-quality outcomes [98]. Another key advantage lies in its ability to bridge experience gaps when experienced health professionals retire or rotate, thereby maintaining continuity of practice and organizational memory [37,99]. Effective KM systems further enable individualized, evidence-based care through timely access to up-to-date information, enhancing patient outcomes and elevating the overall standard of healthcare services [20,100]. Additionally, KM supports JP of nursing personnel by streamlining work organization, including identifying service needs, drafting proposals, and planning projects with timelines and budgets [40].

Empirical evidence demonstrates that nurses with access to and effective use of knowledge perform at higher levels [101]. KM has also been shown to enhance both operational efficiency (Lockean–Leibnitzian perspective) and healthcare quality (Hegelian–Kantian perspective) [34,102]. Notably, KM exertes a stronger effect on JPN ($\beta = 0.525$, $p < .001$) than nurses' individual competencies [103].

Additionally, KM has shown to enhance clinical competencies in diagnoses, care planning, and patient education [104], improve service quality and reduce adverse events when implemented through SECI-based models [105], and increase job satisfaction and organizational performance [19]. Similarly, other studies indicate that when KM evolves from a static repository of information into an active catalyst for performance, nurses are more likely to internalize and apply knowledge, resulting with enhanced clinical judgment, autonomy, and adaptive behaviour [40,101]. These effects have been further validated in studies from Nigerian university hospitals, where both key components of KM, Process and Infrastructure, positively correlated with JPN [106].

1.2.6 KMI and JP

KMI, encompassing its social infrastructure (culture, leadership/structure) and technical components (technology, measurement) enables efficient KMP that, in turn, improve JP and enhances overall care quality [107,108]. Organizations that foster a learning culture and maintain an infrastructure that integrates learning into practice have demonstrated significant productivity gains [109], superior clinical quality and operational efficiency [19], and improved execution of patient protocols from admission to discharge [75]. Technologies that minimize potentially avoidable visits significantly reduce nursing workload [110]. Furthermore, a collaborative culture as a KMI-enabler fosters knowledge creation and sharing, as evidenced in Korean hospitals [111].

1.2.7 KMP and JP

KMP, encompassing its core elements of acquiring, sharing, storing, and applying knowledge, supports JPN by enhancing decision quality, and fostering evidence-based practice [4,40]. From a DCT perspective, KMP, particularly, knowledge transfer, benefits both individual and team performance [112,113]. A well-designed KMP facilitates communication and collaboration among team members, and encourages knowledge seeking, sharing, and visibility, and highlights the role of knowledge within the organization [19,114]. Captured patient-experience knowledge enhances human capital [75]. Real-time information exchange and utilization enhances healthcare staff performance and decision-making efficacy [115], whereas the absence of integration results in knowledge attrition, obsolescence, and degraded quality [20,42]. In a broader organizational context, Chawla and Joshi found that KM dimensions, including process and infrastructure, are significantly and positively associated with learning-organization practices [51].

1.2.8 MC and JP

MC represents a critical factor shaping the environment in which KM translates into JPN, influencing outcomes through communication, staff development, quality and safety, and systems thinking [87,116]. Nurse managers with MC adeptly enable information

dissemination, supervise organizational learning, and align KM practices with strategic/clinical goals [117], in line with KBV (asset orchestration) and OCT (capability alignment) [86,118]. As a dynamic capability, MC, namely IT ambidexterity, supports digital KM and enhances patient agility [119]. This capability is especially crucial in contexts such as Kosovo's public health care institutions, which are characterised by very limited resources and persistent structural issues [119,120], and demotivating factors like poor management, ineffective leadership, inadequate facilities, and equipment shortages [14].

Empirically, higher levels of MC enhance JP of nursing personnel mainly through the ability of nurses managers to effectively assess and influence staff members' abilities, attitudes, and experiential knowledge [121]. In clinical nursing environments, greater perceived competence of nurse managers is positively associated with nurses' work satisfaction and negatively correlated with turnover intentions, as reported by Mirzaei [122]. Besides, resource and performance management, understanding and supporting staff's competencies [122], fostering autonomy [123], providing recognition [124,125], and setting shared goals directly [126], and continuous feedback [127] represent key mechanisms through which MC of nurse managers enhances both their job performance as well as that of nursing subordinates. Ultimately, strong MCs contribute to improved work motivation, work conditions, attitudes, and behaviours among nursing staff [128].

1.2.9 Contextual factors

The KBV recognizes demographic characteristics and contextual factors as distinct knowledge assets affecting JPN, while the NICT emphasizes that supportive frameworks are essential for enhancing the value of these assets. Alike, the DCT posits adaptive abilities are required to preserve the significance of demographic resources during transitions. Likewise, OCT underscores that organizational frameworks are crucial for actualizing demographic potential. Empirical evidence indicates that demographic and professional characteristics significantly shape nurses' JP, and contextual factors interact with organizational knowledge systems. Among these, age, gender, ethnicity, education, job position, work experience, system level, geography, dual practice, and

workload are typically evidenced as significant determinants of JP among nursing personnel [19], although findings are mixed [129–131]. Distinctively, the JP of relatively older nurses tends to be higher, likely due to their accumulated tacit knowledge, clinical reasoning competence, and mentorship capacity [132]. Yet, age-related stereotyping, reduced adaptability, and a higher likelihood of exclusion from professional development opportunities may counteract these advantages, leading to reduced satisfaction, emotional strain, and ultimately lower JP [133]. Ethnic diversity enriches organization's knowledge capital and promotes collective learning within knowledge-based systems. Nevertheless, nurses from minority ethnic background frequently experience micro-aggressions and limited institutional support, factors which can hinder their work engagement [134,135]. Besides, nurses with advanced qualifications in formal and professional qualifications tend to demonstrate superior decision-making, enhanced patient outcomes, and stronger commitment to professional growth [136,137].

In the same fashion, extensive clinical experience enhances adaptive learning and evidence-based practice, resulting in improved individual and team-based nursing performance [138]. Gender disparities in JP are primarily influenced by occupational role expectations rather than variations in skill. Notably, male nurses demonstrate a broader range of clinical duties and report greater autonomy in advanced practice roles, reflecting the sociocultural norms embedded within organizational hierarchies [138]. Moreover, job position influences access to knowledge resources and decision-making authority. Frontline nurses generally demonstrate higher engagement and emotional investment in patient care than managers [139]. Conversely, nurses in leadership roles, when supported by effective MC and organizational climate, enhance knowledge sharing and team performance [140,141]. Dual employment across public and private sectors has been shown to generate mixed effects on JPN. Nurses engaged part-time in private facilities report greater engagement as well as job satisfaction, and lower burnout, primarily attributed to higher income, superior working conditions and technological resources on the one hand [139]; on the other hand, such practice is also

linked to fatigue, absenteeism, and reduced alertness, all of which impair JP [142,143]. With regards to healthcare level, it represents a significant determinant of nursing performance; each of the care levels is considered as a specific reservoir of structural and human capital [144,145].

Significant performance variation across care levels was reported by Al-Makhaita et al., showing that nurses at the PHC level tend to excel in patient education, communication, and care planning, whereas those at the SHC and THC institutions demonstrate stronger leadership and critical care skills [146]. Excessive workload negatively affects cognitive performance, emotional well-being, and service quality, as sustained work pressure limits time for reflection and knowledge exchange, thereby constraining performance sustainability [147,148]. Contextual disparities across geographical regions influence the effectiveness of KM initiatives and, consequently, JP. Namely, varying cultural norms, institutional capacity, and resource allocation shape how knowledge is created and used in healthcare organizations serving either as enabling or constraining conditions for performance optimization [149–151].

1.3 Demonstration of lack of relevant domestic literature

Empirical studies investigating the correlation between KM, MC, and the JPN are largely lacking in Kosovo's public healthcare system. Although research suggests that effective KM practices and adept leadership enhance organizational efficiency and service quality, their synergistic impact in transitional health systems remains inadequately investigated. This disparity is particularly notable considering Kosovo's persistent healthcare challenges, which encompass inadequate digital infrastructure, inconsistent management practices, and ongoing workforce shortages. Understanding how KMI, KMP, and MC with JP is crucial for improving service delivery, augmenting staff motivation, and fortifying institutional capacity to enhance nursing performance. This study aims to address a significant empirical gap by investigating the direct impact of core KM dimensions (KMP and KMI) on JP, as well as the moderating effects of MC on this relationship at both composite and dimensional levels within Kosovo's public healthcare sector across care levels.

1.4 Justification of the research topic (gap in the literature)

This study explores the relationship between KM, MC, and JPN in Kosovo's public healthcare system, a relationship that has not been previously investigated in this context. By bringing new perspectives on the dynamics underlying the JP of nursing staff across the three levels of Kosovo's public healthcare system, this study underscores the theoretically and empirically validated potential of KM measures to enhance nurses' performance—thereby contributing to improved patient outcomes and the long-term sustainability of the healthcare sector.

The evidence generated via this study provides guidance for formulating evidence-based health, education, social, and managerial policies, thereby supporting the creation of an environment conducive to the development of robust capacities in knowledge generation and management. This promotes the advancement of nurses' roles to include more complex responsibilities within the healthcare structure. The urgent and long-standing challenges within Kosovo's healthcare system and the potential theoretical and practical contributions of this research motivate this study. Nonetheless, Kosovo's public health system is challenged primarily by limited resources, fragmented service provision, and workforce dissatisfaction, all of which hamper performance outcomes [152]. Despite being the largest professional group within the healthcare workforce, the potential of nurses is constrained mainly by limited managerial support, inadequate opportunities for knowledge sharing, and insufficient institutional infrastructure, factors that collectively hinder the effective application of KM practices and the development of MC [120,153]. This study analyses the impact of KM components (process and infrastructure) and their dimensions, along with the moderating effects of MC of nurse managers on JP of nurse managers and nurses, offering evidence that could enhance healthcare delivery in resource-limited settings. Thus, it will help mitigate the deficiency of relevant scientific knowledge. There is very limited empirical research in the Kosovo, or, for that matter, in similar contexts (Western Balkans countries), that has investigated the impact of organizational knowledge resources and managerial practices on the performance of front-line healthcare

providers. Although the relationship between KM and MC has been explored extensively in high-income nations, evidence from transitioning healthcare systems such as Kosovo remains limited. By addressing this gap, the study meets a critical prerequisite for strengthening institutional capacity and ensuring equitable patient care [1,71].

1.5 Theoretical foundations

This study is grounded on interrelated theories— nursing theories (Florence Nightingale's Environmental Theory, and Nursing Intellectual Capital Theory) [154,155], Organizational Capability Theory (OCT) [145], Knowledge-Based View (KBV) [144,156], and Dynamic Capabilities Theory (DCT) [157], applied to the public healthcare sector of a transitioning economy. These theories offer a framework for comprehending how KM practices, alongside managerial competencies; can affect nursing staff performance in environments marked by substantial resource limitations, institutional inflexibility, and restricted innovation potential.

1.5.1 Florence Nightingale's Environmental Theory

Though it cannot be stated that Nightingale articulated her concepts in a similar formal way as is usually done in KM cases, her focus on the relationship between nursing skills (human capital) and the care environment (structural capital) closely parallels contemporary interpretations of KM practices. This is particularly notable regarding the interaction between KMI (infrastructure) and KMP (process) in enhancing nursing performance [155,158,159].

Furthermore, she validated the importance and thus the need for knowledge, both embodied in individuals and embedded in systems, regulations, and processes, to be managed, when aiming to enhance healthcare outcomes [155].

This contextual and holistic emphasis provided the foundation for contemporary nursing theories, particularly NICT, motivating successive theorists to create systematic models that include the intricate relationship among patient demands, health outcomes, and the nursing function [32].

1.5.2 Nursing Intellectual Capital Theory (NICT)

The NICT endorses philosophical traditions such as Lockean–Leibnizian perspectives that prioritize efficiency [34], whereas Hegelian–Kantian philosophies concentrate on reflexive knowledge generation [102]. From this point of view investment in knowledge

assets, at both individual and systemic levels are expected to substantially enhance JP [160], primarily via effectively mobilizing and utilizing such assets [117].

1.5.3 Knowledge-Based View (KBV)

The KBV asserts that knowledge is the most strategically vital resource for organizational competitiveness. It goes further, emphasizing that the latter is not achieved simply through the acquisition of knowledge, but also through the organization's capacity to generate, disseminate, and utilize it proficiently [144]. In the healthcare domain, this entails utilizing both individual and group expertise to enhance care delivery, clinical decision-making, and operational efficiency [161].

1.5.4 Dynamic Capabilities Theory (DCT)

While the Knowledge-Based View (KBV) emphasizes the significance of knowledge, Dynamic Capabilities Theory (DCT) elaborates on the mechanisms by which organizations assimilate, develop, and reorganize their knowledge assets in swiftly evolving contexts. DCT identifies three core components, namely sensing, seizing, and transforming, through which organizations adapt to changing environments [162]. Particularly, while KMP acts as a sensing mechanism, it supports recognition of knowledge needs and emerging challenges, MC functions as the seizing capability, enabling nurse managers to act swiftly on new insights through strategic implementation and problem-solving. KMI underpins transforming capability, allowing structural and cultural reconfiguration for institutional learning and renewal [119]. KM itself is also conceptualized as a dynamic capability that directly impacts organizational performance [163].

1.5.5 Organizational Capability Theory (OCT)

The OCT offers a more comprehensive perspective by adding critical contextual factors such as information systems, organizational culture and management quality aspects in the analysis of how organizations leverage knowledge for improving their overall performance or achieving specific objectives i.e., KM deployment and effectiveness [164,165]. In the healthcare sector, those factors influence planning, implementing,

sustaining, and scaling improvement efforts, serving as one of the determinants of whether improvement initiatives succeed or fail [166].

2 DOCTORAL DISSERTATION GOALS

The main aim of this study is to investigate how KM, namely its core components, KMP, and KMI, influence the JP of nursing staff across the PHC, SHC, and THC levels in Kosovo's public healthcare sector. The study further explores the moderating role of MC in shaping this relationship. Lastly, the dissertation seeks to generate evidence-based insights for enhancing healthcare performance in transitioning economies.

The main objectives of this study are:

- To conceptualize the theoretical relationship between KM, MC, and JP of nursing personnel within the framework of Nightingale's Environmental Theory, NICT, OCT, KBV, and DCT.
- To operationalize and measure the key constructs of KM infrastructure, KM process, MC, and JP and their respective dimensions through validated instruments adapted to the Kosovan public healthcare context.
- To analyse the direct effects of the core constructs of KM infrastructure and KM processes on the JPN of nurses and nurse managers and on their performance dimensions using quantitative methods.
- To assess the moderating effect of the construct and dimensions of MC of nurse managers on the relationship between KMP, KMI, and JP.
- To compare the relative influence of KM process, KM infrastructure and MC across different levels of healthcare service.
- To provide evidence-based policy and managerial recommendations for strengthening knowledge-management-oriented healthcare practices and improving JP of nursing personnel in transitioning health systems, especially.

3 DOCTORAL DISSERTATION THESIS

This section outlines the research questions and corresponding hypotheses that guide the empirical part of the dissertation. The formulation of these research questions and hypotheses reflects an integrative approach that connects individual, managerial, and organizational dimensions of KM to performance outcomes of nurse managers as well as nurses across all care levels.

3.1 Research questions and hypotheses

RQ1: What is the relationship between KMP and the JP of nursing staff?

RQ1a. Do these relationships differ significantly across care levels?

RQ2. What is the relationship between KMI and JP?

RQ2a. Do these relationships differ significantly across care levels?

RQ3. How do the dimensions of KMP and KMI relate to both overall JP and its dimensions?

RQ4. Does MC moderate the relationships between KMP/KMI and JP of nursing staff?

RQ4a. Do these moderation effects differ significantly across care levels?

RQ5. Do the dimensions of MC moderate the relationships between KMP/KMI and JP, including its dimensions?

Congruently, the corresponding hypotheses are:

H1: KMP enahnces the JP of nursing staff.

Multiple studies have found a significant relationship between KM process, namely acquiring, sharing, storing, and applying knowledge processed and increased JP, in terms of higher decision quality and evidence-based practice [4,40]. Similarly, knowledge transfer and learning routines improve individual and team work performance [112,113]. While weak knowledge integration degrades quality, real-time knowledge exchange boosts decision efficacy and ultimately performance outcomes [20,42,115]. Likewise, JP benefits substantially from a well-designed KMP through making knowledge visible and actionable in clinical work [19,114].

H1a: The KMP–JP relationship differs across care levels.

The way knowledge is created and used is conceptualized and evidenced to significantly vary across healthcare levels mainly because the latter have been conceptualized and evidenced to embody different “reservoirs” of human and structural capital [144,145], and are characterized by pronounced contextual disparities [149–151], which give rise to differing competencies and performance profiles among healthcare professionals [146].

H2: KMI enhances the JP of nursing staff.

Social (culture, leadership/structure) and technical (technology, measurement) components of KM infrastructure enhance quality and JP of nurses [107,167], primarily via stimualting learning cultures, collaborative cultures foster knowledge creation [168], integrative infrastructures [19,109], and better protocol execution across the nursing care process [75]. Likewise, nursing JP is found to be significantly enhanced by KM technology via streamlined workflows and reduced burden [110].

H2a: The KMI–JP relationship differs across care levels.

The effectiveness of KM, including its infrastructural components, depends on regional and organizational contextual factors [149–151]. Also, KM infrastructure, namely structural/technological readiness and cultural norms significantly differ by care level [144,145].

H2b: KMI enahnces the dimensions of JP.

KM infrastructure, especially ICT systems that enhance performance facets such as coordination, responsiveness, and error reduction, enhance JP of nurses through ensuring reliable access to evidence and standardization [19,75,167].

H3: The dimensions of KMP and KMI enahnce overall JP and its dimensions.

Dimensions of nursing performance, including but limited to, diagnostic accuracy, care planning, patient education, and teamwork are evidenced to significantly benefit from these dimensions of KM Process such as knowledge acquisition, sharing, storage, and application [19,104,114,115].

Besides, dimensions of nursing performance such as quality, efficiency, protocol compliance, and workload relief are influenced by KMI, particuarly its dimensions of

organizational culture, leadership structure, and technological infrastructure [19,107,109,110,168].

H4: MC moderates the relationship between KMP/KMI and JP.

Orchestrating knowledge flows and aligning KM measures with strategic/clinical goals [117] represent some of the significant ways through which MC of nurse managers is found to moderate the influence of KM Process on JP of nurses [85,87].

Also, previous studies have demonstrated that to effectively translate developed KM infrastructure into nursing performance competence leadership is needed, namely MCs of resource/performance management, goal setting, feedback, recognition, and autonomy [121–128].

H4a: The moderating effect of MC on the KMP–JP relationship differs across care levels.

How the MC of nurse managers amplifies the relation of KM overall, including KM process, and nursing performance is evidenced to vary across care levels, in which significantly different managerial roles, resource intensity, knowledge routines [145,146] and contextual heterogeneity prevail [149–151].

Previous studies have demonstrated that care levels significantly differ in the how MC of nurse managers leverages KM infrastructure toward nursing care performance [144–146]. Moreover, confidence in employing MC as moderator to the KM and performance outcomes is increased, taking into account the evidenced consistent positive association across many contexts between managerial competence and job performance/satisfaction [169].

H5: The empirical consensus on which managerial competencies best enable KM effectiveness remains weak or fragmented [117]. Yet, certain dimensions of MC of nurse managers, namely communication, coaching, planning, supervision, are evidenced to act as significant determinants/moderators of the relation between KMP and JP of nursing personnel [87,116,117]. More precisely, mechanisms of MC such as recognition, feedback, and autonomy are evidenced to moderate the relationship between KMP (knowledge utilization process) and nursing performance [123,124,126,127]. Alike,

leadership and managerial competencies related to staff (professsional) development, recognition, goal setting, leadership culture, and continuous feedback, have emerged as significant moderators of the relationship between KMI and JP of nurses [19,121,122,126,128,170]. These MC dimensions contribute to enahnced job satisfaction among nurses on one hand, and on the other hand to decreased frequency of adverse patient outcomes [171], facilitating positive performance outcomes [169,172].

4 RESEARCH METHODS

Building upon the previously established theoretical foundations—Nursing Theory (NT), Knowledge-Based View (KBV), Dynamic Capabilities Theory (DCT), and Organizational Capability Theory (OCT)—this section outlines the methodological framework through which these conceptual premises were operationalized and empirically tested.

The motivation of this research stems from the scarcity of empirical evidence on how KM-related investments affect the JP of nursing personnel in public health care system, and the extent to which MC of nurse managers moderates these relationship. The integrated framework therefore emphasizes that both individual competencies and organizational knowledge resources jointly shape nursing performance, making it especially suitable for investigating health systems such as Kosovo's, where managerial and knowledge infrastructures remain underdeveloped yet vital for reform.

Congruently, these theoretical frameworks enable the generation of new insights relevant to the problem definition, research questions and hypotheses, by providing empirical evidence that validates the respective theoretical premises, and by claryfing ways and the extent to which systemic and organizational knowledge resources can be better harnessed to improve JP of nursing personnel in Kosovo and other transitioning economies.

4.1 Research philosophy, methodology, and methods

The study adopts a quantitative, cross-sectional research design to investigate the correlations between KM, MC, and JP at the composite and dimension levels. The primary reasons for choosing such an approach are: it allows the systematic collection and statistical analysis of measurable data; it facilitates testing of hypothesized correlations and moderating effects within a practical healthcare setting; and it enables generation of explanatory and actionable and relevant evidence at theoretical and managerial levels [173].

Furthermore, this study is grounded in ontological realism and epistemological positivism, which together assume that the phenomena such as KMI and KMP, MC, and JP exist as real and observable constructs within healthcare organizations, and that reliable knowledge about these them and their interrelationships can be objectively obtained through systematic observation and empirical testing [174,175]. Congruent to the respective philosophical bases underpin the commitment of this study to generate evidence-based insights relevant to both theory and practice, and rigorous quantification that can be replicated in other contexts. Besides, the quantitative methodological orientation adopted in this study allows the precise measurement, hypothesis testing, and generalizability of results [174]. It also reduces subjective interpretation, and acknowledges measurement and contextual limitations of derived results [176].

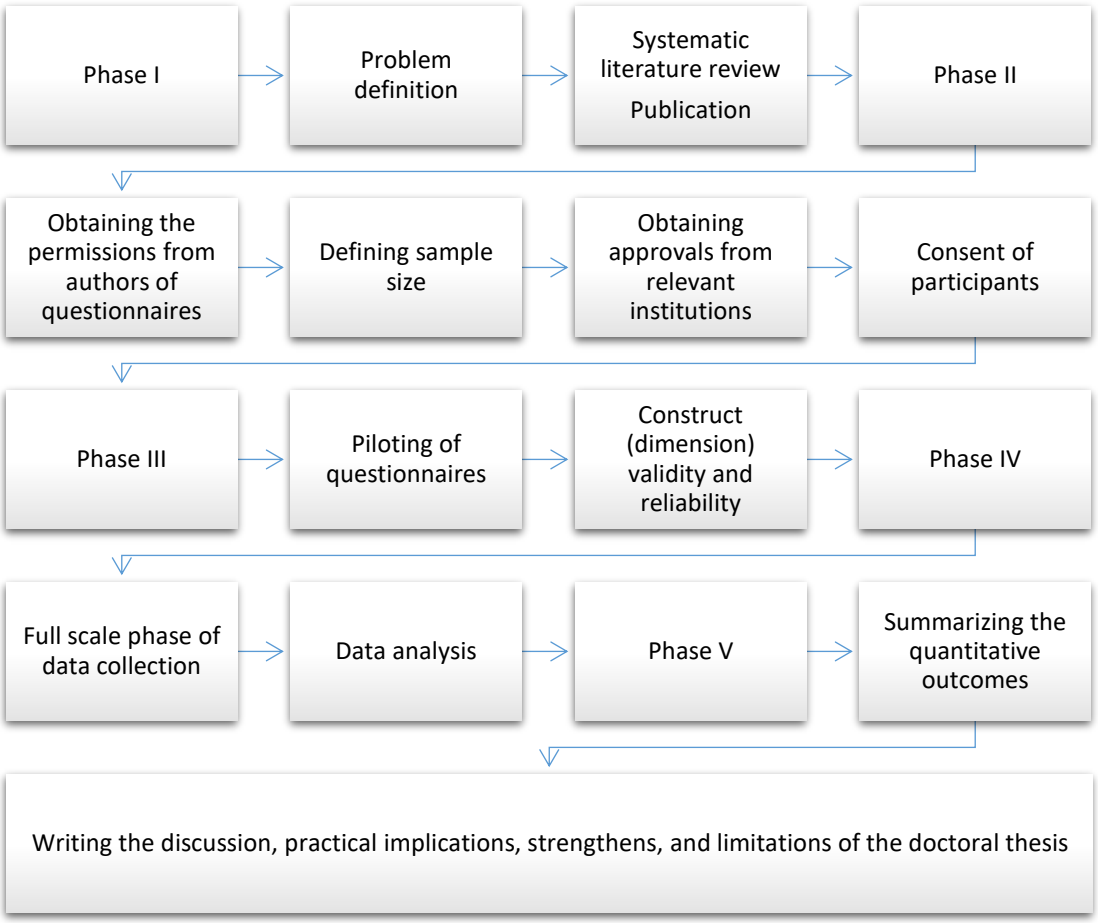


Figure 4.1: Doctoral dissertation plan

Figure 4.1 presents the structured process of this doctoral dissertation consisting of the following sequential phases:

- ✓ Problem definition and literature review, including the publication of a systematic literature review on KM and nursing performance;
- ✓ Instrument permissions and ethical approvals;
- ✓ Validation and reliability testing of questionnaires and their dimensions;
- ✓ Pilot data collection and statistical analyses;
- ✓ Full-scale data collection and statistical analyses; and
- ✓ Interpretation, discussion, and reflection on implications.

This phased approach ensured methodological coherence and alignment between theoretical foundations, data collection, and analytical interpretation.

4.1.1 Systematic literature review, analysis, and synthesis

Performing a systematic literature review (SLR) marked the first phase of this research. It enabled the identification, analysis, and synthesis of existing of theoretical and empirical evidence pertinent to the correlation between KM measures, namely process and infrastructure, and nurses' JP across various healthcare contexts (service levels and geographical locations). Additionally, the review of the literature enabled the exploration of the most relevant theoretical, empirical, and methodological trends, along with limitations that guided the design of the empirical analysis phase of the study. Such systematic review of the literature in English and Albanian was conducted across key databases and by employing an inclusive search strategy that included synonyms and truncations to maximize coverage. Titles and abstracts were screened first, followed by full-text assessment against inclusion/exclusion criteria.

Table 4.1: Inclusion and exclusion criteria

CRITERIA	INCLUDED	EXCLUDED
Document type	Peer-reviewed journal articles; dissertations and theses; conference papers (if peer-reviewed)	Books, Videos, newspapers etc.
Language	English and Albanian	Other languages
Population characteristics	Nursing staff (staff nurses, clinical nurses) and nurse managers (head nurses, directors)	Other healthcare professionals (e.g., physicians, allied health, administrators) unless explicitly including nurses
Results	All obtained results	
Type of study	Empirical studies (Quantitative, qualitative, and mixed studies)	Commentaries, opinion pieces,
Filters in the research	knowledge management, knowledge sharing, knowledge process, knowledge infrastructure, managerial competence, nursing performance	Other fields

Inclusion and exclusion criteria were applied consistently across all records. Studies had to meet all *inclusion criteria and* none *of the exclusion criteria to be considered eligible.*

Table 4.1 presents the inclusion and exclusion criteria of the studies reviewed. Particularly, the inclusion criteria were peer-reviewed articles from journals, theses, and dissertations that had nursing staff and nurse managers as their target population. Both

empirical and theoretical studies were considered if they addressed KM and nursing performance. For the final synthesis, the results were restricted to peer-reviewed journal articles. Conversely, books, videos, newspapers, and other non-research-based resources were excluded, as they did not conform to the specified criteria.

The literature search was conducted across five multidisciplinary databases: SAGE, Web of Science, ProQuest, ScienceDirect, and Scopus, given their comprehensive coverage of nursing, healthcare management, and organizational research. Boolean search strings combined key terms and their variations, including 'knowledge management,' 'knowledge management infrastructure, 'knowledge management process', 'managerial competence,' and 'JP,'. Subsequently, the number of results from each of these databases is presented in the table below. The search was last updated on November 20, 2025.

Table 4.2: Search strategy

#	Key word	ProQuest	Sage	Web of Science	SCOPUS	Science Direct
1	("job performance of nurses" OR "nursing performance" OR "work performance of nurses" OR "clinical performance of nurses")	1,065	241	301	536	891
2	("knowledge management" OR "knowledge management infrastructure" OR "KM infrastructure" OR "knowledge infrastructure")	68,297	8,476	20,056	49,688	46, 535
3	("knowledge management process" OR "KM process" OR "knowledge sharing" OR "knowledge transfer" OR "knowledge application" OR "knowledge capture")	594	16,885	24,284	32,511	1,847
4	("managerial competence" OR "nurse manager competence" OR "nursing leadership" OR "managerial skills" OR "leadership competence" OR "management capacity")	14,249	7,250	3,479	6,492	21,645

5	#1 AND #2	51	2	2	3	0
6	#1 AND #2 AND #3	19	0	1	1	0
7	#1 AND #2 AND #3 AND #4	3	0	0	0	0

Table 4.2 presents the number of search results retrieved from each database prior to duplicate removal and screening for relevance. The search yielded three potentially relevant publications after initial screening. None of the items was excluded during the first screening. A full-text evaluation of these three publications was then conducted, during which two were rejected, based on the pre-established exclusion criteria. In the end, only one article met the inclusion criteria and was included in the dissertation.

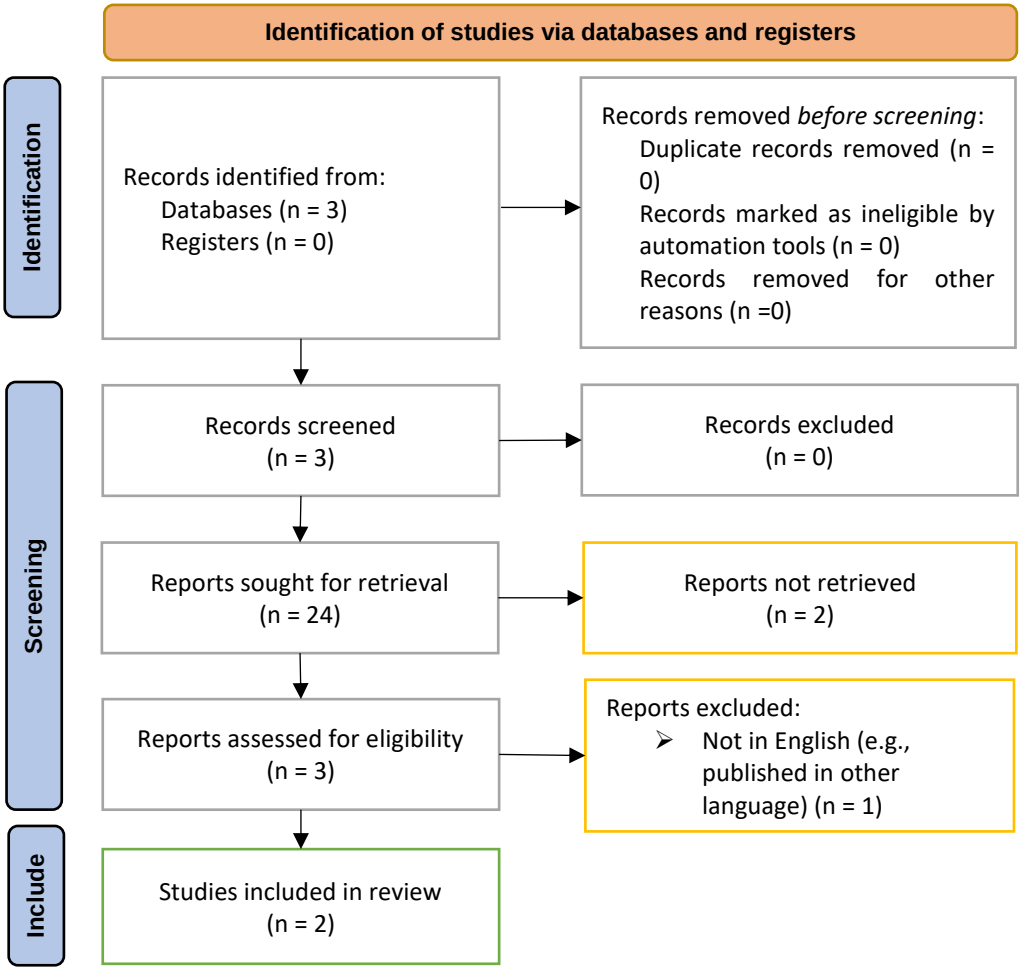


Figure 4.1 PRISMA flow diagram [177]

The PRISMA 2020 flow diagram in the figure above shows that the database search found three relevant records. No duplicates were found, and all three studies were full-text screened. Two studies were excluded after detailed eligibility assessment for addressing unrelated constructs and non-nursing contexts. One study met all inclusion criteria and was included in the review and synthesis. The few eligible publications show that empirical research on KM and nursing JP is scarce, especially in developing and transitioning healthcare systems. These outcomes of the literature review phase reiterated the relevance of one of the objectives of this study, namely to empirically examine the respective relationships within Kosovo's public healthcare institutions.

Table 4.3: Summary of empirical studies on KM, patient care and nursing performance

No.	Reference (country)	Aim	Study setting and sample	Main Findings
1	Ajanaku, O. J.; Mutula, S. (Nigeria) — Knowledge management enablers affecting patient care: The perspective of registered nurses in South West Nigeria (South African Journal of Information Management, 2021) DOI: 10.4102/sajim.v23i1. 1387	To identify key knowledge management enablers and investigate their influence on patient care in clinical nursing	Cross-sectional survey among registered nurses in a teaching hospital in South West Nigeria; of 196 administered, 186 valid responses used; data analysed via Structural Equation Modelling (SEM)	Information technology (IT) has a direct and significant relationship with patient care. Organizational structure and organizational culture did not have direct effects. However, when combined with IT support, the knowledge management enablers collectively had significant influence on patient care outcomes.

The study conducted by Ajanaku and Mutula [39] employed a cross-sectional design and structural equation modelling to examine the influence of KM enablers on patient care. Information technology (IT) demonstrated positive and significant effect on patient care, while organizational culture and structure did not exhibit any significant effects. However, when combined with IT, these enablers jointly improved patient care. These results demonstrate the significant potential of technology and infrastructure in converting KM practices into enhanced JP, as proposed in the conceptual framework of this dissertation.

4.1.2 The study design

This study employs a cross-sectional, quantitative design, which enables the simultaneous collection of data on its key constructs, KM, MC, and JP, and their respective dimensions [173]. Given the practical constraints associated with longitudinal research in healthcare settings, such as high workforce mobility and institutional turnover, this design allows for an objective description of existing conditions and

facilitates the identification of relationships among those constructs within Kosovo's public healthcare system without experimental manipulation or temporal sequencing. Consequently, it provides a reliable and generalizable snapshot of the current state of KM implementation, MC, and JP within the target population, forming a strong empirical basis for subsequent interpretation of quantitative results, in line with the study's explanatory objectives.

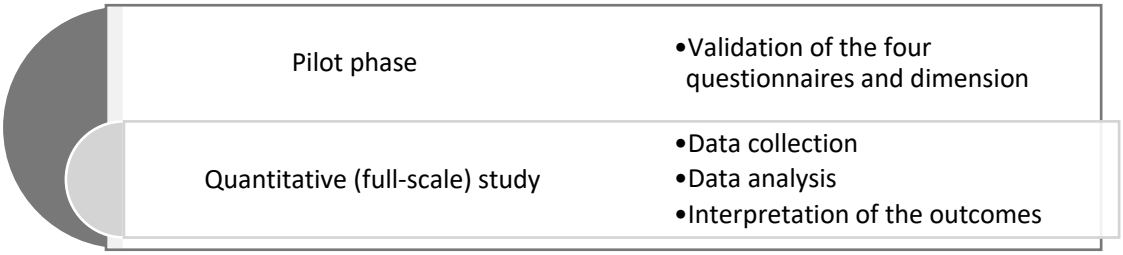


Figure 4.2: A visual model of the quantitative design

The schematic representation of the quantitative research design of the study consists of two consecutive phases, as presented on the Figure 4.2. The pilot phase served as an initial stage intended to validate the four questionnaires and their associated dimensions to ensure measurement reliability and construct clarity. In contrast, the full-scale quantitative phase enabled the empirical analysis of the hypothesized relationships and the interpretation of results based on the primary data collected from the target population.

4.2 Pilot method

4.2.1 Objectives of the pilot phase

The objectives of the pilot phase were to test the clarity and comprehensibility, psychometric properties, and time required for completion of the questionnaires and analytical procedures; to identify potential data-collection challenges and refine questionnaire design; and to verify the statistical robustness of the proposed models. Upon selecting the questionnaires and acquiring permission for their use from their developers, the next step was to acquire authorization and ethical approval to administer them from the management of public healthcare organizations in Kosovo. The application for permission to administer was submitted to the UCHSK administration and the Ethical Committee of Heimerer College for ethical approval/clearance. The original versions of the questionnaires were translated and adjusted from the English language into the local language, Albanian. This phase took place in the Pristina region, the sole area with all three levels of the healthcare system, and in the Gjakova region, a comparatively smaller locale, which encompasses only the PHC and SHC levels.

4.2.2 Sampling and participants

Moreover, in line with the relevant sampling standard of 5-10% of the overall study sample [178], and considering the sample size of 987, a total of 70 nursing staff participated. A diverse group of 70 participants from the three healthcare levels and work titles participated in the pilot phase [178]. Participants were chosen from various organizational units (family medicine centres, regional hospital, clinics, and wards) within the three healthcare levels of the public healthcare system, namely the PHC and THC levels in the Pristina region, and the PHC and SHC levels in the Gjakova region. The inclusion criteria established for the pilot phase required participants to be citizens of Kosovo, registered nurses, and proficient in the Albanian language. Various synonyms were employed in the Albanian language to ensure the questions were clear and comprehensible for the participants.

4.2.3 Reliability testing

The internal consistency reliability of each questionnaire and its sub-dimensions was evaluated using Cronbach's alpha. Reliability testing was conducted for all key constructs, and Cronbach's alpha coefficients were calculated for each scale and subgroup (nurses and nurse managers). Cronbach's alpha values ≥0.70 were considered acceptable, and all values met or exceeded this recommended threshold [175]. Certain adjustments to their final version in the Albanian language were made. Upon data collection for this phase, each of the utilized questionnaires was validated, where the Cronbach's alpha values for the questionnaires of JP of nursing staff, MC, KMP (KMAT), and KMI were 0.883, 0.975, 0.960, and 0.979, respectively.

4.2.4 Normality and regression diagnostics

A preliminary regression analysis (one-way ANOVA) was conducted to evaluate the predictive capacity of the respective models, which confirmed that both KMP and KMI were positively associated with JP, consistent with theoretical expectations, thereby justifying their inclusion in the main analytical framework.

Diagnostic checks, namely Normal P–P plots of standardized residuals and Residuals vs Predicted plots of JP were conducted to ensure the suitability of the regression models for the pilot data; normality, linearity, and multicollinearity were confirmed at acceptable levels. Given the relatively small pilot sample size, instead of formal inferential tests, residual distributions were inspected visually.

In addition, the Shapiro–Wilk test was applied to assess the distributional properties of the data, although results were interpreted with caution given the limited sample size of the pilot dataset. The appropriateness of including the main variables in the main regression models was also checked through computing the Spearman's correlations between them, which showed no redundancy, and theoretical alignment of their directionality.

4.2.5 Duration and completion of the pilot phase and questionnaires

Another insight gleaned from the pilot phase was that, on average, it took 20 minutes to complete the questionnaires. The pilot phase was completed in five days, in August 2025. The validated instruments and tested procedures confirmed during this phase paved the way for the full-scale study.

4.3 Quantitative method

Building on the design of this study, this section delineates its practical implementation at the full-scale level. It commences with the description of the procedures for sampling and data collection. Moreover, it elucidates how participants were identified, recruited, and surveyed to ensure adequate representation of both nurses and nurse managers (nurse directors and nurse heads) across the three levels of the public healthcare system in Kosovo. The subsequent sections provide detailed descriptions of the sampling method, recruitment process, data collection tools, and data analyses (descriptive, pre-regression, regression, and post-regression) that form the empirical basis for testing the research questions and hypotheses of the study.

4.3.1 Sampling and data collection

A stratified probability sampling method was employed to ensure adequate representation of nurses and nurse managers across all levels of Kosovo's public healthcare system. Stratification sampling was based on healthcare levels and work title (staff nurse versus nurse managers). This stratification is considered an effective choice to reach sufficient proportional representation of subgroups, even if they are characterized by structural homogeneity, guaranteeing accurate estimates across healthcare tiers [179,180].

All eligible/licensed nurses and nurse managers at the University Clinical Centre of Kosovo (UCCK), the seven Regional Hospitals, and the primary health family centres located across Kosovo were invited to participate. Eligibility criteria included active employment in public healthcare institutions and direct involvement in clinical or managerial nursing functions.

Participants were informed about the study through formal communications and institutional approvals secured. Upon the granting of permissions, the principal invitations were disseminated via these main channels:

- informational flyers exhibited in wards and departments,

- email to nurse directors, nurse managers, directors of regional hospitals, managers of clinics and
- direct engagement with nurse managers to promote participation at the team level.

The survey instruments, consisting of four structured self-administered questionnaires, were distributed in paper format by the principal researcher. In relatively more distant municipalities and family medicine centres facing logistical constraints, the researcher remained available on site to clarify any questions and ensure accurate completion.

4.3.2 Data analyses

To systematically address the research questions and hypotheses, the structured sequence of descriptive, correlational and multicollinearity diagnostic, and multiple OLS regression with robust standard errors analyses were conducted. The questionnaires were evaluated for completeness, coded, entered and analysed into Statistical Software Package (STATA) Version 17.0 [181].

4.3.2.1 *Descriptive analyses*

To profile participants and summarize key variables, overall and stratified by healthcare level descriptive statistics were computed. For categorical demographic variables such as age, gender, education level, years of experience, institutional work title, workload, dual practice, region, hospital, clinic, ward, and care level, frequencies and percentages were presented. For continuous variables, means and standard deviations were reported (JP, KMP, KMI, MC).

Even though demographic and professional characteristics (gender, age, ethnicity, education, experience, employment sector, patient load) were not conceptualized as focal moderators in the theoretical framework, they were included as control variables in all regression models to account for potential confounding effects.

To minimize the risk of identification via quasi-identifiers such as gender, age group, evaluation level, and workplace unit, these variables were consolidated into generalized categories as deemed necessary. This procedure followed k-anonymity principles,

ensuring that each combination of demographic variables was represented multiple times in the dataset, thereby reducing uniqueness and the risk of identification [182]. A uniqueness analysis on the demographic data was performed, and whenever any combination of attributes yielded exceedingly low frequencies—specifically fewer than three respondents—local suppression was applied by masking or excluding those infrequent combinations to avert inadvertent identification. To protect participant confidentiality and comply with GDPR, all reported institutional- and clinic-level sample counts were inspected for small number of participants. For the published version of the table, any cell where the number of respondents was 1 or 2 was replaced with '<3'. This suppression was applied only to sample counts (nurse director, head nurse, nurse, and total respondents) and did not affect population staffing figures. Although a certain reduction in granularity was necessary, analytical rigor was maintained. Consolidated categories allowed meaningful analysis of demographic trends while preserving participant confidentiality. Thus, the balance between safeguarding participant anonymity and maintaining the significance of demographic data essential for the analysis in organizational and healthcare research was achieved.

4.3.2.2 *Correlation and multicollinearity diagnostics*

The examination of the bivariate relationships among the main constructs, including JP KM, KMP, KMI, and MC, separately for nurses and nurse managers, was performed through the Pearson's pairwise correlation. Both statistical significance and effect size were checked as part of the pre-steps of regression modelling.

In addition, multicollinearity diagnostics were examined using the Variance Inflation Factor (VIF) to determine the independence of predictor variables. VIF revealed the degree of independence among predictor variables. In exceptional cases when a particular category of a categorical variable was found to have a higher VIF value than the threshold (10), Joint Wald tests were applied to verify the joint significance of category effects [183].

4.3.2.3 *Regression analyses*

Given the stratified design and the aim of this study to examine how KMP, KMI, and MC influence JP of nursing staff (nurses and nurse managers) across healthcare levels, two complementary analytical strategies were necessary were employed: one for nurses and another for nurse managers. These approaches were motivated based on the sample size distribution across care levels, and based on the theoretical and methodological considerations [184].

For nurses, the sufficiently large and balanced subsamples across care levels enabled the estimation of care-level–specific models. Separate regression analyses were conducted for each level to obtain the magnitude and direction of effects of KMP, KMI, and MC, including their two-way interactions (KMP × MC) on JP. This strategy provided a clear picture of how KMP and MC operated within each organizational context. Because these separate regressions already represent conditional, level-specific effects, additional post-estimation tests were not required. To formally evaluate whether these relationships differed statistically between care levels, pooled models were subsequently estimated, incorporating interaction terms (KMP × Care Level, KMI × Care Level, and KMP × MC × Care Level). The significance of these interaction terms directly indicated whether the effects and moderation patterns varied across healthcare levels.

For nurse managers, the smaller number of respondents within each care level did not permit reliable estimation of separate regressions. Therefore, a pooled modelling strategy was adopted to estimate all main and interaction effects simultaneously within a single framework. This approach included two-way interactions (KMP × Care Level and KMI × Care Level) to test whether the effects of KMP and KMI differed across health care levels, as well as a three-way interaction (KMP × MC × Care Level, and KMI × MC × Care Level) to evaluate whether the moderating role of MC on the KMP–JP relationship varied between levels of care. In this context, the raw regression coefficients from the pooled model indicate overall trends but not the specific within-level effects. Accordingly, post-estimation linear combination tests (lincom) were applied to compute the conditional (care-level–specific) effects of KMP and MC, allowing precise interpretation of the

magnitude and direction of these relationships within each care level. Furthermore, the sequence of regression analyses is elaborated in the following paragraphs starting with the main effects and then moderation effects for both nurses and nurse managers.

4.3.2.3.1 Main effects regression models

To test the hypothesized effects, a series of multiple linear regression models were estimated. For RQ1, models were specified with JP as the dependent variable, while KMP and KMI served as key predictors, and MC of nurse managers, demographic, and organizational covariates were included as control variables.

Differently from the case of nurses, due to the very small sample sizes of nurse manager within individual care-level strata 23 at the PHC, 44 at the SHC, and 68 at the THC levels, separate regressions at the care-level were not pursued, as these models were found to be statistically underpowered and prone to unstable estimates. Typically, the extremely small sample size at the PHC level risks overfitting and inflated R^2 values, while the moderate samples at the SHC and THC levels provide unstable and rather limited statistical power [185,186]. To address these limitations, all observations of nurse managers (N = 135) were pooled into a joint regression model, thereby maximizing available statistical power and improving the stability of estimates. Care-level differences were formally tested through moderation terms (interaction effects), enabling a direct assessment of whether the effects of KMP and KMI varied significantly across levels of healthcare. Robust standard errors were employed to correct for heteroscedasticity.

$$\boldsymbol{JP_{\{nurse\}} = \beta_0 + \beta_1 KMP + \beta_2 KMI + \beta_3 MC + Controls + \epsilon}$$

$$\boldsymbol{JP_{\{mgr\}} = \beta_0 + \beta_1 KMP + \beta_2 KMI + \beta_3 MC + \beta_4 (KMP\ x\ CareLevel) + \beta_5 (KMI\ x\ CareLevel) + Controls + \epsilon}$$

Where:

KMP = Knowledge Management Process

KMI = Knowledge Management Infrastructure

MC = Managerial Competence

CareLevel = Dummy variables for PHC, SHC, and THC

Controls = Gender, age group, ethnicity, education, work sector, total experience, daily workload

ε = Error term

Concerning RQ2–RQ4, independent samples t-tests were applied to compare the mean scores of the self-reported answers of nurse managers and nurses for their respective JPs, and mean scores of self-reported answers for MCs of managers, and their subordinates.

4.3.2.3.2 Moderation regression analyses:

The regression models including the moderation terms MC are:

$$JP_{\{nurse\}} = \beta_0 + \beta_1 KMP + \beta_2 KMI + \beta_3 MC + \beta_4 (KMP \times MC) + \beta_5 (KMI \times MC) + Controls + \epsilon$$

$$\begin{aligned} JP_{\{mgr\}} = {} & \beta_0 + \beta_1 KMP + \beta_2 KMI + \beta_3 MC + \beta_4\, CareLevel + \beta_5 (KMP \times MC) \\ & + \beta_6 (KMP \times CareLevel) + \beta_7 (KMP \times MC \times CareLevel) \\ & + \beta_8 (KMI \times MC) + \beta_9 (KMI \times CareLevel) \\ & + \beta_{10} (KMI \times MC \times \text{Care level}) + Controls + \epsilon \end{aligned}$$

Where:

KMP = Knowledge Management Process

KMI = Knowledge Management Infrastructure

MC = Managerial Competence

CareLevel = Dummy variables for PHC, SHC, and THC

Controls = Gender, age group, ethnicity, education, work sector, total experience, daily workload

ε = Error term

Where control variables included gender, age group, ethnicity, education level, work/private sector, total experience, and daily workload. Statistical significance was set

at $p < .05$. Results were presented in tables and figures, reporting coefficients, confidence intervals, and effect sizes.

4.3.2.4 *Post-regression analyses*

The Wald test and lincom estimates were conducted to evaluate the presence of cross-level variation, and quantify the care-level–specific slopes of the KMP and KMI. Specifically, for the nurse models, post-regression analyses included joint Wald F-tests (testparm) to determine whether the interaction terms were jointly significant, indicating that the effects of the KMP or KMI on JP varied across care levels.

As for the nurse manager models, post-regression analyses were conducted in two stages. Joint Wald F-tests were conducted initially to determine whether the effects of KMP or KMI varied significantly across care levels. Then, linear combination tests (lincom) were employed to estimate the slopes that were specific to each care level, thereby providing a more precise interpretation of the direction and magnitude of these effects.

4.4 Research environment and sample

The study was conducted within the public healthcare system in Kosovo, including its Primary (PHC), Secondary (SHC), and Tertiary Health Care (THC) levels, and respective healthcare service institutions located across the country. Kosovo, which proclaimed independence in 2008, is advancing its healthcare infrastructure despite economic and political obstacles. The healthcare system in Kosovo is marked by constrained resources, a shortage of healthcare personnel, and a need for modernization [12]. The health sector in Kosovo is regulated under Health Law 04/L-125. The Ministry of Health (MoH), which is the main institution, mandated to regulate, supervise, and oversee the execution of healthcare in both public and private institutions [152]. Subordinate agencies include the National Institute of Public Health of Kosovo (NIPHK), the Kosovo Agency for Medical Products and Equipment, the National Blood Transfusion Centre, the Health Inspectorate, and the Pharmaceutical Inspectorate, which serve as law enforcement bodies [187].

The healthcare system consists of 458 PHC, 17 SHC, and 19 THC healthcare institutions. Hospital, outpatient, home, and emergency services constitute the main modes through which healthcare is organized across public and private institutions [187]. Based on the census of 2024, during which the population of Kosovo resulted to be 1,603,115 [188], there are 2.6 PHC units per 10,000 inhabitants and 0.45 public hospital institutions per 100,000 inhabitants (SHC and THC levels combined). When including private hospitals, the total reaches 2.2 hospitals per 100,000 inhabitants, surpassing Serbia (1.4), Albania (1.5), and Montenegro (1.8), while remaining below North Macedonia (3.2) and the EU average (2.9). Combined with private hospitals, there are 2.2 hospitals per 100,000 inhabitants, surpassing Serbia's 1.4, Albania's 1.5, and Montenegro's 1.8, yet falling short of North Macedonia's 3.2 and the EU average of 2.9 per 100,000 inhabitants, based on the WHO European Data Warehouse. The PHC level is conceptualized based on the family medicine model, universally recognized as a cost-effective, comprehensive, and equitable approach to attaining universal health coverage. It serves as the primary access point for citizens to the health system and concurrently functions as the

coordination hub for all other health services. Its functions encompass health promotion, disease prevention, early detection, diagnosis, treatment, and rehabilitation pertaining to ailments, disorders, and injuries, including dental care, palliative care, home visits for maternal and child health, and minor surgical procedures. All of these functions are grounded in the principles of family medicine [187].

The primary healthcare service delivery is municipal, anchored in 38 Main Family Medicine Centres (MFMCs) overseeing 164 Family Medicine Centres (FMCs) and 256 Family Medicine Ambulances (FMAs) nationwide [152]. Significant challenges persist concerning capital investments and infrastructure; however, certain improvements have been made, particularly in the establishment of specialized mechanisms for assessing institutional needs, increased funding for maternal and child health and palliative care, and the provision of new vehicles for home visits, cold chain provision, and palliative care. In addition, the Ministry of Health is in the process of zoning and designating a family doctor for citizens at the nearest centres, while concurrently compiling lists of patients who will receive services at those locations [187]. Self-generated revenues at the PHC level are utilized to partially fund the execution of capital healthcare projects at the municipality level [152].

The SHC and THC levels operate under the University Clinical and Hospital Service of Kosovo (UCHSK) [187]. The SHC level comprises eight regional hospitals, located in eight key geographic regions. The THC level comprises 31 hospitalizing clinics, and 9 non-hospitalizing clinics, one institute, and three specialized centres all located in the region of Pristina, and uniquely integrated in the University Clinical Centre of Kosovo (UCCK). The Pristina region thus functions under an integrated services model, providing both, the THC and SHC levels. It encompasses in-hospital and out-of-hospital services, diagnostic and therapeutic care, rehabilitation, emergency transport, dental services, and public health initiatives in the region. Comprehensive health care encompasses advanced medical services, hospital care, outpatient services, public health initiatives, dental care, transfusion medicine, occupational health, and consular services at the THC level. In parallel to delivering health services, the Kosovo public health institutions also

provide undergraduate and postgraduate education services, scientific research in collaboration with higher education institutions [187].

Nursing care in Kosovo is integral to the healthcare system. The latter is primarily funded by the consolidated budget of the Republic of Kosovo, supplemented by loans or grants from international organizations [152]. The current financing model, based on historical patterns and prior-year distributions, which is widely considered as inefficient, is demanded and expected to transform into performance-oriented one, based on measurable outcomes and service quality [187]. Within that nutshell, the nursing workforce comprises of three main hierarchical categories: nurse directors, head nurses, and nurses. Jointly, these three roles form an interconnected care framework that links strategic planning, operational leadership, and direct patient care, ensuring that nursing practice in Kosovo remains both professionally accountable and deeply human-centred. Nurse directors oversee nursing departments across hospitals and healthcare institutions [189]. Their work spans multiple wards and involves shaping nursing policies, managing human resources, coordinating professional development, and ensuring adherence to ethical and regulatory standards [190]. They also serve as the primary representatives of nursing in institutional decision-making processes, bridging clinical realities with administrative planning [191]. Nurse Heads translate strategic priorities into everyday clinical practice. They coordinate ward activities, prepare staff schedules, supervise nursing teams, and ensure that patient care is delivered safely, effectively, and compassionately [192]. Their leadership is both managerial and relational, as they support their teams, communicate with physicians, and maintain ward hygiene and order [193]. As for the role of nurses, it involves a comprehensive and patient-centred approach to care that incorporates clinical expertise, education, advocacy, and ethical accountability. Nurses provide direct care to individuals, families, and communities across all life stages, focusing not only on treatment but also on health promotion, disease prevention, and rehabilitation [194].

4.4.1 Pilot method

A pilot study was conducted as an initial phase to assess and refine the feasibility of the data collection procedures and instruments, in line with the best practices and recommendations of previous researchers [195]. The study took place in the Pristina and Gjakova regions. In the former, both PHC and THC institutions were included, whereas in the latter only PHC and SHC institutions were present. The data collected during this phase met quality standards, and were included in the full-scale sample.

4.4.2 Quantitative method

A multi-stage stratified random sampling strategy was chosen to guarantee representativeness and facilitate subgroup analyses. The stratified sampling technique reduces sampling error and improves precision when there is significant variation among population subgroups [196]. It also exhibits resilience when structural homogeneity is significant within strata, even in the presence of missing observations [180,197,198]. Stratification occurred in two stages: a) by healthcare level, and b), within each healthcare level, by professional role—staff nurses versus nurse managers (including nurse directors and head nurses). All qualified, licensed nursing personnel were invited to participate in the research directly. The target population comprised 7,926 licensed nursing staff who are employed within Kosovo's public healthcare system, comprising 4,330 PHC nursing staff members working in family medicine centres and municipal outpatient units; 1,910 SHC nursing staff members working either in general regional hospitals or Urgency Centre of Pristina); and 1,686 THC nursing staff members working in specialized clinics under the UCCK [199]. To ensure that the sample accurately reflects the populations relevant to this study, specific inclusion - registered nurses currently in public-sector PHC, SHC, and THC levels, and exclusion, nurses working only in private facilities, other professionals, interns, and those on extended leave, above 65 years old – criteria were applied.

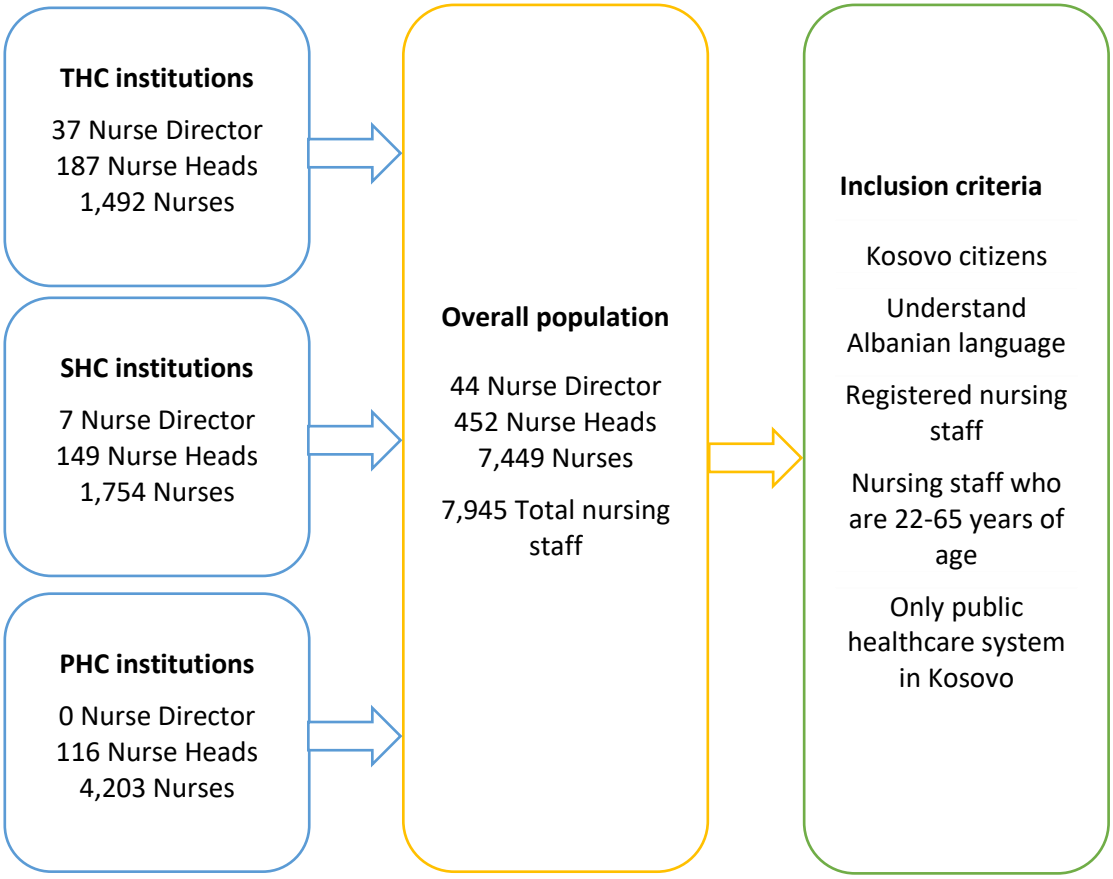


Figure 4.3: Flowchart of relevant population

To determine the appropriate sample size, both precision estimation and hypothesis-testing–oriented power analysis were conducted. A power analysis evaluated whether the full sample would be adequate for testing hypotheses using regression and moderation models (Cochran, 2021). Detecting small-to-moderate interaction effects required a minimum of approximately 250–400 respondents in the pooled dataset, assuming $\alpha = .05$ with a desired statistical power of .80, and following Cohen's (1988) conventions for effect sizes ($f^2 = 0.02$ for small, $f^2 = 0.15$ for medium, and $f^2 = 0.35$ for large effects) [200,201]. On that basis, to detect small effects, the minimum required sample size was 400 respondents.

The Cochran formula was used to estimate the sample size using [202]:

$$n = \frac{-Z^2 * p * (1 - p)}{d^2}$$

Where:

- Z=1.96 (95% confidence level),
- p=0.50 (maximum variability), and
- d=0.05 (desired precision)

It was assumed a 95% confidence level, a ±5percentage margin of error, and maximum variability (p=0.5). Subsequently, the computation based on the Cochran formula resulted in a target sample size 987 nurses within the public healthcare system of Kosovo, namely 353, 320, 314 respondents at the PCH, SHC, and THC levels, respectively. This sampling method enhances the generalizability and ensures that subgroup-specific effects could be identified, a key consideration given the study's aim to assess contextual influences on KM and JP. In total, 22 incomplete responses were excluded.

With a limited target population, this strategy maximized population estimate precision while guaranteeing that every level of healthcare was fairly represented. Especially, it allowed comparisons between different levels of healthcare possible (RQ3).

Notwithstanding, the final sample size of 987 respondents surpasses the minimum needed to run the power analyses, offering more than sufficient statistical power to test the hypotheses, and as a result, enabling stratified and subgroup analyses by work title and level of healthcare. Moreover, a deliberate oversample of nurse managers (including nurse directors and head nurses) was applied to adequately assess role-based moderation effects. Furthermore, a minimum of 80–100 nurse managers (nurse directors or nurse heads) across all levels were identified as essential by this methodology, providing sufficient analytical power due to the variation in job titles. Analytic weights were included in the regression models to maintain representativeness. Proportional allocation for each substratum stratum (n_h) was determined by the following formula, reflecting the population share of each group to maintain precision and representativeness [203].

$$n_h = \mathrm{n}\frac{N_h}{\mathrm{N}}$$

These calculations follow the established standards for cross-sectional health research [202,204–206], and align with work of Krejcie [207], as well as general standards in organizational KM research [183].

The details of the population and the sample of this study are presented on the figure below, and on the Appendix Tables 0.19 and 0.20, respectively. Since no official source publishes staffing data by working titles of nursing staff (nurse manager and nurse), it was necessary to review the hierarchical structures of the overall health care system, and consult with multiple experts in healthcare management, nursing and health sciences, currently working for the public healthcare organizations, higher education institutions, and relevant research institutes in Kosovo. These alternative sources enabled precise enumeration of the population of qualified nursing personnel across institutions and care levels, and work titles, thereby enhancing sample coverage and bolstering the reliability of stratified sampling.

While proportional allocation across healthcare levels was accomplished, ensuring precise proportional representation by substratum or unit type i.e., clinic, family medicine centre, proved unfeasible during data collection. Specifically, in the case of PHC, where out of 38 municipalities, some family medicine centres are very small and have no nursing personnel, whereas those located in the four northern municipalities were inaccessible due to safety considerations. In the case of the SHC level, all of the units were included, but in a slightly disproportionate way given the relatively lower response rates in certain regional hospitals. A similar situation was faced in the THC. These cases align with survey methodology practices suggesting that nonresponse in homogeneous strata or substrata, characterized by uniform organizational and procedural contexts, may have minimal impact on estimator bias or variance, particularly when the clusters exist within a common institutional framework [208,209]. Correspondingly, in line with established survey methodology practices, an oversampling technique was applied, namely additional participants from higher-

performing units within the same healthcare levels were surveyed [208,209]. Disproportionate sampling strategies enhance efficiency and power for subgroup and interaction effects, where researchers pursue system-level comparisons and subgroup analyses [179]. Calibration techniques enabled the addressing of differential response probabilities during the sampling process, thereby ensuring valid inferences [210].

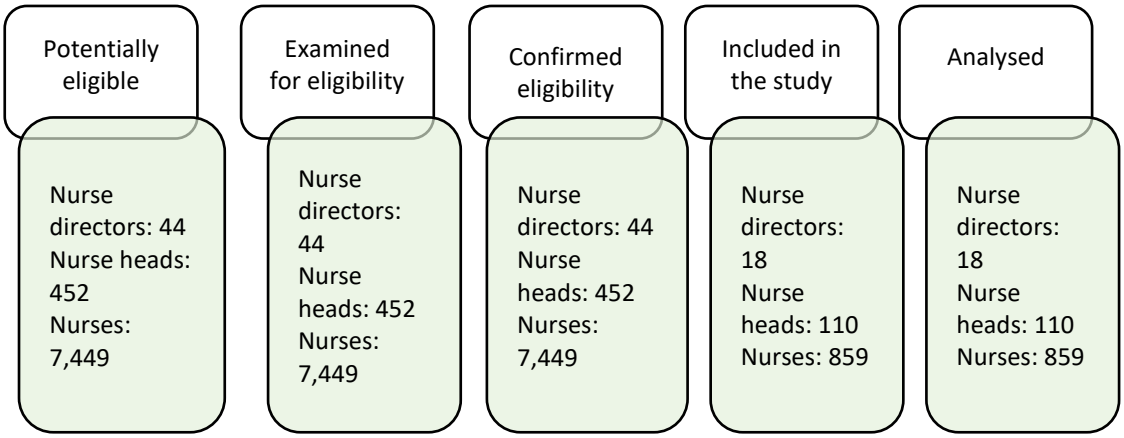


Figure 4.4: Flowchart of participant selection and inclusion process

The figure displays the process of recruitment and eligibility aspects for nursing personnel involved in the study: nurse directors, nurse heads, and nurses. As the first step, a total of 7,945 professionals (44 nurse directors, 452 nurse heads, and 7,449 nurses) were identified as potentially eligible based on the official statistics, published by the KAS [199]. Ultimately, 18 nurse directors, 110 nurse heads, and 859 nurses, who were included in the study and analysed in the final dataset. Thus, such a structured recruitment pathway ensured transparency and representativeness of the sample across the three nursing personnel groups and care levels.

4.5 Research instruments

This study employed four structured self-administered questionnaires to measure the key constructs of interest: JP, KMI, KMP, and MC. The data collection instruments were selected from prior peer-reviewed work, focusing on their research designs and methods. Subsequently, their validity as well as reliability were assessed in Kosovo healthcare context with a pilot sample of 70 participants from different work titles and healthcare levels. Their final (post-adaptation) versions are presented in Appendixes D-G. Specifically, the questionnaires used in this dissertation are:

4.5.1 Questionnaire for JP

The JP questionnaire was developed and validated by Carlos and Rodrigues [2], drawing conceptually on the model of Borman and Motowidlo [80]. The goal of developing this questionnaire was to respond to the previous trend of developing measures of job-performance specific to a context, through developing a measure which applies across jobs and cultures [2]. Multiple other studies, including that of Barać et al. [211], and Topa & Aranda-Carmena [212], have validated its psychometric robustness. This aggregation reflects the multidimensional yet unified nature of performance in nursing roles, and has been widely adopted in prior nursing and organizational behaviour research [80].

Specifically, it was designed to evaluate the JP of healthcare professionals in Portugal's public hospital system, including the following main parts:

I. Task-related performance – 13 items (P1–P13) assessing direct, technical, and procedural aspects of nursing work.
II. Contextual performance – 13 items (P14–P26) reflecting interpersonal, organizational, and attitudinal behaviours.

Further, this questionnaire consists of the following six performance dimensions:

- Task Performance – 4 items (P1–P4)
- Organizational Skills – 5 items (P5–P9)
- Contextual Performance – 5 items (P10–P14)

- Cooperation – 3 items (P15–P17)
- Organizational Conscientiousness – 5 items (P18–P22)
- Interpersonal/Relational Skills – 4 items (P23–P26)

Such format permits calculating both overall performance score (sum/mean) and sub dimension scores. The original version of JPN Questionnaire entails 26 questions with the following possible scaled responses: Responses are measured on a 7-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree nor Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree. The 26 items are aggregated to form a composite index of overall JPN, with subdomain scores also calculable.

In this study, the following adjustments to the original version of this questionnaire were made:

- The original 7-point Likert scale was converted into a 5-point Likert scale (1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neither Agree nor Disagree, 4 = Somewhat Agree, 5 = Strongly Agree)
- Based on best research practices, the extreme labels were retained and intermediate categories adjusted, eliminating only the in-between options “Disagree” and “Agree” [213,214].
- Four negatively worded items (P7, P8, P10, P26) were reverse-coded prior to scale aggregation.

Subsequently, this questionnaire was validated in this study, too, with its Cronbach’s alpha exceeding 0.868 for the overall construct of JPN, which made it possible to generate the composite score of dependent variable of this study.

4.5.2 Questionnaire for MC

The original objective of developing this instrument was to measure managerial competencies of the PHC nurse managers in guiding and supporting their teams effectively. It was adapted from the 360-degree instrument by Munyewende et al. [1], developed within health systems leadership research. It measures six dimensions of MC:

- Communication – 5 items (M1–M5);

- Leadership – 6 items (M6–M11);
- Staff Management – 8 items (M12–M19);
- Financial Management – 9 items (M20–M28);
- Planning and Prioritization – 6 items (M29–M34);
- Problem-Solving and Decision-Making – 6 items (M35–M40).

Items are rated on a 10-point scale (1 = Very Low Competence/Training needed to 10 = Very High Competence/No training need). Self and subordinate ratings were combined to create composite MC scores. The six dimensions are conceptually integrated, allowing aggregation into an overall MC composite, with subdomain scores also calculable.

Following the feedback collected during the back-translation as well as pilot phase, were made the following adjustments to the original format of this questionnaire:

- Answer labels were adjusted for clarity, from “low skilled–basic” to “high skilled–advanced.”
- Wording was neutralized to apply broadly (“in principle in the work of a clinic manager”) to allow both nurse managers and staff nurses to provide responses.
- In Question 6, the term “ward” was added for contextual clarity.
- In Question 7, the item was adapted to read, “I am able to implement long-term/strategic plans.”
- In Question 11, an explanatory note was added in parentheses regarding Batho Pele (“human first/centred”); and
- References to the term “organization” were systematically replaced with “clinic/ward” to match the actual organization units at which nurse managers are eligible to lead in Kosovo.

This questionnaire was validated with a Cronbach’s alpha exceeding 0.975 across domains. Some other researchers who had validated this questionnaire in healthcare management settings as well are Munyewende et al. [1], and Tabejamaat et al. [55].

Congruently, it was possible to collect data for one of the independent variables, namely MC of nurse managers (nurse directors and nurse heads). Its score is based on the

perceptions from manager-self, plus supervisor and subordinate nurses, across the respective domains. Aggregation is justified due to the conceptual integration of these dimensions into the overarching construct of MC, aligned with frameworks from health management literature [1].

4.5.3 Questionnaire for KMAT

The main purpose for developing the Knowledge Management Assessment Tool (KMAT) was to evaluate the organization's systematic ability to create, share, and apply knowledge effectively. Originally it goes back to the works of American Productivity & Quality Centre and Arthur Andersen [215]. Ever since, it has been widely used by professional associations i.e., the Canadian Society of Association Executives, in multiple projects with clients, and as a reference material in program certifications [4,216]. The following represents its five dimensions of KM:

- Process - 5 items (KMP1–KMP5);
- Leadership – 4 items (KML1–KML4);
- Culture – 5 items (KMC1–KMC5);
- Technology – 6 (KMT1–KMT6);
- Measurement – 4 (KMM1–KMM4).

Items are scored on a 5-point Likert scale, where 1 = No, 2 = Poor, 3 = Fair, 4 = Good, 5 = Excellent. Its item scores are averaged to produce a composite index reflecting the strength of organizational KM processes. Particularly, its sub-domain of KMP is computed by averaging the scores of 5 items (KMP1–KMP5), measuring organizational KM practices (1 = No, 5 = Excellent) [51]. These items assess the organization's ability to identify, capture, share, and leverage both explicit and tacit knowledge. This aggregation captures the organization's capacity to operationalize KM processes systematically, and follows best practices in scale construction for KM-related constructs [51]. There are multiple scholarly works that discussed KMAT, used it as a benchmarking instrument, incorporated it into assessment frameworks [217,218], and validated it [51]. In this study, the items responses were restructured into a tabular format to ensure visual

uniformity with the other questionnaires, thereby enhancing readability and navigation for respondents. The respective instrument emerged as valid given its derived Cronbach's alpha exceeding 0.96 across domains.

4.5.4 Questionnaire for KMI

This questionnaire was designed to assess the organizational and technical readiness of institutions to support KM practices. It was adapted by Kudozia et al. [3], building on the framework of Becerra-Fernandez and Sabherwal [219]. KM Infrastructure consists of two main dimensions, which encompass the respective categories as follows:

I. Technical Infrastructure - 30 items (IT systems, intranet, databases, and communication tools).
II. Social Infrastructure – (17 items) (policies, roles, leadership, culture, and training).

Whereas, the key dimensions of the KM Infrastructure are:

- Organizational structure – 3 items: (KMI4, KMI10, KMI30).
- Shared knowledge – 13 items: (KMI7, KMI8, KMI9, KMI11, KMI18, KMI19, KMI20, KMI21, KMI22, KMI23, KMI24, KMI25, and KMI26).
- Physical environment – 2 items: (KMI5, KMI32).
- Information Technology infrastructure – 18 items: (KMI12, KMI13, KMI14, KMI15, KMI16, KMI17, KMI27, KMI28, KMI34, KMI35, KMI37, KMI39, KMI41, KMI42, KMI43, KMI44, KMI46, KMI47), and
- Organizational culture – 10 items: (KMI1, KMI2, KMI3, KMI6, KMI31, KMI33, KMI36, KMI38, KMI40, KMI45).

Items are rated on a 5-point scale: 1 = Rarely, 2 = Very Low, 3 = Low, 4 = High, 5 = Very High. Sub-dimension scores are computed and combined to yield a composite KMI index. The combined KMI score reflects the overall infrastructure readiness of the organization to support KM, consistent with prior studies in healthcare knowledge systems [3].

No structural modifications were implemented in this study to this questionnaire; however, formatting and terminology were refined to ensure consistency with other

instruments and the Kosovo healthcare context. Correspondingly, KMI was operationalized into two broad sub-constructs, namely technical infrastructure (IT systems, intranet, storage, communication channels) and social infrastructure (policies, roles, culture, training infrastructure). Similar to previous study of Kudozia et al. [3], this questionnaire was validated in this case as well, considering its derived values of Cronbach's alpha exceeding 0.979 across dimensions.

4.5.5 General adaptations of research instruments

In addition, the following necessary general adaptations were made across the questionnaires, to ensure linguistic, cultural, and contextual appropriateness for the Kosovo public healthcare system:

- Translation and back-translation: all instruments were translated from English to Albanian and then back translated to ensure semantic precision and equivalence. This process entailed these steps: translation of the original versions from English to Albanian language; back translation; comparison of English versions (original and translated one), harmonization of differences, and
- Cultural tailoring: terminology was modified to align with regional healthcare vernacular and organizational contexts in Kosovo.
- Expert review: senior nursing managers, researchers, and academic staff helped review draft versions to guarantee conceptual clarity, content validity, and practical applicability.
- Uniformity among instruments: a uniform visual format was implemented across all questionnaires to minimize respondent burden and cognitive load, incorporating standardized fonts, spacing, alignment, sequential numbering, and distinct section headings. The response options were consistently formatted, and guidelines were integrated to assist respondents.
- Demographic section: a series of demographic and professional questions was incorporated to ascertain respondents' age, gender, ethnicity, education, working title, overall and current professional experience, municipality, level of

healthcare (PHC, SHC, THC), name of their institution, centre, hospital, clinic, or ward, where they serve, dual practice (public and private work affiliation), and number of daily clients served facilitating subgroup and moderation analyses.

All variables measured through Likert-type scales were treated as continuous to allow regression and moderation analyses, whereas respondent demographic/contextual characteristics were modelled as categorical variables.

4.6 Data collection procedures

Data collection procedures began in August 2025 after the pilot phase was completed in mid-August and continued until late September 2025. The first ethical approval was obtained from the Board of the University Clinical and Hospital Service of Kosovo (UCHSK) in July 2024, and the second one from the Ethical Committee of the Heimerer College (HC) in July 2025. To meet the deadline of the doctoral research plan, the data collection process commenced with coordination with healthcare facility managers and nursing administrators to facilitate the relevant logistics within public institutions across Kosovo immediately after obtaining the first ethical approval, whereas the four validated questionnaires were distributed to the respective target population after the second approval was obtained.

Initial steps involved establishing contact with the leadership of the respective organisational units at pertinent to each healthcare level. Specifically, coordination was undertaken with one nurse director and seven Heads of nurses at the PHC level, seven nurse directors and seven nurse Heads at the SHC level, and 39 nurse Heads of Specialized Hospitalizing Clinics and four nurse Heads of Non-hospitalizing Clinics at the THC level. Then, coordinated meetings were arranged with nursing teams to schedule data collection sessions, agreeing on suitable times and locations to minimize disruption to healthcare services.

Before the distribution of the questionnaires, each participant received the information sheet and signed the consent form. This step ensured a thorough understanding of the study's objective, the voluntary nature of participation, the guarantee of confidentiality, and the right to withdraw without any consequences. The mean time required to complete the questionnaire ranged from 15 to 25 minutes.

The administration of paper-based questionnaires was conducted with complete confidentiality in controlled settings, specifically designated staff rooms or meeting venues, while minimizing external distractions. A standardized briefing script was employed, highlighting the study's objectives and ensuring uniformity in data collection. Special attention was directed towards avoiding circumstances that could interfere with

participants during their work hours. Participants were afforded the opportunity to complete the questionnaire at either their convenience, prior to or following work hours. A retrieval period of up to three business days was allowed to obtain the completed questionnaires directly from the respective respondents.

Completed questionnaires were securely managed: only the principal investigator had direct access to the raw data, which was stored in locked cabinets and password-protected digital files, ultimately ensuring the privacy of participants.

4.7 Ethical aspect

The study adhered to the European Code of Conduct for Integrity in Scientific Research, as well as national regulations and international ethical standards pertaining to research involving human subjects [220].

Before data collection, formal approvals were secured from the Board of the UCHSK, and the Ethical Committee of HC. Additional unit-level permissions were acquired from municipal-level health authorities and the PHC and SHC levels nurse directors to access their respective premises.

Participation was voluntary. No financial remuneration was provided to any participant, nor was any deception employed. An information sheet, detailing the study's objectives and methodology, were distributed to each participant. The latter were afforded the opportunity to pose inquiries prior to signing the written informed consent document. Participants were clearly informed that they could withdraw at any time without incurring any adverse consequences.

Confidentiality was maintained through the collection of anonymized data. No personally identifiable information, including names or staff identification numbers, was recorded on the questionnaires. Numerical codes were assigned to the data, and all results are presented at an aggregate level, categorized by healthcare level, role, or demographic subgroup, to maintain the anonymity of individual participants. The identities of participants will remain confidential when information is disseminated or published in relation to this study.

Access to the completed questionnaires, securely stored in locked cabinets, was limited only to the principal researcher. Electronic datasets were transformed into password-protected files, stored on encrypted institutional servers, and backed up in compliance with General Data Protection Regulation (GDPR, EU 2016/679) standards. Access to raw data was restricted to the primary research team. All research data will be retained for five years following completion, in accordance with institutional and international standards. Following this period, paper questionnaires will be incinerated, and digital datasets will be permanently deleted from secure servers.

4.8 Assumptions and limitations

The main assumptions of this study are:

- There is a significant direct relationship between KM, namely KMP and KMI, and JP in public health care system in Kosovo.
- The MC of nurse managers significantly moderates the relationships between KM, namely KMI and KMP and JPN in public health care system in Kosovo.
- The effects of independent (KM, namely KMI and KMP) and moderating (MC) factors on JPN in public health care system in Kosovo are not substantially different across levels of health care, and work titles.
- Nursing staff are knowledgeable workers:
    - Whose JP enhances if they would know or have access to more knowledge and when needed during the delivery of their services;
    - Who generate new knowledge in parallel to using it, which if documents and shared with each other could significantly enhance their JPs.
- Kosovo nursing staff have at least basic understanding of the respective constructs.
- KMI, namely KMI and KMP contribute to the capacities of public healthcare institutions in Kosovo to absorb and generate knowledge;
- KMI and KMP may contribute to making health care service more affordable, accessible, and higher quality at the public healthcare institutions in Kosovo;
- Nursing personnel willingly participate in this research,
- Nursing personnel correctly understand the questions and provide truthful and honest answers to the questions;
- The research findings have applicability to other health care contexts that are similar to the Kosovan one.

Whereas, the main limitations of this study, followed by respective mitigation strategies applied in it are:

- Sampling bias and representation: despite utilizing a stratified sampling methodology across various healthcare levels and work titles, achieving

complete proportional representation at the unit level (clinics, wards, and municipalities) proved unfeasible. This was especially true at the THC level, which comprised hospitalizing and non-hospitalizing clinics of differing sizes, and at the PHC level, where some of the most remote family medicine centres employed a minimal number of nurses or none. In addition, access to healthcare facilities in the four northern municipalities was restricted due to safety concerns.

    - Mitigation: oversampling in better-represented units, post-stratification adjustments, and the relative homogeneity of institutional sub-units within strata (healthcare level and work titles).

- Self-report bias: all observations (data collected) relied on self-administered questionnaires, which raises the possibility of social desirability bias or under/over estimation of MC and JP, especially.
    - Mitigation: anonymity and confidentiality were guaranteed, questions were phrased neutrally to avoid pressure for socially desirable biased answers, and instruments with validated psychometric properties were employed.
- Generalizability: the study is limited to the public healthcare system in Kosovo. Nursing staff working solely in the private sector were excluded. Given the distinct structural characteristics of Kosovo's public health system, results may not be directly generalizable to other countries.
    - Mitigation: a large and representative sample improves internal generalizability within Kosovo and other contexts alike. The results of this study are compared to those from previous studies conducted in other countries, contributing to the contextualization of these results in a broader perspective.
- The adoption of cross-sectional research design restricts the ability to establish temporal causal inferences, directionality, or temporal precedence.

- Mitigation: solid theoretical frameworks and statistical diagnostics and controls enhanced the explanatory power and interpretation of results beyond the correlation level and more toward causal inferences.

- Low response rate: the hesitation of nursing personnel to participate in this research is due to their excessive workload.
    - Mitigation: a flexible approach was maintained throughout the phase of data collection, supported by close coordination healthcare management and nursing staff, and offering multiple opportunities to administer questionnaires in the respondents' work environments (wards, clinics, and departments), facilitating participation with minimal disruption to clinical responsibilities.

5 RESULTS

This section presents the results obtained from both the pilot and main phases of analyses of the study. The pilot phase of pilot focuses on assessing the reliability, regression diagnostic, validity, and internal consistency of the study instruments, as well as preliminary correlations among key variables. The main analyses comprises descriptive statistics, correlation matrices, diagnostic tests, and a series of regression analyses. The latter demonstrate the direct effects of KMP and KMI on JP of nurses and nurse managers, as well as the moderating role of MC of nurse managers at both composite and dimension levels.

5.1 Pilot phase

This section presents the key results of the pilot study. It outlines the demographic and professional characteristics of the pilot sample (Table 5.1). It then presents the reliability of the four core instruments—JPN, MC, KMP, and KMI (Table 5.2), preliminary regression findings and diagnostic checks (Table 5.3), and concludes with the content validity results, initial correlation patterns, and group comparisons that guided the refinement of the final analytical models.

Table 5.1: Pilot sample characteristics

Characteristics	Nurse Director (N=5)		Nurse Head (N=10)		Nurse (N=55)	
	N	%	N	%	N	%
Age (collapsed)						
22–39 years	–	–	–	–	23	41.8%
40–59 years	–	–	–	–	26	47.3%
60–65 years	–	–	–	–	6	10.9%
Gender						
Female	–	–	6	60.0%	41	74.5%
Male	–	–	4	40.0%	14	25.5%
Ethnicity						
Albanian	–	–	10	100%	55	100%
Education Level (collapsed)						
High school / Bachelor	–	–	–	–	51	92.7%
Master	–	–	–	–	4	7.3%
Overall Experience (collapsed)						
0–10 years	–	–	–	–	22	40.0%
11–20 years	–	–	–	–	13	23.6%
>20 years	–	–	–	–	20	36.4%
Municipality						
Gjakova	–	–	–	–	26	47.3%
Pristina	–	–	–	–	29	52.7%
Healthcare Level						
PHC	–	–	–	–	18	32.7%
SHC	–	–	–	–	20	36.4%
THC	–	–	–	–	17	30.9%
Healthcare Institution (collapsed)						
PHC (CFMC/FMC)	–	–	–	–	18	32.7%

Characteristics	Nurse Director (N=5)		Nurse Head (N=10)		Nurse (N=55)	
SHC (Regional Hospital)	–	–	–	–	20	36.4%
THC (UCCK)	–	–	–	–	17	30.9%
Works in private sector						
Yes	–	–	–	–	7	12.7%
No	–	–	9	90.0%	48	87.3%
Workload (collapsed)						
<10 clients	–	–	–	–	8	14.5%
11–19 clients	–	–	–	–	6	10.9%
20–39 clients	–	–	–	–	25	45.5%
≥40 clients	–	–	–	–	16	29.1%

N=Sample size.

Table 5.1 presents the demographic and professional profile of the pilot sample, consisting of nurse directors (N=5), nurse heads (N=10), and nurses (N=55). After applying k-anonymity rules, detailed breakdowns for directors and heads are suppressed due to small subgroup sizes, yet the general distribution across the total sample still reveals several notable trends.

In general, the nursing workforce represented in the pilot reflects a predominantly Albanian and female sample, with women comprising the clear majority across all roles. Additionally, nurses occupied a wider range of age groups and were mostly younger than those in managerial positions were. Aggregated data for nurses show that over 40% were between 22 and 39 years old, whereas managerial roles (directors and heads) were predominantly filled by staff aged 40 years or above.

Educational patterns also differentiate nurses from those in leadership roles. While detailed educational levels for managerial groups cannot be disclosed due to anonymity thresholds, the aggregated data show that most nurses held either a high school or bachelor-level qualification, with only a small proportion having completed a master's degree.

Besides, work experience followed a similar pattern. Nurses were widely distributed across early-, mid-, and late-career stages, while the majority of individuals in managerial roles belonged to the more experienced categories. Although exact figures

for directors and heads cannot be presented, the visible nurse distribution shows that approximately 40% had 0–10 years of experience, and over one-third reported more than 20 years.

Geographically, nurses were nearly evenly split between Pristina and Gjakova. While detailed figures for managerial staff cannot be shown, they were largely concentrated in Pristina, reflecting the location of THC/specialized care facilities/clinics. Correspondingly, nurse directors and heads were predominantly positioned within the SHC and THC levels, whereas nurses were spread more broadly across care levels.

Regarding institutional placement, nurses were distributed across primary care centres, regional hospitals, and the UCCK. Managerial roles were again concentrated within higher-level institutions, consistent with the structure of the public healthcare system.

Patterns of daily workload were clearly visible among nurses, who reported a wide distribution of Workload, with a notable proportion managing 20–39 clients daily or more than 40 clients. Workload information for nurse directors and heads is suppressed in the anonymized table; however, the available data suggest that nurses generally bore the highest direct patient workload in the sample.

Table 5.2: Reliability test of questionnaires and KMP dimension

Questionnaire / Dimension	No. of items	Cronbach's α
JPN	26	0.868
Nurses	26	0.883
Nurse managers	26	0.833
MC	40	0.975
KMAT Questionnaire	24	0.960
KMP	5	0.876
KMI	47	0.979

JP = Job Performance of Nursing personnel;
KMAT = Knowledge Management Assessment Tool;
KMP = Knowledge Management Process;
MC = Managerial Competence;
KMI = Knowledge Management Infrastructure.

As presented in the Table 5.2, the four questionnaires that were utilized in this study demonstrated robust and reliable measurement properties, confirming their suitability for subsequent statistical analyses.

The JP questionnaire for nursing personnel, demonstrated high overall reliability for both nurses (α = 0.883), and nurse managers (α = 0.833). When examining the six dimensions of JP, however, reliabilities varied considerably. The JP dimension of Task Performance consistently demonstrated the highest internal reliability across both groups, whereas Cooperation, Conscientiousness, and Interpersonal Skills showed weaker internal consistency.

Regarding the MC questionnaire, it exhibited excellent overall reliability (α = 0.975) with its subscales' alphas ranging from 0.874 (Planning) to 0.944 (Financial Management), confirming strong internal consistency across all six dimensions.

Likewise, the KMAT questionnaire revealed an excellent reliability coefficient (α =0.960), including its dimension of the KMP that yielded strong reliability (α = 0.876).

Lastly, the questionnaire of KMI also demonstrated very high reliability overall (α = 0.979), with dimensions ranging from adequate (Structure, α = 0.800) to excellent (Social, α = 0.967). Only its dimensions Physical Environment exhibited weak reliability (α = 0.565). The full results of reliability test are presented in Table 0.19 in the Appendix.

Table 5.3: Model Summary and ANOVA Results for the Prediction of JP of nurses and nurse managers, regressed by KMI, KMP, and MC.

Group	Care Level	N	F(df1, df2)	p	R^2	Adjusted R^2	Notes (Model Specification)
Nurses – Main effects	PHC	18	75.65 (2, 15)	0.00	.658	.620	Main effects only (KMP, KMI)
	SHC	20	2.19 (2, 17)	.142	.274	.179	Main effects only (KMP, KMI)
	THC	17	4.07 (2, 14)	.040	.249	.155	Main effects only (KMP, KMI)
Nurses – Moderation	PHC	18	34.92 (5, 12)	.001	.757	.656	Reduced moderation model with KMP, KMI, MC + interactions; controls excluded due to over specification
	SHC	20	30.26 (5, 14)	.001	.591	.445	Moderation model with KMP, KMI, MC + interactions; controls excluded to preserve degrees of freedom
	THC	17	4.30 (5, 11)	.021	.737	.617	Moderation model with KMP, KMI, MC + interactions; full extended model not estimable in pilot
Nurse managers – Main effects	Pooled	15	0.62 (2, 12)	.658	.170	.028	Main effects only (KMP, KMI); no moderation terms
Nurse managers – Moderation	Pooled	15	9.82 (5, 9)	.002	.333	−.038	Reduced moderation model with KMP, KMI, MC + interactions; controls excluded

N = Sample size (number of participants);
F(df1, df2) = F-statistic with numerator and denominator degrees of freedom;
p = p-value (significance level);
R^2 = Coefficient of determination (variance explained by the model);
Adjusted R^2 = R-squared adjusted for model complexity;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
Pooled = Combined sample of all nurse managers across care levels;
Main effects model = Model including only direct effects (KMP, KMI);
Moderation model = Model including interaction terms (e.g., KMP × MC, KMI × MC);
Reduced model = Simplified model used when full model cannot be estimated;
Controls excluded = Control variables removed due to limited sample size;
Extended model not estimable = Full extended model could not be computed due to insufficient data.

As shown in Table 5.3, the predictive models examining the influence of KMI, KMP, and MC, including their interaction terms, yielded mixed results across groups and care levels. For nurses, the main-effects-only models showed that predictors explained a substantial proportion of variance in JP at the PHC, $R^2 = .658$, $F(2, 15) = 75.65$, $p < .001$, with an adjusted R^2 of .620. At the SHC level, however, the main-effects model did not reach statistical significance, $F(2, 17) = 2.19$, $p = .142$, with only 27% of the variance explained ($R^2 = .274$; adjusted $R^2 = .179$). At the THC level, the main-effects model emerged as significant, $F(2, 14) = 4.07$, $p = .040$, explaining 24.9% of the variance ($R^2 = .249$; adjusted $R^2 = .155$).

When moderation terms were included, the explanatory power increased notably in PHC, where the model accounted for 75.7% of the variance, $F(5, 12) = 34.92$, $p = .001$, with an adjusted R^2 of .656. At the SHC level, the moderation model explained 59.1% of the variance, $F(5, 14) = 30.26$, $p = .001$, adjusted $R^2 = .445$, representing a significant improvement compared to the main-effects model. As for THC nurses, the moderation model was significant, $F(5, 11) = 4.30$, $p = .021$, with a notably high variance explained ($R^2 = .737$; adjusted $R^2 = .617$), though estimation of the full extended model was limited by the small pilot sample.

For nurse managers (pooled sample), the main-effects-only model was not statistically significant, $F(2, 12) = 0.62$, $p = .658$, accounting for only 17% of the variance ($R^2 = .170$; adjusted $R^2 = .028$). By contrast, the moderation model achieved statistical significance, $F(5, 9) = 9.82$, $p = .002$, explaining 33.3% of the variance ($R^2 = .333$). Yet, the negative adjusted R^2 (−.038) indicates potential overfitting, a likely outcome of the small sample size and the need for a reduced moderation specification.

These results indicate that while KMI and KMP alone provide explanatory value in predicting nurses' JP at certain care levels, the inclusion of MC and its interaction terms markedly enhances model fit, especially at the PHC level and SHC levels. In contrast, the predictive capacity for nurse managers appears limited in the pooled pilot sample, underscoring the challenges of modelling moderation effects with very small sample size (n).

Regression Diagnostics

Diagnostic procedures were implemented during the pilot phase, primarily aimed to evaluate the validity and robustness of the initial regression models; and detect possible violations of fundamental assumptions of the Ordinary Least Squares (OLS) method; and guide necessary key model adjustments.

The assessment of normality was conducted through visual examination of histograms, Q–Q plots, and P–P plots of residuals, given the limited size of the pilot sample. The results indicated adequate adherence to standard regression assumptions. Consequently, the analytical framework and model specifications developed during the pilot phase were preserved and later implemented on the comprehensive dataset.

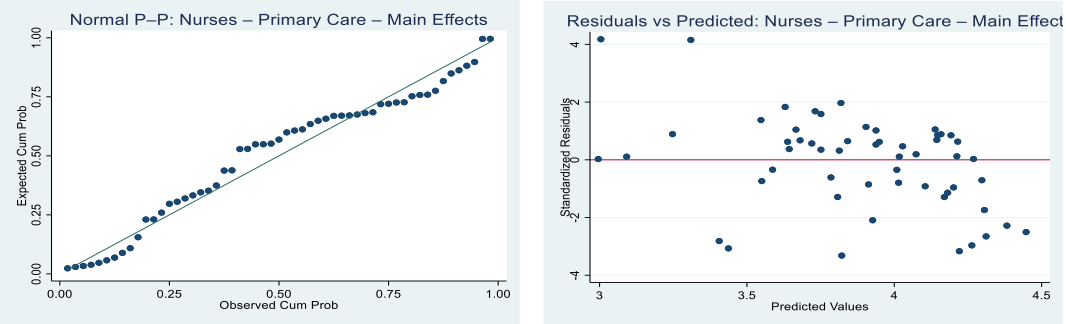


Figure 5.1: Normal P-P Plot of Regression Standardized Residual and Scatterplot linearity for nurses – PHC level – Main Effects

Figure 5.1 shows the Normal P–P plot, where the standardized residuals are found located close to the diagonal line, which suggests that the data is about normal. At the bottom and top of the distribution, there were small deviations that were not big enough to be considered strong departures from the assumption. Whereas, the Scatterplot linearity shows that the residuals were dispersed near the horizontal axis, with no clear pattern. Some clustering and a small spread of variance at higher predicted values, on the other hand, pointed to mild heteroscedasticity. Sequentially, the regression assumptions were relatively sufficiently met.

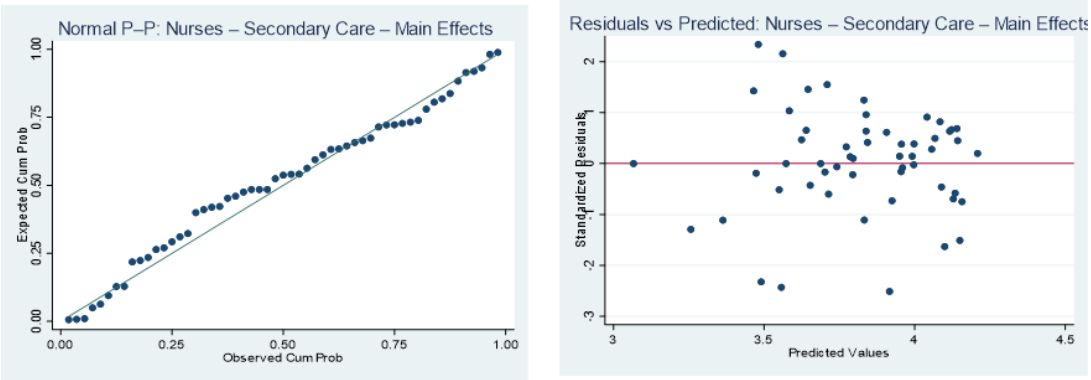


Figure 5.2: Normal P-P Plot of Regression Standardized Residual and Scatterplot linearity for nurses – SHC - Main Effects

In Figure 5.2., the Normal P–P plot indicates that standardized residuals of the pilot regression model predicting JP of nurses at the SHC level (main effects of KMP and KMI) mostly followed the diagonal line, suggesting approximate normality. No major violations of the normality assumption were observed, albeit minor departures at the tails. Meanwhile, Scatterplot linearity demonstrated that heteroscedasticity was not a substantial concern for this model, as the variance in the residuals was relatively stable across predicted values. Besides, the respective residuals were randomly scattered around the horizontal axis, without a clear pattern, supporting the assumption of linearity.

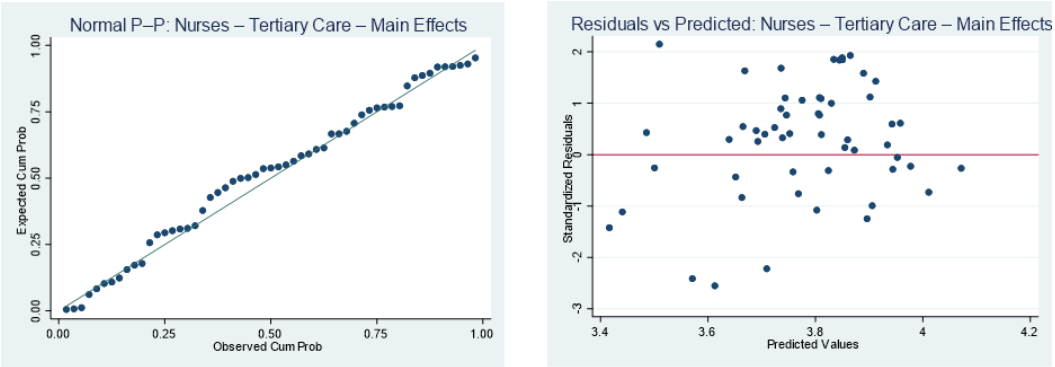


Figure 5.3: Normal P-P Plot of Regression Standardized Residual and Scatterplot linearity for nurses – at the THC level – Main Effects

In Figure 5.3., the Normal P–P plot shows that standardized residuals of the pilot regression model predicting JP of nurses at the THC level (main effects of KMP and KMI) followed the diagonal line relatively closely, indicating approximate normality.

Minor deviations were observed at the lower end of the distribution, but these did not suggest any major violation of the normality assumption. In the Scatterplot linearity figure, the residuals were randomly dispersed around the horizontal axis, supporting the assumption of linearity. Although the variance of residuals appeared slightly uneven across predicted values, no distinct funnelling pattern was visible, implying that heteroscedasticity was not a serious concern for this model. Overall, the diagnostic results confirmed that regression assumptions were sufficiently satisfied at the pilot stage.

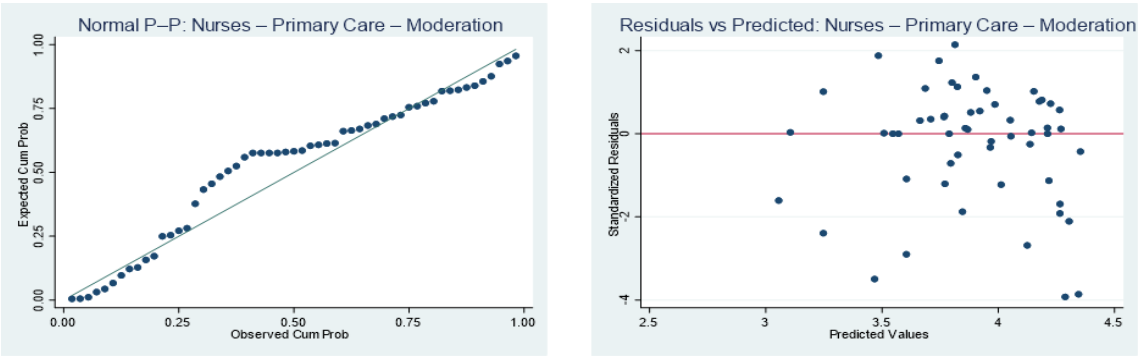


Figure 5.4: Normal P-P Plot of Regression Standardized Residual and Scatterplot linearity for nurses – PHC – Moderation

In Figure 5.4., the Normal P–P plot showed that standardized residuals of the pilot regression model predicting JP of nurses at the PHC, including moderation terms (KMP × MC and KMI × MC), largely followed the diagonal line, indicating approximate normality. Minor deviations were observed in the mid-range distribution; however, these did not suggest serious departures from the assumption. In the Scatterplot linearity, the residuals were randomly distributed around the horizontal axis, thereby affirming linearity. A slightly wider spread of residuals at higher predicted values suggested potential heteroscedasticity; however, no distinct pattern or funnelling effect was detected, indicating that the regression assumptions were sufficiently satisfied, despite minor instability in variance homogeneity.

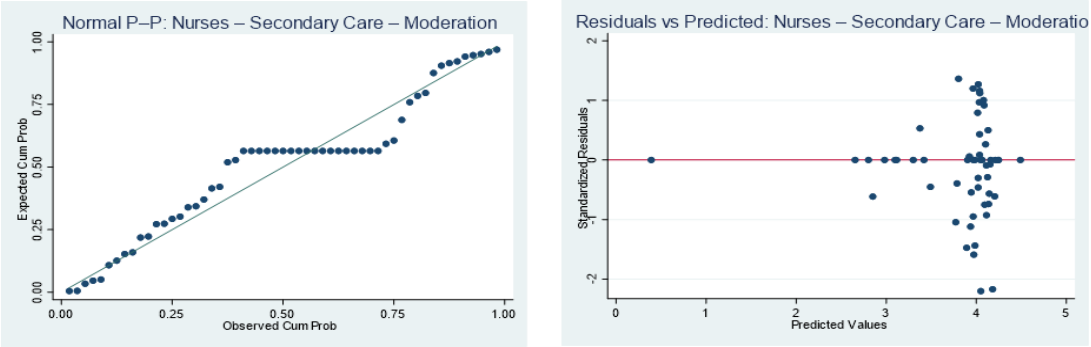


Figure 5.5: Normal P-P Plot of Regression Standardized Residual and Scatterplot linearity for nurses – at the SHC level – Moderation

Figure 5.5 displays diagnostic plots for the pilot regression model predicting JP of nurses at the SHC level with moderation terms (KMP × MC; KMI × MC). The Normal P–P plot indicated that standardized residuals followed the diagonal line relatively well, supporting approximate normality, although mild deviations at the extremes were visible. Residuals were scattered around the horizontal zero line, suggesting linearity. However, the Scatterplot linearity part of the Figure 5.5 shows that the clustering of points in the middle range and a few more dispersed values at higher predictions pointed to some heterogeneity in variance. While not severely problematic, this indicates that variance homogeneity should be interpreted with caution in this moderation model.

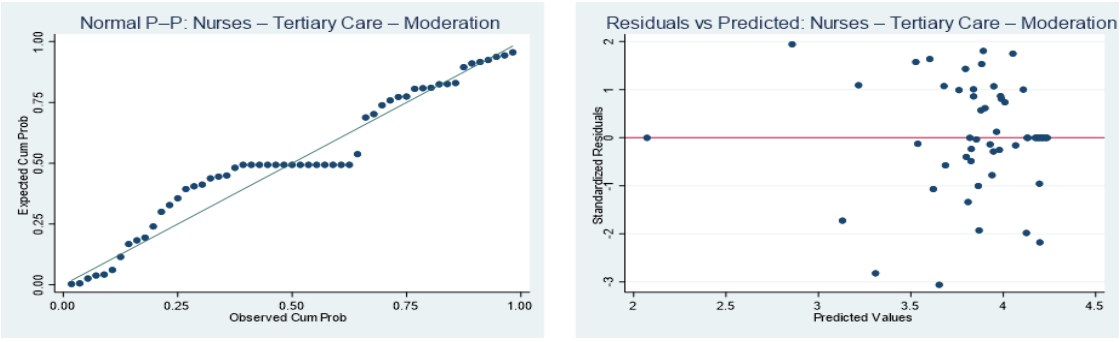


Figure 5.6: Normal P-P Plot of Regression Standardized Residual and Scatterplot linearity for nurses – at the THC level – Moderation

Figure 5.6 illustrates that the Normal P–P plot of the standardized residuals from the pilot regression model, which predicts the JP of nurses at the THC level and includes moderation terms (KMP × MC and KMI × MC), predominantly aligns with the diagonal line. A slight, albeit not substantive, curvature appears shown in the mid-range of the distribution. In addition, the residuals were shown to be randomly dispersed around the horizontal axis without any significant pattern. A wider dispersion of residuals at elevated predicted values suggested possible mild heteroscedasticity. In general terms, the regression assumptions were adequately met.

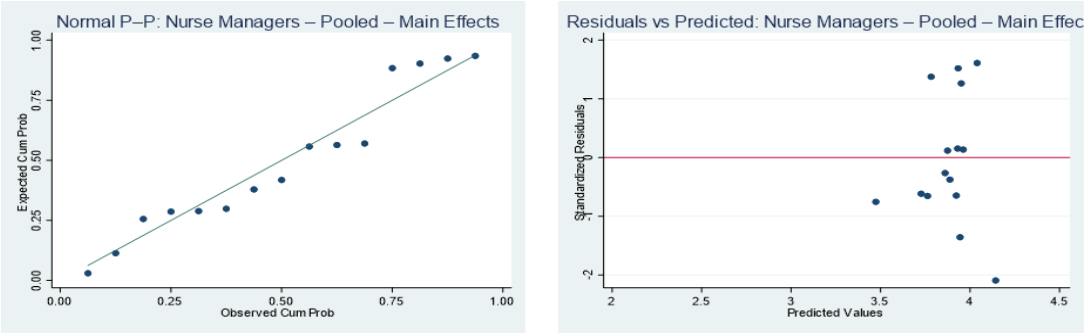


Figure 5.7: Normal P-P Plot of Regression Standardized Residual and Scatterplot linearity for nurse managers - Pooled - Main effects

Figure 5.7., for the pilot regression model predicting JP of nurse managers (pooled sample) with main effects of KMP and KMI, presents diagnostic plots. The Normal P–P plot shows that residuals followed the diagonal line reasonably well, suggesting approximate normality, though slight departures were visible due to the very small sample size (N = 15). Whereas Scatterplot linearity shows that residuals were dispersed across predicted values, yet exhibited significant clustering within a limited range. Although the points were approximately balanced around the horizontal zero line, the uneven distribution suggested potential problems with variance homogeneity.

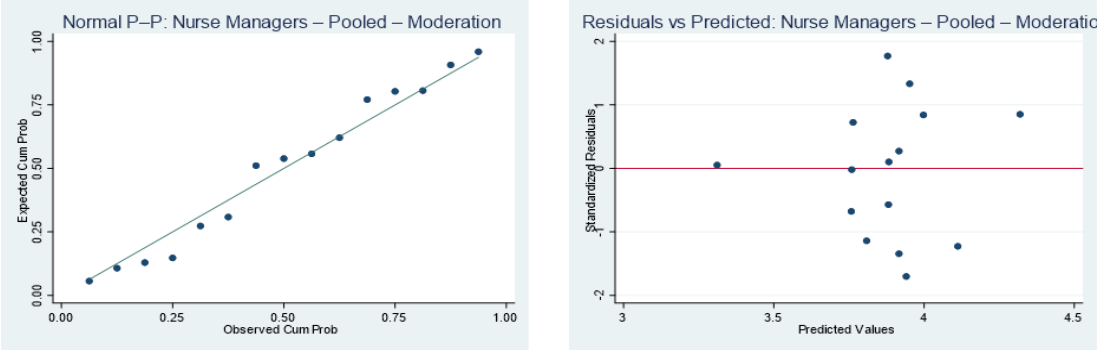


Figure 5.8: Normal P-P Plot of Regression Standardized Residual and Scatterplot linearity for nurse managers - Pooled – Moderation

In Figure 5.8, the Normal P–P plot displays the standardized residuals of the pilot regression model, which assessed the moderating effects of MC on the relationship between Knowledge Management-related factors and JP among nurse managers (pooled sample), closely conforming to the diagonal reference line, largely satisfying assumption of normality. In parallel, Scatterplot linearity demonstrates that the residuals-versus-predicted-values plot shows the residuals are primarily concentrated around the horizontal axis, thereby confirming linearity, although some clustering is apparent around mid-range predicted values. The variation of residuals displayed minor discrepancies across the prediction range, suggesting mild heteroscedasticity. These patterns indicate expected variability resulting from the limited sample size of the consolidated nurse manager group and imply that the findings should be interpreted cautiously during the pilot phase. The diagnostic assessments of all eight pilot regression models, presented in Figures 5.1-5.8, yielded diverse but generally adequate evidence supporting the assumptions of linear regression. The pilot analyses produced interpretable results, despite noticeable minor deviations in normality and variance patterns. Such discrepancies are typical of exploratory models with limited sample sizes, as observed in this instance, which stabilize and produce more reliable statistical inferences in larger samples.

Table 5.4: Shapiro–Wilk W test for normal data

Group	Care Level	*n*	*W*	*V*	*z*	*p*
Nurses – Main effects	PHC	18	0.949	2.562	2.018	0.022*
	SHC	20	0.969	1.587	0.991	0.161
	THC	17	0.963	1.882	1.357	0.087
Nurses – Moderation effects	PHC	18	0.927	3.724	2.819	0.002**
	SHC	20	0.962	1.948	1.430	0.076
	THC	17	0.951	2.500	1.965	0.025*
Nurse managers – Main effects	Pooled	15	0.935	1.262	0.461	0.322
Nurse managers – Moderation effects	Pooled	15	0.966	0.662	-0.816	0.793

**p < .05; **p < .01; ***p < .001;*
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
W = Shapiro–Wilk W statistic;
V = Test statistic (transformed);
z = z-score approximation for normality testing;
p = p-value (probability of rejecting normality).

Table 5.4 illustrates the Shapiro–Wilk tests that were performed to evaluate the normality of standardized residuals for each regression model across various groups and care levels. The main effects models for nurses indicated that residuals at the PHC level significantly deviated from normality, W = 0.949, p = .022, whereas residuals at the SHC and THC levels did not, with p-values of .161 and .087, respectively. In the nurses' moderation models, significant deviations from normality were observed at the PHC (W = 0.927, p = .002) and THC (W = 0.951, p = .025) levels, while the SHC model residuals did not significantly deviate from normality (p = .076). Conversely, the models of the nurse managers (including both main effects and moderation) exhibited no indications of non-normality. Both the pooled main effects model (W = 0.935, p = .322) and the pooled moderation model (W = 0.966, p = .793) revealed normally distributed residuals, despite the limited sample size.

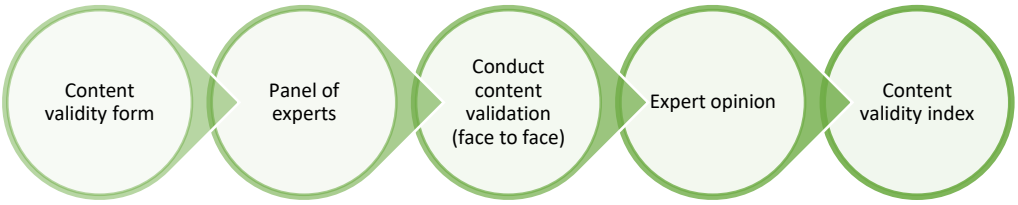


Figure 5.9: Variability content steps

Content validity involves verifying that the instrument's content adequately and comprehensively represents the construct being measured, tested through thorough evaluation of their items by experts or by consulting prior research and theoretical frameworks [221]. In this study, three experts were selected for the evaluation process, two from the field of clinical psychology and one from the field of sociology [222]. Specifically, the questionnaire items were evaluated using a four-point scale: 1 = Not relevant; 2 = Somewhat relevant; 3 = Quite relevant; 4 = Highly relevant [223]. The procedures employed to establish content validity are illustrated in Figure 5.9. The findings substantiated the content validity of the KMI questionnaire. The observed recurrence of identical Probability of Expected Agreement (Pe) and Kappa coefficient (κ) values across various items was derived using the combinatorial formula suggested by Polit and Beck [221].

Table 5.5: Content validity of the JP questionnaire

	JP	N	A	CVI	UA	Pe	κ
	Task Performance						
P1	If I need to perform a task that I am not familiar with, I seek for information that allows me to perform it better	3	3	1	1	0.13	1
P2	I do not think I could execute my tasks effectively if I did not have a certain amount of experience	3	3	1	1	0.13	1
P3	The way I perform the basic tasks required in my job is not always in agreement with what I can do (R)	3	3	1	1	0.13	1

P4	The way I perform the basic tasks required in my job corresponds completely to the performance that the organization where I work asks from me	3	3	1	1	0.13	1
	Organizational skills						
P5	It is not always easy for me to perform tasks on time.	3	3	1	1	0.13	1
P6	When I have a deadline to perform a certain task, I always finish it on time. If I had to perform a task in conjunction with other workers, I would probably be responsible for the planning, organizing, and monitoring of the work to be done	3	3	1	1	0.13	1
P7	I always leave my tasks to the last minute. I am always aware when there is a lack of the resources (material or human) needed for the efficient performance of the organization	3	3	1	1	0.13	1
P8	Sometimes, I feel disappointed with my performance at work because I know I could have done better 20. I consider myself a fundamental worker to the organization I work for, due to the high quality of my performance	3	3	1	1	0.13	1
P9	Receiving feedback (from my subordinates, my colleagues, my supervisor or from the organization) is fundamental in order for me to continue performing my duties with dedication (R)	3	2	0.67	0	0.38	0.47
	Contextual performance						
P10	When something is not right at work, I don't complain because I am afraid that others won't agree with me (R)	3	2	0.67	0	0.38	0.47
P11	Usually, I take the initiative to give constructive feedback in order to improve the performance of other workers (subordinates, colleagues, supervisor or workgroups)	3	3	1	1	0.13	1
P12	In the event the organization did not provide the training that I consider necessary to perform my duties effectively, I would seek information from other sources	3	3	1	1	0.13	1
P13	I'm still able to perform my duties effectively when I'm working under pressure	3	3	1	1	0.13	1

P14	As soon as I arrive at work, I set aside all my personal problems, so that my performance is not harmed	3	3	1	1	0.13	1
	Cooperation						
P15	Usually, I dedicate less effort to work when performing a task in conjunction with other people (R)	3	3	1	1	0.13	1
P16	I am always willing to assist other workers from the organization, even when I don't have much time available	3	3	1	1	0.13	1
P17	Usually, I also perform tasks that are not related to my specific duties	3	3	1	1	0.13	1
	Organizational conscientiousness						
P18	Frequently, I arrive late at work (R)	3	3	1	1	0.13	1
P19	It's really difficult for me to miss work, even when I'm feeling sick	3	3	1	1	0.13	1
P20	I would never adopt actions that could harm the well-being of the other workers	3	3	1	1	0.13	1
P21	When I think that the goals of the organization conflict with my personal goals, my dedication to work decreases (R)	3	3	1	1	0.13	1
P22	I take my job seriously, so I always comply with the rules and procedures imposed (by my supervisor or by the organization), even when no one is around	3	3	1	1	0.13	1
P23	My communication skills are so good that I'm always able to capture everyone's attention	3	3	1	1	0.13	1
P24	Communication inside organizations, even in workgroups, is fundamental so that people can perform their tasks effectively	3	3	1	1	0.13	1
P25	When I write a message to others (other workers or students) I feel a certain difficulty in expressing what I am thinking	3	3	1	1	0.13	1
P26	When someone has a different opinion from mine, I usually convince them that my opinion is the best	3	3	1	1	0.13	1

N = Number of experts;
A = Number of experts who rated the item as "3 = quite relevant" or "4 = highly relevant" on the 4-point relevance scale;
CVI (Content Validity Index) = Proportion of experts who agreed that an item is relevant. Calculated as A ÷ N. Values ≥ 0.78 indicate acceptable item-level validity (I-CVI);

UA (Universal Agreement) = Indicates whether all experts agreed that the item is relevant (UA = 1) or not (UA = 0);
Pe (Probability of Expected Agreement) = The probability of experts agreeing by chance alone; used to adjust the Kappa statistic;
κ (Kappa coefficient) = A chance-corrected index of inter-rater agreement:
κ ≥ 0.75 = Excellent agreement;
0.40 ≤ κ < 0.75 = Moderate to good agreement;
κ < 0.40 = Poor agreement.

Table 5.5 shows the content validity assessment results for the JP questionnaire, as evaluated by three experts. Each item was evaluated for relevance, and content validity indicators were calculated based on the agreement indices (A). The questionnaire exhibited robust content validity, as most items garnered unanimous consensus among experts, with 24 out of 26 items achieving perfect scores (CVI = 1.00, UA = 1, κ = 1). In contrast, two items (P9 and P10) attained merely partial expert unanimity, as indicated by their lower content validity indices (CVI = 0.67, UA = 0, κ = 0.47).

Table 5.6: Content validity of the MC questionnaire

	MC	N	A	CVI	UA	Pe	κ
	Communication						
M1	I listen attentively to the concerns of others	3	3	1	1	0.13	1
M2	I can share my ideas about improving services with the clinic supervisor	3	3	1	1	0.13	1
M3	I am able to write reports to meet the needs of different audiences	3	3	1	1	0.13	1
M4	I am able to communicate the specific programme targets to my staff	3	3	1	1	0.13	1
M5	I am able to inform community representatives about all the relevant clinic issues	3	3	1	1	0.13	1
	Leadership and Management						
M6	I can implement my vision for health improvements in this clinic	3	2	0.67	0	0.38	0.47
M7	I am able to implement long-term/strategic plans	3	2	0.67	0	0.38	0.47
M8	I know when to consult clinic employees when making strategic decisions	3	3	1	1	0.13	1
M9	I can deal with difficult patients and their relatives	3	3	1	1	0.13	1
M10	I encourage my staff to display a caring attitude to patients according to the Batho Pele principles ("human first/centered")	3	3	1	1	0.13	1

M11	I ensure that the risk of infection to patients in this clinic is minimized	3	2	0.67	0	0.38	0.47
	STAFF MANAGEMENT						
M12	I am able to measure clinical care programmes against National Core Standards	3	3	1	1	0.13	1
M13	I ensure that my staff receive ongoing in-service training to perform their nursing tasks	3	3	1	1	0.13	1
M14	I ensure that staff are knowledgeable about what is expected from them at work	3	3	1	1	0.13	1
M15	I supervise my staff through effective performance management for the achievement of health system goals	3	3	1	1	0.13	1
M16	I am able to delegate work to staff in an emergency context	3	3	1	1	0.13	1
M17	I have a system in place to manage staff absenteeism	3	3	1	1	0.13	1
M18	I provide constructive feedback to staff	3	3	1	1	0.13	1
M19	I monitor individual's performance in response to allocated work	3	3	1	1	0.13	1
	Financial Management						
M20	I manage the clinic budget in line with the relevant financial legislation	3	3	1	1	0.13	1
M21	I make sure that the asset register in my clinic is up-to-date	3	3	1	1	0.13	1
M22	I take prompt action when equipment is out of order	3	3	1	1	0.13	1
M23	I take prompt action when contractors fail to deliver against their service level agreement	3	3	1	1	0.13	1
M24	I engage staff about how best to use financial resources	3	3	1	1	0.13	1
M25	I educate staff about financial issues that impact on the clinic	3	3	1	1	0.13	1
M26	I can develop realistic budget projections based on previous expenditure	3	3	1	1	0.13	1
M27	I ensure that all the necessary expenses are included in the budget	3	3	1	1	0.13	1
M28	I am able to evaluate programme performance in relation to expenditure	3	3	1	1	0.13	1
	Planning and priority setting						
M29	I use clinic statistics to motivate for financial and human resources	3	3	1	1	0.13	1
M30	I involve stakeholders in determining which needs are the most important to improve clinic performance	3	3	1	1	0.13	1
M31	I generally defend the interests of the clinic	3	3	1	1	0.13	1
M32	I always carry out the most urgent tasks first	3	3	1	1	0.13	1
M33	I follow through on agreed tasks and priorities	3	3	1	1	0.13	1

M34	I am able to identify community health needs in my catchment area for use in strategic planning	3	3	1	1	0.13	1
	Problem solving						
M35	I monitor the work environment for potential safety issues that could impact on staff and patients	3	3	1	1	0.13	1
M36	I remain calm and composed in emergency situations	3	3	1	1	0.13	1
M37	I implement corrective action in a timely manner in cases of non- compliance	3	3	1	1	0.13	1
M38	I can resolve conflicts among staff	3	3	1	1	0.13	1
M39	I can identify root causes of problems in the clinic	3	3	1	1	0.13	1
M40	I gather sufficient information prior to solving a problem	3	3	1	1	0.13	1

MC = Managerial Competence;
N = Number of experts;
A = Number of experts who rated the item as "3 = quite relevant" or "4 = highly relevant" on the 4-point relevance scale;
CVI (Content Validity Index) = Proportion of experts who agreed that an item is relevant. Calculated as A ÷ N. Values ≥ 0.78 indicate acceptable item-level validity (I-CVI);
UA (Universal Agreement) = Indicates whether all experts agreed that the item is relevant (UA = 1) or not (UA = 0);
Pe (Probability of Expected Agreement) = The probability of experts agreeing by chance alone; used to adjust the Kappa statistic;
κ (Kappa coefficient) = A chance-corrected index of inter-rater agreement:
κ ≥ 0.75 → Excellent agreement;
0.40 ≤ κ < 0.75 → Moderate to good agreement;
κ < 0.40 → Poor agreement.

Table 5.6 presents the content validity assessment of the MC questionnaire, which demonstrates excellent content validity, with the vast majority of items judged highly relevant by the three experts. Particularly, 36 out of 40 items achieved perfect scores (CVI = 1.00, UA = 1, κ = 1), reflecting unanimous agreement among experts regarding their relevance, whereas the remaining four items (M6, M7, and M11) showed lower CVIs (0.67), no universal agreement (UA = 0), and moderate κ values (κ = 0.47), demonstrating only partial consensus on their relevance.

Table 5.7: Content validity of the KMAT questionnaire

	KMAT	N	A	CVI	UA	Pe	κ
KMP1	Knowledge Gaps are systematically identified and well-defined processes are used to close them.	3	3	1	1	0.13	1

KMP2	A sophisticated and ethical intelligence gathering mechanism has been developed.	3	3	1	1	0.13	1
KMP3	All staff and volunteers of the organization are involved in looking for ideas in traditional and non-traditional places.	3	3	1	1	0.13	1
KMP4	The organization has formalized the process of transferring best practices, including documentation and lessons learned.	3	3	1	1	0.13	1
KMP5	"Tacit" knowledge (what staff and volunteers know how to do, but cannot express) is valued and transferred across the organization.	3	2	0.67	0	0.38	0.47
	Leadership in Knowledge Management						
KML1	Managing organizational knowledge is central to the organization's strategy.	3	3	1	1	0.13	1
KML2	The organization understands the revenue-generating potential of its knowledge assets and develops strategies for marketing and selling them.	3	3	1	1	0.13	1
KML3	The organization uses learning to support existing core competencies and create new ones.	3	3	1	1	0.13	1
KML4	Individuals are hired, evaluated and compensated for their contributions to the development of organizational knowledge.	3	3	1	1	0.13	1
	Knowledge Management Culture						
KMC1	The organization encourages and facilitates knowledge sharing.	3	3	1	1	0.13	1
KMC2	A climate of openness and trust permeates the organization.	3	3	1	1	0.13	1
KMC3	Customer value creation is acknowledged as a major objective of knowledge management.	3	3	1	1	0.13	1
KMC4	Flexibility and a desire to innovate drive the learning process.	3	2	0.67	0	0.38	0.47
KMC5	Staff takes responsibility for their own learning.	3	3	1	1	0.13	1
	Knowledge Management Technology						
KMT1	Technology links all members of the organization to one another and to all relevant external publics.	3	3	1	1	0.13	1
KMT2	Technology creates an institutional memory that is accessible to the entire enterprise.	3	3	1	1	0.13	1
KMT3	Technology brings the organization closer to its members.	3	3	1	1	0.13	1
KMT4	The organization fosters development of "human-centered" information technology.	3	3	1	1	0.13	1
KMT5	Technology that supports collaboration is rapidly placed in the hands of staff.	3	3	1	1	0.13	1

KMT6	Information systems are real-time, integrated, and "smart."	3	3	1	1	0.13	1
	Knowledge Management Measurement						
KMM1	The organization has invented ways to link knowledge to financial results	3	3	1	1	0.13	1
KMM2	The organization has developed a specific set of indicators to manage knowledge.	3	3	1	1	0.13	1
KMM3	The organization's set of measures balances hard and soft as well as financial and non-financial indicators.	3	2	0.67	0	0.38	0.47
KMM4	The organization allocates resources toward efforts that measurably increase its knowledge base.	3	3	1	1	0.13	1

KMAT = Knowledge Management Assessment Tool;
N = Number of experts;
A = Number of experts who rated the item as "3 = quite relevant" or "4 = highly relevant" on the 4-point relevance scale;
CVI (Content Validity Index) = Proportion of experts who agreed that an item is relevant. Calculated as A ÷ N. Values ≥ 0.78 indicate acceptable item-level validity (I-CVI);
UA (Universal Agreement) = Indicates whether all experts agreed that the item is relevant (UA = 1) or not (UA = 0);
Pe (Probability of Expected Agreement) = The probability of experts agreeing by chance alone; used to adjust the Kappa statistic;
κ (Kappa coefficient) = A chance-corrected index of inter-rater agreement:
κ ≥ 0.75 = Excellent agreement;
0.40 ≤ κ < 0.75 = Moderate to good agreement;
κ < 0.40 = Poor agreement.

Table 5.7 presents the content validity results for the Knowledge Management Assessment Tool (KMAT) questionnaire, which demonstrated strong overall content validity. The majority of items were rated as highly relevant by the expert panel, whereas only three items (KMP5, KMC4, and KMM3) showed lower content validity indices (CVI = 0.67), no unanimous agreement (UA = 0), and moderate kappa values (κ = 0.47).

Table 5.8: Content validity of the KMI questionnaire

KMI		N	A	CVI	UA	Pe	κ
Indicate the extent to which the following factors represent the knowledge management infrastructure in your institution/department/clinic.							
	Component						
KMI.1	Human Resource	3	3	1	1	0.13	1
KMI.2	Training and Development	3	3	1	1	0.13	1
KMI.3	Organizational Culture	3	3	1	1	0.13	1

KMI.4	Organizational Structure	3	3	1	1	0.13	1
KMI.5	External Environment	3	3	1	1	0.13	1
KMI.6	Organizational Goals	3	3	1	1	0.13	1
KMI.7	Customers	3	3	1	1	0.13	1
KMI.8	Supply Chain	3	3	1	1	0.13	1
KMI.9	External Partners	3	3	1	1	0.13	1
KMI.10	Administrative Procedures, Rules and Policies, Codes of Conduct	3	3	1	1	0.13	1
KMI.11	Organizational Memory	3	3	1	1	0.13	1
KMI.12	IT and Security Policies	3	3	1	1	0.13	1
KMI.13	Computers Systems	3	3	1	1	0.13	1
KMI.14	Telecommunications Connectivity	3	3	1	1	0.13	1
KMI.15	Internet Access	3	3	1	1	0.13	1
KMI.16	Core and related Technologies	3	2	0.67	0	0.38	0.47
KMI.17	IT Support Systems	3	3	1	1	0.13	1
To what extent would you say knowledge management infrastructure affect the following Knowledge management process							
	Component						
	Knowledge Management Processes						
KMI.18	Knowledge Identification	3	3	1	1	0.13	1
KMI.19	Knowledge Acquisition	3	3	1	1	0.13	1
KMI.20	Knowledge Development	3	3	1	1	0.13	1
KMI.21	Knowledge Preservation	3	3	1	1	0.13	1
KMI.22	Knowledge Distribution	3	3	1	1	0.13	1
KMI.23	Knowledge Utilization	3	3	1	1	0.13	1
KMI.24	Knowledge Measurement	3	3	1	1	0.13	1
KMI.25	Knowledge verification	3	3	1	1	0.13	1
KMI.26	Knowledge Goals	3	3	1	1	0.13	1
To what extent would you say the following factors affect the acquisition of knowledge management infrastructure							
	Component						
KMI.27	Privacy, Security of information and information technology systems	3	3	1	1	0.13	1
KMI.28	Cost of core and related technology	3	2	0.67	0	0.38	0.47
KMI.29	Cost of Human Resource acquisition, training and development	3	3	1	1	0.13	1
KMI.30	Cost of Organizational Structure including Administrative procedures, Rules and Policies, Codes of Conduct	3	3	1	1	0.13	1
KMI.31	Competition environments	3	3	1	1	0.13	1
KMI.32	Cost of physical infrastructure that constitute KMI	3	3	1	1	0.13	1
KMI.33	Organizational goals	3	3	1	1	0.13	1

To what extent are you willing to participate in knowledge management infrastructure sharing by a third party?							
	Component						
KMI.34	To what extent are you willing to participate in knowledge management infrastructure sharing by a third party?	3	2	0.67	0	0.38	0.47
	Component						
KMI.35	Indicate the extent to which you perceive that knowledge management infrastructure sharing would reduce operational and deployment costs	3	3	1	1	0.13	1
KMI.35	Indicate the extent to which you perceive that knowledge management infrastructure sharing would reduce operational and deployment costs	3	3	1	1	0.13	1
To participate in social knowledge management infrastructure (KMI) sharing, what extent do you want to know about another participant?							
	Component						
KMI.36	To participate in social knowledge management infrastructure (KMI) sharing, what extent do you want to know about another participant?	3	3	1	1	0.13	1
To what extent could the following motivate you in knowledge management infrastructure sharing							
	Component						
KMI.37	Technical knowledge management infrastructure	3	3	1	1	0.13	1
KMI.38	Social knowledge management infrastructure	3	2	0.67	0	0.38	0.47
To which extent are you willing to share the following aspect of your knowledge management infrastructure							
	Component						
KMI.39	Technical knowledge management infrastructure	3	3	1	1	0.13	1
KMI.40	Social knowledge management infrastructure	3	3	1	1	0.13	1
To what extent do you consider the following as impact of knowledge management infrastructure sharing on Knowledge management							
	Component						
KMI.41	It reduces the cost of deployment	3	3	1	1	0.13	1
KMI.42	It reduces operational costs	3	3	1	1	0.13	1
KMI.43	It increases efficiency	3	3	1	1	0.13	1
KMI.44	It makes resources available to participants	3	3	1	1	0.13	1

KMI.45	It improves work culture or productivity	3	3	1	1	0.13	1
KMI.46	It helps the Organization achieve its objective or focus	3	3	1	1	0.13	1
To what extent are you willing to participate in knowledge management infrastructure sharing by a third party?							
	Component						
KMI.47	KMI Sharing	3	3	1	1	0.13	1

KMI = Knowledge Management Infrastructure;
N = Number of experts;
A = Number of experts who rated the item as "3 = quite relevant" or "4 = highly relevant" on the 4-point relevance scale;
CVI (Content Validity Index) = Proportion of experts who agreed that an item is relevant. Calculated as A ÷ N. Values ≥ 0.78 indicate acceptable item-level validity (I-CVI);
UA (Universal Agreement) = Indicates whether all experts agreed that the item is relevant (UA = 1) or not (UA = 0);
Pe (Probability of Expected Agreement) = The probability of experts agreeing by chance alone; used to adjust the Kappa statistic;
κ (Kappa coefficient) = A chance-corrected index of inter-rater agreement:
κ ≥ 0.75 = Excellent agreement;
0.40 ≤ κ < 0.75 = Moderate to good agreement;
κ < 0.40 = Poor agreement.

Table 5.8., presents the content validity assessment of the KMI questionnaire, where out of 47 items, 43 received perfect scores (CVI = 1, UA = 1, κ = 1), reflecting unanimous expert consensus regarding their relevance. Specifically, four items (KMI.16, KMI.28, KMI.34, and KMI.38) showed lower CVIs (0.67), no universal agreement (UA = 0), and moderate κ values (κ = 0.47), indicating partial agreement among experts.

Table 5.9: Spearman's Correlation Matrix – nurses (N = 55)

Variables	1. JP Score	2. KMP	3. KMI	4. MC
1. JP of nurses	1.000			
2. KMP	.389	1.000		
3. KMI	.533	.644	1.000	
4. MC	.512	.533	.697	1.000

Correlation coefficients (r) = Pearson's correlation coefficients indicating the strength and direction of linear relationships among the variables;
Ranges from –1.00 to +1.00, where:
- *r > 0 = Positive relationship (as one variable increases, the other tends to increase);*
- *r < 0 = Negative relationship (as one variable increases, the other tends to decrease);*
- *|r| ≈ 0 = Weak or no linear relationship;*

JP = Job Performance of nursing staff;
KMI = Knowledge Management Infrastructure;
KMP = Knowledge Management Process;

MC = Managerial Competence.

Table 5.9 shows that JP of nurses was significantly and positively correlated with KMP (r =.39, p <.01), KMI (r = .53, p < .01), and MC of nurse managers (r = .51, p < .01). KMP was strongly correlated with KMI (r =.64, p <.01) and MC (r = .53, p < .01). KMI was also strongly associated with MC of nurse managers (r = .70, p < .01). When results were disaggregated by care level (Spearman analyses; Tables 3–5 in the Appendix), the pattern varied. In PHC, JP showed a strong positive correlation with KMI (r = .75, p < .01) and MC (r = .57, p < .01). At the SHC level, correlations were weaker, with only MC showing a moderate, non-significant correlation to JP (r = .16, ns). In THC, JP correlated strongly with MC (r = .62, p < .01), whereas its correlation with KMP was not significant (r = .07, ns).

Table 5.10: Spearman's Correlation Matrix – nurse managers (N = 15)

Variables	1. JP Score	2. KMP	3. KMI	4. MC
1. JP Score	1.000			
2. KMP	.284	1.000		
3. KMI	.143	.691	1.000	
4. MC	–.039	.225	.541	1.000

Correlation coefficients (r) – Pearson's correlation coefficients indicating the strength and direction of linear relationships among the variables;
r ranges from –1.00 to +1.00, where:

- *r > 0 = Positive relationship (as one variable increases, the other tends to increase)*
- *r < 0 = Negative relationship (as one variable increases, the other tends to decrease)*
- *|r| ≈ 0 = Weak or no linear relationship*

JP = Job Performance of nursing staff;
MC = Managerial Competence;
KMI = Knowledge Management Infrastructure;
KMP = Knowledge Management Process.

Table 5.10 shows that JP of nurse managers was not significantly correlated with KMP (r = .28, ns), KMI (r = .14, ns), or MC (r = –.04, ns). KMP was strongly correlated with KMI (r = .69, p < .01). MC was moderately correlated with KMI (r = .54, p < .05), but not with KMP (r = .22, ns).

Table 5.11: Independent t-test for MC, by work-title

Group	N	Mean	SD	95% CI (Lower–Upper)
Nurses	852	7.89	1.59	7.78 – 7.99

Managers	135	8.42	1.61	8.15 – 8.69
Total	987	7.96	1.60	7.86 – 8.06
Difference		–0.53		–0.82 – –0.24

N = Number of participants included in each group;
Mean = The average score of the variable (i.e., Job Performance) for each group;
SD = Standard Deviation;
CI = Confidence Interval.

The independent samples t-test results presented in Table 5.11 demonstrate that nurse managers (M = 8.42, SD = 1.61) self-reported significantly higher levels of their MC than those reported to them by Subordinates/Nurses (M = 7.89, SD = 1.59), t(985) = –3.56, p = .001.

5.2 Quantitative data analyses

This section presents the results of the empirical analyses conducted to examine the main effects of KMP, KMI, and the moderating role of MC on the JP of nurses and nurse managers across the three healthcare levels. The analytical sequence includes descriptive statistics, correlation analyses, regression diagnostics, multiple regression models, and moderation analyses. Initially, the main effects are reported using composite-level regression models, followed by detailed dimension-level analyses of KMP and KMI. Subsequent moderation analyses assess whether MC and its dimensions alter these relationships. Regression analyses for nurses are conducted separately for each healthcare level, whereas those for nurse managers are estimated using pooled models because of the smaller sample sizes within individual care levels. Finally, the moderation effects of nurse managers' MC are estimated using both the composite MC score and its dimensions. Supplementary tables and outputs are included in the Appendix to provide full statistical detail and to ensure transparency and replicability.

Descriptive analyses begin with an overview of participants' demographic and professional characteristics, followed by summary measures for the key variables, including JP, KMP, KMI, and MC. Descriptive indicators portray overall data distributions and assessed variability within and across the three healthcare levels. They offered essential insights into the dataset prior to proceeding with the inferential analyses

Table 5.12: Descriptive statistics of participants, by care level (N=987)

Variable	Level	N	Mean	SD	Min	Max
JP (Nurses)	PHC	330	3.69	0.38	1.64	4.49
	SHC	276	3.79	0.40	1.61	4.49
	THC	246	3.72	0.37	2.11	4.75
JP (Managers)	PHC	23	3.79	0.32	3.26	4.52
	SHC	44	3.80	0.41	2.54	4.43
	THC	68	3.86	0.45	1.83	4.67
KMP	PHC	353	3.46	0.84	1.00	5.00

	SHC	320	3.79	0.72	1.00	5.00
	THC	314	3.50	0.92	1.00	5.00
	PHC	353	3.76	0.57	2.00	5.00
KMI	SHC	320	3.94	0.58	2.38	5.00
	THC	314	3.75	0.70	1.53	5.00
	PHC	353	7.80	1.59	2.00	10.00
MC	SHC	320	8.06	1.53	1.20	10.00
	THC	314	8.20	1.59	1.49	10.00

PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
JP = Job Performance;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
N = Sample size (number of respondents);
Mean = Average score of the variable;
SD = Standard deviation (degree of variability);
Min = Minimum observed score;
Max = Maximum observed score.

Table 5.12 presents the descriptive statistics for the primary study variables across the three tiers of healthcare. Nurses generally indicated elevated JP levels, with mean scores varying from 3.69 at the PHC level to 3.79 at the SHC level. Nurse managers exhibited a comparable trend, with marginally elevated scores noted at the THC level institutions (M = 3.86, SD = 0.45). Across all care levels, KMI consistently achieved higher mean values than KMP, indicating that infrastructural enablers are more developed than process-related mechanisms. The mean MC of nurse managers showed a gradual increase from the PHC (M = 7.80) to the THC level (M = 8.20).

Table 5.13: Sociodemographic characteristics of the participants

Characteristics	Nurse Director (N=21)		Nurse Head (N=114)		Nurse (N=852)	
	N	%	N	%	N	%
Care level						
PHC	–	–	23	20.2%	330	38.7%
SHC	6	28.6%	38	33.3%	276	32.4%
THC	15	71.4%	53	46.5%	246	28.9%
Age (collapsed)						

Characteristics	Nurse Director (N=21)		Nurse Head (N=114)		Nurse (N=852)	
	N	%	N	%	N	%
22–39 years	–	–	24	21.1%	441	51.8%
40–59 years	–	–	78	68.4%	355	41.7%
60–65 years	–	–	12	10.5%	56	6.6%
Gender						
Female	18	86.7%	76	68.0%	660	77.7%
Male	3	13.3%	38	32.0%	192	22.3%
Ethnicity (collapsed)						
Albanian	21	100%	113	99.1%	830	97.4%
Minority groups*	–	–	–	–	22	2.6%
*Includes Serbian, Bosnian, Turkish, Other						
Education level (collapsed)						
High school	–	–	21	18.4%	282	33.1%
Bachelor	6	28.6%	48	42.1%	470	55.2%
Master / PhD	–	–	–	–	100	11.7%
Work experience (collapsed)						
0–10 years	–	–	16	14.0%	441	51.7%
11–20 years	–	–	34	29.8%	234	27.5%
>20 years	14	66.7%	64	56.1%	177	20.8%
Municipality (collapsed)						
Pristina region	–	–	58	50.9%	312	36.6%
Gjakova region	–	–	12	10.5%	65	7.6%
Other municipalities (combined)**	–	–	44	38.6%	475	55.8%
Healthcare institution (collapsed)						
PHC (CFMC/FMC)	–	–	22	19.3%	323	37.9%
Regional Hospital (SHC)	6	28.6%	38	33.3%	276	32.4%
UCCK (THC)	15	71.4%	53	46.5%	246	28.9%
Urgent Centre	–	–	–	–	7	0.8%
Works in private sector						
Yes	3	14.3%	14	12.3%	99	11.6%
No	18	85.7%	100	87.7%	753	88.4%
Workload (collapsed)						
<10 clients	–	–	39	34.2%	180	21.2%
11–19 clients	–	–	50	43.9%	167	19.6%
20–39 clients	–	–	14	12.3%	338	39.7%
≥40 clients	–	–	11	9.6%	167	19.6%

N = Number of participants;

% = Percentage of total participants;
Nurse Director = senior-level nurse overseeing multiple departments or facilities;
Nurse Head = ward or unit-level nurse manager responsible for daily operational leadership;
Nurse = registered nursing staff providing direct patient care;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
CFMC = Central Family Medicine Center;
FMC = Family Medicine Center;
UCCK = University Clinical Center of Kosovo.

Table 5.13 presents the demographic and professional characteristics of the main study sample, which consisted of nurse directors (N=21), nurse heads (N=114), and nurses (N=852). The distribution of attributes demonstrates a clear gradient by work title, reflecting differences in seniority, experience, and institutional placement. Nurse directors represented the smallest group (2.4% of the sample). As shown in the anonymized table, detailed demographic distributions for this subgroup are suppressed to ensure confidentiality due to the small group size. However, available aggregated information indicates that directors were predominantly female and exclusively of Albanian ethnicity. Consistent with their leadership role, they held the highest educational attainment within the nursing workforce, with most possessing bachelor's or master's degrees. Their professional experience was similarly advanced, with a substantial majority reporting more than 20 years in the field. Nurse directors were primarily concentrated in the THC institutions, particularly the University Clinical Centre of Kosovo (UCCK), and were almost entirely employed in the public sector. Their workload patterns could not be fully disaggregated due to anonymity constraints, although directors generally combined administrative oversight with some level of clinical engagement.

Nurse heads constituted a larger and more diverse managerial group. While detailed characteristics for subgroups with low cell counts are suppressed, aggregated results indicate that the vast majority were Albanian and that women comprised approximately two-thirds of this group. Educationally, nurse heads displayed a strong academic profile, with a substantial proportion holding bachelor's or master's degrees. They were also a highly experienced cohort, with most having more than 20

years of work experience. Geographically, more than half were based in Pristina, with allocations across other municipalities appearing in aggregated categories. Occupationally, nurse heads were mainly affiliated with institutions of the SHC and THC levels, notably UCCK and regional hospitals. Most served exclusively within the public sector. Their workload distribution, based on available safe categories, suggests a stronger emphasis on supervisory and coordination responsibilities rather than intensive patient loads.

Nurses formed the largest share of the sample (86.3%), representing the operational backbone of the healthcare system across care levels. As reflected in the anonymized table, they were predominantly female (77.7%) and Albanian (97.4%), with minority ethnic groups reported only in aggregated form for confidentiality. Compared to managerial personnel, nurses tended to have lower levels of educational attainment, with the majority holding bachelor's degrees and a sizable proportion having completed only secondary education. Their experience profile was more varied, spanning early-, mid-, and late-career stages. Nurses were distributed across municipalities in patterns reflecting the broader population distribution and institutional placement, with the largest share located in Pristina. They worked across the full spectrum of healthcare levels, with the highest proportions at the PHC level (38.7%) and the SHC (32.4%) levels. Workload patterns showed that nurses bore the highest client volumes in the system, with substantial proportions reporting daily caseloads exceeding 20 clients, underscoring their front-line clinical role.

Before proceeding with regression modelling, bivariate associations among the principal study constructs, namely JP, KMP, KMI, and MC, were examined. A pooled Spearman correlation matrix is presented in the main text, while subgroup-specific correlations (PHC, SHC, THC and pooled nurse managers) are provided in Appendix Tables 0.1–0.3. These analyses revealed broadly consistent patterns across subgroups and no indications of problematic collinearity, thereby supporting the robustness of the subsequent regression analyses. Together, these descriptive and preliminary correlational findings establish the empirical foundation for evaluating

the hypothesized relationships between knowledge management components, managerial competence, and nurse job performance.

Table 5.14: Spearman's Correlation Matrix – nurses (N = 852)

Variables	JP Score	KMP	KMI	MC
JP (Nurses)	1.000			
KMP	.309***	1.000		
KMI	.430***	.585***	1.000	
MC	.392***	.461***	.529***	1.000

p < .05, p < .01, p < .001;
JP = Job Performance of nursing staff;
MC = Managerial Competence;
KMI = Knowledge Management Infrastructure;
KMP = Knowledge Management Process.

Table 5.14 shows the Spearman's the correlation analysis, which demonstrated the prevalence of significant positive associations among all variables. JP was positively correlated with KMP (p = .309, p < .001), KMI (ρ = .430, p < .001), and MC (ρ = .392, p < .001). Furthermore, KMP was strongly associated with KMI (ρ = .585, p < .001) and with the MC of nurse managers (ρ = .461, p < .001). KMI also showed a significant positive relationship with MC (ρ = .529, p < .001).

To further examine contextual differences, the subgroup-specific, correlation matrices were derived separately each care level. The respective results are presented in Tables 0.1-0.3 in the Appendix. The comparison revealed variations in the magnitude of correlations across healthcare settings. Upon comparison of the pooled results with those obtained at the care level, several disparities in the strength of associations were observed. All three predictors—KMP, KMI, and MC—exhibited the strongest correlations with JP at the SHC subgroup, suggesting a more cohesive alignment between management practices, competence, and performance in that context. JP of nurses, working at the PHC level, and KMI were found to have a moderate-to-strong correlation, whereas at the THC level weaker correlations were derived.

Table 5.15: Spearman's Correlation Matrix – Nurse managers (N = 135)

Variables	1. JP Score	2. KMP	3. KMI	4. MC

1. JP (Nurse managers)	1.000			
2. KMP	.287***	1.000		
3. KMI	.346***	.570***	1.000	
4. MC	.384***	.362***	.439***	1.000

N = Number of participants;
p < .05, p < .01, p < .001;
JP = Job Performance of nursing staff;
MC = Managerial Competence;
KMI = Knowledge Management Infrastructure;
KMP = Knowledge Management Process.

As shown in Table 5.15, the JP of nurse managers was found to be directly correlated with the respective predictors, albeit at lower magnitudes. Specifically, JP of nurse managers was correlated with MC (ρ = .384, p < .001), KMI (ρ = .346, p < .001), and KMP (ρ = .287, p < .001). Furthermore, KMP was significantly correlated with both KMI (ρ = .570, p < .001) and MC (ρ = .362, p < .001). Conversely, KMI was positively correlated with MC (ρ = .439, p < .001).

Additionally, the Variance Inflation Factors (VIFs) for all four main regression models confirmed the lack of multicollinearity among predictors, as shown in the tables. Although some categorical predictors, particularly those representing extreme categories of Work Experience and Workload, displayed elevated VIF values, these were isolated cases and did not substantially affect the interpretability or stability of the regression results.

Table 5.16: Variance Inflation Factor, main effects models

Model	Mean VIF	Mean 1/VIF
Nurses – PHC	3.66	0.27
Nurses – SHC	2.96	0.34
Nurses – THC	3.12	0.32
Nurse managers – Pooled	3.79	0.26

p < .05, p < .01, p < .001;
VIF = Variance Inflation Factor;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

Table 5.16 summarizes the VIF diagnostics for all main-effects regression models. Specifically, for nurses, the mean VIF values ranged from 2.96 at the SHC level to 3.66 at the PHC level, with corresponding tolerance values (1/VIF) between 0.27 and 0.34,

suggesting moderate but acceptable correlations among predictors. Correspondingly, the pooled model for nurse managers produced a mean VIF of 3.79 (1/VIF = 0.26), confirming that the explanatory variables are sufficiently independent. What is more, the VIF values for each variable for the three models of nurses and the one for nurse managers are presented in Tables 0.4 and 0.5 in the Appendix. For nurses in PHC, VIF values ranged from 1.04 to 11.41 (M = 3.66). All of the included variables exhibited VIF values below the conventional threshold of 10 (Hair et al., 2019), except the Workload category of 40 clients per day (VIF = 11.41). At the SHC model, VIFs ranged from 1.07 to 6.74 (M = 2.96), and at the THC model from 1.08 to 7.06 (M = 3.12), all well below the critical cut-off.

Lastly, the pooled nurse manager model showed VIFs between 1.09 and 12.83 (M = 3.79). The violation of the respective threshold occurred in the case of the Professional experience variable, namely its category of greater than 20 years. To evaluate whether the above-threshold VIF values indicated multicollinearity concerns, a joint Wald test was performed for the set of Work load categories.

Table 5.17: Joint Wald test for Workload categories at the PHC level regression model of nurses

Predictor Block	df_1	df_2	F	p
Workload (number of daily clients)	5	113	0.85	.459

df_1 = numerator degrees of freedom;
df_2 = denominator degrees of freedom;
F = F-statistic;
p = significance level.

Table 5.17 shows the non-significant result joint Wald test, namely F(5, 305) = 0.85, p = .459. The regression model as a whole did not suffer from multicollinearity, meaning that the above-threshold value represents a localized redundancy within the Workload dummies rather than a true multicollinearity issue. Therefore, the Workload variable was kept as a control factor, too.

Table 5.18 Joint Wald test for Workload categories in the pooled regression model of nurse managers

Predictor Block	df_1	df_2	F	p
Total Experience (years)	4	113	3.03	.021

df_1 = numerator degrees of freedom;
df_2 = denominator degrees of freedom;
F = F-statistic;
p = significance level.

In Table 5.18, it is shown that the Wald test yielded a significant result, F(4, 113) = 3.03, p = .021, indicating that some overlap existed among the experience-related dummy variables. However, because this effect was localized and the overall VIFs remained below critical levels. Hence, the variable "Total Experience" was retained in the regression model as a control factor, as well.

5.2.1 Main effects of KMP and KMI

This sub-section reports the results of multivariable linear regressions estimating the effects of KMP, KMI, and MC on JP. For nurses, models are estimated separately by care level to capture contextual heterogeneity; for nurse managers, analyses use a pooled specification due to smaller subgroup sizes. All models include demographic and organizational controls (gender, age group, ethnicity, education, professional experience, private-sector work, and daily workload). The unstandardized coefficients (B), 95% confidence intervals (CI), and p-values are reported, along with model fit (R^2).

Table 5.19: JP of nurses regressed by KMP, KMI, MC, and control factors, care-level–specific effects

Predictor	PHC (N=330, R^2=.281)			SHC (N=276, R^2=.482)			THC (N=246, R^2=.199)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMP	-0.047	.077	[-0.099, 0.005]	0.085*	0.011	[0.019, 0.151]	0.030	.348	[-0.033, 0.092]
KMI	0.280***	.001	[0.167, 0.392]	0.205***	0.000	[0.104, 0.307]	0.060	.141	[-0.020, 0.139]

KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
p < .05, p < .01, p < .001;

B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size.

The regression results presented in Table 5.19 depict how each of the respective factors contributed to JP of nurses across the three levels of healthcare, highlighting the contextual nature of KM. Notably, KMI constituted the most stable and substantial predictor at the PHC level and SHC levels, whereas KMP offered incremental value primarily at the SHC level. Moreover, the impact of KMP differed depending on the level of care, as it demonstrated a significant positive association with JP of nurses operating at the SHC level (B = 0.085, p =.011) only.

On the contrary, KMI showed the most significant and reliable effects for the performance of nurses in the PHC. KMI significantly and positively predicted JP at the PHC level (B = 0.280, p <.001), with a one-unit increase in KMI yielding a sizeable increase in JP. A similar significant pattern was observed at the SHC level (B = 0.205, p <.001). However, KMI did not significantly predict JP at the THC level (B = 0.060, p =.141). The complete regression output, including all controls is reported in Appendix Table 0.6.

To examine whether the effects of KMP and KMI on JP vary systematically across healthcare levels interaction terms with Care Level were introduced.

Table 5.20: JP of nurses regressed by moderation terms of KMP x Care level, and KMI x Care level, differences between care levels (N = 852, R^2 = .293)

Predictor	B	p	95% CI
KMP × PHC	–0.046	.076	[–0.097, 0.005]
KMP × SHC	0.125**	.004	[0.041, 0.209]
KMP × THC	0.088*	.024	[0.011, 0.165]
KMI × PHC	0.283***	.001	[0.171, 0.394]
KMI × SHC	–0.080	.305	[–0.234, 0.073]
KMI × THC	–0.219**	.001	[–0.353, –0.085]

p < .05, p < .01, p < .001;
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;

KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

Table 5.20 shows the moderation results by Care Level, which indicate that the effects of KMP and KMI on JP of nurses differ significantly across healthcare levels.

Specifically, KMP acted as a negative and non-significant predictor of JP of nurses at the PHC level (B = −0.046, p = .076), but showed significant positive associations at both the SHC (B = 0.125, p = .004) and THC (B = 0.088, p = .024) levels.

In contrast, KMI demonstrated a robust positive overall effect (B = 0.283, p = .001), but this relationship was significantly moderated downward at the THC level (B = –0.219, p = .001). At the SHC level, the moderation effect was negative but non-significant (B = –0.080, p = .305). Control variables were included in all models, but the main interpretation focuses on the moderation terms of KMP and KMI with Care level. The complete regression output, including all controls is reported in Appendix Table 0.7.

Additionally, the differences of effects of KMP and KMI on JP of nurses across care levels were evaluated by the Joint Wald F-tests (testparm).

Table 5.21 Joint Wald F-Tests for interaction effects between KMP x KMI and Care Level on JP of nurses (N = 852)

Predictor Interaction	F(2, 820)	p
KMP × Care Level	5.59	.0039
KMI × Care Level	8.15	.0003

p < .05, p < .01, p < .001;
F = Joint Wald F-Tests;
p = Significance level;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure.

The Joint Wald F-tests presented in Table 5.21 confirm that the effects of both KMP and KMI on JP differ significantly across care levels, with F(2, 820) = 5.59, p = .004 for KMP × Care Level and F(2, 820) = 8.15, p < .001 for KMI × Care Level.

Table 5.22: JP of nurses regressed by dimensions of KMP at the SHC level (N=276)

Predictor	JP of nurses at the SHC level (R^2 = .491)		
	B	p	95% CI
KMP Dimension			
KMP – Identification	0.055*	.027	[0.006, 0.103]
KMP – Capture	–0.027	.314	[–0.079, 0.026]
KMP – Sharing	0.025	.367	[–0.029, 0.078]
KMP – Application	0.038	.192	[–0.019, 0.096]
KMP – Measurement	–0.001	.959	[–0.055, 0.052]

p < .05, p < .01, p < .001;
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
KMP = Knowledge Management Process.

Table 5.22 presents the regression results demonstrating the varied effects of the five KMP dimensions on JP of nurses at the SHC level. Consistent with the composite analysis, the Knowledge Identification dimension emerged as the only significant predictor. The effect was statistically significant and positive (B = 0.055, p = .027). The complete regression output, including all controls, is reported in Appendix Table 0.8. The subsequent analysis investigated which specific aspects of JP were most affected by KMP-Identification.

Table 5.23: Dimensions of JP of nurses regressed by dimensions of KMP at the SHC level (N = 276)

Predictor	Dimensions of JP of nurses																	
	Task Performance			Organizational Skills			Contextual Performance			Cooperation			Conscientiousness			Interpersonal		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
Dimensions of KMP																		
Identification	0.131**	.010	[0.032, 0.230]	–0.002	.973	[–0.093, 0.090]	0.018	.687	[–0.069, 0.104]	0.081	.157	[–0.031, 0.193]	0.151**	.002	[0.057, 0.246]	–0.050	.141	[–0.117, 0.017]

** p < .05, ** p < .01, *** p < .001*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
KMP = Knowledge Management Process.

Table 5.23 presents the regression results linking dimensions of KMP to dimensions of JP among nurses at the SHC level. The Identification dimension again stands out as the only consistently influential factor, significantly predicting Task Performance (B = 0.131, p = .010) and Conscientiousness (B = 0.151, p = .002). Interpreted in practical terms, a one-unit increase in Identification is associated with a 0.131-point increase in nurses' Task Performance, and a 0.151-point increase in Conscientiousness. The complete regression output, including all controls is reported in Appendix Table 0.9.

In addition, given that the composite-level regression results demonstrated that KMI significantly predicted the JP of nurses at both the PHC and SHC levels. Based on these results, within the respective healthcare levels, the dimension-level analyses for the KMI, namely, the effect of KMI Structure, Shared Knowledge, Physical Infrastructure, Information Technology (IT), and Culture on the composite and dimensions of JP of nurses were conducted.

Table 5.24: JP of nurses regressed by dimensions of KMI at the PHC and SHC levels

Predictor	JP of nurses					
	PHC			SHC		
	B	p	95% CI	B	p	95% CI
Dimensions of KMI						
Structure	–0.056	.182	[–0.138, 0.026]	0.085	.091	[–0.014, 0.184]
Shared Knowledge	0.138*	.017	[0.025, 0.251]	0.067	.344	[–0.072, 0.207]
Physical	–0.060	.115	[–0.134, 0.015]	–0.019	.627	[–0.094, 0.057]
IT	0.120*	.024	[0.016, 0.225]	–0.057	.355	[–0.177, 0.064]
Culture	0.112	.170	[–0.048, 0.273]	0.122	.079	[–0.014, 0.259]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
KMI = Knowledge Management Infrastructure.

Table 5.24 shows that at the PHC level, two specific dimensions of KMI, namely Shared Knowledge (B = 0.138, p = .017) and Information Technology (IT) (B = 0.120, p = .024), emerged as significant predictors of the JP of nurses.

By contrast, the other dimensions of KMI, including Structure, Physical Infrastructure, and Culture, did not reach statistical significance. Practically, a one-unit increase in Shared Knowledge is associated with a 0.138-point increase in expected JP, while a one-unit increase in IT corresponds to a 0.120-point increase in JP. Conversely, at the SHC level, a different pattern emerged, whereby none of the individual KMI dimensions achieved statistical significance. However, the KMI dimension of Organizational Culture showed a marginally positive trend (B = 0.122, p = .079), indicating that a one-unit increase in Culture would correspond to a 0.122-point increase in JP, although this effect did not meet conventional significance thresholds. The complete regression output, including all control variables, is reported in Appendix Table 0.10.

Table 5.25: Dimensions of JP of nurses regressed by dimensions of KMI at the PHC level (N=330)

Predictor (Dimension of KMI)	Dimensions of JP of nurses																	
	Task Performance			Organizational Skills			Contextual Performance			Cooperation			Conscientiousness			Interpersonal Relations		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMI–Shared Knowledge	0.185*	.013	[.039, .331]	0.168**	.002	[.064, .272]	0.217**	.001	[.093, .341]	0.243**	.003	[.082, .404]	0.290**	<.001	[.146, .434]	0.211**	<.001	[.097, .324]
KMI–IT	0.221**	.009	[.056, .387]	0.141*	.023	[.020, .262]	0.197**	.002	[.072, .322]	0.290**	<.001	[.133, .446]	0.330**	<.001	[.182, .478]	0.223**	.002	[.083, .364]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
KMI = Knowledge Management Infrastructure.

In Table 5.25, the results of the disaggregated analyses show that Shared Knowledge acted as a consistent and significant predictor of JP of nurses, specifically for the dimensions of Task Performance (B = 0.185, p = .013), Organizational Skills (B = 0.168, p = .002), Contextual Performance (B = 0.217, p = .001), Cooperation (B = 0.243, p = .003), Conscientiousness (B = 0.290, p < .001), and Interpersonal Relations (B = 0.211, p < .001). Substantively, a one-unit increase in Shared Knowledge corresponds to increases ranging from 0.168 to 0.290 points across these JP dimensions, indicating meaningful and widespread improvements in nurses' performance at the PHC level.

Similarly, the KMI dimension of Technology and Information Infrastructure (IT) emerged as a consistent and significant enabler of nurses' JP across all six measured dimensions. Specifically, it was positively associated with the Task Performance (B = 0.221, p = .009), Organizational skills (B = 0.141, p = .023), Contextual performance (B = 0.197, p = .002), Cooperation (B = 0.290, p < .001), Conscientiousness (B = 0.330, p < .001), and Interpersonal relations (B = 0.223, p = .002). In practical terms, a one-unit increase in IT is linked to performance gains ranging from 0.141 to 0.330 points. The complete regression outputs for the KMI dimension of Shared Knowledge and IT-structure, including all control factors are reported in Appendix Tables 0.11 and 0.12, respectively.

Table 5.26: JP of nurse managers regressed by KMP and KMI, by Care-Level (lincom) (N = 135)

Predictor	Care Level	*B*	SE	*t*	*p*	95% CI
	PHC	–0.313*	0.136	–2.31	.023	[–0.582, –0.044]
KMP	SHC	0.048	0.064	0.75	.455	[–0.079, 0.175]
	THC	0.043	0.053	0.81	.422	[–0.063, 0.149]
	PHC	0.213	0.110	1.94	.055	[–0.005, 0.431]
KMI	SHC	0.203	0.114	1.78	.078	[–0.023, 0.429]
	THC	0.065	0.069	0.94	.350	[–0.072, 0.201]

p < .05, p < .01, p < .001;
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

As seen in Table 5.26, for KMP, the effect of KMP on the JP of nurse managers was significant and negative at the PHC level (B = –0.31, t = –2.31, p = .023) level, indicating that stronger process-management practices were associated with slightly lower job-performance ratings. At the SHC (B = 0.05, p = .46) and THC (B = 0.04, p = .42) levels, the slopes were positive but not significant, suggesting that the negative association appears to attenuate and reverse in higher-level institutions.

For KMI, the effect was positive across all care levels, marginally significant at the PHC level (B = 0.21, p = .055) level, and non-significant at the SHC (B = 0.20, p = .078) and THC (B = 0.07, p = .35) levels. Similarly, the moderation analyses by care level revealed statistically significant differences across healthcare levels for KMP, while no significant differences were detected for KMI. Considering the significant regression results at the composite-pooled-level analyses for the JP of nurse managers, where KMP was significant, the disaggregate level analyses were conducted as a follow-up, seeking to evaluate whether any of the KMP dimensions more strongly drive nurse managers' performance relatively more.

Table 5.27: JP of nurse managers regressed by moderation terms of KMP x Care level, and KMI x Care level, differences between care level (N = 135, R^2 = .448)

Predictor	B	p	95% CI
KMP x Care level			
KMP × PHC	–0.313*	.023	[–0.582, –0.044]
KMP × SHC	0.361*	.017	[0.066, 0.656]
KMP × THC	0.356*	.013	[0.077, 0.635]
KMI x Care level			
KMI × PHC	0.213	.055	[–0.005, 0.431]
KMI × SHC	–0.010	.951	[–0.337, 0.317]
KMI × THC	–0.149	.247	[–0.402, 0.105]

p < .05, p < .01, p < .001;
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

In Table 5.27, the results indicate that, similar to the findings for nurses, the relationship between the KM predictors (KMP and KMI) and the JP of nurse managers is context-dependent, varying significantly across care levels. The interaction terms reveal that KMP exerts different effects depending on whether nurse managers operate at the PHC, SHC, or THC levels.

Specifically, KMP acted as a significant negative predictor in PHC(B = –0.313, p = .023), suggesting that in lower-intensity care environments, higher engagement in KMPs may not translate into improved performance, and may even inhibit it. Conversely, KMP showed significant positive associations at both the SHC (B = 0.361, p = .017) and THC (B = 0.356, p = .013) levels.

For the KMI interactions, none of the effects reached conventional levels of statistical significance, although the coefficient in PHC approached significance (B = 0.213, p = .055).

The complete regression results, including all control variables, are presented in Appendix Table 0.13. These findings were further supported by Joint Wald F-tests (testparm), which confirmed significant differences across care-level interaction terms for KMP.

Table 5.28: Joint Wald F-Tests for interaction effects between KMP x Care Level and KMI x Care Level on JP among nurse managers (testparm) (N = 135)

Predictor Interaction	F(2, 107)	*p*
KM Process × Care Level	3.34	.039
KM Infrastructure × Care Level	1.01	.366

** p < .05, ** p < .01, *** p < .001;*
p = Significance level;
F = joint Wald F-tests (testparm in Stata).

Table 5.28 shows the results of the joint Wald F-tests reconfirmed that the effect of KMP on JP among nurse managers differed significantly across healthcare levels, F(2, 107) = 3.34, p = .039, whereas that of KMI did not, F(2, 107) = 1.01, p = .366.

Besides, given the significant effects of the composite measure of KMP on the JP of nurse managers at the PHC level, the subsequent analysis determined which of the KMP dimensions contributed the most to this outcome.

Table 5.29: JP of nurse managers regressed by dimensions of KMP, Care-level–specific effects (lincom results) (N = 135)

KMP Dimension →	Care Level	B	p	95% CI
	PHC	−0.011	.876	[−0.145, 0.124]
Identification (R^2 = .432)	SHC	0.068	.447	[−0.109, 0.245]
	THC	0.016	.821	[−0.124, 0.155]
Capture (R^2 = .430)	PHC	−0.093	.605	[−0.447, 0.262]
	SHC	−0.043	.636	[−0.225, 0.138]
	THC	−0.075	.188	[−0.187, 0.037]
Sharing (R^2 = .427)	PHC	0.189	.081	[−0.024, 0.402]
	SHC	−0.040	.586	[−0.187, 0.106]
	THC	0.062	.345	[−0.067, 0.190]
Application (R^2 = .447)	PHC	0.017	.857	[−0.171, 0.205]
	SHC	0.151	.092	[−0.025, 0.326]
	THC	0.057	.326	[−0.058, 0.173]
Measurement (R^2 = .444)	PHC	−0.210**	.005	[−0.355, −0.064]
	SHC	−0.046	.634	[−0.237, 0.145]
	THC	−0.023	.585	[−0.108, 0.061]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMP = Knowledge Management Process;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

The results presented in Table 5.29 show the care-level–specific effects of the five dimensions of KMP on the JP of nurse managers, estimated using the post-estimation linear combination tests. Out of the five dimensions, the Knowledge Measurement dimension contributed the most to the previously identified KMP composite effects. Precisely, a statistically significant negative relationship with performance outcomes of nurse managers was observed at the PHC level (B = −0.210, p = .005). Pragmatically, a

one-unit increase in the Measurement dimension of KMP is associated with a 0.210-point decrease in expected JP among nurse managers in primary care. Consistent with the composite-level findings, this particular KMP dimension was found to exhibit no significant effects, namely a negligible practical impact on the JP of nurse managers at the SHC (B = −0.046, p = .634) or THC (B = −0.023, p = .585) levels. To evaluate the significance of these differences across the health care levels, a moderation analysis was employed.

Table 5.30: JP of nurse managers regressed by KMP dimension of Measurement, differences between care levels (N = 135)

KMP Dimension →	Care level	B	p	95% CI
Measurement *(R^2 = .444)*	PHC	–0.210	.005	[–0.355, –0.064]
	SHC	0.164	.191	[–0.083, 0.410]
	THC	0.186	.032	[0.016, 0.356]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

Table 5.30 shows that the KMP dimension of Knowledge Measurement exerted a significant negative effect on the JP of nurse managers working at the PHC level (B = –0.210, p = .005). In contrast, it demonstrates that although such negative effects turned into positive ones at the SHC and THC levels, they failed to reach statistical significance. Given that this was the only dimension of KMP that emerged as significant predictor of the composite JP of nurse managers at the PHC level, the subsequent analyses focused on disentangling its influence on the dimensions of JP.

Table 5.31: Dimensions of JP of nurse managers regressed by KMP dimension of Measurement at the PHC level (N = 135)

Predictor	Dimension of JP of nurse managers																	
	Task Performance (R^2 = .186)			Organizational Skills (R^2 = .064)			Contextual Performance (R^2 = .248)			Cooperation (R^2 = .169)			Conscientiousness (R^2 = .180)			Interpersonal Relations (R^2 = .116)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMP dimension																		
Measurement	−0.133	.437	[−0.471, 0.205]	−0.124	.224	[−0.325, 0.077]	−0.313	.043	[−0.615, −0.010]	−0.324	.007	[−0.556, −0.092]	−0.170	.184	[−0.422, 0.082]	−0.004	.977	[−0.252, 0.245]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
PHC=Primary Health Care.

Table 5.31 presents the KMP dimension of Measurement exhibiting different effects on the dimensions of JP of nurse managers affiliated with healthcare institutions at the PHC level. Statistically significant negative relationships were observed for Contextual Performance (B = –0.313, p = .043) and Cooperation (B = –0.324, p = .007).Practically speaking, a one-unit increase in Measurement is associated with a 0.313-point decrease in Contextual Performance and a 0.324-point decrease in Cooperation.

In contrast, the effects on other JP dimensions such as Task Performance (B = –0.133, p = .437), Organizational Skills (B = –0.124, p = .224), Conscientiousness (B = –0.170, p = .184), and Interpersonal Relations (B = –0.004, p = .977) were also negative albeit statistically non-significant, and practically negligible.

5.2.2 Moderation effects of MC

This part of the study presents the results of the moderation analyses conducted to examine whether the MC of nurse managers alters the association between KM—namely KMP and KMI—and the JP of nurses and nurse managers across care levels, at both composite and dimension levels. All models controlled for demographic and institutional variables. To further clarify the nature and direction of these moderating effects within each care level, post-estimation linear combination tests (lincom) were used to compute the conditional (care-level–specific) effects of KMP and KMI at different values of MC.

Moderation effects of MC for JP of nurses

The results of the moderation analyses for nurses are presented first, followed by those for nurse managers, to allow for a clear comparison of the moderating effects of MC across professional roles and healthcare levels.

Table 5.32: JP of nurses regressed by the moderation term of KMP x MC, by Care Level

Predictor	PHC (N=330, R^2=.283)			SHC (N=276, R^2=.484)			THC (N=246, R^2=.213)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMP x MC	0.012	.322	[−0.012, 0.036]	−0.014	.389	[−0.045, 0.018]	0.027*	.023	[0.004, 0.050]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;

R^2 = Coefficient of determination;
N = Sample size;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence of nurse managers;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

In the case of JP of nurses, the moderation results for MC of nurse managers presented in Table 5.32 demonstrate a context-dependent pattern. Namely, MC exerted limited moderating influence at the PHC and SHC levels, but became a significant amplifier at the THC level. Neither at the PHC level (B = 0.012, p = .322) nor at the SHC (B = –0.014, p = .389) level did the interaction term between KMP and MC reach statistical significance. The interaction coefficient indicates that the effect of KMP on JP changes by 0.012 points for each one-unit increase in MC at the PHC level and by −0.014 points at the SHC level, representing very small and non-meaningful adjustments in the KMP–JP relationship.

By contrast, at the THC level, the moderating effect of MC emerged as statistically significant and positive (B = 0.027, p = .023). In practical terms, this indicates that the effect of KMP on JP increases by 0.027 points for each one-unit increase in MC among nurses at the THC level. The complete regression output, including all controls, is reported in Appendix Table 0.14.

To determine whether the respective results were statistically different across levels, a triple moderation term was included in the model (KMP × MC × Care Level).

Table 5.33: JP of nurses regressed by the triple moderation term of KMP x MC x Care Level, differences between care levels (N = 852, R^2 = .287)

Predictor		B	p	95% CI
Moderation term of KMP, MC and Care Level				
	PHC	0.017	.234	[−0.011, 0.046]
	SHC	−0.037	.109	[−0.081, 0.008]
	THC	0.007	.716	[−0.030, 0.044]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;

PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

As shown in Table 5.33, the three-way interaction term between KMP, MC, and Care Level was not found to be statistically significant across care levels. Namely, in PHC, the moderating effect of MC on the KMP–JP relationship was positive but non-significant (B = 0.017, p = .234). At the SHC level, the coefficient shifted negative (B = –0.037, p = .109), while in THC, it was again positive but negligible and non-significant (B = 0.007, p = .716). Nonetheless, the direction of the slopes remained consistent with the trends observed in the care-level analysis. The complete regression output, including all controls, is reported in Appendix Table 0.15.

Besides, considering that the MC composite emerged as a significant moderating factor on the KMP–JP relationship in THC, the subsequent disaggregated analyses sought to identify which of the MC dimensions contributed the most to this outcome.

Table 5.34: JP of nurses regressed by moderation terms of KMP composite x MC dimensions at the THC level (N=246)

Predictor	B	p	95% CI
KMP × MC Dimension			
Communication	0.006	.550	[−0.015, 0.028]
Leadership	0.026*	.016	[0.005, 0.048]
Staff Development	0.028**	.008	[0.007, 0.048]
Financial Management	0.023*	.017	[0.004, 0.041]
Planning & Organization	0.021	.076	[−0.002, 0.044]
Problem-Solving	0.022	.051	[−0.000, 0.043]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size.

Table 5.34 displays the results of the moderation analysis, revealing variation in the interaction between KMP and specific dimensions of the MC of nurse managers on the JP of nurses operating at the THC level. The moderating influence of MC was particularly pronounced for the dimensions Leadership, Staff Development, and Financial Management. Specifically, the interaction term for KMP dimension of Staff Development was positive and statistically significant, B = 0.028, p = .008. Similarly, Leadership showed a positive and

significant interaction, B = 0.026, p = .016, and Financial Management emerged as a significant positive moderator, B = 0.023, p = .017.

By contrast, the interaction terms for the remaining MC dimensions (Communication, Planning & Organization, and Problem-Solving) did not reach conventional statistical significance thresholds.

To develop a more detailed understanding of these dynamics, the subsequent analysis disaggregated the JP of nurses into its constituent dimensions to examine how each is influenced by the interaction between KMP and these three significant MC dimensions among nurse managers operating at the THC level.

Table 5.35: Dimensions of JP of nurses regressed by moderation term of KMP x MC dimensions at the THC level (N=246)

Predictor	Dimensions of JP of nurses																	
	Task Performance			Organizational Skills			Contextual Performance			Cooperation			Conscientiousness			Interpersonal Relations		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
Moderation term of KMP and MC dimension																		
Leadership	0.037	.098	[−0.007, 0.082]	0.014	.412	[−0.020, 0.049]	0.044*	.035	[0.003, 0.085]	0.054*	.024	[0.007, 0.101]	0.022	.333	[−0.023, 0.066]	−0.014	.537	[−0.060, 0.031]
Staff Development	0.026	.247	[−0.018, 0.071]	0.008	.605	[−0.023, 0.039]	0.045*	.020	[0.007, 0.083]	0.058**	.005	[0.018, 0.097]	0.031	.160	[−0.012, 0.075]	−0.002	.918	[−0.046, 0.042]
Financial Mgmt.	0.040*	.029	[0.004, 0.076]	0.006	.683	[−0.023, 0.034]	0.017	.395	[−0.023, 0.057]	0.043*	.029	[0.004, 0.082]	0.033	.101	[−0.006, 0.072]	−0.003	.883	[−0.042, 0.036]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMP – Knowledge Management Process;
MC – Managerial Competence of nurse managers.

Table 5.35 presents the results of the moderation analysis, which identified variability in the interaction between KMP and specific facets of MC of nurse managers on the dimensions of JP of nurses working within the THC level. Specifically, the moderating effect of MC is evident for the Leadership, Staff Development, and Financial Management, which displayed significant positive associations with certain dimensions of nursing performance outcomes.

The interaction terms for the Leadership and Staff Development dimensions of MC were positive and statistically significant for Contextual Performance (B = 0.044, p = .035, and B = 0.045, p = .020, respectively) and for Cooperation (B = 0.054, p = .024, and B = 0.058, p = .005, respectively). Interpreted in practical terms, a one-unit increase in the Leadership × KMP interaction corresponds to a 0.044-point increase in Contextual JP Performance and a 0.054-point increase in Cooperation JP Performance. Furthermore, a one-unit increase in the Staff Development × KMP interaction results in a 0.045-point increase in Contextual Performance and a 0.058-point increase in Cooperation.

Additionally, the MC dimension of Financial Management evolved as a significant and positive moderator for the JP dimension of Task Performance (B = 0.040, p = .029) and Cooperation (B = 0.043, p = .029) dimensions of JP of nurses. Substantively, this demonstrates that a one-unit increase in the Financial Management × KMP interaction is associated with a 0.040-point increase in Task Performance and a 0.043-point increase in Cooperation dimension of JP. In contrast, the respective interaction terms did not exert statistically significant—and thus only negligible—practical effects on the remaining JP dimensions.

Table 5.36: JP of nurses regressed by the moderation term of KMI x MC x Care Level

Predictor	PHC (N = 330, R^2 = .286)			SHC (N = 276, R^2 = .485)			THC (N = 246, R^2 = .206)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMI × MC	−0.026	.144	[−0.062, 0.009]	−0.026	.289	[−0.075, 0.022]	0.026	.147	[−0.009, 0.061]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
MC = Managerial Competence;
KMI = Knowledge Management Infrastructure;

PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

The moderation results for MC presented in Table 5.36 show no statistically significant moderating effects on the relationship between KMI and JP of nurses across care levels. The complete regression output, including all controls, is reported in Appendix Table 0.15. Since the interaction between KMI and MC at the composite level did not emerge as a significant moderator of JP among nurses at any healthcare level, conducting disaggregated-level analyses was not deemed relevant.

Moderation effects of MC for JP of nurses managers

For nurse managers, the moderation analysis examined whether MC influences the strength or direction of the relationships between KMP and KMI with JP across care levels.

Table 5.37: JP of nurse managers regressed by the moderation term of KMP x MC x Care level, care-level–specific effects (lincom results) (N = 135)

Predictor	B	p	95% CI
KMP × MC × Care level			
PHC®:	0.069	.626	[−0.211, 0.350]
SHC	−0.080	.074	[−0.169, 0.008]
THC	−0.100**	.002	[−0.162, −0.038]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMP = Knowledge Management Process;
MC = Managerial Competence of nurse managers.

As shown in Table 5.37, the three-way interaction between KMP, MC, and Care Level indicated that the moderating effect of MC on the KMP–JP relationship varied only modestly across care levels.

In the PHC level, the effect was positive but statistically non-significant (B = 0.069, p = .626), and hence practically negligible.

At the SHC level, the moderation term turned negative and approached, but did not reach, conventional levels of significance (B = –0.080, p = .074).

Lastly, at the THC level, the effect was significantly negative (B = –0.100, p = .002), indicating that stronger MC in combination with higher levels of KMP is associated with lower levels of JP of nurse managers.

To evaluate the existence of significant differences across care levels, a pooled-level analysis was employed.

Table 5.38: JP of nurse managers regressed by the Triple Moderation Term of KMP, MC, and Care Level, Pooled effects (N = 135, R^2 = .448)

Predictor	B	p	95% CI
Triple interaction (KMP × MC × Care Level)			
PHC®	0.069	.626	[−0.211, 0.350]
SHC	−0.150	.301	[−0.435, 0.136]
THC	−0.169	.262	[−0.467, 0.129]

B = Unstandardized regression coefficient;
p = p-value (significance level);
CI = Confidence Interval for the coefficient;
KMP = Knowledge Management Process;
MC = Managerial Competence;
Care Level = Healthcare level (PHC, SHC, THC);
PHC = Primary Health Care (reference category);
SHC = Secondary Health Care;
THC = Tertiary Health Care.

The results of the pooled analyses, presented in Table 5.38, revealed that the moderating role of MC on the KMP–JP relationship did not vary significantly across healthcare levels. Specifically, at the PHC level, the effect of MC on the KMP–JP relationship was positive but non-significant (B = 0.069, p = .626). Substantively, a one-unit increase in the respective triple interaction term corresponds to only a 0.069-point increase in the JP of nurse managers in PHC.

At the SHC level, the coefficient was negative but non-significant (B = –0.150, p = .301). Although slightly larger in magnitude than in PHC, the result remains statistically unreliable and practically negligible.

At the THC level, it remained negative and non-significant (B = –0.169, p = .262).

The complete regression output, including all controls, is reported in Appendix Table 0.16. Again, these results reflect small, non-significant, and practically limited effects.

Table 5.39: JP of nurse managers regressed by moderation terms of KMP composite and MC dimensions at the THC level (lincom results) (N=135)

Predictor	B	p	95% CI
KMP x MC Dimension x Care level			
Communication	−0.137***	.000	[−0.204, −0.069]
Leadership	−0.079**	.034	[−0.151, −0.006]
Staff Development	−0.103**	.001	[−0.161, −0.045]
Financial Management	−0.017	.594	[−0.081, 0.046]
Planning & Organizing	−0.061	.114	[−0.137, 0.015]
Problem Solving / Decision-Making	−0.049	.200	[−0.123, 0.026]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMP = Knowledge Management Process;
MC = Managerial Competence of nurse managers.

Table 5.39 demonstrated that three out of the six dimensions of MC exerted significant moderating effects on the relationship between KMP and JP of nurse managers in THC. Specifically, Communication (B = −0.137, p < .001), Leadership (B = −0.079, p = .034), and Staff Development (B = −0.103, p = .001) exhibited statistically significant negative interaction terms. Practically, a one-unit increase in each respective interaction term is associated with a 0.137-point, 0.079-point, and 0.103-point decrease in JP of nurse managers at the THC level.

Table 5.40: JP of nurse managers regressed by moderation terms of KMP composite and significant MC dimensions at the THC level (lincom results) (N=135)

Moderator (KMP × MC × Care Level)	Task Performance			Organizational Skills			Contextual Performance			Cooperation			Conscientiousness			Interpersonal Relations		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMP × MC Communication	−0.263***	<.001	[−0.392, −0.135]	−0.005	.949	[−0.158, 0.148]	−0.150**	.001	[−0.241, −0.059]	−0.217**	.001	[−0.345, −0.089]	−0.153	.067	[−0.316, 0.011]	−0.032	.572	[−0.145, 0.080]
KMP × MC Leadership	−0.173***	<.001	[−0.251, −0.095]	0.042	.561	[−0.101, 0.185]	−0.121***	<.001	[−0.179, −0.062]	−0.174**	.001	[−0.275, −0.073]	−0.052	.476	[−0.195, 0.092]	0.005	.916	[−0.088, 0.098]
KMP × MC Staff Development	−0.196**	.003	[−0.323, −0.070]	−0.012	.874	[−0.160, 0.136]	−0.147***	<.001	[−0.226, −0.069]	−0.164**	.005	[−0.276, −0.051]	−0.087	.250	[−0.235, 0.062]	−0.012	.779	[−0.101, 0.076]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMP = Knowledge Management Process;
MC = Managerial Competence of nurse managers.

In Table 5.40, the results reveal a distinct pattern for the three-way moderation of the MC dimensions Communication, Leadership, and Staff Development. Precisely, they exhibited significant and negative moderating effects on the relationship between KMP and JP of nurse managers, namely the JP dimensions of Task Performance, Contextual Performance, and Cooperation, at the THC level.

Specifically, for the MC Communication dimension, significant negative interaction effects were observed for Task Performance (B = −0.263, p < .001), Contextual Performance (B = −0.150, p = .001), and Cooperation (B = −0.217, p = .001). From a practical perspective, these interaction coefficients indicate that the effect of KMP on JP decreases by 0.263 points for Task Performance, 0.150 points for Contextual Performance, and 0.217 points for Cooperation for each one-unit increase in MC-Communication. Likewise, the negative interaction coefficients for Leadership and Staff Development suggest that the effect of KMP on JP becomes weaker by 0.173 and 0.121 points, respectively, for each one-unit increase in these MC dimensions. Lastly, the MC Staff Development dimension also yielded significant negative moderation effects on Task Performance (B = −0.196, p = .003), Contextual Performance (B = −0.147, p < .001), and Cooperation (B = −0.164, p = .005). Substantively, this means that a one-unit increase in the Staff Development × KMP interaction corresponds to reductions of 0.196, 0.147, and 0.164 points.

The moderation effects of the three interaction terms on Organizational Skills, Conscientiousness, and Interpersonal Relations did not reach statistical significance, and thus had negligible effects on performance outcomes of nurse managers at the THC level.

Table 5.41: JP of nurse managers regressed by the moderation term of KMI, MC, and Care level, care-level–specific effects (lincom results) (N = 135)

Predictor	B	p	95% CI
KMI × MC × Care level			
PHC®:	1.845	.005	[0.575, 3.115]
SHC	–0.120	.043	[–0.237, –0.004]
THC	–0.088	.066	[–0.182, 0.006]

PHC® = Reference category for Care Level;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
KMI = Knowledge Management Infrastructure;

MC = Managerial Competence;
B = Unstandardized regression coefficient;
p = p-value;
CI = Confidence Interval.

Table 5.41 presents the care-level–specific effects of the three-way interaction between KMI, MC, and Care Level on the JP of nurse managers. The simple-slope (lincom) estimates indicate that the combined influence of KMI and MC on JP varies substantially across healthcare levels. For PHC, the moderation term showed a strong and statistically significant positive effect (B = 1.845, p = .005). In SHC, the effect was significant but negative (B = –0.120, p = .043). At the THC level, the respective effect was negative but did not reach statistical significance (B = –0.088, p = .066). To assess the presence of significant differences across care levels, pooled-level analyses were employed.

Table 5.42: JP of nurse managers regressed by the moderation term of KMI and MC, pooled effects (N = 135)

Predictor	B	p	95% CI
Triple interaction (KMI × MC × Care level)			
PHC®	–0.2009	.014	[–0.3599, –0.0418]
SHC	–0.1203	.419	[–0.2369, –0.0037]
THC	–0.0879	.234	[–0.1816, 0.0059]

PHC® = Reference category for Care Level;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence of nurse managers.

As shown in Table 5.42, the moderating role of MC on the relationship between KMI and the JP of nurse managers also differed across care levels. At the PHC level, the moderation effect was significantly negative (B = –0.2009, p = .014), although the lincom-based care-level–specific effect in Table 5.41 was statistically significant. At the SHC level, the moderating effect also remained negative and reached statistical significance (B = –0.1203, p = .043), though with a smaller magnitude compared to the

PHC level. At the THC level, the corresponding effect continued in a negative direction but did not reach statistical significance (B = –0.0879, p = .066). The complete regression output, including all controls, is reported in Appendix Table 0.17.

Table 5.43: JP of nurse managers regressed by the moderation term of KMI and MC dimensions at the PHC level (N = 135)

Predictor	PHC			SHC		
	B	p	95% CI	B	p	95% CI
KMI × MC dimension × Care Level						
Communication	−0.116	.225	[−0.304, 0.072]	−0.091	.099	[−0.200, 0.017]
Leadership	−0.147	.053	[−0.295, 0.002]	−0.135**	.004	[−0.224, −0.045]
Staff Development	−0.203*	.016	[−0.369, −0.038]	−0.143**	.005	[−0.241, −0.045]
Financial Management	−0.091	.106	[−0.201, 0.020]	−0.079	.225	[−0.207, 0.049]
Planning & Organization	−0.180**	.003	[−0.297, −0.064]	−0.119	.056	[−0.240, 0.003]
Problem-Solving & Decision-Making	−0.186***	< .001	[−0.271, −0.101]	−0.123*	.037	[−0.238, −0.007]

** p < .05, ** p < .01, *** p < .001;*
PHC® = Reference category for Care Level;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence of nurse managers.

The results presented in Table 5.43 reveal that at the PHC level, the effect of KMI on job performance becomes weaker as specific dimensions of managerial competence increase. The interaction terms between KMI and the MC dimensions of Staff Development, Planning & Organization, and Problem-Solving & Decision-Making are negative, indicating that a one-unit increase in each corresponds to decreases of 0.203, 0.180, and 0.186 points in expected JP of nurse managers at the PHC level, respectively. The interactions involving Communication (B = −0.116, p = .225), Leadership (B = −0.147, p = .053), and Financial Management (B = −0.091, p = .106) were not statistically significant and therefore represent effects that are small and practically negligible.

Regarding the moderation terms of KMI and MC dimensions on JP of nurse managers at the SHC level, statistically significant and negative effects were observed for Leadership (B = −0.135, p = .004), Staff Development (B = −0.143, p = .005), and Problem-Solving & Decision-Making (B = −0.123, p = .037). In practical terms, these interaction coefficients indicate that the effect of KMI on JP decreases by 0.135, 0.143, and 0.123 points, respectively, for each one-unit increase in the corresponding MC dimensions among nurse managers at the SHC level. The interactions for Communication (B = −0.091, p = .099), Financial Management (B = −0.079, p = .225), and Planning & Organization (B = −0.119, p = .056) were not statistically significant and are practically negligible.

Table 5.44: Dimensions of JP of nurse managers regressed by moderation term of KMI and MC dimensions at the PHC level (N=135)

Predictor	Dimensions of JP of nurse managers at the SHC level																	
	Task Performance			Organizational Skills			Contextual Performance			Cooperation			Conscientiousness			Interpersonal Relations		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
Moderation term of KMI and MC dimension																		
Planning & Organization	−0.016	.875	[−0.223, 0.190]	−0.281	.078	[−0.593, 0.032]	−0.216	.173	[−0.529, 0.097]	0.059	.710	[−0.254, 0.372]	−0.314***	.001	[−0.497, −0.131]	−0.314**	.002	[−0.507, −0.122]
Staff Development	−0.169	.286	[−0.483, 0.144]	0.048	.810	[−0.348, 0.445]	−0.156	.393	[−0.515, 0.204]	−0.184	.238	[−0.493, 0.124]	−0.441***	.001	[−0.700, −0.182]	−0.319**	.005	[−0.540, −0.097]
Problem-Solving & Decision Making	0.020	.847	[−0.189, 0.230]	−0.366*	.018	[−0.668, −0.064]	−0.335**	.004	[−0.558, −0.112]	0.071	.658	[−0.248, 0.391]	−0.286*	.042	[−0.562, −0.011]	−0.220*	.031	[−0.420, −0.021]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence of nurse managers;

Table 5.44 presents the results on the moderating effects of MC dimensions on the relationship between KMI and JP dimensions of nurse managers at the PHC level. Substantively, a one-unit increase in the Planning & Organization × KMI interaction corresponds to a 0.314-point decrease in Conscientiousness and a 0.314-point decrease in the Interpersonal Relations dimensions of JP of nurse managers. At the same time, Staff Development demonstrated significant moderation for Conscientiousness (B = −0.441, p = .001) and Interpersonal Relations (B = −0.319, p = .005). These represent substantial negative shifts imply that a one-unit increase in the Staff Development × KMI interaction results in decreases of 0.441 points and 0.319 points in JP of nurse managers at PHC, respectively.

As far as the Problem-Solving and Decision-Making dimension is concerned, it showed significant interactions with KMI for Organizational Skills (B = −0.366, p = .018), Contextual Performance (B = −0.335, p = .004), Conscientiousness (B = −0.286, p = .042), and Interpersonal Relations (B = −0.220, p = .031). No other effects reached statistical significance. In practical terms, a one-unit increase in this interaction term corresponds to decreases of 0.366, 0.335, 0.286, and 0.220 points in the respective JP dimensions of nurse managers affiliated with healthcare organizations at the PHC level.

Table 5.45: Dimensions of JP of nurse managers regressed by moderation term of KMI and MC dimensions at the SHC level (N=132)

Predictor	Dimensions of JP of nurse managers at the SHC level																	
	Task Performance			Organizational Skills			Contextual Performance			Cooperation			Conscientiousness			Interpersonal Relations		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
Moderation term of KMI and MC dimension																		
Leadership	0.041	.692	[−0.165, 0.248]	−0.322	.047	[−0.639, −0.005]	−0.179	.274	[−0.504, 0.146]	0.146	.398	[−0.189, 0.480]	−0.170	.315	[−0.503, 0.163]	−0.184*	.041	[−0.358, −0.008]
Staff Development	−0.192	.067	[−0.398, 0.014]	−0.152	.058	[−0.310, 0.005]	−0.084	.472	[−0.315, 0.147]	−0.323***	< .001	[−0.469, −0.176]	−0.071	.416	[−0.243, 0.101]	−0.036	.662	[−0.201, 0.129]
Problem-Solving & Decision Making	−0.205	.056	[−0.415, 0.005]	−0.157*	.037	[−0.303, −0.010]	−0.079	.513	[−0.319, 0.161]	−0.242**	.002	[−0.389, −0.094]	−0.011	.887	[−0.157, 0.136]	−0.044	.615	[−0.216, 0.128]

** p < .05, ** p < .01, *** p < .001;*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
N = Sample size;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence of nurse managers.

Regarding the SHC level, several dimensions of MC significantly moderated the relationship between KMI and various aspects of nurse managers' JP. Specifically, the results presented in Table 5.45 demonstrated significant negative moderation effects of Leadership for the JP dimensions of Organizational Skills (B = −0.322, p = .047) and Interpersonal Relations (B = −0.184, p = .041). Substantively, a one-unit increase in the Leadership × KMI interaction corresponds to reductions of 0.322 points in the Organizational Skills and 0.184 points in the Interpersonal Relations dimensions of JP.

Staff Development was also a significant moderator, influencing Organizational Skills (B = −0.152, p = .058) and Cooperation (B = −0.323, p < .001). A one-unit increase in the Staff Development × KMI interaction results in a 0.323-point decrease in JP of nurse managers with respect to Cooperation.

Similarly, Problem-Solving and Decision-Making significantly moderated the relationships between KMI and Organizational Skills (B = −0.157, p = .037) and Cooperation (B = −0.242, p = .002). Essentially, a one-unit increase in this interaction term is associated with reductions of 0.157 points and 0.242 points in the Organizational Skills and Cooperation dimensions, respectively.

6 INTERPRETATION AND DISCUSSION

This chapter interprets the results within the theoretical, methodological, and empirical framework, specifically examining how knowledge management components (process and infrastructure) affect the JP of nursing personnel (managers, directors, heads, and nurses) across various levels of public healthcare in Kosovo. The convergent and divergent outcomes are highlighted, along with context-specific factors across healthcare levels and nursing roles, and the findings are ultimately juxtaposed with those of prior global studies. Subsequently, the implications of the respective findings for policy, practice, and theory are further discussed.

6.1 Justification of the studied subject and methodology

In this doctoral thesis, the correlations between KMI, KMP, MC of nurse managers, and JP of nursing personnel (both managers and nurses) of healthcare institutions across care levels in Kosovo are evaluated. The latter provides the context of a transitioning post-conflict health system, characterized by a resource-constrained and institutionally challenging environment. Accordingly, this study contributes to minimizing the significant gap in the literature.

This study is grounded within an ontological realist and epistemological positivist paradigm, in which the studied phenomena are considered real, measurable, and constructs within healthcare organizations and in which systematic empirical inquiry can uncover valid knowledge regarding their interrelationships [175].

Therefore, the decision to utilize the quantitative research design was a natural methodological alignment. Specifically, the research paradigm and design of this study are justified on the following main grounds: methodological fit, practical feasibility and analytical rigor while acknowledging recognized limitations.

Precisely, the quantitative research design corresponds with the aim of this research, namely to test hypothesized associations among measurable variables (KM, MC, and JPN) without interventions or time-series manipulation [173]. It is consistent with the objectives of this study by aligning the design, sampling, instruments, and analytic approach with best practices for methodological coherence and purposeful inquiry [224].

The data analysis phase began with descriptive statistics, reliability testing, and construct validity assessments, followed by comparative analyses, correlation analyses, and concluding with multivariate regression analyses. To evaluate subgroup differences, interaction terms for healthcare level were included. These analyses enabled identification of both direct and moderating effects of knowledge management and MC on JP within organizational contexts and characteristics of nursing staff [174,175]. Since the variables were measured using Likert scales and were modelled as continuous predictors in linear regression, the unstandardized coefficients (B) in this study

represent the expected point change in JP associated with a one-unit increase in the respective predictor, holding other variables constant.

Moreover, under the resource-limited public healthcare framework of Kosovo, executing longitudinal research or treatments presents considerable financial and logistical challenges. A cross-sectional design provides a time-efficient and cost-effective method, producing empirically robust data [225].

At last, although cross-sectional designs are limited in establishing temporal causality, they remain effective for hypothesis testing, pattern identification, and preliminary causal inference. Such studies can generate generalizable insights and reduce subjective interpretation while acknowledging contextual limitations inherent to the measurement and research setting [225,226]. Simultaneously, they improve the accuracy and dependability of results via systematic measurement and statistical inference [227]. As a result, they elucidate the prevalence and intensity of respective factors on the variability of JP of nursing personnel throughout the health system, while subgroup analyses offer further insight by illustrating the variations of these effects across different levels of analyses (healthcare levels and work titles or roles) [228].

Consequently, this study offers a legitimate, contextually relevant basis for enhancing both theoretical comprehension and practical guidance in nursing and healthcare management [173]. Namely, its findings contribute to the development of theoretical frameworks in knowledge management and organizational capability, alongside practical strategies for improving knowledge management and managerial capabilities to enhance the JP of healthcare professionals in various contexts.

6.2 Justification of the research sample

This study utilized a stratified probability sampling method, with stratification based on healthcare level and work title, resulting with the final sample comprising 987 nursing personnel (18 nurse directors, 110 head nurses, and 859 staff nurses), working in Kosovo's public healthcare system. Those respondents came from the three levels of care: 353 from PHC, 320 from SHC, and 314 from THC. Such sample composition ensured that the perspectives of licensed nursing personnel of different roles, and working at the three main health care organizations, family medicine centres, regional hospitals, and specialized clinics at the University Clinical Centre of Kosovo were appropriately represented.

Particularly, the justification for this sample rests on several factors. First, such sample reflects the prevailing demographic and professional structure of the national nursing personnel, thereby supporting the external validity and generalizability of the findings across Kosovo's healthcare system [179,196]. Additionally, stratification by both care level and role strengthened internal validity through ensuring representation of heterogeneous organizational contexts.

The final sample size exceeded the one (400 respondents) determined by power analysis and Cochran's formula for identifying small-to-moderate effects, while also providing sufficient statistical power for accurate subgroup analyses [200,201]. Accordingly, the obtained sample of 987 valid responses provided adequate statistical power for both multivariate regression and moderation models. Furthermore, the inclusion of nurse managers (directors and heads) was deliberately oversampled to enable meaningful comparisons with staff nurses (subordinates), testing role-based moderation effects, and evaluating MC [208].

Lastly, despite the fact that the response rates varied among certain regional hospitals and family medicine centres, analytic weighting methods and proportional allocation across strata helped mitigate nonresponse bias. Kosovo's healthcare system was structurally uniform, so nonresponse within homogeneous strata was unlikely to bias estimators [209].

Therefore, the final sample of 987 nurses provided adequate representation of the target population, sufficient statistical power, and meaningful subgroup coverage, leading to reliable findings with inferential statistical power across the national public healthcare system.

6.3 Justification of the research instruments

To ensure scientific integrity and alignment with the aim and objectives of this study, a set of validated and contextually appropriate self-reported questionnaires was used. A questionnaire is a tool for collecting self-reported information from respondents who answer pre-established questions created by the researcher. Utilizing structured surveys enhances objectivity, reduces measurement bias, and facilitates statistical analysis when addressing larger sample sizes [175,195]. In the context of Kosovo's public healthcare system, the selected instruments were chosen to capture both subjective experiences and objective measurements relevant to JP of nursing personnel, MC of nurse managers, and knowledge management process and infrastructure. These instruments were chosen primarily due to their applicability in healthcare organizational settings, theoretical grounding, and prior empirical validation.

The questionnaire of JP of nursing personnel was originally designed and validated by Carlos and Rodrigues [2]. In their study, as well as those of Barać et al. [211], and Topa and Aranda-Carmena [212], the instrument demonstrated strong psychometric properties, with internal consistency exceeding the threshold, with Cronbach's alpha values of 0.70, 0.83, and 0.74, respectively. In addition, construct validity was supported through confirmatory factor analyses, with fit indices (χ^2/df, GFI, CFI) demonstrating adequate model fit [211]. Thus, the questionnaire provided a reliable and multidimensional assessment of JP of nursing personnel.

MC of nurse managers was measured with a tool, which had been originally validated in South African primary healthcare settings [1]. In this instrument, scale reliability was confirmed across all dimensions, including communication, leadership and management, staff management, financial management, planning and priority setting, and problem-solving, being 0.80 for the three groups of respondents (clinic nursing managers, supervisors, and subordinate nurses).

KMP was assessed using items from the Knowledge Management Assessment Tool. The latter had been extensively utilized as an instruments in professional/consulting settings by organizations such as a benchmarking tool of knowledge management capabilities of

organizations [218]. With Cronbach's alpha values ranging between 0.755 and 0.94 across its five dimensions (process, leadership, culture, technology, measurement), it was validated, namely demonstrated for its reliability and robust internal consistency [229]. This instrument encompasses critical KMPs, including knowledge identification, sharing, and application, and evaluation, thereby ensuring thorough coverage of process-related factors.

The development level of KMI in the public healthcare institutions in Kosovo was evaluated using questionnaire validated in a healthcare setting by Kudozia et al. [3]. In their study, the instrument was used to assess organizational KMI components such as social and technical infrastructure, namely organisational, cultural, structural, and technological conditions that foster effective knowledge management, and demonstrated Cronbach's alpha values above 0.80 for its dimensions and 0.86 overall. A more recent validation conducted by Tabejamaat et al. [55] further reinforced its psychometric soundness. Subsequently, this instrument was considered as suitable for capturing the KMI-related dimensions in this study.

Ultimately, the use of validated and adapted instruments ensured methodological robustness, contextual appropriateness, and psychometric reliability. These tools provided a solid foundation for testing theoretical assumptions and empirical hypotheses, thereby strengthening the credibility of the findings and promoting their transferability to other healthcare systems with similar structural and organizational challenges. Thus, by ensuring psychometric reliability, methodological rigor, and contextual relevance, the selected instruments established a robust basis for evaluating theoretical and empirical propositions, ultimately enhancing the credibility and applicability of the study's findings.

6.4 Addressing the research questions and hypotheses

The selection of the research methodology for this study was guided by the following rationale:

- Suitability for achieving the study's objectives.
- Adherence to established methodological practices.
- Capacity to support the concurrent measurement of multiple relevant constructs.
- Ability to apply regression (main and moderation) analyses for testing hypothesized relationships among variables.

Furthermore, the use of regression analysis allowed the study to examine whether increases in KMI and KMP were associated with higher levels of JPN, thus facilitating the evaluation of the relationships specified in RQ1, RQ2, and their associated hypotheses (H1a–H2b).

Building on the results of RQ1 and RQ2, the study examined how the individual dimensions of KMP (identification, capture, sharing, application, and measurement) and KMI (culture, leadership/strategy, technology, and measurement) related to both overall JPN and its specific performance dimensions (task, contextual, cooperation, and conscientiousness) across healthcare levels. In doing so, it answered RQ3 and its corresponding hypothesis and identified which dimensions of the respective predictors most strongly influenced each aspect of nursing performance.

Furthermore, by measuring the construct of MC, the study enabled the examination of its moderating effects on the relationships between KM dimensions (KMI and KMP) and JPN, thereby providing answers to RQ4 and RQ5 (and their sub-hypotheses on moderation effects, H4a–H5b). Such approaches are well aligned with subgroup and interaction analyses widely employed in nursing and healthcare research to reveal subtle differences in effects across various staff profiles and clinical environments [230]. The stratified sampling design adopted in this study enabled the involvement of nursing staff from healthcare organizations across care levels, supported subgroup analyses, and

facilitated the inclusion of interaction terms in regression models [231]. As such, it allowed the assessment of whether the respective relationships differed by level of care, as specified in RQ1a, RQ2a, RQ4a, and RQ5a.

6.5 Empirical results overview by research question and hypotheses

This study explored five central Research Questions (RQs) and nine associated Hypotheses (Hs) to examine how KMP, KMI, and MC influence the JP of nurses and nurse managers working at the PHC, SHC, and THC levels. Collectively, the results reveal a combination of patterns, with some being in congruence with previous literature and others reflecting the specific and unique realities of the public healthcare system in Kosovo.

6.5.1 RQ1: The relationship between KMP and JP

RQ1 examined the relationship between KMP and JP among nurses and nurse managers across PHC, SHC, and THC. The analyses were conducted separately for nurses and nurse managers to reflect the distinct work titles and contextual conditions in which each group operates. Among nurse managers, KMP demonstrated a negative association with JP in PHC, with no significant effects observed at the SHC or THC levels, underscoring the context-dependent nature of these associations.

JP of nurses

More to the point, the positive relationship between KMP and JP among nurses at the SHC level aligns with prior researches conducted by Pealow [4] and Tajafari, Fanoodi [40], and Akgun and Polat [115], which reported that systematic knowledge acquisition, sharing, and application enhance decision-making quality and overall JP. Similar results were derived from studies of Agrifoglio et al. [113], and Gharajeh-Alamdari et al. [112], who highlighted that knowledge transfer and learning routines strengthen both individual and team performance outcomes. These findings align with the theoretical premises derived from the DCT, which states that knowledge routines, namely sharing and application, foster adaptive performance through better situational awareness and evidence-based judgement [157]. However, the respective relationship did not reach statistical significance at the PHC, nor at the THC levels. These mixed results contrast the existing literature suggesting that well-designed KMP often enhances clinical

performance [114] and [19], which reported positive correlations between KMP and JP outcomes, namely communication, collaboration, and knowledge visibility.

JP of nurse managers

In contrast, the observed significant and negative effect of KMP on JP of nurse managers at the PHC level aligns with the findings of Fadaie et al. [42] and Malik et al. [20], where similar declines in job performance were reported under highly constrained or fragmented work environments. Within the latter context, the KM activities typically become burdensome, or processes become inefficient, leading to performance decline. Moreover, the significant cross-level variation in KMP effects across care levels supports the theoretical perspectives of Helfat and Peteraf [145], who conceptualized healthcare levels as distinct environments of human and structural capital. Comparable cross-level disparities were also evidenced by Bawack [151] and Mladenova [149], emphasizing that contextual variations in knowledge management shape performance outcomes across care levels. At the same time, they likely mirror the prevailing constraints of the Kosovo context, primarily those related to the PHC level often struggling with fragmented knowledge systems, insufficient documentation practices, and high patient loads, which limit the extent to which formal knowledge processes can directly convert into measurable performance gains [232,233].

6.5.2 RQ2: The relationship between KMI and JP

RQ2 investigated the influence of KMI on JP among nurses and nurse managers across PHC, SHC, and THC. The analyses were again conducted separately for nurses and managers to account for differences in role demands and organizational positioning. The findings showed strong and positive KMI–JP effects for nurses at the PHC and SHC levels, but no significant effects in THC, nor consistent relationships among nurse managers across care levels.

JP of nurses

Precisely, for nurses operating at the PHC and SHC levels, the KMI showed significant and positive effects on their JP, whereas no significant effect was observed in THC. These results are consistent with previous studies showing that both social (organizational culture and leadership) and technical elements (technology and performance measurement), contribute to enhancing nursing outcomes [107,108]. They also echo findings of studies conducted by Karltun et al. [107], Kosklin et al. [19], and Ramirez [75], who emphasized that KM-related infrastructures enhance communication and operational efficiency, and implementation of clinical protocols across the care levels. Alike, the observed positive role of KMI dimension of IT is in line with [110], and [234], both of whom demonstrated that IT-based collaboration fosters coordination, responsiveness, and knowledge sharing among nursing teams.

JP of nurse managers

As for nurse managers, the absence of significant KMI effects diverges from the results reported by Kosklin [19], where robust infrastructures were evidenced to directly strengthen leadership and system performance. This pattern instead reflects the argument put forth by Ramirez [75] and Karltun et al. [107] that managerial-level performance depends less on infrastructure alone regardless of care level.

6.5.3 RQ3: Effects of KMP and KMI dimensions on overall JP and its dimensions

RQ3 explored the extent to which specific dimensions of KMP and KMI influenced those JP of nursing staff. Building on the composite-level results, the KMP dimensions were examined only among nurses at the SHC level, whereas those of KMI at both the PHC and SHC levels. By the same logic, for nurse managers, the dimensional analysis of KMP was conducted only at the PHC level, as this was the only care level with a significant composite-level effect. No dimensional analysis was performed for KMI among nurse managers because KMI did not exhibit significant effects on JP at the composite level in any care level.

JP of nurses

Knowledge Identification was the only KMP dimension that significantly and positively influenced overall JP, particularly the Task Performance and Conscientiousness dimensions. This finding shows that nurses who are better able to recognize relevant knowledge, understand where information resides, and locate clinical resources or expertise perform better overall. In healthcare environments with limited formal knowledge systems, such as Kosovo's SHC, nursing performance may depend heavily on this early-stage KM capability. Moreover, this finding aligns with KBV, which emphasizes that the ability to identify knowledge is foundational for effective decision-making and clinical judgement.

The lack of significant effects from the rest of KMP dimensions could be explained by the ineffective knowledge capturing and storing, limited real-time measurement, or retrieval, or inadequate documentation, largely rooted in the absence of structured KM systems and digital tools. Other possible explanations to such outcomes could be related to the restricted time for deliberate knowledge sharing and/or application due to the high workloads, and lack of informal knowledge processes integrated in the clinical workflows, as evidenced in studies of [4,40,115]. The particularly strong contribution of the respective KMP dimension to Task Performance and Conscientiousness resonates with findings of [75], which revealed that drawing on patient-experience, knowledge strengthens professional judgment and accountability.

Regarding KMI, the dimensions of Shared Knowledge and IT were found to act as significant enablers of the JP of nurses, namely the composite as well as each of its six dimensions. These persistent results further resemble those of earlier studies showing that technology and collaborative learning environments enhance job satisfaction, coordination, and service quality [107,108,110].

JP of nurse managers

For nurse managers, the Measurement dimension was the only KMP component to show a significant effect at the composite level, especially on Contextual Performance and Cooperation dimensions. This effect was negative and confined to the PHC level,

reconfirming that in resource-limited environments, as at the PHC level, the increased emphasis on tracking, documenting, or quantifying knowledge-related activities may inadvertently reduce the time and opportunities for managers to engage in mentoring, and team support. These findings align with earlier findings that excessive administrative requirements or poorly designed monitoring tools can displace managerial attention from core clinical and supervisory responsibilities [84,87].

6.5.4 RQ4: The moderating role of MC in the KMP–JP and KMI–JP relationships

RQ4 assessed whether MC moderates the relationships between KMP, KMI, and JP across care levels. The findings provided only partial support for this moderating role. Among nurses, MC significantly strengthened the KMP–JP relationship exclusively at the THC level. In contrast, among nurse managers, MC weakened the KMP–JP relationship only at the SHC level, and the KMI–JP relationship only at the PHC and SHC levels.

The moderating role of MC in the KMP–JP

JP of nurses

Concerning nurses, the moderation analysis revealed that MC significantly strengthened the positive effect of KMP on JP at the THC level only, albeit the cross care analysis revealed that such effect does not statistically differ from the PHC level. These findings align with the DCT and OCT, which posit a direct relationship between the importance of managerial capability and complexity of work. Congruently, previous studies had evidenced that when the demand for specialized knowledge rises, MC emerges as a significant amplifier of JP [85,87]. Particularly, they highlighted the enabling role of competent managers in facilitating decision-making under high clinical pressure, especially. Relatedly, MC was found to foster nursing performance, primarily in areas of problem-solving, team-work capacity, and evidence-integration among nurses via alignment between evidence based practices and clinical routines, responsive decision-making, interpretation and translation of complex knowledge and orchestration of knowledge flows [117,127,141].

JP of nurse managers

As for nurse managers, the pattern differed, given that MC significantly weakened the relation between KMP and their JP at the THC level. The differences across care levels were not statistically significant, indicating that while the moderation pattern is context-sensitive, it is not systematically shaped by the care-level structure. Such a finding is in line with those of Mosadeghrad and Abbasi [84], and González-García [85], where highly competent managers were observed to act less dependent on procedural knowledge mechanisms, instead utilizing their tacit knowledge and experiential judgement. Similar results were found also by González-García et al. [84] and Karsikas et al. [117], where managers dealing with more complex and higher workloads were less able to leverage knowledge for their own performance outcomes. DCT also supports this finding in the sense that capabilities interact differently depending on the role and responsibility. More to the point, managers are required to invest relatively more of their time and energies in activities, which may be less central to their concrete and measurable performance outcomes such as monitoring and control, and coordination.

The Moderating Role of MC in the KMI–JP relation

The respective findings of this study reveal notable disparities in how MC moderates the KMI–JP relationship for nurses and nurse managers, suggesting that these effects depend on role expectations, decision-making responsibilities, and exposure to infrastructural constraints.

JP of nurses

For nurses, MC did not significantly moderate the relationship between KMI and JP at any care level. This result aligns with the existing literature demonstrating that clinical workflow efficiency and service quality may benefit from infrastructural enablers (ICT systems, shared repositories, and collaborative cultures) instead [19,107,108].

JP of nurse managers

For nurse managers, the moderating role of MC on the KMI–JP relationship showed a clear care-level differentiation, in contrast to the null effects among nurses. In PHC, higher MC amplified the positive effect of KMI on JP (B = 1.845, *p* = .005), suggesting that competent managers can effectively leverage infrastructural supports in less complex settings.

Conversely, at the SHC level, MC hampered the influence of KMI on JP (B = –0.120, *p* = .043), with a similar but non-significant negative trend at the THC level (B = –0.088, *p* = .066). These downward effects indicate that in more complex hospital environments, managerial competence may be constrained by structural or procedural bottlenecks, limiting managers' ability to translate knowledge infrastructure into performance gains. These care-level disparities align with the substitution effect described in leadership and KM literature [121,124], where the marginal productivity of infrastructure diminishes when MC is relatively stronger and acts as the dominant capability. These findings also resonate with the prevailing misalignment between competencies and available infrastructure, where managerial frustration, bottlenecks, or inefficiencies are typical outcomes of infrastructural inconsistences in the public healthcare in Kosovo, which cannot be effectively leveraged, even by the most competent nurse managers.

Nevertheless, despite visible directional differences, the moderation effects at the SHC and THC levels were not statistically distinct from those at the PHC level, suggesting that the overall pattern does not systematically vary across care levels.

6.5.5 RQ5: Moderating effects of MC dimensions on KMP/KMI and JP composite and dimensions

RQ5 examined whether specific dimensions of MC moderate the relationships between KMP, KMI, and JP of nursing staff across care levels. It confirmed that not all managerial competencies are equally effective in enabling knowledge-management processes to enhance nurse performance. Specifically, the findings indicated that dimension-level moderation effects were positive, but relatively rare among nurses at the THC level,

whereas several MC dimensions significantly weakened the KMI–JP association among nurse manager at the PHC and SHC levels.

JP of nurses

The disaggregated analyses indicated that only three out of the six MC dimensions, namely Leadership, Staff Development, and Financial Management, significantly strengthened the effect of KMP on JP of nurses at the THC level, while other dimensions did not moderate this relationship. These results reveal specific managerial competencies that matter the most, especially in complex, and highly demanding contexts, in line with previous studies [19,123,169–171,235]. Furthermore, such findings refine the view supported by previous empirical studies that leadership behaviour, supportive supervision, resource management and professional development are important determinants for enabling KM processes to achieve performance gains for nurses [19,85,236]. Taken together, these results suggest that interpersonal or communication-centred competences may be less effective than structural and resource-oriented ones (leadership, development, financial/resource management) when converting KM processes into improved performance [123,235].

JP of nurse managers

For nurse managers, three MC dimensions, namely Communication, Leadership, and Staff Development, turned out to be moderating factors that weaken the relation between KMP and JP, namely its dimensions of Task Performance, Contextual Performance, and Cooperation. These results only partially support H5 and diverge from most previous studies, which generally show that managerial competencies such as communication, coaching, planning, supervision, recognition, feedback, and autonomy enhance the translation of KM components into higher nursing performance [19,87,171,116,121,122,126–128,141,170].

In addition, the moderating role of MC dimensions in the KMI–JP relationship among nurse managers was consistently negative and relatively more pronounced. at the PHC level, the MC dimensions of Staff Development, Planning & Organization, and Problem-

Solving & Decision-Making significantly weakened the relation between KMI and several JP dimensions, most notably Conscientiousness and Interpersonal Relations, and for Problem-Solving also Organizational Skills and Contextual Performance. A similar pattern appeared in SHC, where MC dimensions of Leadership, Staff Development, and Problem-Solving & Decision-Making acted as negative moderators, particularly for JP dimensions of Organizational Skills, Cooperation, and Interpersonal Relations. Consequently, higher levels of specific MC dimensions reduce the marginal performance benefits derived from KMI. As such, they contradict the mainstream literature, in which the MC composite and several of its dimensions were typically found to facilitate the KM effectiveness in enhancing nursing performance [122,126,128].

Nonetheless, the majority of previous studies were conducted in more developed or better-resourced health systems. Therefore, the present findings reveal that MC, or some of its dimensions at least, under certain conditions may instead function as a substitute or buffer for ineffective KMI especially, thereby reducing the benefit that KMI would otherwise enhance nursing performance. More to the point, such patterns signal the phenomena of over-structuring, reduced flexibility, and a possible substitution effect, given the resource-constrained and bureaucratic settings such as Kosovo's public healthcare system, where highly competent managers may rely relatively more on their own expertise and informal routines.

6.6 Research limitations

This study has several limitations that should be acknowledged. First, despite the use of a stratified sampling design, proportional representation across all units and municipalities could not be achieved, particularly at the tertiary care level, which comprises diverse clinics, and in remote primary centres with very few nurses. Moreover, access to facilities in Kosovo northern municipalities was restricted due to safety reasons, which eventually introduced sampling bias. To address this, the study applied oversampling and post-stratification adjustments and ensured institutional homogeneity within strata. Second, reliance on self-reported questionnaires might have introduced social desirability or recall bias, which was mitigated by assuring anonymity and confidentiality, phrasing items neutrally, and using validated instruments with strong psychometric properties. Third, the study focused exclusively on Kosovo's public healthcare system and excluded private-sector nurses, thereby limiting external generalizability. Nonetheless, the large and diverse sample across all levels of public healthcare enhances internal validity, and international comparisons in the discussion help place the results in a broader perspective. Fourth, even though theoretical framing and robust statistical controls supported cautious interpretation, the cross-sectional design restricts the ability to infer temporal dynamics between studied constructs. Lastly, participation rates were affected by heavy clinical workloads. This challenge was partially mitigated by coordinating with healthcare managers and conducting data collection within clinical settings at times that were most feasible for respondents.

6.7 Unique scientific contributions

This doctoral dissertation offers original contributions on several fronts, namely theoretical, methodological, empirical, practical, and policy-related. By examining how KM processes and infrastructures interact with MC to influence the JP of nursing staff within Kosovo's public healthcare system, it adds new insights to both nursing science and health management research. It bridges classical nursing theories with contemporary management frameworks, situating the nursing profession at the intersection of knowledge, leadership, and system performance.

6.7.1 Theoretical contributions

In terms of theoretical contributions, this research integrates nursing theories, specifically Florence Nightingale's Environmental Theory and the NICT, with OCT, namely KBV, and DCT. First, it reiterates Nightingale's foundational idea of the relationship between the care environment (structural capital) and nursing skills (human capital) as an early conceptualization of knowledge management. It also empirically validates this logic by revealing that the interaction between KM infrastructure and KM processes mirrors Nightingale's emphasis on aligning individual competence and environmental support to improve nursing care outcomes. Second, it applies and extends NICT by confirming that investments in both human and structural knowledge assets substantially enhance nursing performance when effectively mobilized. It further demonstrates that nursing excellence is dependent not just on human knowledge but also on the systems and procedures that facilitate its use. Third, this research conceptualizes MC as a dynamic capability that influences and moderates the effects of KM processes on the JP of nursing personnel, illustrating how competent leadership influences the conversion of knowledge into nursing performance gains. Fourth, the study offers a novel perspective for understanding performance in healthcare organizations operating under resource constraints by redefining nurses as active knowledge agents within institutional learning systems. Lastly, MC is found to operate

as an interdependent, multiplicative, and context-and dimension-specific moderator (dynamic capability) of KM effectiveness.

6.7.2 Methodological contributions

Methodologically, this dissertation introduces a robust empirical framework for studying knowledge-driven performance in a transitional public healthcare system. It is the first study to validate four key questionnaires across care levels, confirming their reliability and cultural adaptability in Kosovo's context.

The study employs a multi-stage stratified probability sampling design encompassing 987 nurses and nurse managers, ensuring representativeness across the system. It conducts regression analyses to capture contextual and interactional effects, an approach rarely applied in LMICs such as Kosovo. Thus, these methodological innovations establish a replicable model for future studies on organizational capability and nursing performance, as well as for studies in other sectors.

6.7.3 Empirical contributions

Empirically, this study provides a detailed examination of how KM and MC relate to the JP of nurses and nurse managers across care levels. More specifically, it offers a granular, empirically validated mapping of which KM components and MC competencies matter most, at which level of care, for which categories of nursing personnel, and under certain organizational or contextual conditions. In doing so, it delivers a comprehensive empirical decomposition of KM–performance relationships within a transitional public healthcare setting. The results provide novel empirical support for the argument that context-sensitive and dimension-specific managerial competencies are particularly influential, especially in more complex and demanding contexts such as the SHC or THC levels.

6.7.4 Education contributions

Beyond its organizational relevance, this study provides a robust empirical basis for aligning nursing education with the practical performance demands of different healthcare levels and professional roles. In doing so, it contributes to more competent,

adaptable, and knowledge-enabled nursing workforces in Kosovo and comparable LMIC contexts. Concretely, it offers a foundation for advancing academic and curricular reform in nursing education. Undergraduate and postgraduate nursing programs would benefit significantly from integrating KMP-related skills, digital competence/literacy, and MC, enabling prospective nursing staff to effectively recognize, evaluate, and apply clinical knowledge in practice, to function effectively in increasingly data-driven and technologically supported healthcare settings, and to exercise managerial, coordination, and decision-making responsibilities more confidently.

6.7.5 Policy contributions

At the policy level, this study supports Kosovo's ongoing efforts to modernize its health system and strengthen nursing performance in line with national and European health policy priorities. It provides clear, evidence-based guidance for the Kosovo Ministry of Health and healthcare institutions on how to integrate KM and MC into human resource development, leadership structures, and quality assurance systems. Such investments have been shown to enhance organizational efficiency, reinforce accountability, and ultimately improve the quality of patient care. The implications of this study are not limited to Kosovo. Taking into account the fact that this study reflects the realities of a transitional public healthcare system, its insights are highly relevant to other Western Balkan countries that share similar healthcare workforce, governance, and system-capacity challenges. Accordingly, these findings offer a valuable foundation for informing knowledge-driven health sector reforms across the region.

6.7.6 Practical contributions

In practical terms, this study provides a wide range of actionable insights for hospital administrators and nursing leadership seeking to strengthen nursing performance through strategic investments in KMP, KMI, and MC. The results inform the design of targeted capacity-building programs aimed at developing specific KMP and KMI dimensions, enhancing MC among nurse managers, and leveraging technological

solutions, particularly IT-based knowledge systems, for more effective and efficient knowledge management within healthcare organizations.

The study identifies the KMP, KMI, and MC dimensions that exert the strongest JP effects at each care level (PHC, SHC, THC) and for each category of nursing personnel (nurses vs. nurse managers). As such, it provides a concrete empirical basis for developing evidence-based leadership training, mentorship structures, and workforce development strategies. It also informs the design of institutional quality-improvement systems aligned with European and international nursing standards. These insights hold substantial relevance for comparable LMIC contexts, where nurses constitute the majority of the healthcare workforce and where optimizing knowledge systems and managerial competencies is critical for improving nursing performance.

7 CONCLUSION

Guided by the Knowledge-Based View (KBV), Dynamic Capabilities Theory (DCT), Organizational Capability Theory (OCT), and foundational Nursing theories—including Nightingale's Environmental Theory and the Nursing Intellectual Capital Theory (NICT)—this doctoral dissertation explored how KMP, KMI, and MC shape the JP of nurses and nurse managers working within Kosovo's public healthcare system. Using a quantitative design, the study provides a comprehensive and empirically grounded understanding of how nursing performance is influenced by the interaction between knowledge management processes and infrastructure, and their interplay with the managerial competence of nurse managers across and within all levels of public healthcare in Kosovo.

7.1 Fundamental research findings

This section synthesizes the empirical results pertinent to the relationships of KMP, KMI, MC, and JP of nurses and nurse managers across the three levels of Kosovo's public healthcare system. To ensure clarity and coherence, the presentation proceeds in three steps: (1) findings for nurses related to KMP and KMI, including the moderating role of MC; (2) findings for nurse managers following the same structure; and (3) dimension-level insights highlighting the most influential dimension of each composite. Overall, results demonstrated that improvements of in JP of nursing personnel could not be achieved through uniform KM measures across care levels. Instead, a context-informed approach should be adopted through which specific levels of knowledge management should be prioritized in congruence with the title and characteristics of nursing personnel, clinical and organizational contexts.

7.1.1 JP of nurses

This section synthesizes how KMP, KMI, and MC relate to nurses' JP across the PHC, SHC, and THC levels, focusing on both main and moderating effects. By disaggregating the

results by KM components and care level, the analysis highlights key contextual nuances that shape nurses' performance within Kosovo's public healthcare system.

Knowledge Management Process (KMP)

KMP was found to significantly influence the JP of nurses only at the SHC level, demonstrating that the influence of knowledge processes is strongly context-bound.

Specifically, the Knowledge Identification dimension emerged as the primary driver of nurses' JP. This dimension showed positive and significant associations with several JP dimensions, including Task Performance, Contextual Performance, and Conscientiousness. These patterns revealed that the ability of nursing personnel to identify and retrieve relevant clinical and organizational knowledge is especially valuable at the SHC level, where inter-professional collaboration and information flow are relatively more dynamic.

Regarding interaction effects, MC amplified the KMP–JP relationship only at the THC level, even though KMP itself had no positive effect at this level. Specifically, MC dimensions of Leadership, Staff Development, and Financial Management amplified the JP dimensions of contextual performance, cooperation, and task performance, emphasizing their relevance in more complex care environments.

Knowledge Management Infrastructure (KMI)

KMI emerged as a significant and consistent predictor of nurses' JP at the PHC and SHC levels. Wald tests again confirmed statistically significant differences across care levels, reflecting variation in structural supports, resources, and workflows. Dimension-level analyses showed that at the PHC level, Shared Knowledge and Information Technology (IT) infrastructure were the strongest contributors, significantly affecting all six JP dimensions.

In parallel, at the SHC level, KMI remained significant overall, albeit no individual dimension demonstrated any significant effects.

Lastly, unlike the KMP-JP relationship, MC did not significantly moderate the KMI–JP relationship for nurses at any care level. This suggests that the influence of KMI is structurally stable and less dependent on MC.

Control factors

Among nurses, only a limited number of sociodemographic and job-related factors produced significant, care-level-specific effects. Specifically, gender was significant only in SHC, where male nurses reported lower JP than female nurses. Age mattered only in THC; nurses aged 60–65 displayed higher JP than those aged 22–29. Ethnicity influenced JP primarily in PHC; Serb and Turkish nurses scored higher, while Bosnian nurses scored lower than Albanian nurses. Education level was significant in SHC, where nurses with a BSc degree scored higher than those with only high school education. Work experience showed effects only in SHC; those with 6–10 years reported higher JP. Workload was generally non-significant, except at the PHC level where high caseloads reduced JP. Dual employment was significant only in SHC; nurses working in both sectors had higher JP.

7.1.2 JP of nurse managers

The following section turns to JP of nurse managers, presenting the key findings with regard to the ways in which KMP and KMI relate to their JP across care levels, including the moderating role of MC.

Knowledge Management Process (KMP)

For nurse managers, KMP demonstrated a significant and negative influence on the JP of nurse managers operating at the PHC level only. More precisely, the Measurement dimension of KMP was found to be negatively associated with JP, revealing that administrative or measurement-related tasks may create additional burdens that hinder managerial functioning. The respective negative effects of Knowledge Measurement were particularly significant for the JP dimensions of Contextual Performance and Cooperation, both of which rely heavily on interpersonal support, coordination, and professional judgment.

Moreover, MC significantly moderated the KMP–JP relationship at the THC level only. Specifically, MC further weakened the respective relationship, indicating that under conditions of high managerial workload, stronger MC does not necessarily offset the challenges of intensive knowledge processes. The MC dimensions most consistently associated with negative moderation were Communication, Leadership, and Staff Development, each weakening JP in Task Performance, Contextual Performance, and Cooperation.

Knowledge Management Infrastructure (KMI)

For nurse managers, KMI did not exhibit a significant positive effect on JP. However, when MC was included as a moderating factor, the KMI–JP relationship became statistically significant and positive at the PHC, whereas it was negative at the SHC level. This result suggests the existence of a substitution effect between KMI and MC, particularly in settings where structured or demanding work practices may lead highly competent managers to rely more on their own expertise than on available infrastructure.

However, at both of these care levels, each significant dimension of MC was found to weaken the KMI-JP relationship. Particularly, at the PHC level, the following dimensions of MC weakened the relationships between the KMI composite and JP dimensions:

- Staff Development: Conscientiousness, Interpersonal Relations;
- Problem-Solving & Decision-Making: Organizational Skills, Contextual Performance, Conscientiousness, Interpersonal Relations;
- Planning & Organization: Conscientiousness, Interpersonal Relations.

Similarly, at the SHC level, the following dimensions of MC contributed the most to the hampering moderating effects of the MC composite into the KMI-JP dimensions' relationships:

- Staff Development: Cooperation;
- Problem-Solving & Decision-Making: Organizational Skills, Cooperation;
- Leadership: Organizational Skills, Interpersonal Relations.

Control factors

Notably, for nurse managers, none of the studied sociodemographic and job-related factors emerged as significant control factors of their performance at the THC level. Gender did not emerge as a significant predictor of JP at any care level, indicating that male and female nurse managers performed similarly across the system. Age showed meaningful effects at the PHC and SHC levels. Managers aged 40–49 years reported higher JP than those in the youngest age group (22–29 years), suggesting a mid-career performance advantage associated with accumulated experience, confidence, and professional maturity. No age effects were observed at the THC level. Ethnicity reached significance at the PHC level (as well as in pooled models). Nurse managers identifying as "Other" ethnicities reported higher JP compared to Albanian managers. Ethnicity was not a significant factor at the SHC or THC levels. Education level showed limited significance across the system. In pooled analyses, PhD-trained managers reported lower JP relative to those with lower academic qualifications, a pattern that may reflect role strain or overextension rather than differences in competence. Across the three care levels, no educational levels were significantly associated with JP. Work experience emerged as one of the most important control factors for nurse managers. At the PHC and SHC levels, all higher experience categories (2–20 years) were associated with lower JP compared to managers with less than two years of experience. This negative pattern suggests the possibility of cumulative managerial strain, burnout, or role saturation affecting performance. No significant effects of experience were found at the THC level. Workload tended to show small negative coefficients in pooled analyses, but did not reach significance within any specific care level. Dual employment (employment in both public and private sectors) was not significantly associated with JP at any care level.

7.2 Suggestions for improvement

The key recommendations derived from the evidence of this study fall into these domains: practice, education, research, and policy. They are directed toward healthcare institutions, universities, professional bodies, and national policymakers. Their shared aim is to strengthen KM and MC capacities across the health system, while addressing structural and workforce limitations that continue to constrain their effectiveness.

7.2.1 Education

Educational interventions should reflect the differentiated needs of nurses and nurse managers, consistent with the empirical findings of this study. For nurses, where KMP influenced performance only at the SHC level and, where KMI had the strongest effects at the PHC and SHC levels, undergraduate programs should strengthen competencies related to knowledge identification, sharing, and application, teamwork and inter-professional communication, and use of IT systems for clinical documentation and knowledge retrieval. Simulation-based learning, case-based discussion, and reflective practice exercises are essential for operationalizing knowledge processes, particularly at the SHC level, where KMP matters most.

For nurse managers, where MC plays a decisive moderating role, positive at the THC level and negative at the PHC and SHC levels, postgraduate and continuing professional development (CPD) programs should emphasize leadership and strategic management, planning and organizational skills, decision-making and problem-solving, staff development and performance management, and financial management.

Since IT infrastructure was one of the strongest KMI predictors for nurses, digital competence should be integrated across all curricula, ensuring graduates can effectively use health information systems, dashboards, and digital knowledge platforms. Role-specific training is essential: process-oriented skills for nurses, and infrastructure-, system-, and leadership-oriented competencies for nurse managers.

Finally, in alignment with policy directions regarding expanded nursing roles, education institutions should update existing curricula to include advanced competencies in

assessment, protocol-based care, and digital health, and should develop and introduce a Master's program in Advanced Nursing Practice (ANP) to prepare nurses for expanded clinical responsibilities, higher-level decision-making, and leadership functions consistent with international advanced practice models.

7.2.2 Research

Future research should continue to examine the multilevel dynamics of KM, MC, and JP, paying particular attention to care-level differences highlighted by this study, namely:

- Longitudinal effects of KM and MC investments.
- Comparative dynamics across PHC, SHC, THC and public vs. private sectors.
- Qualitative exploration of knowledge culture and managerial strain.
- Dimension-level effects (e.g., identification, shared knowledge, leadership).
- Benchmarking against Western Balkan and EU systems to contextualize Kosovo's progress.
- Exploration of potential mediating mechanisms through which specific MC dimensions amplify or weaken the effect of KM measures on JP.

7.2.3 Policy

At the policy level, the findings underscore the need for coordinated KM and leadership strategies across the health system. The health policymakers should:

- Establish national KM standards outlining expectations for shared knowledge practices, digital infrastructure, leadership structures, and measurement mechanisms.
- Introduce performance audits and routine monitoring to ensure consistent implementation of KM across PHC, SHC, and THC.
- Allocate dedicated budgets for digital knowledge systems, IT upgrades, and continuing managerial education, reflecting the empirical importance of IT and leadership.

- Update the national nursing competence profile, granting nurses expanded roles in protocol-driven assessment, basic diagnostic reasoning, and limited prescribing authority—functions that can be safely enabled through strengthened KMI systems (digital documentation, IT-supported decision tools, and structured knowledge pathways).
- Design and institutionalize protocol-based care services delivered by nurses, particularly at the PHC and SHC levels, where KMI exerted the strongest performance effects. These protocols should serve as a foundation for progressively upgrading the professional role of nurses within the healthcare system.

The Ministry of Education and relevant professional bodies should:

- Integrate KM, leadership, digital competence, and evidence-based practice into nursing and medical curricula.
- Support postgraduate specialization programs in nursing management and health knowledge systems.
- Update accreditation and licensure standards to reflect competencies in KM, leadership, innovation, and digital health.

Workforce strategy should also address structural challenges identified in this study:

- Improve staffing ratios and reduce excessive patient loads, especially in PHC.
- Introduce clear guidance on dual employment, ensuring it does not compromise public-sector performance.
- Promote equity-focused policies that address ethnicity-related disparities in PHC.

Finally, aligning Kosovo's KM and nursing workforce reforms with EU standards and frameworks will enable the system to progressively adopt best practices in knowledge-driven, digital, and leadership-oriented healthcare.

7.2.4 Practice

Healthcare institutions should formalize KM practices within routine care, prioritizing those KMI components that strongly predicted nurses' and nurse managers'

performance at the PHC and SHC levels. This includes investing in shared knowledge mechanisms, IT systems, and measurement tools. Given that KMP influenced nurses only in SHC, these institutions should encourage structured knowledge identification, sharing, and application (case discussions, standardized pathways). MC acted as a significant moderator, positive for nurses at the THC level, and often negative for nurse managers at the PHC/SHC level, highlighting the need for continuous leadership development focusing on planning and organization, decision-making, communication, and staff development. Institutions should also address workload pressures, especially at the PHC level, where higher workloads reduced JP. In this context, dual employment requires clear guidelines, and inclusion policies should address the ethnicity-related variations observed.

To increase the practical relevance of the findings, an evidence-based and dimension-based Standard Operating Procedure (SOP) is intended to serve as a guide for healthcare institutions in implementing role and care-level-specific knowledge management interventions. It is presented in the Appendix K. Whenever interaction exhibited negative effects on JP, interventions focused on redistributing responsibilities, regulating intensity, and simplifying procedures, rather than further strengthening these mechanisms.

SOURCES AND LITERATURE

[1] Munyewende PO, Levin J, Rispel LC. An evaluation of the competencies of primary health care clinic nursing managers in two South African provinces. Glob Health Action 2016;9:32486. https://doi.org/10.3402/gha.v9.32486.

[2] Carlos VS, Rodrigues RG. Development and Validation of a Self-Reported Measure of Job Performance. Soc Indic Res 2016;126:279–307. https://doi.org/10.1007/s11205-015-0883-z.

[3] Kudozia RY, Kudozia CE, Owusu-Donkor D, Kudozia RY, Kudozia CE, Owusu-Donkor D, et al. Knowledge Management Infrastructure in Organisational Knowledge Management Processes—A Case of Aquantuo LLC. Open J Bus Manag 2023;11:1248–70. https://doi.org/10.4236/ojbm.2023.113070.

[4] Pealow J. Knowledge Management Isn't Just A Fad, It's a New Way of Conducting Business. Content Matters 2016.

[5] Veenstra GL, Rietzschel EF, Molleman E, Heineman E, Pols J, Welker GA. Electronic health record implementation and healthcare workers' work characteristics and autonomous motivation—a before-and-after study. BMC Med Inform Decis Mak 2022;22:120. https://doi.org/10.1186/s12911-022-01858-x.

[6] Jeilani A, Hussein A. Impact of digital health technologies adoption on healthcare workers' performance and workload: perspective with DOI and TOE models. BMC Health Serv Res 2025;25:1–17. https://doi.org/10.1186/s12913-025-12414-4.

[7] Mostafapour M, Smith JD, Fortier JH, Garber GE. Beyond medical errors: exploring the interpersonal dynamics in physician-patient relationships linked to medico-legal complaints. BMC Health Serv Res 2024;24:1–11. https://doi.org/10.1186/S12913-024-11457-3.

[8] Hannawa AF, Wu AW, Kolyada A, Potemkina A, Donaldson LJ. The aspects of healthcare quality that are important to health professionals and patients: A qualitative study. Patient Educ Couns 2022;105:1561–70. https://doi.org/10.1016/J.PEC.2021.10.016.

[9] Alwali J. The innovative–performance connection: how dynamic capabilities empower nurses. Int J Innov Sci 2023;16:1077–99. https://doi.org/10.1108/IJIS-11-2022-0211.

[10] Lukewich J, Martin-Misener R, Norful AA, Poitras ME, Bryant-Lukosius D, Asghari S, et al. Effectiveness of registered nurses on patient outcomes in primary care: a systematic review. BMC Health Serv Res 2022;22:1–34. https://doi.org/10.1186/S12913-022-07866-X.

[11] Jumoke O, Mutula S. The relationship between knowledge management and nursing care performance. South African J Libr Inf Sci 2018. https://doi.org/10.7553/84-2-1785.

[12] Brajshori N, Beqiri P, Hajrullahu V, Ajeti A, Ismajli A, Behrami A, et al. Recognizing Attitudes and Expectations about the Role of Advanced Nurses (ANP's) in Kosovo's Healthcare System. E3S Web Conf 2024;585:06003. https://doi.org/10.1051/e3sconf/202458506003.

[13] Boniol M, Kunjumen T, Nair TS, Siyam A, Campbell J, Diallo K. The global health workforce stock and distribution in 2020 and 2030: A threat to equity and â € universal' health coverage? BMJ Glob Heal 2022;7. https://doi.org/10.1136/BMJGH-2022-009316,.

[14] Snavely TM. A brief economic analysis of the looming nursing shortage in the United States. Nurs Econ 2016;34.

[15] Aluttis C, Bishaw T, Frank MW. The workforce for health in a globalized context –

global shortages and international migration. Glob Health Action 2014;7:10.3402/gha.v7.23611. https://doi.org/10.3402/GHA.V7.23611.

[16] Maurits EEM, De Veer AJE, Van Der Hoek LS, Francke AL. Factors associated with the self-perceived ability of nursing staff to remain working until retirement: A questionnaire survey Organization, structure and delivery of healthcare. BMC Health Serv Res 2015;15. https://doi.org/10.1186/s12913-015-1006-x.

[17] WHO. Nursing and midwifery 2022. https://www.who.int/news-room/fact-sheets/detail/nursing-and-midwifery (accessed November 21, 2023).

[18] Sivagiri N. The Effects of Knowledge Management Infrastructure Capability On knowledge Management effectiveness Of Doctors. An Empir Study J Manag 2018;5:218–31.

[19] Kosklin R, Lammintakanen J, Kivinen T, R Kosklin JLTK, Kosklin R, Lammintakanen J, et al. Knowledge management effects and performance in health care: a systematic literature review. Knowl Manag Res Pract 2023;21:738–48. https://doi.org/10.1080/14778238.2022.2032434.

[20] Malik A, Budhwar P, Kandade K. Nursing excellence: A knowledge-based view of developing a healthcare workforce. J Bus Res 2022;144:472–83. https://doi.org/10.1016/j.jbusres.2022.01.095.

[21] Mawuena EK, Mannion R, Adu-Aryee NA, Adzei FA, Amoakwa EK, Twumasi E. Professional disrespect between doctors and nurses: implications for voicing concerns about threats to patient safety. J Health Organ Manag 2024;38:1009. https://doi.org/10.1108/JHOM-06-2023-0167.

[22] Samuriwo R, Laws E, Webb K, Bullock A. “I didn’t realise they had such a key role.” Impact of medical education curriculum change on medical student interactions with nurses: a qualitative exploratory study of student perceptions. Adv Heal Sci

Educ 2020;25:75–93. https://doi.org/10.1007/S10459-019-09906-4/TABLES/2.

[23] Batanda I. Prevalence of burnout among healthcare professionals: a survey at fort portal regional referral hospital. Npj Ment Heal Res 2024;3:16. https://doi.org/10.1038/s44184-024-00061-2.

[24] Konlan KD, Lee TW, Damiran D. The factors that are associated with nurse immigration in lower- and middle-income countries: An integrative review. Nurs Open 2023;10:7454. https://doi.org/10.1002/NOP2.2003.

[25] Economist. Modernisation of health systems in the Balkanns Uneven progress. 2016.

[26] Qalehsari MQ, Khaghanizadeh M, Ebadi A. Lifelong learning strategies in nursing: A systematic review. Electron Physician 2017;9:5541. https://doi.org/10.19082/5541.

[27] Achor EC, Okon II, Jader A, Ewelike SC, Ibrahim M, Lucero-Prisno DE. Achieving sustainable healthcare cost containment in the United States: the role of collaborative efforts among stakeholders. Discov Heal Syst 2025;4. https://doi.org/10.1007/S44250-025-00188-9.

[28] Christensen C. How Disruption Can Finally Revolutionize Healthcare : Christensen Institute 2017. https://www.christenseninstitute.org/publications/how-disruption-can-finally-revolutionize-healthcare/ (accessed November 14, 2019).

[29] Haug A. Critical success factors for knowledge management systems in new product development. Knowl Manag Res Pract 2024:1–13. https://doi.org/10.1080/14778238.2024.2424290.

[30] Giuliano KK, Sup FC, Benjamin E, Krishnamurty S. INNOVATE. Nurs Adm Q 2022;46:255–65. https://doi.org/10.1097/NAQ.0000000000000529.

[31] Lin CC, Han CY, Huang YL, Ku HC, Chen LC. Exploring a learning model for knowledge integration and the development of critical thinking among nursing students with previous learning: a qualitative study protocol. BMC Med Educ 2024;24:1–7. https://doi.org/10.1186/S12909-024-06118-2/PEER-REVIEW.

[32] Ridge LJ, Liebermann EJ, Stimpfel AW, Klar RT, Dickson VV, Squires AP. The intellectual capital supporting nurse practice in a post-emergency state: A case study. J Adv Nurs 2022;78:3000–11. https://doi.org/10.1111/jan.15282.

[33] Lee HS. Knowledge Management Enablers and Process in Hospital Organizations. Osong Public Heal Res Perspect 2017;8:26. https://doi.org/10.24171/J.PHRP.2017.8.1.04.

[34] Pereira N, Fernandes C. Knowledge Management in Health Organizations: A Systematic Literature Review. J Knowl Econ 2025:1–73. https://doi.org/10.1007/S13132-025-02760-3/TABLES/1.

[35] Hartviksen TA, Sjolie BM, Aspfors J, Uhrenfeldt L. Healthcare middle managers' experiences developing leadership capacity and capability in a public funded learning network. BMC Health Serv Res 2018;18:1–11. https://doi.org/10.1186/S12913-018-3259-7.

[36] Sönmez B, İspir Ö, Önal M, Emiralioğlu R. Turkish psychometric properties of the Innovative Behavior Inventory and Innovation Support Inventory: A model analysis on nurses. Nurs Forum 2019;54:254–62. https://doi.org/10.1111/nuf.12325.

[37] Karamitri I, Talias MA, Bellali T. Knowledge management practices in healthcare settings: a systematic review. Int J Health Plann Manage 2017;32:4–18. https://doi.org/10.1002/hpm.2303.

[38] Kuusisto A, Morin KH. Enhancing knowledge management in nursing through

documentation. J Adv Nurs 2024;80:848–50. https://doi.org/10.1111/jan.15827.

[39] Ajanaku OJ, Mutula S. Knowledge management enablers affecting patient care: The perspective of registered nurses in South West Nigeria. SA J Inf Manag 2021;23. https://doi.org/10.4102/sajim.v23i1.1387.

[40] Tajafari M, Fanoodi N. From knowledge management to evidence-based practice among nurses: a structural equation modeling study. BMC Nurs 2025;24:307. https://doi.org/10.1186/s12912-025-02971-8.

[41] Lunden A, Teräs M, Kvist T, Häggman-Laitila A. A systematic review of factors influencing knowledge management and the nurse leaders' role. J Nurs Manag 2017;25:407–20. https://doi.org/10.1111/jonm.12478.

[42] Fadaie N, Lakbala P, Ghanbarnejad A. Impact of knowledge management on job satisfaction and organizational performance among healthcare employees: A structural equation modeling approach. Heal Sci Reports 2023;6:e1560. https://doi.org/10.1002/hsr2.1560.

[43] Hants L, Bail K, Paterson C. Clinical decision-making and the nursing process in digital health systems: An integrated systematic review. J Clin Nurs 2023;32:7010–35. https://doi.org/10.1111/jocn.16823.

[44] Persson J, Rydenfält C. Why are digital health care systems still poorly designed, and why is health care practice not asking for more? Three paths toward a sustainable digital work environment. J Med Internet Res 2021;23. https://doi.org/10.2196/26694.

[45] Parse RR. Nursing: The Discipline and the Profession. Nurs Sci Q 1999;12:275–6. https://doi.org/10.1177/089431849901200401.

[46] Mahdi OR, Nassar IA, Almsafir MK. Knowledge management processes and

sustainable competitive advantage: An empirical examination in private universities. J Bus Res 2019;94:320–34. https://doi.org/10.1016/J.JBUSRES.2018.02.013.

[47] Min M, Zhou X, Zhang Z. Interactive mechanisms between formal and informal knowledge governance mechanisms in predicting knowledge processes in China. Knowl Manag Res Pract 2024;22. https://doi.org/10.1080/14778238.2023.2205028.

[48] Brennecke J, Coutinho JA, Gilding M, Lusher D, Schaffer G. Invisible Iterations: How Formal and Informal Organization Shape Knowledge Networks for Coordination. J Manag Stud 2025;62:706–47. https://doi.org/10.1111/JOMS.13076;JOURNAL:JOURNAL:14676486;WGROUP:STRING:PUBLICATION.

[49] Nonaka I. The Knowledge-Creating Company. Harv Bus Rev 1991. https://hbr.org/2007/07/the-knowledge-creating-company.

[50] El-Jardali F, Bou-Karroum L, Hilal N, Hammoud M, Hemadi N, Assal M, et al. Knowledge management tools and mechanisms for evidence-informed decision-making in the WHO European Region: a scoping review. Heal Res Policy Syst 2023;21:113. https://doi.org/10.1186/s12961-023-01058-7.

[51] Chawla D, Joshi H. Impact of Knowledge Management on Learning Organization in Indian Organizations-A Comparison. Knowl Process Manag 2011;18:266–77. https://doi.org/10.1002/kpm.384.

[52] Malhotra N, Smets M, Morris T. CAREER PATHING AND INNOVATION IN PROFESSIONAL SERVICE FIRMS. Acad Manag Perspect 2016;30:369–83. https://doi.org/10.5465/amp.2012.0108.

[53] Yazdani S, Bayazidi S, Mafi AA. The current understanding of knowledge

management concepts: A critical review. Med J Islam Repub Iran 2020;34:127. https://doi.org/10.34171/MJIRI.34.127.

[54] Aviv I, Hadar I, Levy M. Knowledge management infrastructure framework for enhancing knowledge-intensive business processes. Sustain 2021;13. https://doi.org/10.3390/SU132011387.

[55] Tabejamaat S, Ahmadi H, Barmayehvar B, Banihashemi S. Enhancing Job Satisfaction and Productivity through Knowledge Management Infrastructure: A Case of Construction Industry. Build 2024, Vol 14, Page 790 2024;14:790. https://doi.org/10.3390/BUILDINGS14030790.

[56] Elgargouh Y, Chbihi Louhdi MR, Zemmouri EM, Behja H. Knowledge Management for Improved Digital Transformation in Insurance Companies: Systematic Review and Perspectives. Informatics 2024;11:60. https://doi.org/10.3390/informatics11030060.

[57] Teixeira AC, Tenório N, Pinto D, Matta N, da Cruz Urpia AGB. The critical success factors' investigation during knowledge management implementation within SME enterprises: a Participatory Design opportunity. SN Comput Sci 2023;4. https://doi.org/10.1007/s42979-022-01420-6.

[58] Cheng CH, Li MH, Tang BJ, Cheng YR. The Impact of Knowledge Management and Organizational Learning Promotion in Small and Medium Enterprises on the Implementation of Industry 4.0 and Competitiveness. Adm Sci 2024, Vol 14, Page 161 2024;14:161. https://doi.org/10.3390/ADMSCI14080161.

[59] Suparwadi, Musadieq M Al, Riza MF, Hutahayan B. Leveraging intellectual capital and knowledge management to drive innovation and organizational performance. Int J Eng Bus Manag 2024;16. https://doi.org/10.1177/18479790241304563.

[60] Indrašienė V, Jegelevičienė V, Merfeldaitė O, Penkauskienė D, Pivorienė J, Railienė A, et al. Linking critical thinking and knowledge management: A conceptual analysis. Sustain 2021;13. https://doi.org/10.3390/su13031476.

[61] Yu Q, Aslam S, Murad M, Jiatong W, Syed N. The Impact of Knowledge Management Process and Intellectual Capital on Entrepreneurial Orientation and Innovation. Front Psychol 2022;13. https://doi.org/10.3389/fpsyg.2022.772668.

[62] Abdelrahman M, Papamichail KN, Hammady R, Kurt Y, Abdallah W, Shixiong Liu L, et al. Organisational Culture and Knowledge Management Systems Adoption: Examining Employee Usage in Multinational Corporations. Glob J Flex Syst Manag 2025;26:439–67. https://doi.org/10.1007/S40171-025-00448-W/TABLES/6.

[63] Yaw KR. Organizational Knowledge Management Practices and Their Impact on Organizational Focus—Assessing the Case of the Service Industry in Ghana. Open J Bus Manag 2023;11:704–17. https://doi.org/10.4236/OJBM.2023.112038.

[64] Lin HF, Antunes H de JG, Pinheiro PG, de Jesus AH, Pinheiro PG. Linking knowledge management, organizational learning and memory. J Innov Knowl 2020;5:140–9. https://doi.org/10.1108/JKM-04-2015-0132.

[65] Nakash M, Bolisani E. Making knowledge management transparent: a new perspective on KM processes integration in the organizational framework. Bus Process Manag J 2025;31:49–66. https://doi.org/10.1108/BPMJ-07-2024-0566.

[66] Galgotia D, Lakshmi N. Implementation of Knowledge Management in Higher Education: A Comparative Study of Private and Government Universities in India and Abroad. Front Psychol 2022;13. https://doi.org/10.3389/fpsyg.2022.944153.

[67] Laihonen H, Kork AA, Sinervo LM. Advancing public sector knowledge management: towards an understanding of knowledge formation in public administration. Knowl Manag Res Pract 2024;22.

https://doi.org/10.1080/14778238.2023.2187719.

[68] Nassani AA, Al-Aiban KM, Rosak-Szyrocka J, Yousaf Z, Isac N, Badshah W. Knowledge management infrastructure capabilities towards innovative work behavior: Employee's resilience and role of functional flexibility. Heliyon 2024;10:e38742. https://doi.org/10.1016/J.HELIYON.2024.E38742.

[69] Dei DGJ, Kankam PK, Anane-Donkor L, Puttick CP, Peasah T. Knowledge Repositories for Managing Knowledge in Learning Organizations. Electron J Knowl Manag 2024;22:1–13. https://doi.org/10.34190/EJKM.22.1.3018.

[70] Thakuri S, Bon M, Cavus N, Sancar N. Artificial Intelligence on Knowledge Management Systems for Businesses: A Systematic Literature Review. TEM J 2024;13:2146–55. https://doi.org/10.18421/TEM133-42,.

[71] Abualoush S, Masa'deh R, Bataineh K, Alrowwad A. The role of knowledge management process and intellectual capital as intermediary variables between knowledge management infrastructure and organization performance. Interdiscip J Information, Knowledge, Manag 2018;13:279–309. https://doi.org/10.28945/4088.

[72] Lam L, Nguyen P, Le N, Tran K. The relation among organizational culture, knowledge management, and innovation capability: Its implication for open innovation. J Open Innov Technol Mark Complex 2021;7. https://doi.org/10.3390/joitmc7010066.

[73] Rezaei F, Khalilzadeh M, Soleimani P. Factors Affecting Knowledge Management and Its Effect on Organizational Performance: Mediating the Role of Human Capital. Adv Human-Computer Interact 2021;2021. https://doi.org/10.1155/2021/8857572.

[74] Chauhan H, Kalkis H. Knowledge management capabilities in the intra-

organizational environment, 2023. https://doi.org/10.54941/ahfe1003898.

[75] Lozano Ramirez MC. Tacit knowledge about internal marketing in health care institutions. Cuad Adm 2022;38:e2011200. https://doi.org/10.25100/cdea.v38i72.11200.

[76] J. R, Opatha HHDNP, M. D. P. A Synthesis towards the Construct of Job Performance. Int Bus Res 2017;10:66. https://doi.org/10.5539/ibr.v10n10p66.

[77] Krijgsheld M, Tummers LG, Scheepers FE. Job performance in healthcare: a systematic review. BMC Health Serv Res 2022;22:149. https://doi.org/10.1186/s12913-021-07357-5.

[78] Al-Ajarmeh DO, Rayan AH, Eshah NF, Al-Hamdan ZM. Nurse–nurse collaboration and performance among nurses in intensive care units. Nurs Crit Care 2022;27:747–55. https://doi.org/10.1111/nicc.12745.

[79] Rahmah NM, Sri Hariyati RT, Sahar J. Nurses' efforts to maintain competence: A qualitative study. J Public Health Res 2022;11. https://doi.org/10.4081/jphr.2021.2736.

[80] Borman, W. C., & Motowidlo SJ. Expanding the criterion domain to include elements of contextual performance. In Schmitt, N. & Borman, W. C. (Eds.),. 1993.

[81] Hoxha A, Glowacka M, Brajshori N. Knowledge Management and Job Performance of Nurses: A Systematic Literature Review. Pielęgniarstwo w Opiece Długoterminowej / Long-Term Care Nurs 2023;8:59–83. https://doi.org/10.19251/pwod/2023.4(6).

[82] Mohd Nasurdin A, Tan CL, Naseer Khan S. Can high performance work practices and satisfaction predict job performance?An examination of the Malaysian private health-care sector. Int J Qual Serv Sci 2020;12:521–40.

https://doi.org/10.1108/IJQSS-06-2019-0090.

[83] Mohamad NI, Abd Rahman I, Ibrahim N, Hasan H, Mahadi MH. Enhancing competency development through managerial coaching: self-efficacy as the driving mechanism. Cogent Bus Manag 2025;12. https://doi.org/10.1080/23311975.2025.2477284.

[84] Mosadeghrad AM, Abbasi M. Managerial intelligence of hospital managers in Sari, Iran. Q J Manag Strateg Heal Syst 2020. https://doi.org/10.18502/mshsj.v4i4.2483.

[85] González-García A, Pinto-Carral A, Villorejo JS, Marqués-Sánchez P. Competency Model for the Middle Nurse Manager (MCGE-Logistic Level). Int J Environ Res Public Health 2021;18:3898. https://doi.org/10.3390/ijerph18083898.

[86] Engle RL, Lopez ER, Gormley KE, Chan JA, Charns MP, Lukas CV. What roles do middle managers play in implementation of innovative practices? Health Care Manage Rev 2017;42:14–27. https://doi.org/10.1097/HMR.0000000000000090.

[87] Cummings GG, Tate K, Lee S, Wong CA, Paananen T, Micaroni SPM, et al. Leadership styles and outcome patterns for the nursing workforce and work environment: A systematic review. Int J Nurs Stud 2018;85:19–60. https://doi.org/10.1016/j.ijnurstu.2018.04.016.

[88] Gunawan J, Aungsuroch Y, Fisher ML, McDaniel AM, Marzilli C. Managerial Competence of First-Line Nurse Managers in Public Hospitals in Indonesia. J Multidiscip Healthc 2020;Volume 13:1017–25. https://doi.org/10.2147/JMDH.S269150.

[89] Aydin S, Dube M. Knowledge management, innovation, and competitive advantage: is the relationship in the eye of the beholder? Knowl Manag Res Pract 2018;16:402–13. https://doi.org/10.1080/14778238.2018.1496564.

[90] Plekhanov D, Franke H, Netland TH. Digital transformation: A review and research agenda. Eur Manag J 2023;41:821–44. https://doi.org/10.1016/j.emj.2022.09.007.

[91] Rafii F, Nasrabadi AN, Tehrani FJ. How Nurses Apply Patterns of Knowing in Clinical Practice: A Grounded Theory Study. Ethiop J Health Sci 2021;31:139. https://doi.org/10.4314/EJHS.V31I1.16.

[92] Maxwell E. Perspectives: Who needs theory? J Res Nurs 2023;28:314. https://doi.org/10.1177/17449871231178926.

[93] Nwozichi CU, Olorunfemi O, Madu AM. Exploring Issues in Theory Development in Nursing. Indian J Contin Nurs Educ 2021;22:3–9. https://doi.org/10.4103/ijcn.ijcn_100_20.

[94] Maria Ansah Ofei A, Barnes T, Paarima Y. Strategic Leadership in Nursing. Nurs. - New Insights Clin. Care, IntechOpen; 2023. https://doi.org/10.5772/intechopen.104512.

[95] Aly NAE-FM, El-Shanawany SM, Ghazala AMA. Ethico-legal aspects and ethical climate: Managing safe patient care and medical errors in nursing work. Clin Ethics 2020;15:132–40. https://doi.org/10.1177/1477750920920559.

[96] Ranegger R, Haug S, Vetsch J, Baumberger D, Bürgin R. Providing evidence-based knowledge on nursing interventions at the point of care: findings from a mapping project. BMC Med Inform Decis Mak 2022;22:308. https://doi.org/10.1186/s12911-022-02053-8.

[97] Rehman HM, Yong HNA, Choong YO. Facilitating the Malaysian Manufacturing Sector in Readiness for Industry 4.0: A Mediating Role of Organization Innovation. Int J ASIAN Bus Inf Manag 2022;13. https://doi.org/10.4018/IJABIM.297847 WE - Emerging Sources Citation Index (ESCI).

[98] Gonzalez-Garcia A, Marques-Sanchez P, Pinto-Carral A, Leiros-Rodriguez R, Perez-Rivera J, Perez-González S. Characterizing the Decision-Making Competency of Nurse Managers: A Scoping Review. J Nurs Manag 2025;2025. https://doi.org/10.1155/jonm/2771210.

[99] Lahaie D. The impact of corporate memory loss. Leadersh Heal Serv 2005;18:35–48. https://doi.org/10.1108/13660750510611198.

[100] Koushazade SA, Omidianpoor S, Zohurian M. The Impact of Organizational Factors on the Effectiveness of Knowledge Management among Nurses 2015:129-135.

[101] Kejžar A, Dimovski V, Colnar S. The impact of knowledge management on the quality of services in nursing homes. Front Psychol 2023;13:1106014. https://doi.org/10.3389/FPSYG.2022.1106014.

[102] Wandhe DP. The Role of Knowledge Management Practices in Healthcare Industry. SSRN Electron J 2020. https://doi.org/10.2139/SSRN.3717126.

[103] Budi B, Anindita R, Mus Aida. Does Knowledge Management Affect Competence and Workload in Nurses' Work Performance at Mitra Medika Pontianak Hospital. J Heal Sains 2022;3:1320–35. https://doi.org/10.46799/jhs.v3i8.563.

[104] Ho KF, Chou PH, Chung MH. Comparison of nursing diagnostic accuracy when aided by Knowledge-Based Clinical Decision Support Systems with Clinical Diagnostic Validity and Bayesian Decision Models for psychiatric care plan formulation among nursing students: a quasi-experimental study. BMC Nurs 2023;22:1–16. https://doi.org/10.1186/S12912-023-01292-Y/TABLES/4.

[105] Fadhillah H, Nursalam N, Mustikasari M. The Influence of Nurse Performance Models Based on Knowledge Management: SECI with Caring Approach on the Quality of Nursing Services. SysrevpharmOrg 2021;12.

[106] Ajanaku OJ, Mutula S. The relationship between knowledge management and nursing care performance. South African J Libr Inf Sci 2018;84:39–51. https://doi.org/10.7553/84-2-1785.

[107] Karltun A, Sanne JM, Aase K, Anderson JE, Fernandes A, Fulop NJ, et al. Knowledge management infrastructure to support quality improvement: A qualitative study of maternity services in four European hospitals. Health Policy (New York) 2020;124:205–15. https://doi.org/10.1016/j.healthpol.2019.11.005.

[108] H Ayatollahi KZ, Ayatollahi H, Zeraatkar K. Factors influencing the success of knowledge management process in health care organisations: a literature review. Heal Inf Libr J 2020;37:98–117. https://doi.org/10.1111/hir.12285.

[109] Weston MJ, Estrada NA, Carrington J. Reaping Benefits From Intellectual Capital. Nurs Adm Q 2007;31:6–12. https://doi.org/10.1097/00006216-200701000-00005.

[110] Mohammadnejad F, Freeman S, Klassen-Ross T, Hemingway D, Banner D. Impacts of Technology Use on the Workload of Registered Nurses: A Scoping Review. J Rehabil Assist Technol Eng 2023;10:20556683231180188. https://doi.org/10.1177/20556683231180189.

[111] Lee H-S. Knowledge Management Enablers and Process in Hospital Organizations. Osong Public Heal Res Perspect 2017;8:26–33. https://doi.org/10.24171/j.phrp.2017.8.1.04.

[112] Gharajeh-Alamdari N, Mirzaei A, Mehri S, Soola AH. Assessing the relationship between supervisor knowledge sharing and innovative behaviors among clinical nurses: the mediating role of organizational learning. BMC Nurs 2025;24:508. https://doi.org/10.1186/S12912-025-03165-Y.

[113] Agrifoglio R, Briganti P, Varriale L, Metallo C, Ferrara M. Understanding

knowledge sharing through the working practices. Int J Organ Anal 2021;29:920–34. https://doi.org/10.1108/IJOA-02-2020-2049.

[114] Ghosh B, Scott JE. Effective Knowledge Management Systems for a Clinical Nursing Setting. Inf Syst Manag 2006;24:73–84. https://doi.org/10.1080/10580530601038188.

[115] Akgun AE, Polat V. Strategic orientations, marketing capabilities and innovativeness: an adaptive approach. J Bus Ind Mark 2022;37:918–31. https://doi.org/10.1108/JBIM-09-2020-0435.

[116] González-García A, Pinto-Carral A, Pérez-González S, Marqués-Sánchez P. Nurse managers' competencies: A scoping review. J Nurs Manag 2021;29:1410–9. https://doi.org/10.1111/jonm.13380.

[117] Karsikas E, Meriläinen M, Tuomikoski A, Koivunen K, Jarva E, Mikkonen K, et al. Health care managers' competence in knowledge management: A scoping review. J Nurs Manag 2022;30:1168–87. https://doi.org/10.1111/jonm.13626.

[118] Lalleman PCB, Smid GAC, Lagerwey MD, Oldenhof L, Schuurmans MJ. Nurse Middle Managers' Dispositions of Habitus. Adv Nurs Sci 2015;38:E1–16. https://doi.org/10.1097/ANS.0000000000000083.

[119] Wetering R van de, Versendaal J. Information Technology Ambidexterity, Digital Dynamic Capability, and Knowledge Processes as Enablers of Patient Agility: Empirical Study. JMIRx Med 2021;2:e32336. https://doi.org/10.2196/32336.

[120] Hoxha A, Taganoviq B, Hysenaj A. Qualitative research: Determinants and Long-Term Implications of Readiness and Trust of Kosovo Health Professionals on Digital technology. Pielęgniarstwo w Opiece Długoterminowej / Long-Term Care Nurs 2021;6:47–56. https://doi.org/10.19251/PWOD/2021.4(4).

[121] Platis C, Zoulias E. Leadership Capabilities and their Effect on Job Performance, an Approach in Healthcare Sector. Springer Proc Bus Econ 2017:365–71. https://doi.org/10.1007/978-3-319-33865-1_46.

[122] Mirzaei A, Imashi R, Saghezchi RY, Jafari MJ, Nemati-Vakilabad R. The relationship of perceived nurse manager competence with job satisfaction and turnover intention among clinical nurses: an analytical cross-sectional study. BMC Nurs 2024;23:1–11. https://doi.org/10.1186/S12912-024-02203-5/TABLES/4.

[123] Alsadaan N, Salameh B, Reshia FAAE, Alruwaili RF, Alruwaili M, Awad Ali SA, et al. Impact of Nurse Leaders Behaviors on Nursing Staff Performance: A Systematic Review of Literature. Inq (United States) 2023;60. https://doi.org/10.1177/00469580231178528.

[124] Batson VDVD, Yoder LHLH. Managerial coaching: a concept analysis. J Adv Nurs 2012;68:1658–69. https://doi.org/10.1111/j.1365-2648.2011.05840.x.

[125] Platis C, Reklitis P, Zimeras S. Relation between Job Satisfaction and Job Performance in Healthcare Services. Procedia - Soc Behav Sci 2015;175:480–7. https://doi.org/10.1016/J.SBSPRO.2015.01.1226.

[126] Bourini I, Jahmani A, Mumtaz R, Al-Bourini FA. Investigating the managerial practices' effect on Employee-Perceived Service Quality with the moderating role of supportive leadership behavior. Eur Res Manag Bus Econ 2019;25:8–14. https://doi.org/10.1016/J.IEDEEN.2018.11.001.

[127] Menguc B, Auh S, Ang D, Uray N. Don't give me just positive feedback: How positive and negative feedback can increase feedback-based goal setting and proactive customer service behavior. J Acad Mark Sci 2024;52:1608–26. https://doi.org/10.1007/S11747-024-01032-X/TABLES/2.

[128] Baljoon R, Banjar H, Banakhar M. Nurses' Work Motivation and the Factors

Affecting It: A Scoping Review. Int J Nurs Clin Pract 2018;5. https://doi.org/10.15344/2394-4978/2018/277.

[129] Al-Hasnawi AA, Adea Aljebory MK. Relationship between nurses' performance and their demographic characteristics. J Port Sci Res 2023;6. https://doi.org/10.36371/port.2023.1.3.

[130] Faraji A, Karimi M, Azizi SM, Janatolmakan M, Khatony A. Occupational stress and its related demographic factors among Iranian CCU nurses: a cross-sectional study. BMC Res Notes 2019;12:634. https://doi.org/10.1186/S13104-019-4674-5.

[131] Biroudian S, Mohit M, Mousavinejad S, Kojidi HM, Keleshteri ZK, Attarchi M, et al. Assessing the Impact of Demographics Factors on Healthcare Professionals' Performance: A Cross-Sectional Study. Zahedan J Res Med Sci 2025 272 2025;27. https://doi.org/10.5812/ZJRMS-157711.

[132] Wei H, Horsley L, Cao Y, Haddad LM, Hall KC, Robinson R, et al. The associations among nurse work engagement, job satisfaction, quality of care, and intent to leave: A national survey in the United States. Int J Nurs Sci 2023;10:476–84. https://doi.org/10.1016/J.IJNSS.2023.09.010.

[133] Mohamed AAK, Shaban M. Age and expertise: The effects of ageism on professional recognition for senior nurses. Geriatr Nurs (Minneap) 2024;60:70–8. https://doi.org/10.1016/J.GERINURSE.2024.08.045.

[134] Kim DS, Byon H Do. The Lived Experiences of Racial and Ethnic Minority Nurses Exposed to Racial Microaggressions in the Hospital Setting: Qualitative Study. Asian Pacific Isl Nurs J 2025;9. https://doi.org/10.2196/67029,.

[135] Smiley R, Reid M, Martin B. The Registered Nurse Workforce: Examining Nurses' Practice Patterns, Workloads, and Burnout by Race and Ethnicity. J Nurs Regul

2024;15:65–79. https://doi.org/10.1016/S2155-8256(24)00030-9.

[136] Alzoubi MM, Al-Mugheed K, Al-Zoubi KM, Al-Oweidat I, Saeed Alabdullah AA, Abdelaliem SMF. Quality management for nurses performance and commitment on government hospitals: A cross-sectional study. Med (United States) 2025;104:e40085. https://doi.org/10.1097/MD.0000000000040085.

[137] Liu Z, Yan X, Xie G, Lu J, Wang Z, Chen C, et al. Latent profile analysis and influence factors study of nurses' job performance. Front Psychol 2025;16:1474091. https://doi.org/10.3389/FPSYG.2025.1474091/BIBTEX.

[138] Kahya E, Oral N. Measurement of clinical nurse performance: Developing a tool including contextual items. J Nurs Educ Pract 2018;8:112. https://doi.org/10.5430/jnep.v8n6p112.

[139] Engelbrecht M, Rau A, Nel P, Wilke M. Emotional well-being and work engagement of nurses who moonlight (dual employment) in private hospitals. Int J Nurs Pract 2020;26:e12783. https://doi.org/10.1111/IJN.12783.

[140] Almutairi DR, Alkorbi SA, Alghabbashi MT, Aly SMM, Alsulami SA. Effect of work environment on nurses' job performance: Systematic review. Int J Health Sci (Qassim) 2022:4935–50. https://doi.org/10.53730/ijhs.v6nS6.10636.

[141] Alsadaan N, Salameh B, Reshia FAAE, Alruwaili RF, Alruwaili M, Awad Ali SA, et al. Impact of Nurse Leaders Behaviors on Nursing Staff Performance: A Systematic Review of Literature. Inq A J Med Care Organ Provis Financ 2023;60:00469580231178528. https://doi.org/10.1177/00469580231178528.

[142] Russo G, Fronteira I, Jesus TS, Buchan J. Understanding nurses' dual practice: a scoping review of what we know and what we still need to ask on nurses holding multiple jobs. Hum Resour Health 2018;16:14. https://doi.org/10.1186/S12960-018-0276-X.

[143] Portela LF, Rotenberg L, Waissmann W. Self-reported health and sleep complaints among nursing personnel working under 12h night and day shifts. Chronobiol Int 2004;21:859–70. https://doi.org/10.1081/CBI-200038513.

[144] Nonaka I. A Dynamic Theory of Organizational Knowledge Creation. Organ Sci 1994;5:14–37. https://doi.org/10.1287/orsc.5.1.14.

[145] Helfat CE, Peteraf MA. Managerial cognitive capabilities and the microfoundations of dynamic capabilities. Strateg Manag J 2015;36:831–50. https://doi.org/10.1002/SMJ.2247.

[146] Al-Makhaita H, Sabra A, Hafez A. Job performance among nurses working in two different health care levels, Eastern Saudi Arabia: a comparative study. Int J Med Sci Public Heal 2014;3:832. https://doi.org/10.5455/IJMSPH.2014.240420142.

[147] Kurnia A, Karmilah K, Khusnul N, Fatimah S, Intan T, Ridwan H, et al. The Effect of Workload on Nurse Performance in Hospital Inpatient Settings: A Systematic Literature Review. Genius J 2024;5:315–25. https://doi.org/10.56359/GJ.V5I2.422.

[148] Maghsoud F, Rezaei M, Asgarian FS, Rassouli M. Workload and quality of nursing care: the mediating role of implicit rationing of nursing care, job satisfaction and emotional exhaustion by using structural equations modeling approach. BMC Nurs 2022;21:1–10. https://doi.org/10.1186/S12912-022-01055-1/FIGURES/2.

[149] Mladenova I. Relation between Organizational Capacity for Change and Readiness for Change. Adm Sci 2022, Vol 12, Page 135 2022;12:135. https://doi.org/10.3390/ADMSCI12040135.

[150] Sen A. Organizational Knowledge and Knowledge Management - A New Framework. Am J Manag Sci Eng 2024, Vol 9, Page 1 2024;9:1–12. https://doi.org/10.11648/J.AJMSE.20240901.11.

[151] Bawack R. Knowledge Management in Organizations: Gateway to Sustainable Competitive Performance 2022.

[152] Ujkani E. Assessment of Health Services in Kosovo. Prishtina: 2022.

[153] Taganoviq B, Kurutkan MN, Bagis M, Hoxha A, Kryeziu B, Hysenaj A, et al. Psychometric assessment of organizational readiness scale for digital innovations and antecedents of organizational readiness. Hum Syst Manag 2023:1–18. https://doi.org/10.3233/HSM-220202.

[154] Covell CL, Sidani S. Nursing intellectual capital theory: implications for research and practice. Online J Issues Nurs 2013;18:2. https://doi.org/10.3912/OJIN.VOL18NO02MAN02.

[155] Nightingale F. Notes on nursing: what it is, and what it is not, 1859.

[156] Paswan AK, Guzman F, Pei Z. Innovation-branding: should all firms be equally ambidextrous? J Prod Brand Manag 2021;30:754–67. https://doi.org/10.1108/JPBM-07-2019-2476 WE - Social Science Citation Index (SSCI).

[157] Teece DJ. Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strateg Manag J 2007;28:1319–50. https://doi.org/10.1002/SMJ.640.

[158] Adams JM, Natarajan S. Understanding Influence within the Context of Nursing: Development of the Adams influence model using practice, research, and theory. Adv Nurs Sci 2016;39:E40–56. https://doi.org/10.1097/ANS.0000000000000134.

[159] Matthews J, Whitehead P, Ward C, Kyner M, Crowder T. Florence Nightingale: Visionary for the Role of Clinical Nurse Specialist. OJIN Online J Issues Nurs 2020;25. https://doi.org/10.3912/OJIN.Vol25No02Man01.

[160] Ayatulloh D, Nursalam N, Kurniawati ND. The Effect of Knowledge Management in Healthcare Services: A Systematic Review. J Pendidik KEPERAWATAN Indones 2021;7:84–96. https://doi.org/10.17509/JPKI.V7I1.35132.

[161] Meehan J, Menzies L, Michaelides R. The long shadow of public policy; Barriers to a value-based approach in healthcare procurement. J Purch SUPPLY Manag 2017;23:229–41. https://doi.org/10.1016/j.pursup.2017.05.003.

[162] Teece D, Pisano G, Shuen A. Dynamic Capabilities and Strategic Management. Strateg Manag J 1997;18:509–33.

[163] Kowshik STH, Chew EYT, Lee SWH. Knowledge transfer as a dynamic capability: a meta-analysis of its impact on organizational outcomes in international contexts. Knowl Manag Res Pract 2025. https://doi.org/10.1080/14778238.2025.2519291;PAGE:STRING:ARTICLE/CHAPTER.

[164] Gold AH, Malhotra A, Segars AH. Knowledge Management: An Organizational Capabilities Perspective. J Manag Inf Syst 2001;18:185–214. https://doi.org/10.1080/07421222.2001.11045669.

[165] Aichouche R, Chergui K, Brika SKM, El Mezher M, Musa A, Laamari A. Exploring the Relationship Between Organizational Culture Types and Knowledge Management Processes: A Meta-Analytic Path Analysis. Front Psychol 2022;13:856234. https://doi.org/10.3389/FPSYG.2022.856234/BIBTEX.

[166] Coles E, Anderson J, Maxwell M, Harris FM, Gray NM, Milner G, et al. The influence of contextual factors on healthcare quality improvement initiatives: a realist review. Syst Rev 2020;9:94. https://doi.org/10.1186/S13643-020-01344-3.

[167] H Ayatollahi KZ. Factors influencing the success of knowledge management process in health care organizations: a literature review. Heal Info Libr J

2020;37:98–117.

[168] Lee R, Lee JH, Garrett TC. Synergy effects of innovation on firm performance. J Bus Res 2019;99:507–15. https://doi.org/10.1016/j.jbusres.2017.08.032.

[169] Ystaas LMK, Nikitara M, Ghobrial S, Latzourakis E, Polychronis G, Constantinou CS. The Impact of Transformational Leadership in the Nursing Work Environment and Patients' Outcomes: A Systematic Review. Nurs Reports 2023;13:1271–90. https://doi.org/10.3390/nursrep13030108.

[170] Restivo V, Minutolo G, Battaglini A, Carli A, Capraro M, Gaeta M, et al. Leadership Effectiveness in Healthcare Settings: A Systematic Review and Meta-Analysis of Cross-Sectional and Before–After Studies. Int J Environ Res Public Health 2022;19:10995. https://doi.org/10.3390/ijerph191710995.

[171] Boamah SA, Spence Laschinger HK, Wong C, Clarke S. Effect of transformational leadership on job satisfaction and patient safety outcomes. Nurs Outlook 2018;66:180–9. https://doi.org/10.1016/j.outlook.2017.10.004.

[172] Sfantou D, Laliotis A, Patelarou A, Sifaki- Pistolla D, Matalliotakis M, Patelarou E. Importance of Leadership Style towards Quality of Care Measures in Healthcare Settings: A Systematic Review. Healthcare 2017;5:73. https://doi.org/10.3390/healthcare5040073.

[173] Maier C, Thatcher JB, Grover V, Dwivedi YK. Cross-sectional research: A critical perspective, use cases, and recommendations for IS research. Int J Inf Manage 2023;70. https://doi.org/10.1016/j.ijinfomgt.2023.102625.

[174] Park YS, Konge L, Artino AR. The Positivism Paradigm of Research. Acad Med 2020;95. https://doi.org/10.1097/ACM.0000000000003093.

[175] Creswell JJW, Creswell DJ. Research Design Qualitative, Quantitative, and Mixed

Methods Approaches. Fifth. SAGE Publications; 2018.

[176] Maksimović J, Evtimov J. Positivism and post-positivism as the basis of quantitative research in pedagogy. Res Pedagog 2023;13. https://doi.org/10.5937/istrped2301208m.

[177] Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. https://doi.org/10.1136/bmj.n71.

[178] Johanson GA, Brooks GP. Initial Scale Development: Sample Size for Pilot Studies. Educ Psychol Meas 2010;70:394–400. https://doi.org/10.1177/0013164409355692.

[179] Parsaeian M, Mahdavi M, Saadati M, Mehdipour P, Sheidaei A, Khatibzadeh S, et al. Introducing an efficient sampling method for national surveys with limited sample sizes: application to a national study to determine quality and cost of healthcare. BMC Public Health 2021;21:1–10. https://doi.org/10.1186/s12889-021-11441-0.

[180] DeYoreo M. Stratified Random Sampling. SAGE Encycl. Educ. Res. Meas. Eval., 2455 Teller Road, Thousand Oaks, California 91320: SAGE Publications, Inc.; 2018. https://doi.org/10.4135/9781506326139.n671.

[181] STATA. Statistical software for data science | Stata 2021.

[182] El Emam K, Rodgers S, Malin B. Anonymising and sharing individual patient data. BMJ 2015;350:h1139–h1139. https://doi.org/10.1136/bmj.h1139.

[183] Hair J, Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis. Hampshire: Annabel Ainscow; 2019.

[184] Mitani AA, Mercaldo ND, Haneuse S, Schildcrout JS. Survey design and analysis

considerations when utilizing misclassified sampling strata. BMC Med Res Methodol 2021 211 2021;21:145. https://doi.org/10.1186/S12874-021-01332-8.

[185] Babyak MA. What You See May Not Be What You Get: A Brief, Nontechnical Introduction to Overfitting in Regression-Type Models. Psychosom Med 2004;66:411–21. https://doi.org/10.1097/01.psy.0000127692.23278.a9.

[186] Seabrook JA. Powering Nutrition Research: Practical Strategies for Sample Size in Multiple Regression. Nutrients 2025;17:2668. https://doi.org/10.3390/nu17162668.

[187] Ministry of Health. Health Sector Strategy 2025-2030. Pristina: 2024.

[188] KAS. Total Estimated Kosovo Population, 2017 - 2024. SiteTitle 2024. https://askdata.rks-gov.net/pxweb/en/ASKdata/ASKdata__Population__Estimate, projection and structure of population__Population estimate/tab03.px/ (accessed August 23, 2025).

[189] Hult M, Terkamo-Moisio A, Kaakinen P, Karki S, Nurmeksela A, Palonen M, et al. Relationships between nursing leadership and organizational, staff and patient outcomes: A systematic review of reviews. Nurs Open 2023;10:5920–36. https://doi.org/10.1002/nop2.1876.

[190] Gonnelli C, Raffagnino R. Health of Nurses with Leadership and Management Functions: An Integrative Review. Open J Soc Sci 2018;06:106–31. https://doi.org/10.4236/jss.2018.610010.

[191] Kelly D, Horseman Z, Strachan FE, Hamilton S, Jones A, Holloway A, et al. Strengthening the role of the executive nurse director: A qualitative interview study. J Adv Nurs 2023;79:3809–23. https://doi.org/10.1111/jan.15699.

[192] Poels J, Verschueren M, Milisen K, Vlaeyen E. Leadership styles and leadership outcomes in nursing homes: a cross-sectional analysis. BMC Health Serv Res 2020;20:1009. https://doi.org/10.1186/s12913-020-05854-7.

[193] Fan S, Zhou S, Ma J, An W, Wang H, Xiao T. The role of the nursing work environment, head nurse leadership and presenteeism in job embeddedness among new nurses: a cross-sectional multicentre study. BMC Nurs 2024;23:159. https://doi.org/10.1186/s12912-024-01823-1.

[194] ICN. Nursing: Scope and standards of practice. American Nurses Association; 2023.

[195] Polit D, Beck CT. Nursing Research: Generating and Assessing Evidence for Nursing Practice. 11th ed. Philadelphia: Wolters Kluwer; 2021.

[196] Blair E, Blair J. Stratified Sampling. Appl Surv Sampl 2015:113–28. https://doi.org/10.4135/9781483394022.

[197] Miller TJ, Skalski JR, Ianelli JN. Optimizing a stratified sampling design when faced with multiple objectives. ICES J Mar Sci 2007;64:97–109. https://doi.org/10.1093/ICESJMS/FSL013.

[198] Sekaran U, Bougie R. Research Methods for Business A Skill-Building Approach. VII. West Sussex: John Wiley & Sons Ltd; 2016.

[199] KAS. Health Statistics Report 2021. http://ask.rks-gov.net/en/health.

[200] Faul F, Erdfelder E, Buchner A, Lang A-G. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behav Res Methods 2009;41:1149–60. https://doi.org/10.3758/BRM.41.4.1149.

[201] Selya AS, Rose JS, Dierker LC, Hedeker D, Mermelstein RJ. A Practical Guide to Calculating Cohen's f2, a Measure of Local Effect Size, from PROC MIXED. Front

Psychol 2012;3. https://doi.org/10.3389/fpsyg.2012.00111.

[202] Adhikari GP. Calculating the Sample Size in Quantitative Studies. Sch J 2021:14–29. https://doi.org/10.3126/scholars.v4i1.42458.

[203] Cocchran WG. Sampling Techniques . John Wiley & Sons; 2021.

[204] Ali Memon M, Ting H, Cheah J-H, Thurasamy R, Chuah F, Huei Cham T. Journal of Applied Structural Equation Modeling Sample Size For Survey Research: Review and Recommendations. J Appl Struct Equ Model 2020;4:2590–4221.

[205] Sharma S, Mudgal S, Thakur K, Gaur R. How to calculate sample size for observational and experiential nursing research studies? Natl J Physiol Pharm Pharmacol 2019:1. https://doi.org/10.5455/njppp.2020.10.0930717102019.

[206] CRS. Sample Size Calculator - Confidence Level, Confidence Interval, Sample Size, Population Size, Relevant Population - Creative Research Systems 2018. https://www.surveysystem.com/sscalc.htm (accessed November 15, 2019).

[207] Krejcie R V., Morgan DW. Determining Sample Size for Research Activities. Educ Psychol Meas 1970;30:607–10. https://doi.org/10.1177/001316447003000308.

[208] Vaughan R. Oversampling in Health Surveys: Why, When, and How? Am J Public Health 2017;107:1214. https://doi.org/10.2105/AJPH.2017.303895.

[209] Kolenikov SJ. Post-stratification or a non-response adjustment? Surv Pract 2016;9:1–12. https://doi.org/10.29115/SP-2016-0014.

[210] Tourangeau R, Plewes TJ. Nonresponse in social science surveys: A research agenda. Nonresponse Soc Sci Surv A Res Agenda 2013:1–166. https://doi.org/10.17226/18293.

[211] Barać I, Prlić N, Lovrić R, Kanisek S, Dubac Nemet L, Plužarić J. Development and

Psychometric Testing of the Croatian Version of the Job Satisfaction Scale in Hospital Nurses. J Nurs Meas 2018;26:121–33. https://doi.org/10.1891/1061-3749.26.1.121.

[212] Topa G, Aranda-Carmena M. Job Crafting in Nursing: Mediation between Work Engagement and Job Performance in a Multisample Study. Int J Environ Res Public Health 2022;19:12711. https://doi.org/10.3390/IJERPH191912711.

[213] Felix R. The impact of scale width on responses for multi-item, self-report measures. J Targeting, Meas Anal Mark 2011;19:153–64. https://doi.org/10.1057/JT.2011.16/TABLES/9.

[214] Korkut Altuna O, Arslan FM. Impact of the Number of Scale Points on Data Characteristics and Respondents' Evaluations: An Experimental Design Approach Using 5-Point and 7-Point Likert-type Scales. İstanbul Üniversitesi Siyasal Bilgiler Fakültesi Derg 2016:1–20. https://doi.org/10.17124/iusiyasal.320009.

[215] APQC. Knowledge Management Capability Assessment Tool. 2016.

[216] AMCES. Tools 2020. https://amces.com/resources/tools (accessed September 2, 2025).

[217] Hiebeler RJ. Benchmarking: Knowledge management. Plan Rev 1996;24:22–9. https://doi.org/10.1108/eb054549.

[218] de Jager M. The KMAT: benchmarking knowledge management. Libr Manag 1999;20:367–72. https://doi.org/10.1108/01435129910285136.

[219] Becerra-Fernandez I, Sabherwal R. Knowledge Management Systems and Processes. Routledge; 2014. https://doi.org/10.4324/9781315715117.

[220] World Medical Association. WMA International Code of Medical Ethics 2013. https://www.wma.net/policies-post/wma-international-code-of-medical-ethics/

(accessed December 6, 2025).

[221] Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recommendations. Res Nurs Health 2006;29:489–97. https://doi.org/10.1002/NUR.20147.

[222] Yusoff MSB. ABC of Content Validation and Content Validity Index Calculation. Educ Med J 2019;11:49–54. https://doi.org/10.21315/eimj2019.11.2.6.

[223] Bull C, Crilly J, Latimer S, Gillespie BM. Establishing the content validity of a new emergency department patient-reported experience measure (ED PREM): a Delphi study. BMC Emerg Med 2022;22:1–10. https://doi.org/10.1186/S12873-022-00617-5/TABLES/3.

[224] Barroga E, Matanguihan GJ. A Practical Guide to Writing Quantitative and Qualitative Research Questions and Hypotheses in Scholarly Articles. J Korean Med Sci 2022;37. https://doi.org/10.3346/jkms.2022.37.e121.

[225] Wang X, Cheng Z. Cross-Sectional Studies: Strengths, Weaknesses, and Recommendations. Chest 2020;158. https://doi.org/10.1016/j.chest.2020.03.012.

[226] Park YS, Konge L, Artino AR. The Positivism Paradigm of Research. Acad Med 2020;95:690–4. https://doi.org/10.1097/ACM.0000000000003093.

[227] Sedgwick P. Cross sectional studies: advantages and disadvantages. BMJ 2014;348:g2276–g2276. https://doi.org/10.1136/bmj.g2276.

[228] Corry M, Porter S, McKenna H. The redundancy of positivism as a paradigm for nursing research. Nurs Philos 2019;20. https://doi.org/10.1111/nup.12230.

[229] Chawla D, Joshi H. A Comparative Study of Knowledge Management Assessment in Business Excellence Awarded and Non-awarded Organizations in India. Glob

Bus Rev 2011;12:279–95. https://doi.org/10.1177/097215091101200207.

[230] Cha K sook, Lee D. Influential factors affecting nursing performance amid COVID-19: A cross-sectional study on nurse preparedness for infectious diseases. Int J Nurs Stud Adv 2024;7:100239. https://doi.org/10.1016/J.IJNSA.2024.100239.

[231] Zaitoun RA. Assessing nurses' professional competency: a cross-sectional study in Palestine. BMC Nurs 2024;23:1–12. https://doi.org/10.1186/S12912-024-02064-Y/TABLES/9.

[232] Mužik R, Uka A. Kosovo: Brief health system review | HPI - Health Policy Institute 2013. http://www.hpi.sk/en/2013/11/kosovo-brief-health-system-review/ (accessed July 30, 2017).

[233] Farnsworth N, Goebbels K, Ajeti R. Access to Healthcare in Kosovo 2016.

[234] Lee JC, Shiue YC, Chen CY. An integrated model of the knowledge antecedents for exploring software process improvement success. J Enterp Inf Manag 2020;33:1537–56. https://doi.org/10.1108/JEIM-03-2019-0084.

[235] Abou Hashish EA, Khattab SMAK, Mohammad HF, Elliethey NS. Exploring the Impact of Leadership, Organizational Support, and Knowledge Management in Evidence-Based Practice Implementation Among Nurse Managers Through SEM. Worldviews Evidence-Based Nurs 2025;22. https://doi.org/10.1111/wvn.70051.

[236] Choi J, Thompson CE, Choi J, Waddill CB, Choi S. Effectiveness of Immersive Virtual Reality in Nursing Education: Systematic Review. Nurse Educ 2022;47:E57–61. https://doi.org/10.1097/NNE.0000000000001117.

LIST OF APPENDICES

APPENDIX A: GENERAL INFORMATION FOR PARTICIPANTS IN THE THESIS. II
APPENDIX B: PARTICIPANT INFORMED CONSENT FORM III
APPENDIX C: DEMOGRAPHIC QUESTIONS VII
APPENDIX D: JOB PERFORMANCE OF NURSES IX
APPENDIX E: MANAGERIAL COMPETENCE OF NURSE MANAGERS XIII
APPENDIX F: KNOWLEDGE MANAGEMENT ASSESSMENT TOOL (KMAT / KMP) XVI
APPENDIX G: KNOWLEDGE MANAGEMENT INFRASTRUCTURE (KMI) XVIII
APPENDIX H: APPROVAL FROM THE UNIVERSITY CLINICAL AND HOSPITAL SERVICE OF KOSOVO (UCHSK) (ORIGINAL VERSION) XXIII
APPENDIX I: ETHICAL APPROVAL FROM THE ETHICAL COMMITTEE OF HEIMERER COLLEGE XXIV
APPENDIX J: PARTICIPANT INVITATION FLYER (ALBANIAN VERSION) XXV
APPENDIX K: STANDARD OPERATING PROCEDURE (SOP) XXVI
APPENDIX L: EXTENDED QUANTITATIVE RESULTS XXXIII

APPENDIX A: GENERAL INFORMATION FOR PARTICIPANTS IN THE THESIS.

GENERAL INFORMATION FOR PARTICIPANTS IN THE THESIS

Research title

The relationship between the Knowledge Management Infrastructure and Processes, Managerial Competence of Nurse Managers, and Job Performance of Nursing staff in Kosovo

Invitation paragraph

You are invited to take part in this research. Before deciding to participate, you need to understand why the research is being done. Please take your time to read the following information carefully, and you can discuss it with others too if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part. Thank you for reading this.

Thesis aim

The aim of this research is to provide empirical evidence on the level of effect of knowledge management (infrastructure and process) and managerial competence of nurse managers on the job performance of nursing staff, employed in public health organizations providing primary, secondary and tertiary health care services in Kosovo. In this way, the study contributes to a more context-sensitive understanding of improving performance in resource-limited health settings.

Do I have to participate (from the participant's point of view)?

It is up to each participant whether you wish to be part of the research or not. Participants can withdraw at any time without giving any reason or affecting any benefit they are entitled to.

The anonymity of the participants

- All the data that I collect from you for this research will be strictly confidential.
- Participants will not be defined in any subsequent reports or publications.
- The results obtained will be used only for the research.

APPENDIX B: PARTICIPANT INFORMED CONSENT FORM

Name of the main researcher: Adnan Hoxha

Title of the Ph. D thesis: Researcher on the relationship between Knowledge Management Infrastructure and Process, and Managerial Competence of Nurse Managers with the Job Performance of Nursing Staff

I am Adnan HOXHA, Researcher on the relationship between Knowledge Management Infrastructure and Process, and Managerial Competence of Nurse Managers with the Job Performance of Nursing Staff.
The aim of this research is to provide empirical evidence on the level of effect of knowledge management (infrastructure and process) and managerial competence of nurse managers on the job performance of nursing staff, employed in public health organizations providing primary, secondary and tertiary health care services in Kosovo. In this way, the study contributes to a more context-sensitive understanding of improving performance in resource-limited health settings.
You are invited to participate in this research because of your work title and affiliation.
You will participate in a questionnaire that will last approximately 20 minutes.
Your participation in this survey does not pose any risk. Your participation is completely voluntary and you will not receive any compensation. You may refuse to participate or withdraw at any time. You have the right to skip or not answer any question without giving a reason.
During the research I will take notes on my personal laptop or notebook. Extracts from the questionnaires with you may be cited in the report without disclosing your identity.
All data will be kept strictly confidential and will only be used for research purposes.
We respect your right to privacy and your data will be kept confidential. However, if during this research we discover any information that suggests a risk to you, children or others (such as child abuse, threats to life, or any criminal offense), we are legally obliged to report it to the relevant authorities.
Your data will be stored on secure platforms. After the research is completed and the retention period (5 years after publication), the data will be destroyed in accordance with legal and ethical practices.
By participating in the research, I agree that:

1) *I have read the information sheet and fully understand the process regarding this study. I have been given the opportunity to ask questions about the research, and I have been given the contact details of the principal investigator.*
2) *I understand that my participation in this research is completely voluntary, and I have been assured that I am free to withdraw from the research at any time, and that this will not result in any consequences or harm to me.*
3) *I understand that my responses will be kept strictly confidential. I give my permission to the members of the research team to have access to my anonymous responses. I am aware that my name will not be linked to the research materials and I will not be identified in the research reports.*

This consent will remain valid for the duration of the Consent Grantor's mandate, unless revocation is requested in writing by either party.

If there is anything about your participation that is unclear or that you do not understand or if you have any questions or would like to report any concerns regarding the questionnaires, you can discuss with the researcher before or during the research. For further periods, you can contact him/her by email at hoxha@doktorant.umk.pl
You will keep a copy of the consent form while the signed copy will remain with me.

First Name Surname: _____
Date of interview: _____
Signature: _____

Researcher contact:

Adnan HOXHA

E-mail: hoxha@doktorant.umk.pl

Tel.: +383 45 668 207

Dear Participants,

I am Adnan Hoxha. Currently, I am a Ph. D student at the University of Nicolaus Copernicus, Academia Copernicana, in the field of Health Sciences. My Ph. D thesis is "The relationship between the Knowledge Management Infrastructure and Processes, Managerial Competence of Nurse Managers, and Job Performance of Nursing staff in Kosovo". The aim of this study is to investigate how knowledge management components (infrastructure and process) and managerial competence influence the job performance of nursing staff across healthcare levels in Kosovo's public sector, accounting for variability across demographics and professional roles.

Thank you very much for your contribution, and if there is a need for more additional information during the completion of the questionnaires, feel free to ask Adnan Hoxha (hoxha@doktorant.umk.pl).

Adnan HOXHA

APPENDIX C: DEMOGRAPHIC QUESTIONS

	Demographics questions	
D1	Age of the healthcare worker	1. 22-29 years 2. 30-39 years 3. 40-49 years 4. 50-59 years 5. 60-65 years
D2	What is your gender?	1. Female 2. Male 3. Prefer not to answer
D3	Ethnicity	1. Albanian 2. Serb 3. Bosnian 4. Croatian 5. Turkish 6. Romanian 7. Other
D4	Highest qualification	1. High school 2. BSc 3. Master 4. PhD
D5	Job position	1. Nursing Director 2. Head Nurse 3. Nurse
D6.a.	Work experience in your current position	1. Less than two years 2. 2-5 years 3. 6-10 years 4. 11-15 years 5. 16-20 years 6. More than 20 years
D6.b.	Overall work experience	1. Less than two years 2. 2-5 years 3. 6-10 years 4. 11-15 years 5. 16-20 years 6. More than 20 years
D7.a.	The municipality where you serve	_____
D7.b	Level of the healthcare system in which you serve	1. Primary 2. Secondary 3. Tertiary
D7.c	The name of the institution where you	_____

	serve	
D7.d	The name of the unit (centre, hospital, clinic, department) in which you serve.	_____
D10	Do you work in the private sector (part-time)?	1. Yes 2. No
D11	Number of client visits per day:	1. Less than five clients 2. 5-10 clients 3. 11-19 clients 4. 20-29 clients 5. 30-39 clients 6. More than 40 clients

APPENDIX D: JOB PERFORMANCE OF NURSES

Task Performance

	Questions	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
P1	If I need to perform a task that I am not familiar with, I seek for information that allows me to perform it better	1	2	3	4	5
P2	I do not think I could execute my tasks effectively if I did not have a certain amount of experience	1	2	3	4	5
P3	The way I perform the basic tasks required in my job is not always in agreement with what I can do (R)	1	2	3	4	5
P4	The way I perform the basic tasks required in my job corresponds completely to the performance that the organization where I work asks from me	1	2	3	4	5
	Organizational skills	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
P5	It is not always easy for me to perform tasks on time.	1	2	3	4	5
P6	When I have a deadline to perform a certain task, I always finish it on time. If I had to perform a task in conjunction with other workers, I would probably be responsible for the planning, organizing, and monitoring of the work to be done	1	2	3	4	5
P7	I always leave my tasks to the last minute. I am always aware when there is a lack of the resources (material or human) needed for the efficient performance of the organization	1	2	3	4	5
P8	Sometimes, I feel disappointed with my performance at work because I know I could have done better 20. I	1	2	3	4	5

	consider myself a fundamental worker to the organization I work for, due to the high quality of my performance					
P9	Receiving feedback (from my subordinates, my colleagues, my supervisor or from the organization) is fundamental in order for me to continue performing my duties with dedication (R)	1	2	3	4	5

Contextual performance

	Questions	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
P10	When something is not right at work, I don't complain because I am afraid that others won't agree with me (R)	1	2	3	4	5
P11	Usually, I take the initiative to give constructive feedback in order to improve the performance of other workers (subordinates, colleagues, supervisor or workgroups)	1	2	3	4	5
P12	In the event the organization did not provide the training that I consider necessary to perform my duties effectively, I would seek information from other sources	1	2	3	4	5
P13	I'm still able to perform my duties effectively when I'm working under pressure	1	2	3	4	5
P14	As soon as I arrive at work, I set aside all my personal	1	2	3	4	5

	problems, so that my performance is not harmed					
	Cooperation	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
P15	Usually, I dedicate less effort to work when performing a task in conjunction with other people (R)	1	2	3	4	5
P16	I am always willing to assist other workers from the organization, even when I don't have much time available	1	2	3	4	5
P17	Usually, I also perform tasks that are not related to my specific duties	1	2	3	4	5
	Organizational conscientiousness	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
P18	Frequently, I arrive late at work (R)	1	2	3	4	5
P19	It's really difficult for me to miss work, even when I'm feeling sick	1	2	3	4	5
P20	I would never adopt actions that could harm the well-being of the other workers	1	2	3	4	5
P21	When I think that the goals of the organization conflict with my personal goals, my dedication to work decreases (R)	1	2	3	4	5
P22	I take my job seriously, so I always comply with the rules and procedures imposed (by my supervisor or by the organization), even when no one is around	1	2	3	4	5
	Interpersonal and relational skills	Strongly Disag	Somewhat disagree	Neither agree nor	Somewhat agree	Strongly agree

		ree		disagree		
P23	My communication skills are so good that I'm always able to capture everyone's attention	1	2	3	4	5
P24	Communication inside organizations, even in workgroups, is fundamental so that people can perform their tasks effectively	1	2	3	4	5
P25	When I write a message to others (other workers or students) I feel a certain difficulty in expressing what I am thinking	1	2	3	4	5
P26	When someone has a different opinion from mine, I usually convince them that my opinion is the best	1	2	3	4	5

APPENDIX E: MANAGERIAL COMPETENCE OF NURSE MANAGERS

Below is a list of tasks that may be encountered in the work of a head nurse/nurse director.

Please rate the level of skills of the head nurse (head nurse) where 1 is "Low skills, more training needed", and 10 is "Very high skills, no training needed".

Note: give your ratings depending on your job position, as follows:

- If you are the supervisor of your head nurse/head nurse, please answer the following questions from your point of view about the skills of the head nurse/head nurse
- If you are the head nurse/head nurse, please answer the following questions from your point of view about your skills.
- If you are a nurse, please answer the following questions from your point of view about the skills of your supervisor (head nurse/head nurse).

	COMMUNICATION	**Low Skills**									**Very High Skills**	**Don't know**
M1	I listen attentively to the concerns of others	1	2	3	4	5	6	7	8	9	10	DN
M2	I can share my ideas about improving services with the clinic supervisor	1	2	3	4	5	6	7	8	9	10	DN
M3	I am able to write reports to meet the needs of different audiences	1	2	3	4	5	6	7	8	9	10	DN
M4	I am able to communicate the specific programme targets to my staff	1	2	3	4	5	6	7	8	9	10	DN
M5	I am able to inform community representatives about all the relevant clinic issues	1	2	3	4	5	6	7	8	9	10	DN
	LEADERSHIP AND MANAGEMENT	**Low Skills**									**Very High Skills**	**Don't know**
M6	I can implement my vision for health improvements in this clinic	1	2	3	4	5	6	7	8	9	10	DN
M7	I am able to implement the 10 point plan of the NDOH for 2009-2014	1	2	3	4	5	6	7	8	9	10	DN
M8	I know when to consult clinic employees when making strategic decisions	1	2	3	4	5	6	7	8	9	10	DN
M9	I can deal with difficult patients and their relatives	1	2	3	4	5	6	7	8	9	10	DN

M10	I encourage my staff to display a caring attitude to patients according to the Batho Pele ("human first/centred") principles	1	2	3	4	5	6	7	8	9	10	DN
M11	I ensure that the risk of infection to patients in this clinic is minimised	1	2	3	4	5	6	7	8	9	10	DN
	STAFF MANAGEMENT	**Low Skills**									**Very High Skills**	**Don't know**
M12	I am able to measure clinical care programmes against National Core Standards	1	2	3	4	5	6	7	8	9	10	DN
M13	I ensure that my staff receive ongoing in-service training to perform their nursing tasks	1	2	3	4	5	6	7	8	9	10	DN
M14	I ensure that staff are knowledgeable about what is expected from them at work	1	2	3	4	5	6	7	8	9	10	DN
M15	I supervise my staff through effective performance management for the achievement of health system goals	1	2	3	4	5	6	7	8	9	10	DN
M16	I am able to delegate work to staff in an emergency context	1	2	3	4	5	6	7	8	9	10	DN
M17	I have a system in place to manage staff absenteeism	1	2	3	4	5	6	7	8	9	10	DN
M18	I provide constructive feedback to staff	1	2	3	4	5	6	7	8	9	10	DN
M19	I monitor individual's performance in response to allocated work	1	2	3	4	5	6	7	8	9	10	DN
	FINANCIAL MANAGEMENT	**Low Skills**									**Very High Skills**	**Don't know**
M20	I manage the clinic budget in line with the relevant financial legislation	1	2	3	4	5	6	7	8	9	10	DN
M21	I make sure that the asset register in my clinic is up-to-date	1	2	3	4	5	6	7	8	9	10	DN
M22	I take prompt action when equipment is out of order	1	2	3	4	5	6	7	8	9	10	DN
M23	I take prompt action when contractors fail to deliver against their service level agreement	1	2	3	4	5	6	7	8	9	10	DN
M24	I engage staff about how best to use financial resources	1	2	3	4	5	6	7	8	9	10	DN
M25	I educate staff about financial issues that impact on the clinic	1	2	3	4	5	6	7	8	9	10	DN

M26	I can develop realistic budget projections based on previous expenditure	1	2	3	4	5	6	7	8	9	10	DN
M27	I ensure that all the necessary expenses are included in the budget	1	2	3	4	5	6	7	8	9	10	DN
M28	I am able to evaluate programme performance in relation to expenditure	1	2	3	4	5	6	7	8	9	10	DN
	PLANNING AND PRIORITY SETTING	**Low Skills**							**Very High Skills**			**Don't know**
M29	I use clinic statistics to motivate for financial and human resources	1	2	3	4	5	6	7	8	9	10	DN
M30	I involve stakeholders in determining which needs are the most important to improve clinic performance	1	2	3	4	5	6	7	8	9	10	DN
M31	I generally defend the interests of the clinic	1	2	3	4	5	6	7	8	9	10	DN
M32	I always carry out the most urgent tasks first	1	2	3	4	5	6	7	8	9	10	DN
M33	I follow through on agreed tasks and priorities	1	2	3	4	5	6	7	8	9	10	DN
M34	I am able to identify community health needs in my catchment area for use in strategic planning	1	2	3	4	5	6	7	8	9	10	DN
	PROBLEM SOLVING	**Low Skills**							**Very High Skills**			**Don't know**
M35	I monitor the work environment for potential safety issues that could impact on staff and patients	1	2	3	4	5	6	7	8	9	10	DN
M36	I remain calm and composed in emergency situations	1	2	3	4	5	6	7	8	9	10	DN
M37	I implement corrective action in a timely manner in cases of non-compliance	1	2	3	4	5	6	7	8	9	10	DN
M38	I can resolve conflicts among staff	1	2	3	4	5	6	7	8	9	10	DN
M39	I can identify root causes of problems in the clinic	1	2	3	4	5	6	7	8	9	10	DN
M40	I gather sufficient information prior to solving a problem	1	2	3	4	5	6	7	8	9	10	DN

APPENDIX F: KNOWLEDGE MANAGEMENT ASSESSMENT TOOL (KMAT / KMP)

The questionnaire is divided into five sections: Knowledge Management Process; Leadership; Culture; Technology; and Measurement. Below is a subset of the items and information in the KMAT, with a simplified rating system.

Instructions: Read the statements below and rate the situation in your clinic or department (institution).

1 = no, 2 = poor, 3 = average, 4 = good, and 5 = excellent

	The Knowledge Management Process	**1 = no**	**2 = poor**	**3 =fair**	**4 = good**	**5 = excellent**
KMP 1	Knowledge Gaps are systematically identified and well-defined processes are used to close them.	1	2	3	4	5
KMP 2	A sophisticated and ethical intelligence gathering mechanism has been developed.	1	2	3	4	5
KMP 3	All staff and volunteers of the association are involved in looking for ideas in traditional and non-traditional places.	1	2	3	4	5
KMP 4	The association has formalized the process of transferring best practices, including documentation and lessons learned.	1	2	3	4	5
KMP 5	"Tacit" knowledge (what staff and volunteers know how to do, but cannot express) is valued and transferred across the association.	1	2	3	4	5
	Leadership in Knowledge Management	1 = no	2 = poor	3 =fair	4 = good	5 = excellent
KML 1	Managing organizational knowledge is central to the association's strategy.	1	2	3	4	5
KML 2	The association understands the revenue-generating potential of its knowledge assets and develops strategies for marketing and selling	1	2	3	4	5

	them.					
KML 3	The association uses learning to support existing core competencies and create new ones.	1	2	3	4	5
KML 4	Individuals are hired, evaluated and compensated for their contributions to the development of organizational knowledge.	1	2	3	4	5
	Knowledge Management Culture	1 = no	2 = poor	3 =fair	4 = good	5 = excellent
KMC 1	The association encourages and facilitates knowledge sharing.	1	2	3	4	5
KMC 2	A climate of openness and trust permeates the association.	1	2	3	4	5
KMC 3	Customer value creation is acknowledged as a major objective of knowledge management.	1	2	3	4	5
KMC 4	Flexibility and a desire to innovate drive the learning process.	1	2	3	4	5
KMC 5	Staff takes responsibility for their own learning.	1	2	3	4	5

APPENDIX G: KNOWLEDGE MANAGEMENT INFRASTRUCTURE (KMI)

1. The Knowledge Management Infrastructure includes the following components in the organizational context:
    a. organizational structure,
    b. shared knowledge,
    c. physical environment,
    d. information technology infrastructure, and
    e. organizational culture.
2. Organizations usually consider knowledge as their most strategic and valuable resource. For example, the more an institution/department/clinic knows about its technologies, products, and clients, the greater its chances for success. There are two categories of knowledge management infrastructure:
    I. social – includes human resources, structure, and culture [71].
    II. Technical – includes components, equipment, information technology, and physical infrastructure.

Indicate the extent to which the following factors represent the knowledge management infrastructure in your institution/department/clinic.

Component	Rarely	Very Low	Low	High	Very High
KMI.1 Human Resource	1	2	3	4	5
KMI.2 Training and Development	1	2	3	4	5
KMI.3 Organizational Culture	1	2	3	4	5
KMI.4 Organizational Structure	1	2	3	4	5
KMI.5 External Environment	1	2	3	4	5
KMI.6 Organizational Goals	1	2	3	4	5
KMI.7 Customers	1	2	3	4	5
KMI.8 Supply Chain	1	2	3	4	5
KMI.9 External Partners	1	2	3	4	5
KMI.10 Administrative Procedures, Rules and	1	2	3	4	5

	Policies, Codes of Conduct					
KMI.11	Organizational Memory	1	2	3	4	5
KMI.12	IT and Security Policies	1	2	3	4	5
KMI.13	Computers Systems	1	2	3	4	5
KMI.14	Telecommunications Connectivity	1	2	3	4	5
KMI.15	Internet Access	1	2	3	4	5
KMI.16	Core and related Technologies	1	2	3	4	5
KMI.17	IT Support Systems	1	2	3	4	5

1. To what extent would you say knowledge management infrastructure affect the following Knowledge management process

	Knowledge Management Processes	**Rarely**	**Very Low**	**Low**	**High**	**Very High**
KMI.18	Knowledge Identification	1	2	3	4	5
KMI.19	Knowledge Acquisition	1	2	3	4	5
KMI.20	Knowledge Development	1	2	3	4	5
KMI.21	Knowledge Preservation	1	2	3	4	5
KMI.22	Knowledge Distribution	1	2	3	4	5
KMI.23	Knowledge Utilization	1	2	3	4	5
KMI.24	Knowledge Measurement	1	2	3	4	5
KMI.25	Knowledge verification	1	2	3	4	5
KMI.26	Knowledge Goals	1	2	3	4	5

2. To what extent would you say the following factors affect the acquisition of knowledge management infrastructure

	Component	**Rarely**	**Very Low**	**Low**	**High**	**Very High**
KMI.27	Privacy, Security of information and information technology systems	1	2	3	4	5
KMI.28	Cost of core and related technology	1	2	3	4	5

KMI.29	Cost of Human Resource acquisition, training and development	1	2	3	4	5
KMI.30	Cost of Organizational Structure including Administrative procedures, Rules and Policies, Codes of Conduct	1	2	3	4	5
KMI.31	Competition environments	1	2	3	4	5
KMI.32	Cost of physical infrastructure that constitute KMI	1	2	3	4	5
KMI.33	Organizational goals	1	2	3	4	5

3. To what extent are you willing to participate in knowledge management infrastructure sharing by a third party?

	Component	**Rarely**	**Very Low**	**Low**	**High**	**Very High**
KMI.34	To what extent are you willing to participate in knowledge management infrastructure sharing by a third party?	1	2	3	4	5

4. Indicate the extent to which you perceive that knowledge management infrastructure sharing would reduce operational and deployment costs

	Component	**Rarely**	**Very Low**	**Low**	**High**	**Very High**
KMI.35	Indicate the extent to which you perceive that knowledge management infrastructure sharing would reduce operational and deployment costs	1	2	3	4	5

5. To participate in social KMI sharing, what extent do you want to know about another participant?

	Component	Rarely	Very Low	Low	High	Very High
KMI.36	To participate in social KMI sharing, what extent do you want to know about another participant?	1	2	3	4	5

6. To what extent could the following motivate you in knowledge management infrastructure sharing

	Component	Rarely	Very Low	Low	High	Very High
KMI.37	Technical knowledge management infrastructure	1	2	3	4	5
KMI.38	Social knowledge management infrastructure	1	2	3	4	5

7. To which extent are you willing to share the following aspect of your knowledge management infrastructure

	Component	Rarely	Very Low	Low	High	Very High
KMI.39	Technical Infrastructure of Knowledge Management	1	2	3	4	5
KMI.40	Social Infrastructure of Knowledge Management	1	2	3	4	5

8. To what extent do you consider the following as impact of knowledge management infrastructure sharing on Knowledge management

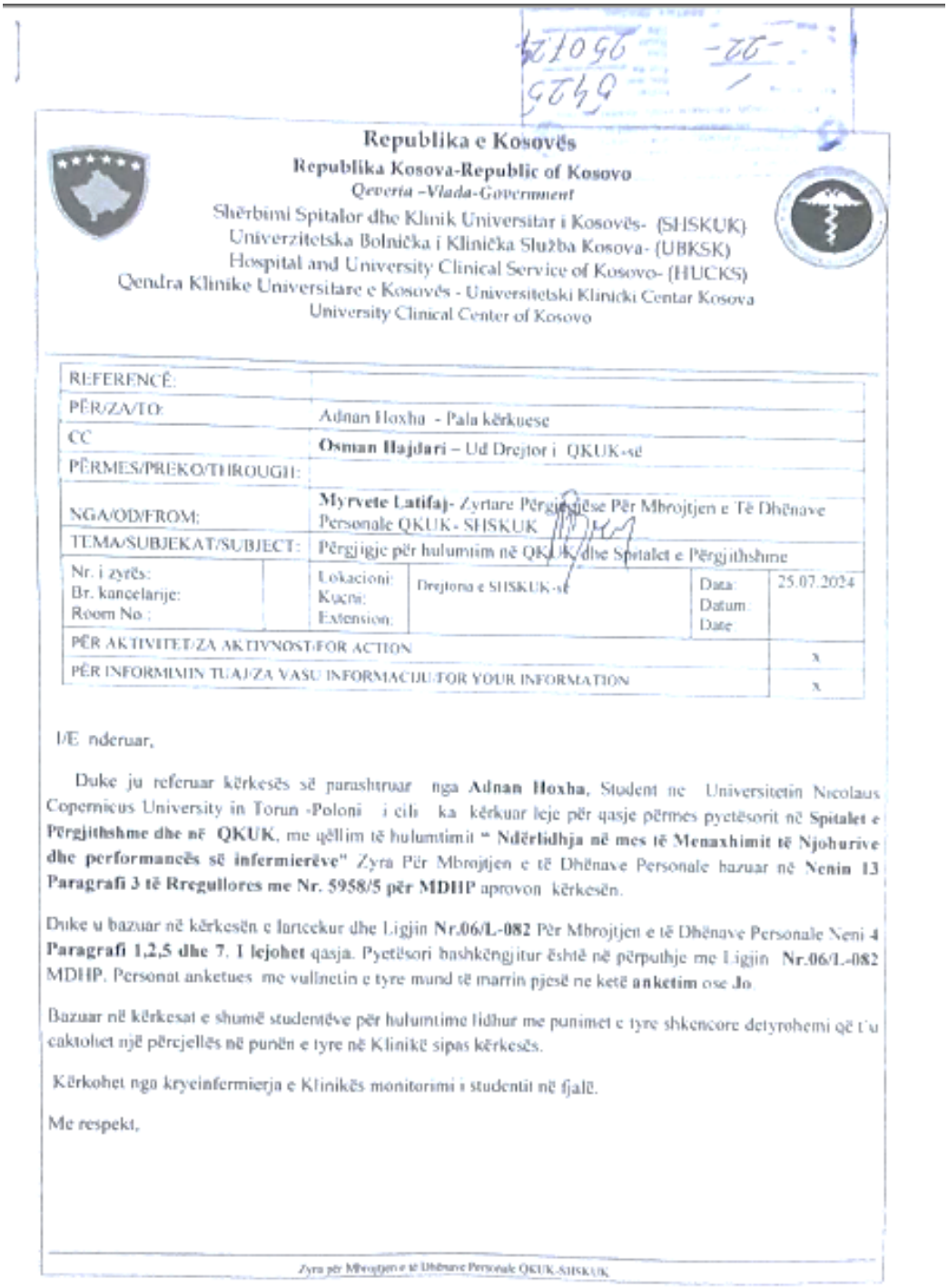
	Component	Rarely	Very Low	Low	High	Very High
KMI.41	It reduces the cost of deployment	1	2	3	4	5
KMI.42	It reduces operational costs	1	2	3	4	5

KMI.43	It increases efficiency	1	2	3	4	5
KMI.44	It makes resources available to participants	1	2	3	4	5
KMI.45	It improves work culture or productivity	1	2	3	4	5
KMI.46	It helps the Organization achieve its objective or focus	1	2	3	4	5

9. To what extent are you willing to participate in knowledge management infrastructure sharing by a third party?

	Component	Rarely	Very Low	Low	High	Very High
KMI.47	KMI Sharing	1	2	3	4	5

APPENDIX H: APPROVAL FROM THE UNIVERSITY CLINICAL AND HOSPITAL SERVICE OF KOSOVO (UCHSK) (ORIGINAL VERSION)



Republika e Kosovës
Republika Kosova-Republic of Kosovo
Qeveria -Vlada-Government
Shërbimi Spitalor dhe Klinik Universitar i Kosovës- (SHSKUK)
Univerzitetska Bolnička i Klinička Služba Kosova- (UBKSK)
Hospital and University Clinical Service of Kosovo- (HUCKS)
Qendra Klinike Universitare e Kosovës - Universitetski Klinički Centar Kosova
University Clinical Center of Kosovo

REFERENCË:					
PËR/ZA/TO:	Adnan Hoxha - Pala kërkuese				
CC	**Osman Hajdari** – Ud Drejtor i QKUK-së				
PËRMES/PREKO/THROUGH:					
NGA/OD/FROM:	**Myrvete Latifaj**- Zyrtare Përgjegjëse Për Mbrojtjen e Të Dhënave Personale QKUK- SHSKUK				
TEMA/SUBJEKAT/SUBJECT:	Përgjigje për hulumtim në QKUK dhe Spitalet e Përgjithshme				
Nr. i zyrës: Br. kancelarije: Room No.:		Lokacioni: Kucni: Extension:	Drejtoria e SHSKUK-së	Data: Datum: Date:	25.07.2024
PËR AKTIVITET/ZA AKTIVNOST/FOR ACTION					X
PËR INFORMIMIN TUAJ/ZA VASU INFORMACIJU/FOR YOUR INFORMATION					X

I/E nderuar,

Duke ju referuar kërkesës së parashtruar nga **Adnan Hoxha**, Student ne Universitetin Nicolaus Copernicus University in Torun -Poloni i cili ka kërkuar leje për qasje përmes pyetësorit në **Spitalet e Përgjithshme dhe në QKUK**, me qëllim të hulumtimit **" Ndërlidhja në mes të Menaxhimit të Njohurive dhe performancës së infermierëve"** Zyra Për Mbrojtjen e të Dhënave Personale bazuar në **Nenin 13 Paragrafi 3 të Rregullores me Nr. 5958/5 për MDHP** aprovon kërkesën.

Duke u bazuar në kërkesën e lartcekur dhe Ligjin **Nr.06/L-082** Për Mbrojtjen e të Dhënave Personale Neni 4 **Paragrafi 1,2,5 dhe 7. I lejohet** qasja. Pyetësori bashkëngjitur është në përputhje me Ligjin **Nr.06/L-082** MDHP. Personat anketues me vullnetin e tyre mund të marrin pjesë ne këtë **anketim** ose Jo.

Bazuar në kërkesat e shumë studentëve për hulumtime lidhur me punimet e tyre shkencore detyrohemi që t'u caktohet një përcjellës në punën e tyre në Klinikë sipas kërkesës.

Kërkohet nga kryeinfermierja e Klinikës monitorimi i studentit në fjalë.

Me respekt,

Zyra për Mbrojtjen e të Dhënave Personale QKUK-SHSKUK

APPENDIX I: ETHICAL APPROVAL FROM THE ETHICAL COMMITTEE OF HEIMERER COLLEGE

DPrAL kolegji-heimerer
PrBHE college-heimerer
Nr Prot. 1300/25 Data Date 14.08.25
Numër 1 Prishtinë

kolegji-heimerer

From: Ethical Committee
To: Adnan Hoxha
Date: 14/08/2025

Nr 69

ETHICAL APPROVAL

The Commision on Research Ethics has reviewed the study protocol described below. Your project proposal is considered to meet the requirements of Law No. 04/L-135 on Scientific-Research Activities, the ethical principles of Heimerer College, and has been granted full ethical approval.

Project title	The relationship between the Knowledge Management Infrastructure and Processes, Managerial Competence of Nurse Managers, and Job Performance of nursing staff
Approval date	14/08/2025
Comission Decision	Approved

Reasoning: Based on the Ethics Committee regulation, Article 11.2.1, the research meets the conditions for Ethical Approval.

The standard conditions of this approval are:

a) The research must be carried out strictly in accordance with the submitted proposal and the ethical approval, including any changes made as required by the Commission,
b) Immediate advice (rektorati@kolegji-heimerer.eu) on any complaints or other issues related to the project that may warrant a review of the project's ethical approval,
c) You must send the permission for data collection from the relevant institution (where applicable).
d) You must send a "final report" when the project is completed.
e) You must notify in writing if the project is terminated.
f) Please note that non-compliance with the conditions of approval and the principles of research ethics may result in the withdrawal of approval for the project.

Sent to:

- Individuals affected by this decision;
- The Rectorate;
- The Secretary's Office;
- The Archive;

Prof. Ass. Dr. Nahide Ibrajshori
Chair of the Academic Council
Rector of Heimerer College

DPrAL Kolegji Heimerer
PrBHE College Heimerer

Page 1 of 1

APPENDIX J: PARTICIPANT INVITATION FLYER (ALBANIAN VERSION)

FTESË PËR PJESËMARRJE NË HULUMTIM

Të nderuar staf infermieror,

Me respekt ju ftoj që të merrni pjesë në hulumtimin tone që synon të qartësoj ndërlidhjen në mes të Procesit të Menaxhimit të Njohurive, Infrastrukturës se Menaxhimit të Njohurive, Kompetenca Menaxheriale e Menaxherëve Infermieror, dhe Performancës së Punës së stafit infermieror në punësuar në institucionet publike shëndetësore publike në Kosovë.

Ky hulumtim është duke u realizuar si pjesë e studimeve te mia të doktoratës në Universitetin Nikolaus Kopernikus, me miratim nga Komiteti Etik i SHSKUK-së (Prot. 5425, më datë 25.07.2024).

Pjesëmarrja juaj është vullnetare dhe anonime. Plotësimi i pyetësorit kërkon rreth 20 minuta.

Kush mund të marrë pjesë?

Stafi infermieror të kujdesit parësor, dytësor dhe tretësor, përfshirë:

- Infermierët
- Krye-infermierët,
- Drejtorët infermieror

Pse është i rëndësishëm ky studim?

Rezultatet do të ndihmojnë në:

- Identifikimin e nevojave reale në terren,
- Hartimin e trajnimeve profesionale,
- Përmirësimin e proceseve të punës,
- Përforcimin e kompetencave të infermierëve dhe menaxherëve,
- Ngritjen e cilësisë së kujdesit në gjithë sistemin.

Për çdo pyetje ose sqarim, ju lutem kontaktoni më kontaktoni përmes:

+383 45 668 207
hoxha@doktorant.umk.pl
Prishtinë, 10000, Kosovë

APPENDIX K: STANDARD OPERATING PROCEDURE (SOP)

Standard Operating Procedure (SOP)

Implementation of Care-Level– and Role-Specific Knowledge Management Strategies to Improve Job Performance

SOP Title
Implementation of evidence-based knowledge management strategies across care levels and professional roles

SOP Code
KM-JP-SOP-01

Effective Date

_____

Review Date

_____

Responsible Authority
Hospital Management Board / Ministry of Health / Nursing Directorate

1. Purpose

The main purpose of this SOP is to guide healthcare institutions in implementing evidence-based knowledge management interventions aimed at enhancing the job performance of nurses and nurse managers. This SOP operationalizes empirical findings demonstrating that the effectiveness of knowledge management depends on care level, professional role, and managerial competence of nurse managers.

2. Scope

This SOP is targeted to:

- Public healthcare institutions operating at Primary, Secondary, and Tertiary care levels
- Nurses and nurse managers (heads, directors)
- Units involved in clinical care delivery, nursing management, and quality improvement

3. Definitions

- **Knowledge Management Process (KMP):** Activities related to identifying, capturing, sharing, applying, and measuring knowledge.
- **Knowledge Management Infrastructure (KMI):** Organizational structure, shared knowledge, physical environment, IT infrastructure, and organizational culture
- **Managerial Competence (MC):** Leadership, communication, planning, staff development, and decision-making capabilities of nurse managers.
- **Job Performance (JP):** Task, contextual, cooperative, conscientious, and interpersonal performance dimensions.

4. Guiding Principles

- Knowledge management interventions must not be uniform across care levels.
- They must not increase workload.
- They must be aligned with institutional capacity and care complexity.
- KMI investments alone do not guarantee nursing performance gains.
- MC often determines whether KM is enabling or burdensome.

5. Procedures by Professional role and Care level

5.1. Nurses

5.1.1. The PHC level:

- **Targeted KMP dimensions**
  - None
- **Targeted KMI dimensions**
  - KMI – Shared knowledge
  - KMI – Information Technology
- **Required actions**
  - **Shared knowledge**
    - Implement standardized clinical protocols and care pathways that are accessible.
    - Invest in handover-enabling tools to ensure continuity of care.
    - Keep up-to-date clinical data repositories at the unit level.

        - **Information Technology**
            - Enable point-of-care digital access to patient records, guidelines, and documentation systems.
            - Standardize digital documentation formats to reduce duplication.
            - Provide basic IT support to ensure uninterrupted system use.
    - **Targeted JP dimensions**
        - Task performance
        - Contextual performance
        - Cooperation
        - Conscientiousness
        - Interpersonal relations

5.1.2. The SHC level:

- **Targeted KMP dimensions**
    - KMP – Identification
- **Targeted KMI dimensions**
    - Overall
- **Required actions**
    - **Knowledge measurement**
        - Integrate structured knowledge-identification checklists for daily nursing routines.
        - Use checklists during shift briefings to identify critical clinical and organizational information needs.
        - Conduct regular case-based reflection sessions to identify knowledge gaps.
        - Utilize incident reviews to generate short learning cycles focused on knowledge needs.
- **Targeted JP dimensions**
    - Overall

5.1.3. The THC level:

- **Targeted KMP dimensions**
    - None

- **Targeted KMI dimensions**
  - Overall and in combination with MC dimensions
- **Required actions**
  - Redirect KM-related initiatives to the managerial level.
  - Maintain existing workflows without additional cognitive or procedural load.
- **Targeted JP dimensions**
  - Contextual Performance
  - Cooperation
  - Task Performance

5.2. Nurse managers

5.2.1. The PHC level:

- **Targeted KMP dimensions**
  - Knowledge measurement
- **Targeted KMI dimensions**
  - None
- **Targeted MC dimensions**
  - Staff development
  - Planning and organization
  - Problem-solving & decision-making
- **Required actions**
  - **Knowledge measurement**
    - Restrict/regulate existing KM measurement and reporting requirements, and eliminate redundant indicators and duplicate reporting requirements.
    - Ensure that activities related to knowledge measurement do not hamper cooperation and coordination work.
    - Limit KM measurement activities to essential quality and regulatory indicators only.
  - **Staff development**
    - Apply a supportive, but not manager-intensive approach
    - Spare nurse managers from excessive mentoring and appraisal workloads.

        - Provide trainings (lifelong learning) through accredited formal and professional education institutions.
    - **Planning and organization**
        - Set clear, stable schedules and workflows
        - Avoid ad-hoc and repeated planning driven by measurement outputs.
        - Simplify and reduce over-planning procedures.
    - **Problem-solving and decision-making**
        - Decentralize operational decision-making and problem-solving from nurse managers to nursing teams
        - Engage nurse managers primarily in strategic issues and high-impact decision-making
- **Targeted JP dimensions**
    - Contextual performance
    - Cooperation
    - Conscientiousness
    - Interpersonal relations
    - Organizational skills

5.2.2. The SHC level:

- **Targeted KMP dimensions**
    - None
- **Targeted KMI dimensions**
    - None
- **Targeted MC dimensions**
    - Leadership
    - Staff Development
    - Problem-Solving & Decision-Making
- **Required actions**
    - **Leadership**
        - Reduce micromanagement practices linked to KM infrastructure-driven monitoring.
        - Promote team-based coordination mechanisms and shared responsibility
    - **Staff development**
        - Apply a supportive, but not manager-intensive or driven approach
        - Spare nurse managers from excessive mentoring and appraisal workloads.

        - Provide trainings (life-long-learning) through HR units or external accredited higher education and professional accredited programs/institutions.
    - **Problem-solving and decision-making**
        - Decentralize operational decision making and problem-solving from nurse managers to nursing teams
        - Engage nurses managers primarily in strategic issues and high-impact decision-making
- **Targeted JP dimensions**
    - Organizational skills
    - Cooperation
    - Interpersonal skills

5.2.3. The THC level:

- **Targeted KMP dimensions**
    - None
- **Targeted KMI dimensions**
    - None
- **Targeted MC dimensions**
    - Communication
    - Leadership
    - Staff Development
- **Required actions**
    - **Communication**
        - Unit-level leaders should be delegated the responsibilities of task coordination and routine supervision.
        - Support coordination across complex care units through strengthening structured and clear communication channels.
    - **Leadership**
        - Instead of operational micromanagement, nurse managers should focus on strategic coordination, prioritization, and direction.
        - Unit-level leaders should be delegated the responsibilities of task coordination and routine supervisory.
    - **Staff development**
        - Apply a supportive, but not manager-intensive or driven approach.

        - Spare nurse managers from excessive mentoring and appraisal workloads.
        - Provide trainings (life-long-learning) through HR units or external accredited higher education and professional accredited programs/institutions.
    - **Targeted JP dimensions**
        - Task Performance
        - Contextual Performance
        - Cooperation

6. Monitoring and evaluation

- Performance indicators shall be monitored semi-annually.
- Evaluation shall include:
    - JP metrics
    - Managerial workload indicators
    - Staff feedback
- Necessary adjustments should be made based on observed outcomes and capacity.

7. Responsibilities

- Hospital directors: Ensure institutional alignment and resource allocation.
- Unit managers: Apply procedures and monitor outcomes.
- Nurse managers (heads and managers): Oversee implementation and compliance.
- Quality assurance units: Evaluate effectiveness and report findings.

8. Review and Continuous Improvement

This SOP shall be reviewed every 12 months, if:

- Significant/structural organizational changes occur;
- New empirical evidence is generated;
- Performance indicators significantly decline.

APPENDIX L: EXTENDED QUANTITATIVE RESULTS

Table 0.1: Spearman's Correlation Matrix – Nurses at the PHC level (N = 330)

Variables	JP Score	KMP	KMI	MC
JP of nurses (PHC)	1.000			
KMP	.184**	1.000		
KMI	.432***	.568***	1.000	
MC	.377***	.427***	.536***	1.000

N = Sample size;
JP = Job Performance;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
PHC = Primary Health Care.

Table 0.2: Spearman's Correlation Matrix – Nurses at the SHC level(N = 276)

Variables	JP Score	KMP	KMI	MC
JP of nurses (SHC)	1.000			
KMP	.434***	1.000		
KMI	.532***	.617***	1.000	
MC	.501***	.519***	.615***	1.000

N = Sample size;
JP = Job Performance;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
SHC = Secondary Health Care.

Table 0.3: Spearman's Correlation Matrix – Nurses at the THC level (N = 246)

Variables	JP Score	KMP	KMI	MC
JP of nurses	1.000			
KMP	.269***	1.000		
KMI	.247***	.540***	1.000	
MC	.277***	.461***	.434***	1.000

N = Sample size;
JP = Job Performance;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
THC = Tertiary Health Care.

Table 0.4: Variance Inflation Factors (VIF) for Nurses across Care Level

Predictor	PHC (N = 330)		SHC (N = 276)		THC (N = 246)	
	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
Knowledge Management						
KMP	1.72	0.58	1.75	0.57	1.80	0.56
KMI	1.90	0.53	2.07	0.48	1.80	0.55
MC	1.60	0.62	1.77	0.56	1.45	0.69
Gender						
Female (ref.)	—	—	—	—	—	—
Male	1.10	0.91	1.20	0.83	1.17	0.85
Age of Nursing Personnel						
22–29 (ref.)	—	—	—	—	—	—
30–39	2.78	0.36	3.52	0.28	3.35	0.30
40–49	4.09	0.24	5.52	0.18	5.55	0.18
50–59	3.82	0.26	3.23	0.31	3.10	0.32
60–65	2.88	0.35	2.84	0.35	3.27	0.31
Ethnicity						
Albanian (ref.)	—	—	—	—	—	—
Serb	1.13	0.89	1.07	0.93	—	—
Bosnian	1.04	0.97	1.13	0.89	—	—
Other	1.08	0.93	1.19	0.84	1.11	0.90
Education Level						
High school (ref.)	—	—	—	—	—	—
BSc	1.58	0.63	1.35	0.74	1.74	0.58
Master	1.50	0.67	1.17	0.86	1.69	0.59
Works in Private Sector						
No (ref.)	—	—	—	—	—	—
Yes	1.16	0.86	1.10	0.91	1.25	0.80
Work Experience (years)						
< 2 years (ref.)	—	—	—	—	—	—
2–5 years	2.66	0.38	3.14	0.32	2.06	0.48
6–10 years	3.78	0.26	5.35	0.19	3.88	0.26
11–15 years	3.74	0.27	4.83	0.21	4.16	0.24
16–20 years	3.83	0.26	4.49	0.22	4.25	0.24
>20 years	5.92	0.17	6.74	0.15	7.06	0.14
Workload						
0–5 (ref.)	—	—	—	—	—	—
5–10	5.24	0.19	3.76	0.27	4.51	0.22
11–19	7.55	0.13	3.60	0.28	5.17	0.19
20–29	8.61	0.12	4.68	0.21	4.26	0.23
30–39	7.76	0.13	3.27	0.31	3.94	0.25
≥40	11.41	0.09	2.18	0.46	4.03	0.25
Mean VIF	3.66	—	2.96	—	3.12	—

KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;

VIF = Variance Inflation Factor;
1/VIF = Tolerance;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care.

Table 0.5: Variance Inflation Factors (VIF) for Nurse Managers (Pooled)

Predictor	VIF	1/VIF
Knowledge Management		
KMP	1.78	0.56
KMI	2.20	0.45
MC	1.75	0.57
Gender		
Female (ref.)	–	–
Male	1.27	0.79
Age of Nursing Personnel		
22–29 (ref.)	–	–
30–39	–	–
40–49	3.62	0.28
50–59	3.99	0.25
60–65	3.11	0.32
Ethnicity		
Albanian (ref.)	–	–
Other	1.09	0.92
Education Level		
High school (ref.)	–	–
BSc	2.52	0.40
Master	2.80	0.36
PhD	1.41	0.71
Works in Private Sector		
No (ref.)	–	–
Yes	1.22	0.82
Work Experience (years)		
< 2 years (ref.)	–	–
6–10 years	4.66	0.21
11–15 years	5.81	0.17
16–20 years	7.20	0.14
>20 years	12.83	0.08
Workload		
0–5 (ref.)	–	–

5–10	6.59	0.15
11–19	6.84	0.15
20–29	1.77	0.57
30–39	3.15	0.32
≥40	3.99	0.25
Mean VIF	**3.79**	–

KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
VIF = Variance Inflation Factor;
1/VIF = Tolerance.

Table 0.6: Job Performance of Nurses regressed by KMP, KMI, MC, and control factors, care-level–specific effects (lincom results)

Predictor	PHC (N=330, R^2=.281)			SHC (N=276, R^2=.482)			THC (N=246, R^2=.199)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMP	-0.047	.077	[-0.099, 0.005]	0.085*	0.011	[0.019, 0.151]	0.030	.348	[-0.033, 0.092]
KMI	0.280***	.001	[0.167, 0.392]	0.205***	0.000	[0.104, 0.307]	0.060	.141	[-0.020, 0.139]
MC	0.043*	.012	[0.010, 0.076]	0.071*	0.012	[0.016, 0.127]	0.049*	.014	[0.010, 0.089]
Gender									
Female	1	1	1	1	1	1	1	–	1
Male	-0.001	.985	[-0.079, 0.077]	-0.105*	0.041	[-0.205, -0.004]	-0.017	.804	[-0.152, 0.118]
Age									
22–29	1	1	1	1	1	1	1	–	1
30–39	0.003	.998	[-0.142, 0.142]	-0.035	.641	[-0.185, 0.114]	0.098	.464	[-0.165, 0.360]
40–49	-0.008	.925	[-0.178, 0.162]	-0.003	.975	[-0.196, 0.190]	0.233	.102	[-0.047, 0.513]
50–59	0.073	.484	[-0.131, 0.277]	-0.030	.804	[-0.272, 0.211]	0.175	.235	[-0.115, 0.465]
60–65	-0.047	.706	[-0.292, 0.198]	-0.005	.971	[-0.284, 0.274]	0.401*	.013	[0.086, 0.717]
Ethnicity									
Albanian	1	1	1	1	1	1	1	–	1
Serb	0.295*	.015	[0.057, 0.533]	-0.056	.509	[-0.222, 0.110]	–	–	–
Bosnian	-0.159*	.013	[-0.284, -0.033]	0.158	.553	[-0.367, 0.684]	–	–	–
Croatian	–	–	–	–	–	–	–	–	–
Turkish	0.241*	.033	[0.020, 0.462]	-0.190	0.149	[-0.447, 0.068]	0.367	.120	[-0.097, 0.830]
Other	–	–	–	–	–	–	0.155	.261	[-0.116, 0.426]
Works in private sector									
No	1	1	1	1	1	1	1	–	1
Yes	0.001	.983	[-0.115, 0.118]	0.179*	0.179	[0.006, 0.351]	-0.064	.479	[-0.240, 0.113]
Education level									
High school	1	1	1	1	1	1	1	–	1
BSc	0.038	.401	[-0.051, 0.128]	0.166***	0.001	[0.074, 0.258]	0.060	.291	[-0.051, 0.170]
Master	-0.033	.639	[-0.171, 0.105]	0.070	0.426	[-0.103, 0.244]	0.020	.798	[-0.136, 0.177]

Work experience (years)									
Less than 2 years	1	1	1	1	1	1	1	–	1
2-5 years	0.106	.179	[-0.049, 0.261]	0.111	.160	[-0.044, 0.266]	0.008	.935	[-0.183, 0.199]
6–10 years	0.138	.176	[-0.062, 0.338]	0.259*	.015	[0.051, 0.467]	-0.163	.234	[-0.433, 0.107]
11–15 years	0.081	.479	[-0.143, 0.305]	0.136	.264	[-0.104, 0.376]	-0.148	.283	[-0.419, 0.123]
16–20 years	0.103	.385	[-0.129, 0.335]	0.153	0.153	[-0.136, 0.442]	-0.178	.232	[-0.470, 0.114]
>20 years	–	–	–	0.242	0.242	[-0.024, 0.508]	-0.278*	.050	[-0.556, 0.000]
Workload									
05	1	1	1	1	1	1	1	–	1
5–10	-0.166	.389	[-0.545, 0.213]	0.083	0.083	[-0.063, 0.230]	-0.013	.899	[-0.210, 0.184]
11–19	-0.234	.230	[-0.615, 0.148]	0.038	0.038	[-0.116, 0.193]	0.103	.286	[-0.087, 0.293]
20–29	-0.193	.302	[-0.559, 0.174]	0.089	0.089	[-0.051, 0.229]	0.117	.246	[-0.081, 0.314]
30–39	-0.128	.495	[-0.497, 0.241]	0.109	0.109	[-0.053, 0.271]	0.233*	.025	[0.029, 0.437]
≥40	-0.187	.320	[-0.558, 0.183]	-0.017	-0.017	[-0.260, 0.226]	0.060	.552	[-0.138, 0.258]
Constant	2.520***	0.001	[2.055, 2.986]	1.638***	1.638	[1.220, 2.055]	2.918***	<.001	[2.475, 3.361]

JP = Job Performance;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size;
**p < .05, ** p < .01, *** p < .001.*

Table 0.7: Job Performance of Nurses regressed by moderation terms of KMP x Care level, and KMI x Care level (N = 852, R^2 = .293)

Predictor	B	p	95% CI
KMP × PHC	–0.046	.076	[–0.097, 0.005]
KMP × SHC	0.125**	.004	[0.041, 0.209]
KMP × THC	0.088*	.024	[0.011, 0.165]
KMI × PHC	0.283***	.001	[0.171, 0.394]
KMI × SHC	–0.080	.305	[–0.234, 0.073]
KMI × THC	–0.219**	.001	[–0.353, –0.085]
MC x PHC	0.042*	.010	[0.010, 0.075]
MC × SHC	0.035	.326	[–0.035, 0.104]
MC × THC	–0.001	.982	[–0.052, 0.051]
Gender			
Female ®	1	1	1
Male	–0.028	.331	[–0.084, 0.028]
Age of nursing personnel			
22–29 ®	1	1	1
30–39	0.040	.440	[–0.061, 0.141]
40–49	0.084	.163	[–0.034, 0.201]
50–59	0.106	.135	[–0.033, 0.244]
60–65	0.136	.084	[–0.018, 0.290]
Ethnicity			
Albanian ®	1	1	1
Serb	0.176	.078	[–0.020, 0.371]
Bosnian	0.108	.580	[–0.275, 0.492]
Turkish	0.085	.487	[–0.154, 0.323]
Other	0.150*	.041	[0.006, 0.294]
Works in private sector			
No ®	1	1	1
Yes	0.028	.549	[–0.063, 0.119]
Education level			
High school ®	1	1	1
BSc	0.086**	.003	[0.030, 0.142]
Master	0.011	.807	[–0.079, 0.101]
Work experience (years)			
<2 years ®	1	1	1
2–5 years	0.059	.212	[–0.034, 0.153]
6–10 years	0.061	.357	[–0.069, 0.190]
11–15 years	0.002	.972	[–0.135, 0.140]
16–20 years	0.002	.981	[–0.150, 0.154]
>20 years	0.017	.820	[–0.129, 0.163]
Workload			
<5 clients ®	1	1	1
5–10	0.007	.911	[–0.119, 0.133]
11–19	0.008	.903	[–0.121, 0.137]
20–29	0.034	.579	[–0.086, 0.154]
30–39	0.102	.107	[–0.022, 0.226]
≥40	0.003	.958	[–0.126, 0.133]
Constant	2.279***	.001	[1.928, 2.630]

p < .05, p < .01, p < .001;
N = Sample size;
JP = Job Performance;
Ref. = Reference category;
KMP = Knowledge Management Process;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
PHC = Primary Health Care;
SHC = Secondary Health Care;
THC = Tertiary Health Care;
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination.

Table 0.8: JP of Nurses regressed by dimensions of KMP at the SHC level (N=276)

Predictor	JP of Nurses (R^2 = .491)		
	B	p	95% CI
KMP Dimensions			
KMP – Identification	0.055*	.027	[0.006, 0.103]
KMP – Capture	–0.027	.314	[–0.079, 0.026]
KMP – Sharing	0.025	.367	[–0.029, 0.078]
KMP – Application	0.038	.192	[–0.019, 0.096]
KMP – Measurement	–0.001	.959	[–0.055, 0.052]
Knowledge Management Infrastructure	0.202***	<.001	[0.101, 0.304]
Managerial Competence	0.070*	.016	[0.013, 0.127]
Gender			
Female ®	Ref.	–	–
Male	–0.098	.061	[–0.201, 0.005]
Age of nursing personnel			
22–29 ®	1	1	1
30–39	–0.026	.741	[–0.179, 0.127]
40–49	0.027	.788	[–0.173, 0.227]
50–59	0.006	.963	[–0.241, 0.253]
60–65	0.022	.880	[–0.265, 0.309]
Ethnicity			
Albanian ®	1	1	1
Serb	–0.038	.698	[–0.232, 0.156]
Bosnian	0.154	.555	[–0.358, 0.666]
Turkish	–0.175	.201	[–0.443, 0.094]
Other	–	–	–
Works in private sector			
No ®	1	1	1
Yes	0.180*	.040	[0.009, 0.352]
Education level			
High school ®	Ref.	–	–
BSc	0.175***	<.001	[0.083, 0.267]
Master	0.087	.320	[–0.085, 0.259]
Work experience (years)			
<2 ®	1	1	1
2–5	0.107	.177	[–0.049, 0.263]
6–10	0.235*	.033	[0.019, 0.451]
11–15	0.095	.462	[–0.159, 0.348]
16–20	0.111	.463	[–0.186, 0.408]
>20	0.212	.131	[–0.064, 0.487]
Workload			
0–5 ®	1	1	1
5–10	0.089	.238	[–0.059, 0.237]
11–19	0.051	.521	[–0.106, 0.208]
20–29	0.097	.177	[–0.044, 0.239]
30–39	0.116	.154	[–0.044, 0.277]

≥40	–0.008	.953	[–0.261, 0.246]
Constant	1.629***	<.001	[1.217, 2.041]

p = Significance level;
p < .05, p < .01, p < .001;
B = Unstandardized regression coefficient;
CI = Confidence Interval;
JP = Job Performance;
KMP Identification = Knowledge Identification;
KMP Capture = Knowledge Capture;
KMP Sharing = Knowledge Sharing;
KMP Application = Knowledge Application;
KMP Measurement = Knowledge Measurement;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
SHC = Secondary Health Care.

Table 0.9: Dimensions of Job Performance of Nurses regressed by dimensions of Knowledge Management Process, at the SHC level (N = 276)

Predictor	Task Performance (R^2 = .313)			Organizational Skills (R^2 = .160)			Contextual Performance (R^2 = .428)			Cooperation (R^2 = .302)			Conscientiousness (R^2 = .327)			Interpersonal Relations (R^2 = .272)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMP – Identification	0.131**	.010	[0.032, 0.230]	–0.002	.973	[–0.093, 0.090]	0.018	.687	[–0.069, 0.104]	0.081	.157	[–0.031, 0.193]	0.151**	.002	[0.057, 0.246]	–0.050	.141	[–0.117, 0.017]
KMP – Capture	–0.055	.354	[–0.171, 0.061]	–0.120*	.013	[–0.214, –0.026]	–0.072	.065	[–0.148, 0.004]	0.033	.596	[–0.089, 0.155]	0.025	.673	[–0.091, 0.141]	0.028	.467	[–0.048, 0.105]
KMP – Sharing	0.094	.157	[–0.036, 0.223]	0.046	.302	[–0.042, 0.135]	0.009	.856	[–0.084, 0.101]	–0.073	.234	[–0.195, 0.048]	0.045	.464	[–0.076, 0.165]	0.028	.501	[–0.054, 0.111]
KMP – Application	–0.027	.646	[–0.143, 0.089]	0.035	.437	[–0.054, 0.124]	0.088*	.039	[0.004, 0.171]	0.102	.101	[–0.020, 0.225]	0.026	.645	[–0.086, 0.138]	0.004	.918	[–0.078, 0.086]
KMP – Measurement	–0.078	.215	[–0.202, 0.046]	–0.005	.913	[–0.094, 0.084]	–0.037	.383	[–0.122, 0.047]	–0.001	.985	[–0.134, 0.131]	0.060	.260	[–0.045, 0.165]	0.053	.187	[–0.026, 0.133]
KM Infrastructure	0.318**	.005	[0.099, 0.537]	0.127	.097	[–0.023, 0.277]	0.248**	.001	[0.103, 0.392]	0.232*	.033	[0.019, 0.446]	0.134	.184	[–0.064, 0.331]	0.155*	.028	[0.016, 0.293]
Managerial Competence	0.083	.086	[–0.012, 0.178]	0.051	.069	[–0.004, 0.107]	0.137***	<.001	[0.074, 0.200]	0.081	.113	[–0.019, 0.181]	0.040	.325	[–0.040, 0.120]	0.029	.351	[–0.032, 0.090]
Gender																		
Female (ref)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
Male	–0.105	.319	[–0.311, 0.102]	–0.066	.382	[–0.214, 0.082]	–0.098	.166	[–0.237, 0.041]	–0.165	.114	[–0.371, 0.040]	–0.006	.955	[–0.211, 0.200]	–0.149*	.026	[–0.280, –0.018]
Age of nurses																		
22–29 (ref)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
30–39	0.185	.254	[–0.133, 0.503]	0.119	.229	[–0.075, 0.314]	0.028	.804	[–0.197, 0.253]	–0.156	.329	[–0.470, 0.158]	–0.215	.197	[–0.543, 0.112]	–0.115	.237	[–0.307, 0.076]
40–49	0.342	.097	[–0.063, 0.748]	0.234	.068	[–0.017, 0.486]	0.086	.546	[–0.193, 0.365]	–0.300	.149	[–0.708, 0.108]	–0.121	.560	[–0.530, 0.288]	–0.077	.525	[–0.316, 0.162]

50–59	0.293	.279	[–0.239, 0.825]	0.159	.324	[–0.158, 0.475]	–0.138	.453	[–0.500, 0.224]	–0.297	.212	[–0.763, 0.170]	0.220	.428	[–0.325, 0.765]	–0.202	.181	[–0.498, 0.095]
60–65	0.155	.621	[–0.460, 0.769]	0.019	.937	[–0.444, 0.482]	0.061	.774	[–0.358, 0.480]	–0.062	.821	[–0.604, 0.480]	–0.058	.856	[–0.690, 0.573]	0.018	.920	[–0.338, 0.375]
Ethnicity																		
Albanian (ref)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
Serb	–0.928***	<.001	[–1.341, –0.516]	0.246	.131	[–0.074, 0.566]	0.715***	<.001	[0.401, 1.030]	–0.861***	<.001	[–1.267, –0.454]	–0.235	.231	[–0.620, 0.150]	0.833***	<.001	[0.553, 1.114]
Bosnian	–0.141	.722	[–0.920, 0.639]	0.020	.918	[–0.368, 0.408]	0.065	.801	[–0.443, 0.574]	0.322	.516	[–0.653, 1.298]	0.607*	.033	[0.049, 1.166]	0.049	.884	[–0.610, 0.708]
Croatian	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Turkish	–0.247	.599	[–1.172, 0.677]	–0.040	.698	[–0.243, 0.163]	–0.356**	.002	[–0.577, –0.135]	–0.108	.759	[–0.798, 0.583]	–0.007	.970	[–0.363, 0.350]	–0.290	.141	[–0.676, 0.097]
Roma	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Other	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Works in private sector																		
No (ref)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
Yes	0.301	.055	[–0.007, 0.610]	0.044	.727	[–0.202, 0.290]	0.131	.333	[–0.135, 0.396]	0.225	.234	[–0.146, 0.596]	0.269	.118	[–0.069, 0.608]	0.111	.341	[–0.118, 0.339]
Education level																		
High school (ref)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
BSc	0.125	.178	[–0.057, 0.307]	0.041	.526	[–0.085, 0.167]	0.089	.156	[–0.034, 0.212]	0.248**	.009	[0.063, 0.432]	0.330***	<.001	[0.150, 0.509]	0.220***	<.001	[0.100, 0.339]

Master	–0.006	.965	[–0.279, 0.267]	–0.045	.747	[–0.317, 0.228]	0.171	.261	[–0.128, 0.471]	0.041	.848	[–0.379, 0.461]	0.151	.350	[–0.167, 0.469]	0.209	.094	[–0.036, 0.453]
Work experience (years)																		
<2 (ref)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
2–5	0.268	.101	[–0.053, 0.588]	0.024	.845	[–0.216, 0.264]	0.115	.372	[–0.139, 0.369]	0.086	.606	[–0.241, 0.412]	0.153	.314	[–0.146, 0.451]	–0.003	.977	[–0.220, 0.214]
6–10	0.145	.533	[–0.312, 0.601]	0.021	.875	[–0.240, 0.282]	0.046	.752	[–0.241, 0.334]	0.474*	.033	[0.039, 0.910]	0.511*	.020	[0.081, 0.941]	0.213	.108	[–0.047, 0.473]
11–15	–0.104	.691	[–0.622, 0.414]	–0.122	.425	[–0.422, 0.178]	–0.041	.806	[–0.372, 0.290]	0.436	.073	[–0.040, 0.912]	0.252	.316	[–0.242, 0.747]	0.149	.303	[–0.135, 0.433]
16–20	–0.089	.793	[–0.755, 0.577]	–0.148	.366	[–0.470, 0.174]	0.095	.602	[–0.262, 0.452]	0.682*	.011	[0.160, 1.203]	0.034	.912	[–0.571, 0.639]	0.092	.583	[–0.236, 0.419]
>20	0.028	.924	[–0.554, 0.610]	–0.006	.975	[–0.371, 0.360]	0.322	.093	[–0.054, 0.699]	0.561*	.039	[0.028, 1.093]	0.211	.475	[–0.369, 0.792]	0.155	.355	[–0.174, 0.484]
Workload																		
0–5 (ref)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
5–10	–0.104	.507	[–0.412, 0.204]	0.291**	.005	[0.090, 0.492]	0.002	.986	[–0.257, 0.262]	0.074	.670	[–0.267, 0.415]	0.088	.494	[–0.165, 0.342]	0.183	.085	[–0.025, 0.391]
11–19	0.093	.538	[–0.203, 0.389]	0.199	.077	[–0.022, 0.420]	0.045	.732	[–0.215, 0.306]	–0.048	.791	[–0.404, 0.308]	–0.016	.912	[–0.305, 0.273]	0.034	.773	[–0.198, 0.267]
20–29	0.041	.754	[–0.216, 0.298]	0.200*	.026	[0.024, 0.375]	0.044	.716	[–0.195, 0.283]	0.099	.532	[–0.212, 0.409]	0.076	.563	[–0.182, 0.333]	0.124	.223	[–0.076, 0.325]
30–39	0.091	.515	[–0.183, 0.364]	0.082	.465	[–0.138, 0.302]	0.053	.706	[–0.224, 0.331]	0.039	.827	[–0.309, 0.386]	0.289*	.036	[0.019, 0.559]	0.145	.184	[–0.069, 0.359]

≥40	–0.185	.515	[–0.743, 0.374]	0.227	.195	[–0.117, 0.572]	–0.017	.923	[–0.362, 0.328]	–0.101	.652	[–0.544, 0.341]	–0.071	.765	[–0.535, 0.394]	0.101	.560	[–0.239, 0.440]
Constant	1.286**	.001	[0.534, 2.037]	2.408***	<.001	[1.864, 2.951]	1.560***	<.001	[0.954, 2.166]	1.279**	.003	[0.444, 2.115]	0.954**	.003	[0.322, 1.585]	2.287***	<.001	[1.755, 2.818]

p = Significance level;
p < .05, p < .01, p < .001;
B = Unstandardized regression coefficient;
CI = Confidence Interval;
JP = Job Performance;
KMP Identification = Knowledge Identification;
KMP Capture = Knowledge Capture;
KMP Sharing = Knowledge Sharing;
KMP Application = Knowledge Application;
KMP Measurement = Knowledge Measurement;
KMI = Knowledge Management Infrastructure;
MC = Managerial Competence;
SHC = Secondary Health Care;
Ref. = Reference category.

Table 0.10: Job Performance of Nurses regressed by dimensions of KMI at the PHC and SHC levels

Predictor	Job Performance of Nurses					
	PHC (CL1)			SHC (CL2)		
	B	p	95% CI	B	p	95% CI
Dimensions of KMI						
Structure	–0.056	.182	[–0.138, 0.026]	0.085	.091	[–0.014, 0.184]
Shared Knowledge	0.138*	.017	[0.025, 0.251]	0.067	.344	[–0.072, 0.207]
Physical	–0.060	.115	[–0.134, 0.015]	–0.019	.627	[–0.094, 0.057]
IT	0.120*	.024	[0.016, 0.225]	–0.057	.355	[–0.177, 0.064]
Culture	0.112	.170	[–0.048, 0.273]	0.122	.079	[–0.014, 0.259]
KMP	–0.030	.253	[–0.082, 0.022]	0.094**	.005	[0.028, 0.160]
MC	0.043*	.013	[0.009, 0.077]	0.070*	.015	[0.014, 0.127]
Gender						
Female®	1	1	1	1	1	1
Male	–0.007	.859	[–0.084, 0.070]	–0.109*	.032	[–0.208, –0.010]
Age of nursing personnel						
22–29®	1	1	1	1	1	1
30–39	0.009	.909	[–0.140, 0.157]	–0.045	.566	[–0.198, 0.109]
40–49	–0.002	.982	[–0.179, 0.175]	–0.025	.803	[–0.223, 0.173]
50–59	0.058	.595	[–0.156, 0.272]	–0.057	.640	[–0.297, 0.183]
60–65	–0.048	.715	[–0.309, 0.212]	–0.024	.864	[–0.305, 0.256]
Ethnicity						
Albanian®	1	1	1	1	1	1
Serb	0.284*	.012	[0.064, 0.504]	–0.039	.632	[–0.197, 0.120]
Bosnian	–0.039	.611	[–0.192, 0.113]	0.190	.489	[–0.349, 0.729]
Croatian	–	–	–	–	–	–
Turkish	0.190	.089	[–0.029, 0.409]	–0.184	.193	[–0.461, 0.094]

Works in private sector						
No®	1	1	1	1	1	1
Yes	–0.003	.958	[–0.120, 0.114]	0.196*	.020	[0.030, 0.361]
Education level						
High school®	1	1	1	1	1	1
BSc	0.027	.549	[–0.062, 0.116]	0.169***	<.001	[0.077, 0.261]
Master	–0.048	.500	[–0.189, 0.092]	0.105	.215	[–0.062, 0.272]
PhD	–	–	–	–	–	–
Work experience (years)						
Less than 2 years®	Ref.	–	–	Ref.	–	–
2–5 years	0.121	.132	[–0.037, 0.278]	0.108	.150	[–0.039, 0.255]
6–10 years	0.141	.176	[–0.063, 0.345]	0.272**	.009	[0.069, 0.474]
11–15 years	0.077	.500	[–0.147, 0.300]	0.146	.226	[–0.091, 0.382]
16–20 years	0.119	.315	[–0.114, 0.353]	0.166	.251	[–0.118, 0.449]
>20 years	0.140	.236	[–0.092, 0.371]	0.268*	.044	[0.007, 0.530]
Workload						
0–5®	Ref.	–	–	Ref.	–	–
5–10	–0.132	.478	[–0.498, 0.234]	0.073	.302	[–0.066, 0.211]
11–19	–0.215	.249	[–0.583, 0.152]	0.043	.568	[–0.106, 0.193]
20–29	–0.167	.351	[–0.519, 0.185]	0.083	.229	[–0.053, 0.219]
30–39	–0.119	.509	[–0.475, 0.236]	0.109	.171	[–0.047, 0.265]
≥40	–0.181	.320	[–0.537, 0.176]	–0.028	.822	[–0.273, 0.217]
Constant	2.537***	<.001	[2.091, 2.984]	1.614***	<.001	[1.205, 2.023]

p = Significance level;
B = Unstandardized regression coefficient;
CI = Confidence Interval;
JP = Job Performance;
KMI Structure = Structural Infrastructure;

KMI Shared Knowledge = Shared Knowledge Infrastructure;
KMI Physical = Physical Infrastructure;
KMI IT = Information Technology Infrastructure;
KMI Culture = Cultural Infrastructure;
KMP = Knowledge Management Process;
MC = Managerial Competence;
PHC = Primary Health Care;
SHC = Secondary Health Care;
R^2 = Coefficient of determination;
N = Sample size;
Ref. = Reference category.

Table 0.11: Dimensions of Job Performance of Nurses regressed by the significant dimension KMI dimension of Shared Knowledge at the PHC level

Predictor	Task Performance (R^2 = .214)			Organizational Skills (R^2 = .145)			Contextual Performance (R^2 = .298)			Cooperation (R^2 = .162)			Conscientiousness (R^2 = .238)			Interpersonal Relations (R^2 = .110)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMI—Shared Knowledge	0.185*	.013	[0.039, 0.331]	0.168	.002	[0.064, 0.272]	0.217	.001	[0.093, 0.341]	0.243	.003	[0.082, 0.404]	0.290*	<.001	[0.146, 0.434]	0.211*	<.001	[0.097, 0.324]
Knowledge Management Process	–0.100	.088	[–0.215, 0.015]	–0.113	.007	[–0.194, –0.031]	–0.047	.314	[–0.139, 0.045]	0.127	.015	[0.024, 0.229]	0.035	.495	[–0.066, 0.135]	–0.032	.424	[–0.111, 0.047]
Managerial Competence	0.144*	<.001	[0.089, 0.199]	0.005	.808	[–0.032, 0.042]	0.133*	<.001	[0.089, 0.176]	0.017	.579	[–0.043, 0.078]	0.029	.254	[–0.021, 0.079]	–0.010	.644	[–0.054, 0.033]
Gender																		
Female (ref.)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
Male	0.021	.778	[–0.124, 0.166]	–0.147	.013	[–0.263, –0.031]	–0.046	.459	[–0.168, 0.076]	0.069	.429	[–0.102, 0.241]	0.231	.002	[0.089, 0.374]	–0.170	.009	[–0.297, –0.043]
Age (22–29 ref.)																		
30–39	0.150	.300	[–0.134, 0.435]	0.092	.386	[–0.116, 0.300]	–0.095	.358	[–0.298, 0.108]	–0.018	.901	[–0.297, 0.262]	–0.021	.852	[–0.244, 0.202]	–0.005	.966	[–0.233, 0.223]
40–49	0.315	.084	[–0.042, 0.672]	0.155	.202	[–0.083, 0.394]	–0.169	.210	[–0.434, 0.096]	–0.232	.181	[–0.573, 0.108]	–0.050	.521	[–0.318, 0.218]	–0.044	.708	[–0.276, 0.188]
50–59	0.390	.065	[–0.025, 0.804]	0.296	.053	[–0.004, 0.596]	–0.051	.759	[–0.374, 0.274]	–0.471	.150	[–1.114, 0.171]	–0.318	.200	[–0.806, 0.170]	0.105	.603	[–0.293, 0.504]
60–65	0.112	.639	[–0.359, 0.583]	0.425	.025	[0.053, 0.797]	–0.193	.345	[–0.594, 0.208]	–0.471	.150	[–1.114, 0.171]	–0.333	.177	[–0.817, 0.152]	0.095	.624	[–0.287, 0.477]
Ethnicity (Albanian ref.)																		
Serb	0.436	.049	[0.001, 0.871]	0.116	.578	[–0.294, 0.525]	0.591	.030	[0.058, 1.124]	0.459	.137	[–0.146, 1.063]	0.058	.743	[–0.290, 0.406]	–0.093	.649	[–0.493, 0.307]

Predictor	Task Performance (R^2 = .214)			Organizational Skills (R^2 = .145)			Contextual Performance (R^2 = .298)			Cooperation (R^2 = .162)			Conscientiousness (R^2 = .238)			Interpersonal Relations (R^2 = .110)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
Bosnian	–0.223	.071	[–0.465, 0.019]	–0.563*	<.001	[–0.750, –0.376]	0.668*	<.001	[0.457, 0.879]	–0.330	.015	[–0.596, –0.064]	0.267	.019	[0.043, 0.490]	–0.624*	<.001	[–0.819, –0.429]
Turkish	0.114	.538	[–0.249, 0.477]	–1.037*	<.001	[–1.311, –0.761]	0.238	.155	[–0.090, 0.567]	0.930*	<.001	[0.490, 1.370]	0.650*	.001	[0.275, 1.025]	0.411	.018	[0.070, 0.753]
Other	0.144	.442	[–0.225, 0.514]	–1.065*	<.001	[–1.321, –0.809]	0.216	.193	[–0.110, 0.541]	0.970*	<.001	[0.534, 1.405]	0.682*	<.001	[0.310, 1.054]	0.419	.012	[0.091, 0.747]
Works in private sector (No ref.)																		
Yes	0.124	.243	[–0.085, 0.334]	–0.118	.144	[–0.277, 0.041]	–0.002	.980	[–0.197, 0.192]	0.032	.812	[–0.229, 0.292]	0.109	.294	[–0.095, 0.314]	–0.086	.310	[–0.253, 0.081]
Education (High school ref.)																		
BSc	–0.052	.572	[–0.235, 0.130]	0.202	.003	[0.068, 0.335]	–0.060	.362	[–0.190, 0.070]	–0.093	.325	[–0.279, 0.093]	0.074	.361	[–0.085, 0.234]	0.165	.019	[0.028, 0.302]
Master	–0.227	.115	[–0.509, 0.056]	0.235	.020	[0.037, 0.432]	–0.150	.161	[–0.360, 0.060]	–0.154	.254	[–0.419, 0.111]	0.023	.837	[–0.197, 0.243]	–0.009	.931	[–0.221, 0.202]
Total experience (<2 years ref.)																		
2–5 years	0.222	.115	[–0.054, 0.498]	–0.134	.209	[–0.344, 0.076]	0.308	.007	[0.086, 0.530]	0.161	.268	[–0.124, 0.445]	0.124	.336	[–0.130, 0.379]	–0.016	.898	[–0.260, 0.228]
6–10 years	0.069	.738	[–0.338, 0.477]	–0.176	.178	[–0.433, 0.081]	0.399	.004	[0.132, 0.666]	0.336	.075	[–0.034, 0.705]	0.135	.398	[–0.179, 0.450]	–0.016	.919	[–0.321, 0.289]
11–15 years	–0.056	.800	[–0.491, 0.379]	–0.299	.054	[–0.603, 0.005]	0.459	.006	[0.136, 0.783]	0.241	.257	[–0.177, 0.659]	0.020	.911	[–0.338, 0.379]	0.127	.435	[–0.193, 0.448]
16–20 years	0.016	.943	[–0.416, 0.448]	–0.244	.132	[–0.562, 0.074]	0.342	.052	[–0.002, 0.687]	0.241	.117	[–0.094, 0.844]	0.177	.400	[–0.236, 0.590]	0.043	.806	[–0.299, 0.384]

Predictor	Task Performance (R^2 = .214)			Organizational Skills (R^2 = .145)			Contextual Performance (R^2 = .298)			Cooperation (R^2 = .162)			Conscientiousness (R^2 = .238)			Interpersonal Relations (R^2 = .110)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
>20 years	0.016	.943	[–0.416, 0.448]	–0.244	.132	[–0.562, 0.074]	0.352	.040	[0.016, 0.688]	0.388	.104	[–0.080, 0.855]	0.383	.064	[–0.022, 0.787]	0.100	.600	[–0.273, 0.472]
Daily clients (0–5 ref.)																		
5–10	–0.403	.221	[–1.050, 0.243]	0.070	.739	[–0.340, 0.479]	–0.355	.015	[–0.641, –0.070]	0.186	.660	[–0.644, 1.015]	–0.503	.183	[–1.244, 0.238]	–0.086	.667	[–0.477, 0.306]
11–19	–0.669	.043	[–1.317, –0.021]	0.142	.496	[–0.268, 0.552]	–0.371	.021	[–0.687, –0.056]	–0.131	.753	[–0.952, 0.689]	–0.612	.105	[–1.352, 0.128]	0.166	.423	[–0.241, 0.573]
20–29	–0.542	.090	[–1.170, 0.086]	0.070	.731	[–0.330, 0.469]	–0.358	.011	[–0.634, –0.082]	0.028	.946	[–0.774, 0.829]	–0.470	.193	[–1.195, 0.256]	0.046	.811	[–0.335, 0.428]
30–39	–0.359	.171	[–0.859, 0.141]	0.056	.791	[–0.363, 0.475]	–0.396	.006	[–0.678, –0.115]	0.082	.843	[–0.732, 0.897]	–0.297	.431	[–1.040, 0.445]	0.057	.690	[–0.304, 0.418]
≥40	–0.413	.197	[–1.045, 0.219]	0.062	.766	[–0.350, 0.474]	–0.362	.016	[–0.656, –0.067]	0.072	.862	[–0.741, 0.885]	–0.749	.048	[–1.492, –0.007]	0.077	.690	[–0.303, 0.458]
Constant	2.667*	<.001	[1.843, 3.490]	3.153*	<.001	[2.674, 3.631]	2.377*	<.001	[1.893, 2.861]	1.958*	<.001	[1.059, 2.857]	2.220*	<.001	[1.340, 3.099]	3.040*	<.001	[2.555, 3.525]

p = Significance level;
p < .05, p < .01, p < .001;
B = Unstandardized regression coefficient;
CI = Confidence Interval;
JP = Job Performance;
KMI Shared Knowledge = Shared Knowledge Infrastructure;
KMP = Knowledge Management Process;
MC = Managerial Competence;
PHC = Primary Health Care;
R^2 = Coefficient of determination;
N = Sample size;

Table 0.12: Dimensions of Job Performance of Nurses regressed by the significant KMI dimension of IT-structure at the PHC level

Predictor	Task Performance (R^2 = .219)			Organizational Skills (R^2 = .133)			Contextual Performance (R^2 = .288)			Cooperation (R^2 = .168)			Conscientiousness (R^2 = .244)			Interpersonal Relations (R^2 = .109)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI	B	p	95% CI
Knowledge Management Infrastructure (IT)	0.221**	.009	[0.056, 0.387]	0.141*	.023	[0.020, 0.262]	0.197**	.002	[0.072, 0.322]	0.290***	<.001	[0.133, 0.446]	0.330***	<.001	[0.182, 0.478]	0.223**	.002	[0.083, 0.364]
Knowledge Management Process	–0.117*	.046	[–0.232, –0.002]	–0.110*	.015	[–0.199, –0.021]	–0.049	.300	[–0.141, 0.043]	0.105*	.043	[0.003, 0.206]	0.013	.790	[–0.085, 0.111]	–0.043	.293	[–0.123, 0.037]
Managerial Competence	0.135***	<.001	[0.078, 0.191]	0.005	.817	[–0.036, 0.045]	0.131***	<.001	[0.086, 0.176]	0.005	.874	[–0.057, 0.066]	0.017	.532	[–0.036, 0.070]	–0.017	.497	[–0.065, 0.032]
Gender																		
Female (ref.)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
Male	0.026	.723	[–0.118, 0.171]	–0.143*	.018	[–0.261, –0.024]	–0.040	.522	[–0.163, 0.083]	0.076	.387	[–0.097, 0.249]	0.240**	.001	[0.101, 0.378]	–0.164*	.012	[–0.292, –0.037]
Age of nursing personnel																		
22–29 (ref.)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
30–39	0.115	.433	[–0.172, 0.402]	0.069	.518	[–0.141, 0.278]	–0.127	.221	[–0.331, 0.077]	–0.064	.654	[–0.346, 0.218]	–0.074	.505	[–0.293, 0.145]	–0.041	.720	[–0.266, 0.184]
40–49	0.308	.093	[–0.051, 0.667]	0.160	.198	[–0.084, 0.403]	–0.166	.221	[–0.433, 0.100]	–0.242	.170	[–0.587, 0.104]	–0.058	.664	[–0.320, 0.204]	–0.047	.686	[–0.276, 0.182]
50–59	0.366	.084	[–0.050, 0.783]	0.277	.077	[–0.030, 0.584]	–0.075	.657	[–0.407, 0.257]	–0.214	.332	[–0.648, 0.219]	–0.150	.394	[–0.496, 0.196]	0.056	.732	[–0.267, 0.380]

60–65	0.103	.665	[–0.365, 0.571]	0.417*	.031	[0.039, 0.796]	–0.203	.324	[–0.607, 0.201]	–0.484	.140	[–1.127, 0.159]	–0.333	.177	[–0.817, 0.152]	0.095	.624	[–0.287, 0.477]
Ethnicity																		
Albanian (ref.)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
Serb	0.487*	.028	[0.054, 0.921]	0.180	.370	[–0.215, 0.576]	0.670*	.019	[0.112, 1.227]	0.527	.081	[–0.065, 1.118]	0.144	.395	[–0.188, 0.476]	–0.026	.908	[–0.464, 0.413]
Bosnian	–0.226	.063	[–0.463, 0.012]	–0.546***	<.001	[–0.734, –0.358]	0.685***	<.001	[0.479, 0.890]	–0.334*	.012	[–0.593, –0.074]	0.268*	.017	[0.048, 0.487]	–0.618***	<.001	[–0.813, –0.423]
Turkish	0.114	.538	[–0.249, 0.477]	–1.036***	<.001	[–1.311, –0.761]	0.238	.155	[–0.090, 0.567]	0.930***	<.001	[0.490, 1.370]	0.650***	.001	[0.275, 1.025]	0.411*	.018	[0.070, 0.753]
Works in private sector																		
No (ref.)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
Yes	0.127	.215	[–0.074, 0.327]	–0.117	.151	[–0.276, 0.043]	–0.000	.998	[–0.188, 0.188]	0.034	.793	[–0.223, 0.292]	0.113	.271	[–0.089, 0.314]	–0.084	.328	[–0.252, 0.085]
Education level																		
High school (ref.)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
BSc	–0.064	.491	[–0.245, 0.118]	0.189**	.005	[0.056, 0.322]	–0.076	.263	[–0.209, 0.057]	–0.108	.258	[–0.295, 0.079]	0.056	.489	[–0.104, 0.216]	0.151*	.031	[0.014, 0.288]
Master	–0.221	.135	[–0.512, 0.069]	0.239*	.021	[0.036, 0.442]	–0.144	.193	[–0.362, 0.073]	–0.147	.282	[–0.416, 0.121]	0.031	.778	[–0.184, 0.246]	–0.004	.974	[–0.223, 0.216]
Work experience (years)																		
<2 years (ref.)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–

2–5 years	0.226	.113	[–0.053, 0.506]	–0.125	.250	[–0.337, 0.088]	0.319**	.005	[0.095, 0.542]	0.166	.248	[–0.116, 0.449]	0.133	.305	[–0.121, 0.387]	–0.008	.947	[–0.256, 0.240]
6–10 years	0.103	.622	[–0.308, 0.515]	–0.144	.280	[–0.406, 0.118]	0.440**	.002	[0.169, 0.711]	0.380*	.046	[0.007, 0.753]	0.189	.232	[–0.122, 0.499]	0.023	.882	[–0.285, 0.331]
11–15 years	–0.048	.829	[–0.485, 0.389]	–0.296	.059	[–0.603, 0.011]	0.465**	.005	[0.139, 0.790]	0.252	.237	[–0.166, 0.670]	0.032	.862	[–0.328, 0.392]	0.135	.409	[–0.186, 0.455]
16–20 years	0.006	.978	[–0.427, 0.439]	–0.251	.129	[–0.576, 0.073]	0.342	.052	[–0.002, 0.687]	0.375	.117	[–0.094, 0.844]	0.177	.400	[–0.236, 0.590]	0.043	.806	[–0.299, 0.384]
>20 years	–0.112	.634	[–0.574, 0.350]	–0.189	.264	[–0.523, 0.144]	0.271	.142	[–0.092, 0.634]	0.446	.055	[–0.010, 0.902]	0.383	.064	[–0.022, 0.787]	0.100	.600	[–0.273, 0.472]
Workload 0–5 (ref.)	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
5–10	–0.382	.233	[–1.012, 0.248]	0.068	.748	[–0.350, 0.487]	–0.352*	.023	[–0.655, –0.049]	0.213	.612	[–0.612, 1.038]	–0.476	.196	[–1.198, 0.246]	–0.071	.718	[–0.458, 0.316]
11–19	–0.663*	.038	[–1.290, –0.035]	0.122	.569	[–0.299, 0.542]	–0.391*	.023	[–0.727, –0.055]	–0.123	.766	[–0.940, 0.693]	–0.609	.097	[–1.328, 0.110]	0.161	.426	[–0.236, 0.557]
20–29	–0.538	.083	[–1.146, 0.071]	0.053	.798	[–0.356, 0.462]	–0.374*	.013	[–0.669, –0.079]	0.033	.935	[–0.764, 0.831]	–0.468	.193	[–1.175, 0.239]	0.042	.825	[–0.328, 0.412]
30–39	–0.357	.251	[–0.968, 0.254]	0.035	.870	[–0.392, 0.462]	–0.418**	.007	[–0.718, –0.117]	0.084	.838	[–0.726, 0.895]	–0.301	.413	[–1.024, 0.422]	0.048	.794	[–0.315, 0.412]
≥40	–0.387	.211	[–0.994, 0.220]	0.057	.790	[–0.366, 0.480]	–0.362*	.016	[–0.656, –0.067]	0.106	.798	[–0.705, 0.917]	–0.717	.053	[–1.443, 0.010]	0.093	.621	[–0.277, 0.464]

Constant	2.698***	<.001	[1.905, 3.492]	3.291***	<.001	[2.839, 3.744]	2.528***	<.001	[2.054, 3.003]	2.002***	<.001	[1.126, 2.878]	2.300***	<.001	[1.483, 3.118]	3.129***	<.001	[2.651, 3.606]

JP = Job Performance
KMI IT = Information Technology Infrastructure
KMP = Knowledge Management Process
MC = Managerial Competence
PHC = Primary Health Care
B = Unstandardized regression coefficient
p = Significance level
CI = Confidence Interval
R^2 = Coefficient of determination
N = Sample size
Ref. = Reference category
**p < .05, ** p < .01, *** p < .001*

Table 0.13: JP of Nurse Managers regressed by moderation terms of KMP x Care level, and KMI and Care level, differences between care level (N = 135, R^2 = .448)

Predictor		B	p	95% CI
KMP x Care level				
	KMP × PHC	–0.313*	.023	[–0.582, –0.044]
	KMP × SHC	0.361*	.017	[0.066, 0.656]
	KMP × THC	0.356*	.013	[0.077, 0.635]
KMI x Care level				
	KMI × PHC	0.213	.055	[–0.005, 0.431]
	KMI × SHC	–0.010	.951	[–0.337, 0.317]
	KMI × THC	–0.149	.247	[–0.402, 0.105]
MC		0.084**	.007	[0.024, 0.144]
Gender				
Female ®		1	1	1
Male		0.049	.524	[–0.103, 0.202]
Age of nursing personnel				
22–29 ®		1	1	1
30–39		0.142	.166	[–0.060, 0.345]
40–49		0.308*	.012	[0.069, 0.547]
50–59		0.188	.186	[–0.092, 0.468]
Ethnicity				
Albanian ®		1	1	1
Other		0.291*	.014	[0.060, 0.523]
Works in private sector				
No ®		1	1	1
Yes		0.113	.194	[–0.059, 0.286]
Education level				
High school ®		1	1	1
BSc		–0.036	.745	[–0.254, 0.182]
Master		–0.048	.693	[–0.288, 0.192]
PhD		–0.806**	.005	[–1.364, –0.248]
Work experience (years)				
<2 years ®		1	1	1
2–5 years		–0.567**	.001	[–0.896, –0.237]
6–10 years		–0.461**	.002	[–0.751, –0.171]
11–15 years		–0.660***	.000	[–0.996, –0.324]
16–20 years		–0.598***	.000	[–0.901, –0.296]
Workload				
0–4 ®		1	1	1
5–10		–0.248	.149	[–0.586, 0.090]
11–19		–0.147	.346	[–0.454, 0.161]
20–29		–0.533	.235	[–1.417, 0.351]
30–39		–0.259	.186	[–0.644, 0.127]
≥40		–0.136	.461	[–0.501, 0.229]
Constant		3.860***	.000	[2.690, 5.030]

** p < .05, ** p < .01, *** p < .001*

B = Unstandardized regression coefficient;

p = Significance level;

CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size
KMP = Knowledge Management Process
KMI = Knowledge Management Infrastructure
PHC = Primary Health Care
SHC = Secondary Health Care
THC = Tertiary Health Care

Table 0.14: JP of Nurses regressed by the moderation term of KMP x MC, care-level–specific effects (lincom results)

Predictor	PHC (N=330, R^2=.283)			SHC (N=276, R^2=.484)			THC (N=246, R^2=.213)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMP × MC	0.012	.322	[−0.012, 0.036]	−0.014	.389	[−0.045, 0.018]	0.027*	.023	[0.004, 0.050]
KMP	−0.141	.167	[−0.342, 0.059]	0.192	.165	[−0.080, 0.465]	−0.185	.052	[−0.372, 0.001]
MC	0.005	.907	[−0.079, 0.089]	0.120	.063	[−0.007, 0.246]	−0.034	.420	[−0.116, 0.049]
KMI	0.277***	.000	[0.165, 0.389]	0.207***	.000	[0.106, 0.308]	0.060	.136	[−0.019, 0.139]
Gender									
Female ®	1	1	1	1	1	1	1	1	1
Male	0.001	.981	[−0.077, 0.079]	−0.103*	.043	[−0.204, −0.003]	−0.014	.838	[−0.149, 0.121]
Age (®22–29)									
30–39	−0.003	.967	[−0.145, 0.139]	−0.027	.721	[−0.178, 0.123]	0.098	.460	[−0.162, 0.358]
40–49	−0.010	.910	[−0.180, 0.160]	−0.002	.983	[−0.196, 0.192]	0.237	.096	[−0.042, 0.515]
50–59	0.069	.508	[−0.135, 0.272]	−0.025	.843	[−0.269, 0.219]	0.172	.253	[−0.123, 0.466]
60–65	−0.049	.695	[−0.295, 0.196]	−0.010	.946	[−0.286, 0.267]	0.433**	.007	[0.117, 0.748]
Ethnicity (®Albanian)	1	1	1	1	1	1	1	1	1
Serb	0.304*	.014	[0.062, 0.546]	−0.053	.528	[−0.219, 0.113]	—	—	—
Bosnian	−0.151*	.018	[−0.277, −0.026]	0.171	.531	[−0.366, 0.708]	—	—	—
Croatian	—	—	—	—	—	—	—	—	—
Turkish	—	—	—	—	—	—	—	—	—
Roma	0.225	.051	[−0.001, 0.451]	−0.197	.144	[−0.460, 0.067]	—	—	—
Other	—	—	—	—	—	—	0.303	.131	[−0.091, 0.696]
—	—	—	—	—	—	—	0.182	.188	[−0.090, 0.454]
Works in private sector									
No ®	1	1	1	1	1	1	1	1	1

Yes	−0.000	.999	[−0.116, 0.116]	0.175*	.048	[0.002, 0.348]	−0.068	.454	[−0.245, 0.110]
Education (®High school)									
BSc	0.039	.393	[−0.051, 0.128]	0.165***	.000	[0.073, 0.256]	0.053	.344	[−0.057, 0.164]
Master	−0.035	.617	[−0.172, 0.102]	0.059	.498	[−0.112, 0.230]	0.021	.792	[−0.134, 0.176]
PhD	1	1	1	1	1	1	1	1	1
Work experience (® <2 yrs)									
2–5 yrs	0.102	.197	[−0.053, 0.258]	0.113	.154	[−0.043, 0.269]	−0.004	.963	[−0.191, 0.183]
6–10 yrs	0.139	.173	[−0.061, 0.338]	0.256*	.017	[0.046, 0.466]	−0.167	.224	[−0.437, 0.103]
11–15 yrs	0.082	.471	[−0.142, 0.306]	0.131	.289	[−0.112, 0.374]	−0.161	.239	[−0.431, 0.108]
16–20 yrs	0.104	.379	[−0.128, 0.335]	0.151	.307	[−0.139, 0.440]	−0.181	.222	[−0.472, 0.110]
>20 yrs	0.140	.227	[−0.088, 0.369]	0.238	.083	[−0.031, 0.506]	−0.307*	.029	[−0.583, −0.032]
Workload (0-5) ®	1	1	1	1	1	1	1	1	1
5–10	−0.141	.454	[−0.512, 0.230]	0.073	.343	[−0.079, 0.225]	−0.010	.918	[−0.210, 0.189]
11–19	−0.210	.270	[−0.585, 0.165]	0.036	.658	[−0.123, 0.195]	0.090	.360	[−0.103, 0.282]
20–29	−0.170	.352	[−0.530, 0.189]	0.082	.266	[−0.063, 0.228]	0.108	.287	[−0.091, 0.307]
30–39	−0.105	.568	[−0.466, 0.256]	0.105	.215	[−0.061, 0.272]	0.234*	.026	[0.028, 0.439]
≥40	−0.161	.385	[−0.524, 0.203]	−0.022	.861	[−0.270, 0.226]	0.056	.580	[−0.144, 0.257]
Constant	2.802***	.000	[2.037, 3.567]	1.272**	.010	[0.309, 2.235]	3.594***	.000	[2.910, 4.278]

JP = Job Performance
KMP = Knowledge Management Process
KMI = Knowledge Management Infrastructure
MC = Managerial Competence

PHC = Primary Health Care
SHC = Secondary Health Care
THC = Tertiary Health Care
® = Reference category
*p < .05, ** p < .01, *** p < .001*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size

Table 0.15: JP of Nurses regressed by the moderation term of KMI x MC x Care Level

Predictor	PHC (N = 330, R^2 = .286)			SHC (N = 276, R^2 = .485)			THC (N = 246, R^2 = .206)		
	B	p	95% CI	B	p	95% CI	B	p	95% CI
KMI x MC	−0.026	.144	[−0.062, 0.009]	−0.026	.289	[−0.075, 0.022]	0.026	.147	[−0.009, 0.061]
KMI (Infrastructure)	0.482***	.000	[0.216, 0.749]	0.420*	.046	[0.008, 0.832]	−0.145	.334	[−0.438, 0.149]
MC	0.138	.053	[−0.002, 0.279]	0.168	.086	[−0.024, 0.360]	−0.039	.509	[−0.157, 0.078]
KMP (Process)	−0.044	.099	[−0.096, 0.008]	0.082*	.015	[0.016, 0.149]	0.026	.406	[−0.036, 0.089]
Gender									
Female ®	1	1	1	1	1	1	1	1	1
Male	−0.000	.993	[−0.078, 0.077]	−0.099	.054	[−0.199, 0.002]	−0.021	.756	[−0.156, 0.113]
Age of nursing personnel									
22–29 ®	1	1	1	1	1	1	1	1	1
30–39	0.001	.984	[−0.139, 0.142]	−0.033	.667	[−0.182, 0.117]	0.094	.473	[−0.164, 0.352]
40–49	−0.016	.856	[−0.189, 0.157]	−0.009	.927	[−0.200, 0.182]	0.232	.101	[−0.046, 0.510]
50–59	0.058	.587	[−0.151, 0.266]	−0.029	.814	[−0.270, 0.213]	0.159	.286	[−0.134, 0.451]
60–65	−0.047	.708	[−0.293, 0.199]	−0.014	.920	[−0.288, 0.260]	0.426**	.008	[0.110, 0.741]
Ethnicity									
Albanian ®	1	1	1	1	1	1	1	1	1
Serb	0.288**	.011	[0.066, 0.511]	−0.060	.481	[−0.226, 0.107]	—	—	—
Bosnian	−0.164**	.011	[−0.289, −0.038]	0.194	.480	[−0.347, 0.735]	—	—	—
Roma	0.223*	.044	[0.006, 0.439]	−0.215	.113	[−0.482, 0.051]	0.302	.131	[−0.091, 0.695]
Other	1	1	1	1	1	1	1	1	1
Works in private sector									
No ®	1	1	1	1	1	1	1	1	1
Yes	0.012	.841	[−0.107, 0.132]	0.177*	.048	[0.002, 0.353]	−0.072	.410	[−0.245, 0.100]
Education level									
High school ®	1	1	1	1	1	1	1	1	1
BSc	0.041	.368	[−0.049, 0.131]	0.163***	.001	[0.071, 0.255]	0.054	.334	[−0.056, 0.165]

Master	−0.029	.682	[−0.168, 0.110]	0.054	.534	[−0.116, 0.224]	0.022	.785	[−0.135, 0.178]
Work experience (years)									
<2 yrs ®	1	1	1	1	1	1	1	1	1
2–5 yrs	0.111	.157	[−0.043, 0.264]	0.117	.145	[−0.041, 0.274]	−0.006	.952	[−0.196, 0.184]
6–10 yrs	0.142	.160	[−0.056, 0.341]	0.262*	.014	[0.053, 0.470]	−0.174	.204	[−0.442, 0.095]
11–15 yrs	0.086	.450	[−0.137, 0.308]	0.143	.244	[−0.098, 0.383]	−0.161	.242	[−0.432, 0.110]
16–20 yrs	0.119	.314	[−0.113, 0.350]	0.154	.297	[−0.136, 0.443]	−0.185	.213	[−0.476, 0.106]
>20 yrs	0.151	.197	[−0.079, 0.381]	0.243	.073	[−0.023, 0.509]	−0.298*	.035	[−0.576, −0.021]
Workload									
0–5 ®	1	1	1	1	1	1	1	1	1
5–10	−0.175	.364	[−0.554, 0.204]	0.069	.385	[−0.087, 0.224]	−0.006	.948	[−0.198, 0.185]
11–19	−0.243	.213	[−0.625, 0.140]	0.031	.711	[−0.133, 0.195]	0.114	.230	[−0.073, 0.301]
20–29	−0.200	.285	[−0.567, 0.167]	0.077	.313	[−0.073, 0.227]	0.129	.182	[−0.061, 0.320]
30–39	−0.131	.486	[−0.502, 0.239]	0.102	.236	[−0.067, 0.272]	0.244*	.017	[0.044, 0.443]
≥40	−0.198	.293	[−0.569, 0.172]	−0.026	.838	[−0.277, 0.224]	0.065	.507	[−0.129, 0.259]
Constant	1.781**	.002	[0.678, 2.885]	0.884	.240	[−0.595, 2.364]	3.629***	.000	[2.682, 4.577]

JP = Job Performance
KMP = Knowledge Management Process
KMI = Knowledge Management Infrastructure
MC = Managerial Competence
PHC = Primary Health Care
SHC = Secondary Health Care
THC = Tertiary Health Care
*p < .05, ** p < .01, *** p < .001*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size

Table 0.16: Job Performance of Nurse Managers regressed by the moderation term of KMP and MC, pooled effects (N = 135, R^2 = .547)

Predictor	B	p	95% CI
KMP	−0.853	.489	[−3.290, 1.584]
Care Level × KMP (ref: PHC)			
SHC	1.590	.207	[−0.891, 4.071]
THC	1.748	.182	[−0.829, 4.326]
KMP × MC	0.069	.626	[−0.211, 0.350]
Care Level × MC (ref: PHC)			
SHC	0.515	.267	[−0.400, 1.430]
THC	0.557	.252	[−0.402, 1.517]
Triple Interaction (KMP × MC × Care Level, ref: PHC)			
SHC	−0.150	.301	[−0.435, 0.136]
THC	−0.169	.262	[−0.467, 0.129]
KMI	0.071	.182	[−0.034, 0.175]
MC	−0.128	.779	[−1.030, 0.774]
Gender			
Female ®			
Male	0.043	.596	[−0.117, 0.202]
Age of nursing personnel			
22–29 ®	—	—	—
30–39	0.183	.093	[−0.031, 0.397]
40–49	0.311*	.011	[0.072, 0.551]
50–59	0.245	.115	[−0.060, 0.550]
Ethnicity			
Albanian ®	—	—	—
Other	0.246*	.024	[0.033, 0.459]
Works in private sector			
No ®	—	—	—
Yes	0.124	.206	[−0.069, 0.318]
Education level			
High school ®	—	—	—
BSc	0.024	.820	[−0.186, 0.235]
Master	0.004	.974	[−0.225, 0.232]
PhD	−0.983**	.001	[−1.555, −0.411]
Work experience (years)			
<2 ®	—	—	—
6–10	−0.591***	<.001	[−0.884, −0.298]
11–15	−0.457***	<.001	[−0.681, −0.233]
16–20	−0.657***	<.001	[−0.953, −0.361]
>20	−0.594***	<.001	[−0.830, −0.358]
Workload			
0–5 ®	—	—	—
5–10	−0.291	.084	[−0.622, 0.040]
11–19	−0.176	.253	[−0.481, 0.128]
20–29	−0.520	.062	[−1.065, 0.026]
30–39	−0.287	.140	[−0.669, 0.096]
≥40	−0.179	.306	[−0.526, 0.167]
Constant	5.985	.127	[−1.722, 13.692]

JP = Job Performance
KMP = Knowledge Management Process
KMI = Knowledge Management Infrastructure
MC = Managerial Competence
PHC = Primary Health Care
SHC = Secondary Health Care
THC = Tertiary Health Care
BSc = Bachelor of Science
PhD = Doctor of Philosophy
® = Reference category
*p < .05, ** p < .01, *** p < .001*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size

Table 0.17: Job Performance of Nurse Managers regressed by the moderation term of KMI and MC (N = 135, R^2 = .5113)

Predictor	B	p	95% CI
KMI x Care level			
PHC®:	1.845 **	.005	[0.575, 3.115]
SHC	–0.680	.406	[–2.296, 0.936]
THC	–1.022	.194	[–2.572, 0.528]
KMI × MC x Care level (*within)*			
PHC®:	–0.2009 *	.014	[–0.3599, –0.0418]
SHC	–0.3900	.333	[–1.226, 0.446]
THC	–0.528	.118	[–1.200, 0.144]
Triple interaction (KMI × MC × Care level) (across)			
PHC®:	–0.2009 *	.014	[–0.3599, –0.0418]
SHC	0.0806	.419	[–0.116, 0.278]
THC	0.1130	.234	[–0.074, 0.300]
KMP	0.006	.897	[–0.087, 0.099]
Managerial Competence of Nurse Managers (main effect)	0.723 **	.008	[0.196, 1.250]
Gender			
Female	–0.043	.893	[–0.669, 0.583]
Male ®	—	—	—
Age of nursing personnel			
22–29 ®	—	—	—
30–39	0.126	.221	[–0.077, 0.330]
40–49	0.270 *	.027	[0.032, 0.509]
50–59	0.163	.252	[–0.117, 0.443]
60–65	n.a.	—	—
Ethnicity			
Albanian ®	0.291 *	.013	[0.063, 0.518]
Other	—	—	—
Works in private sector			
No ®	0.117	.273	[–0.094, 0.328]
Yes	—	—	—
Education level			
High school ®	0.005	.962	[–0.190, 0.200]
BSc	–0.025	.826	[–0.250, 0.200]
Master	–0.936 **	.008	[–1.623, –0.249]
PhD	—	—	—
Work experience (years)			

<2 ®	–0.608*	<.001	[–0.931, –0.285]
2–5	–0.497*	<.001	[–0.754, –0.239]
6–10	–0.652*	<.001	[–0.965, –0.339]
11–15	–0.585*	<.001	[–0.859, –0.311]
16–20	—	—	—
>20	n.a.	—	—
Workload			
0–5 ®	–0.310	.049	[–0.619, –0.001]
5–10	–0.214	.112	[–0.477, 0.050]
11–19	–0.496	.061	[–1.015, 0.023]
20–29	–0.271	.140	[–0.632, 0.091]
30–39	–0.229	.162	[–0.552, 0.094]
≥40	—	—	—
Constant	–2.297	.277	[–6.468, 1.875]

JP = Job Performance
KMP = Knowledge Management Process
KMI = Knowledge Management Infrastructure
MC = Managerial Competence
PHC = Primary Health Care
SHC = Secondary Health Care
THC = Tertiary Health Care
BSc = Bachelor of Science
PhD = Doctor of Philosophy
® = Reference category
*p < .05, ** p < .01, *** p < .001*
B = Unstandardized regression coefficient;
p = Significance level;
CI = Confidence Interval;
R^2 = Coefficient of determination;
N = Sample size

Table 0.18: Internal Consistency (Cronbach's α) of All Study Scales and Subscales

Instrument / Subscale	Items (n)	Average Inter-Item Covariance	Cronbach's α
JP			
Task Performance	4	0.462	0.6946
Organizational Skills	5	0.492	0.6854
Contextual Performance	5	0.271	0.5599
Cooperation	3	0.126	0.2399
Conscientiousness	5	0.384	0.6050
Interpersonal Skills	4	0.264	0.4796
Overall JPN	26	0.292	0.8679
MC			
Communication	5	2.521	0.8765
Leadership	6	2.972	0.9223
Staff Management	8	2.222	0.9163
Financial Management	9	3.402	0.9440
Planning	6	2.720	0.8736
Problem Solving	6	2.408	0.8970
Overall MC	40	2.252	0.9754
KMP			
KMP Overall	5	0.690	0.8757
KMI			
Structure	3	0.599	0.7997
Shared Knowledge	13	0.646	0.9489
Physical Environment	2	0.370	0.5654
IT Infrastructure	18	0.555	0.9421
Organizational Culture	10	0.539	0.9124
Social Infrastructure	26	0.570	0.9665
Technical Infrastructure	14	0.651	0.9453
Overall KMI	47	0.551	0.9790

JP = Job Performance
JPN = Overall Job Performance of Nurses
MC = Managerial Competence
KMP = Knowledge Management Process
KMI = Knowledge Management Infrastructure
α = Cronbach's alpha (internal consistency coefficient)

Table 0.19: Target population: nursing staff employed in public healthcare organizations in Kosovo, in 2021 [199]

Organization	Levels of Healthcare	Municipality	Nursing Director	Head Nurse	Nurse	Total
MFMC	PHC	Ferizaj	-	5.00	246.00	251.00
MFMC	PHC	Gjakova	-	8.00	224.00	232.00
MFMC	PHC	Gjilan	-	3.00	183.00	186.00
MFMC	PHC	Klina	-	3.00	102.00	105.00
MFMC	PHC	Mitrovica	-	5.00	188.00	193.00
MFMC	PHC	Peja	-	5.00	220.00	225.00
MFMC	PHC	Pristina	-	13.00	581.00	594.00
MFMC	PHC	Prizren	-	5.00	321.00	326.00
MFMC	PHC	Vushtrri	-	3.00	150.00	153.00
MFMC	PHC	Deçan	-	3.00	86.00	89.00
MFMC	PHC	Dragash	-	3.00	74.00	77.00
MFMC	PHC	Drenas	-	3.00	127.00	130.00
MFMC	PHC	Fushë Kosovë	-	3.00	72.00	75.00
MFMC	PHC	Glogovac	-	3.00	120.00	123.00
MFMC	PHC	Gračanica	-	-	-	-
MFMC	PHC	Hani i Elezit	-	3.00	23.00	26.00
MFMC	PHC	Istog	-	3.00	85.00	88.00
MFMC	PHC	Junik	-	3.00	28.00	31.00
MFMC	PHC	Kaçanik	-	3.00	79.00	82.00
MFMC	PHC	Kamenica	-	3.00	118.00	121.00
MFMC	PHC	Kllokot	-	-	-	-
MFMC	PHC	Leposaviq	-	-	-	-
MFMC	PHC	Lipjan	-	3.00	170.00	173.00

MFMC	PHC	Malisheva	-	3.00	90.00	93.00
MFMC	PHC	Mamushë	-	3.00	24.00	27.00
MFMC	PHC	North Mitrovica	-	3.00	29.00	32.00
MFMC	PHC	Novo Brdo	-	3.00	35.00	38.00
MFMC	PHC	Obiliq	-	3.00	72.00	75.00
MFMC	PHC	Parteš	-	-	-	-
MFMC	PHC	Podujeva	-	3.00	183.00	186.00
MFMC	PHC	Rahovec	-	3.00	86.00	89.00
MFMC	PHC	Ranillug	-	-	-	-
MFMC	PHC	Štrpce	-	-	-	-
MFMC	PHC	Shtime	-	3.00	62.00	65.00
MFMC	PHC	Skenderaj	-	3.00	138.00	141.00
MFMC	PHC	Suhareka	-	3.00	115.00	118.00
MFMC	PHC	Viti	-	3.00	109.00	112.00
MFMC	PHC	Zubin Potok	-	-	-	-
MFMC	PHC	Zvečan	-	-	-	-
Emergency Medical Center	PHC	Prishtine	-	1.00	62.00	63.00
Regional Hospital	SHC	Ferizaj	1.00	25.00	141.00	167.00
Regional Hospital	SHC	Gjilan	1.00	25.00	309.00	335.00
Regional Hospital	SHC	Peja	1.00	20.00	254.00	275.00
Regional Hospital	SHC	Mitrovica	1.00	15.00	226.00	242.00
Regional Hospital	SHC	Prizren	1.00	25.00	398.00	424.00
Regional Hospital	SHC	Vushtrri	1.00	13.00	90.00	104.00
Regional Hospital	SHC	Gjakova	1.00	26.00	336.00	363.00
Obstetrics and Gynecology Clinic	THC	Pristina	1.00	6.00	148.00	155.00
Dermatovenerology Clinic	THC	Pristina	1.00	1.00	5.00	7.00
Abdominal Surgery	THC	Pristina	1.00	6.00	46.00	53.00
Maxillofacial Surgery Clinic	THC	Pristina	1.00	6.00	13.00	20.00
Orthopedics and Traumatology Clinic	THC	Pristina	1.00	6.00	37.00	44.00

Thoracic Surgery Clinic	THC	Pristina	1.00	6.00	14.00	7.00
Gastroenterology Clinic	THC	Pristina	1.00	6.00	5.00	12.00
Hematology Clinic	THC	Pristina	1.00	6.00	7.00	14.00
Neonatology Clinic	THC	Pristina	1.00	6.00	61.00	68.00
Infectious Diseases Clinic	THC	Pristina	1.00	6.00	47.00	54.00
Eye Clinic (Ophthalmology)	THC	Pristina	1.00	6.00	38.00	45.00
Nephrology Surgery	THC	Pristina	1.00	6.00	8.00	15.00
Pulmonology Clinic	THC	Pristina	1.00	6.00	15.00	22.00
Cardiology Clinic	THC	Pristina	1.00	6.00	34.00	41.00
Pediatrics Clinic	THC	Pristina	1.00	6.00	103.00	110.00
Endocrinology Clinic	THC	Pristina	1.00	6.00	10.00	17.00
Anesthesiology and Reanimation Clinic	THC	Pristina	1.00	6.00	92.00	99.00
ENT Clinic (Otorhinolaryngology)	THC	Pristina	1.00	6.00	19.00	26.00
Neurology Clinic	THC	Pristina	1.00	6.00	35.00	42.00
Physical Medicine & Rehabilitation Clinic (Physiatry)	THC	Pristina	1.00	6.00	14.00	21.00
Plastic Surgery Clinic	THC	Pristina	1.00	6.00	22.00	29.00
Neurosurgery Clinic	THC	Pristina	1.00	6.00	24.00	31.00
Urology Clinic	THC	Pristina	1.00	6.00	11.00	18.00
Oncology Clinic	THC	Pristina	1.00	6.00	34.00	41.00
Cardiac Surgery Clinic	THC	Pristina	1.00	6.00	40.00	47.00
Psychiatry Clinic	THC	Pristina	1.00	6.00	28.00	35.00
Rheumatology Clinic	THC	Pristina	1.00	6.00	5.00	12.00
Pediatric Surgery Clinic	THC	Pristina	1.00	6.00	15.00	22.00
Vascular Surgery Clinic	THC	Pristina	1.00	6.00	10.00	17.00
Forensics	THC	Pristina	1.00	6.00	27.00	34.00
Emergency Clinic	THC	Pristina	-	5.00	25.00	30.00
(UCCK) Stomatology (Dentistry)	THC	Pristina	1.00	1.00	64.00	66.00
(NCT – National Center for Transfusion) Blood Transfusion Service	THC	Pristina	1.00	1.00	82.00	84.00
Sports Medicine	THC	Pristina			-	-
Forensic Medicine	THC	Pristina			-	-
(IMP – Occupational Medicine Institute)	THC	Pristina	1.00	1.00	20.00	22.00

Occupational Health Institute						
NIPH – National Institute of Public Health	THC	Pristina	1.00	1.00	43.00	45.00
Under NIPH – Regional Public Health Centers (RPHC)	THC	Pristina	1.00	5.00	73.00	79.00
CMHC – Central Medicine Health Centers	THC	Pristina	1.00	1.00	136.00	138.00
Prison Healthcare Department	THC	Pristina	1.00	1.00	78.00	80.00
TOTAL THC			44.00	457.00	7,444.00	7,931.00

PHC = Primary Health Care
SHC = Secondary Health Care
THC = Tertiary Health Care
UCCK = University Clinical Centre of Kosovo
NCT = National Center for Transfusion
IMP = Occupational Health Institute (Institute of Occupational Medicine)
NIPH = National Institute of Public Health
RPHC = Regional Public Health Center
MFMC = Main Family Medicine Center
N = Number of nursing staff

Table 0.20: Full Sample Summary (Anonymized)

Municipality	Organization	Number of nursing staff surveyed				
		Levels of Healthcare	Nursing Director	Head Nurse	Nurse	Total
Ferizaj	MFMC	PHC	0	5	31	36
Gjakova	MFMC	PHC	0	5	16	21
Gjilan	MFMC	PHC	0	<3	<183	8
Klina	MFMC	PHC	0	2	2	4
Mitrovica	MFMC	PHC	0	2	16	18
Peja	MFMC	PHC	0	0	8	8
Pristina	MFMC	PHC	0	4	59	63
Prizren	MFMC	PHC	0	3	23	26
Vushtrri	MFMC	PHC	0	0	10	10
Deçan	MFMC	PHC	0	0	7	7
Dragash	MFMC	PHC	0	0	5	5
Drenas	MFMC	PHC	0	0	20	20
Fushë Kosovë	MFMC	PHC	0	0	9	9
Glogovac	MFMC	PHC	0	0	3	3
Gračanica	MFMC	PHC	0	0	0	0
Hani i Elezit	MFMC	PHC	0	0	3	3
Istog	MFMC	PHC	0	0	8	8

Junik	MFMC	PHC	0	0	0	0
Kaçanik	MFMC	PHC	0	0	0	0
Kamenica	MFMC	PHC	0	0	0	0
Kllokot	MFMC	PHC	0	0	0	0
Leposaviq	MFMC	PHC	0	0	0	0
Lipjan	MFMC	PHC	0	0	11	11
Malisheva	MFMC	PHC	0	0	7	7
Mamushë	MFMC	PHC	0	0	8	8
North Mitrovica	MFMC	PHC	0	0	0	0
Novo Brdo	MFMC	PHC	0	0	0	0
Obiliq	MFMC	PHC	0	0	12	12
Parteš	MFMC	PHC	0	0	0	0
Podujeva	MFMC	PHC	0	0	10	10
Rahovec	MFMC	PHC	0	0	9	9
Ranillug	MFMC	PHC	0	0	0	0
Štrpce	MFMC	PHC	0	0	0	0
Shtime	MFMC	PHC	0	0	18	18
Skenderaj	MFMC	PHC	0	0	12	12

Suhareka	MFMC	PHC	0	0	0	0
Viti	MFMC	PHC	0	0	9	9
Zubin Potok	MFMC	PHC	0	0	0	0
Zvečan	MFMC	PHC	0	0	0	0
Prishtine	Emergency Medical Center	PHC	0	<3	<62	8
Ferizaj	Regional Hospital	SHC	<3	< 25.00	< 141.00	37
Gjilan	Regional Hospital	SHC	<3	< 25.00	< 309.00	52
Peja	Regional Hospital	SHC	<3	< 20.00	< 254.00	43
Mitrovica	Regional Hospital	SHC	<3	< 15.00	< 226.00	37
Prizren	Regional Hospital	SHC	<3	< 25.00	< 398.00	65
Vushtrri	Regional Hospital	SHC	<3	< 13.00	< 90.00	29
Gjakova	Regional Hospital	SHC	<3	< 26.00	< 336.00	57
Pristina	Obstetrics and Gynecology Clinic	THC	<3	<6	<148	36
Pristina	Dermatovenerology Clinic	THC	<3	<3	<5	1
Pristina	Abdominal Surgery	THC	<3	2	2	4
Pristina	Maxillofacial Surgery Clinic	THC	<3	<6	<13	3
Pristina	Orthopedics and Traumatology Clinic	THC	<3	<=6	<37	10
Pristina	Thoracic Surgery Clinic	THC	<3	3	4	7
Pristina	Gastroenterology Clinic	THC	<3	<6	10	12
Pristina	Hematology Clinic	THC	<3	<6	<7	2
Pristina	Neonatology Clinic	THC	<3	<6	<61	2
Pristina	Infectious Diseases Clinic	THC	<3	<6	<47	21
Pristina	Eye Clinic (Ophthalmology)	THC	<3	0	0	0

Pristina	Nephrology Surgery	THC	<3	<6	<8	12
Pristina	Pulmonology Clinic	THC	<3	<6	<15	14
Pristina	Cardiology Clinic	THC	<3	<6	<34	6
Pristina	Pediatrics Clinic	THC	<3	<6	<103	21
Pristina	Endocrinology Clinic	THC	<3	<6	<10	23
Pristina	Anesthesiology and Reanimation Clinic	THC	<3	<=6	<92	10
Pristina	ENT Clinic (Otorhinolaryngology)	THC	<3	2	2	4
Pristina	Neurology Clinic	THC	<3	<6	<35	12
Pristina	Physical Medicine & Rehabilitation Clinic (Physiatry)	THC	<3	<6	<14	1
Pristina	Plastic Surgery Clinic	THC	<3	<6	<22	4
Pristina	Neurosurgery Clinic	THC	<3	0	0	0
Pristina	Urology Clinic	THC	<3	<6	<11	14
Pristina	Oncology Clinic	THC	<3	0	5	5
Pristina	Cardiac Surgery Clinic	THC	<3	<6	<40	36
Pristina	Psychiatry Clinic	THC	<3	<6	4	6
Pristina	Rheumatology Clinic	THC	<3	0	0	0
Pristina	Pediatric Surgery Clinic	THC	<3	0	0	0
Pristina	Vascular Surgery Clinic	THC	<3	<6	<10	3
Pristina	Forensics	THC	<3	2	7	9
Pristina	Emergency Clinic	THC	<3	<5	<25	15
Pristina	(UCCK) Stomatology (Dentistry)	THC	<3	<3	<64	2
Pristina	(NCT – National Center for Transfusion) Blood Transfusion Service	THC	<3	<3	<82	18
Pristina	Sports Medicine	THC		0	0	0
Pristina	Forensic Medicine	THC		0	0	0
Pristina	(IMP – Occupational Medicine Institute) Occupational Health Institute	THC	<3	0	0	0
Pristina	NIPH – National Institute of Public Health	THC	<3	0	0	0

Pristina	Under NIPH – Regional Public Health Centers (RPHC)	THC	<3	0	0	0
Pristina	CMHC – Community-Based Mental Health Centers	THC	<3	0	0	0
Pristina	Prison Healthcare Department	THC	<3	<3	<78	1
					Total	987

PHC = Primary Health Care
SHC = Secondary Health Care
THC = Tertiary Health Care
UCCK = University Clinical Centre of Kosovo
NCT = National Center for Transfusion
IMP = Occupational Health Institute (Institute of Occupational Medicine)
NIPH = National Institute of Public Health
RPHC = Regional Public Health Center
MFMC = Main Family Medicine Center
N = Number of nursing staff surveyed