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Assessing The Impact of Staffing Ratios on Patient Outcomes and Hospital Performance In 69 Airborne Force Hospital, Tamale

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Abstract

Background / Objective

This study investigates the influence of staffing ratios on patient outcomes and hospital performance at 69 Airborne Force Hospital (69 ABF-Hospital), Tamale. In the context of HR 5.0 — which emphasizes human-centric, data-driven workforce strategies — the research aims to understand how workforce allocation affects care quality, operational efficiency, and employee well-being in a clinical setting.

Methods

A mixed-method design was used. Quantitative data from hospital records over a 12-month period were analyzed, including patient recovery rates, readmission frequencies, mortality trends, hospital bed

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occupancy, staff workload, and patient satisfaction. Nurse-to-patient and doctor-to-patient ratios in different units were correlated with clinical and operational outcomes. Additionally, qualitative interviews with healthcare staff captured their perceptions of staffing adequacy, workload stress, burnout, and overall service quality.

Results

Units that maintained recommended staffing ratios (nurse-to-patient and doctor-to-patient) exhibited a 15% reduction in readmission rates and a 12% increase in patient satisfaction compared to understaffed units. Understaffed departments reported higher levels of staff turnover and lower perceived quality of care. Understaffing was also associated with reduced hospital efficiency as indicated by increased workload and suboptimal bed-utilization metrics.

Conclusion / Implications

Adequate staffing ratios significantly improve patient outcomes, service quality, and operational efficiency, while understaffing leads to staff burnout and compromised care. In line with the conference theme "HR 5.0: The Human-Centric Future of Work," this study highlights the strategic importance of human-resource planning in healthcare. Data-driven, human-cantered HR policies that support workforce adequacy and employee well-being are essential to build resilient, efficient, and patient-focused healthcare institutions.

Keywords: *staffing ratios; patient outcomes; hospital performance; HR 5.0; human-centric healthcare*

CHAPTER 1:

Introduction

Health-care staffing, particularly nurse to patient and physician to patient ratios play a pivotal role in determining the quality of patient care and overall hospital performance. Adequate staffing is directly linked to improved patient outcomes, reduced mortality, enhanced patient satisfaction and optimal utilization of resources, in contrast under staffing contributes to increased adverse events, longer hospital stays, and decreased job satisfaction among healthcare workers. (Aikens et al., 2002; Needleman et al., 2011).

The significance of this issue is heightened in low- and middle-income countries including Ghana, where health facilities often grapple with staffing shortages, inadequate infrastructure, and limited funding. Despite national policies aimed at improving health worker distribution, the Northern Region including Tamale, continue to face staffing imbalances (Ghana Health Service [GHS], 2022). Military Hospitals like the 69 Airborne Force Hospital (69 ABF, Hospital) serving both civilian and military populations, experience unique workload challenges, including trauma, emergency care, and complex inpatient services. These complexities make staff adequacy even more crucial.

The World Health Organization (WHO) emphasizes that safe staffing levels are essential for achieving Universal Health Coverage and Sustainable Development Goals (WHO). Research has shown that an optimal staff to patient ratio improves clinical outcomes such as reduced hospital- acquired infections, fewer medications errors, and lower readmission rates (Griffith's et.al, 2016).

Moreover, appropriate staffing levels are associated with improved hospital efficiency reduced staff burnout and enhanced patient satisfaction.

However, in Ghana, there is a limited body of empirical evidence assessing the direct impact of staffing ratios on both patient outcomes and institutional performance, particularly within military hospitals. This research seeks to fill that gap by focusing on 69 Airborne Force Hospital in Tamale. The study will provide data-driven insights into

how staffing levels affects healthcare delivery with implications for policy reforms and strategic planning within the Ghanaian healthcare system

Aim And Objectives

AIM

To assess the impact of staffing ratios on patient outcomes and hospital performance at the 69 Airborne Force Hospital, Tamale, Northern Region, Ghana.

Objectives

To evaluate the current staff to patient ratios (nurses, doctors and other allied health professionals) at 69 Airborne Force Hospital.

To examine the relationship between staffing ratios and patient outcomes including morbidity, mortality, length of hospital stays and patient satisfaction

To assess the effect of staffing levels on hospital performance indicators such as service delivery efficiency, staff workload, absenteeism and turnover rates

To identify challenges and limitations associated with achieving optimal staffing ratios in a military hospital context

To propose evidence-based recommendations for improving staffing policies and healthcare quality in the Ghanaian Military Health System

Review of Literature

This chapter provides a comprehensive review of existing literature related to staffing ratios and their implications on patient outcomes and hospital performance. It explores empirical studies, theoretical frameworks, and policy discussions relevant to healthcare staffing, emphasizing both global and local (Ghanaian) contexts. The chapter is organized under thematic areas to provide a clearer understanding of the relationship between staffing levels and various health indicators.

Concept Of Staffing Ratios

Staffing ratios, particularly nurse-to-patient ratios, refer to the number of patients assigned to a nurse or healthcare professional during a given shift (Aiken et al., 2002). Adequate staffing is recognized as a crucial determinant of quality care and hospital performance. Studies have indicated that staffing levels are directly proportional to care outcomes, particularly in acute care settings (Needleman et al., 2011). Poor staffing ratios often result in increased workload, fatigue, and compromised patient safety, whereas adequate staffing enhances patient monitoring, timely interventions, and overall satisfaction (Duffield et al., 2011).

In many developed countries such as the United States and Australia, legislations mandate specific nurse-patient ratios to improve healthcare delivery (McHugh et al., 2016). However, in many developing countries, including Ghana, there is a persistent shortage of health personnel and a lack of standardized staffing policies across healthcare facilities (Agyemang & While, 2010)

Global Evidence on Staffing Ratios

Numerous studies have established a strong link between staffing ratios and patient outcomes. Aiken et al. (2002) found that hospitals with higher nurse workloads had significantly higher patient mortality and nurse burnout.

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Similarly, Needleman et al. (2011) demonstrated that increased nurse staffing was associated with reduced inpatient mortality and improved care quality.

Griffiths et al. (2016) emphasized that staffing levels not only affect clinical outcomes but also influence hospital efficiency and staff well-being. Their review for the National Institute for Health and Care Excellence (NICE) concluded that safe staffing is essential for maintaining high standards of care.

Staffing Ratios and Patient Outcomes

Numerous empirical studies have demonstrated that lower nurse-to-patient ratios are associated with higher mortality, increased infection rates, longer hospital stays, and overall negative patient outcomes. For instance, Aiken et al. (2014) found that each additional patient per nurse was associated with a 7% increase in the likelihood of in-hospital death. In Ghana, similar challenges exist, especially in urban tertiary hospitals where nurses are often overwhelmed due to inadequate staffing (Boateng & Bonsu, 2020).

Moreover, inadequate staffing has been linked to preventable adverse events such as medication errors, patient falls, and pressure ulcers (Griffiths et al., 2018). Patients in understaffed wards receive less attention and are more likely to experience complications due to delayed responses or missed care (Kalisch et al., 2009). Conversely, adequate staffing supports patient-centered care, improves communication, and enhances compliance with treatment protocols.

Staffing Challenges In Low and Middle-Income Countries

In low- and middle-income countries, staffing shortages are often compounded by systemic issues such as limited training capacity, poor retention strategies, and urban-rural disparities. The WHO (2020) report on the state of the world's nursing highlights that sub-Saharan Africa faces some of the most severe health workforce deficits globally, with many countries falling below the recommended density of health professionals.

Ghana has struggled with uneven distribution of health workers. The Ghana Health Service (2022) notes that while urban centers are relatively well-staffed, rural and northern regions face critical shortages. These disparities contribute to inequities in health outcomes and service delivery.

Staffing Ratios and Hospital Performance

Staffing ratios not only affect individual patient outcomes but also influence the overall performance of healthcare institutions. Hospital performance is commonly measured by indicators such as bed occupancy rates, hospital-acquired infections, readmission rates, and staff turnover. Inadequate staffing contributes to poor performance in these areas due to inefficiencies, increased medical errors, and higher rates of staff absenteeism and burnout (Twigg et al., 2013).

A study by Duffield et al. (2011) concluded that hospitals with better staffing levels experienced improved financial performance, lower nurse turnover, and enhanced reputation. Moreover, adequate staffing reduces the cost of readmissions and legal claims resulting from poor quality

Ghana, poor staffing has been a major constraint to achieving the targets set under the Universal Health Coverage (UHC) and the Sustainable Development Goals (SDGs), especially Goal 3 on good health and well-being (World Health Organization, 2022).

Military Hospitals: A Unique Context

Military hospitals operate under distinct conditions, often requiring readiness for emergencies, mass casualty events, and specialized care. Staff in such settings must account for both routine and unpredictable demands. Studies from other countries (e.g., U.S. Department of Defense hospitals) suggest that military facilities benefit from flexible staffing models and cross- training but also face challenges in recruitment and retention due to the dual pressures of military and civilian care.

In Ghana, there is limited research on military hospital staffing. Existing literature tends to focus on broader health system issues, leaving a gap in understanding the specific needs and constraints of military health facilities like the 69 ABF Hospital.

Staffing Shortages and Burnout

Burnout among healthcare workers is a common consequence of inadequate staffing ratios. Burnout is characterized by emotional exhaustion, depersonalization, and a reduced sense of accomplishment, often leading to high turnover and low morale (Maslach & Leiter, 2016). In high-stress environments such as hospitals, nurses who care for more patients than recommended are more likely to experience burnout, which negatively affects patient care and institutional stability.

According to a study by Friese et al. (2008), nurses working in poorly staffed units reported higher levels of job dissatisfaction and were more likely to leave their positions. In Ghana, the Nurse and Midwife Council and the Ghana Registered Nurses and Midwives Association have continually advocated for improved staffing levels as a strategy to reduce burnout and improve retention (GRNMA, 2021).

Government Policy and Staffing norms in Ghana

In Ghana, the Ministry of Health has developed staffing norms for various levels of healthcare delivery. However, implementation of these norms remains a challenge due to financial constraints, inequitable distribution of staff, and high attrition rates (Ministry of Health, Ghana, 2021). Rural areas are particularly affected, with some district hospitals having nurse-to-patient ratios as high as 1:30, far exceeding international recommendations.

Despite these challenges, recent policy documents such as the Health Sector Medium Term Development Plan (2020–2023) have emphasized the need for workforce optimization, fair deployment, and continuous professional development to improve healthcare outcomes (MOH, 2020). However, in facilities like 69 Airborne Force Hospital in Tamale, staffing imbalances persist, creating disparities in service delivery and staff well-being.

Gaps In Existing Research

While global studies provide compelling evidence on the importance of staffing ratios, there is a lack of localized data in Ghana, especially within military contexts. Most research focuses on civilian hospitals or national-level workforce statistics, which may not capture the nuances of regional and institutional variations. This study aims to address these gaps by providing

empirical evidence from a military hospital setting, contributing to more targeted and effective policy interventions.

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Summary Of Gaps in the Literature

While global evidence strongly supports the positive impact of adequate staffing on healthcare outcomes, there remains a paucity of localized studies in Ghana that examine this issue in the military or specialized hospital settings. Most existing studies have focused on general hospitals or teaching hospitals, overlooking the dynamics of staffing in military hospitals such as the 69 Airborne Force Hospital. There is a need for more empirical research to investigate staffing ratios in such institutions and their implications for patient care and hospital performance within the Ghanaian context.

Materials and Methodology

Introduction

This chapter outlines the research design, study area, population, sampling methods, data collection instruments, data analysis techniques, and ethical considerations used in assessing the impact of staffing ratios on patient outcomes and hospital performance at 69 Airborne Force Hospital, Tamale. A mixed-method approach combining both quantitative and qualitative methods was employed to ensure comprehensive and contextual findings.

Research Design

The study adopted a descriptive cross-sectional design. This design allows the researcher to examine staffing levels, patient outcomes, and hospital performance at a single point in time, enabling the identification of associations between these variables (Creswell & Plano Clark, 2017). A mixed-method design incorporating structured questionnaires, interviews, and hospital records analysis will used to collect both numerical data and personal insights from staff.

Study Area

The study was conducted at 69 Airborne Force Hospital, a military health facility located in Tamale, Northern Region of Ghana. The hospital serves military personnel, their families, and civilians. It is organized into several awards, including Medical, Pediatric, Maternity and Emergency, staffing shortages and workload imbalances have been recurrent challenges in these departments. Its dual role presents a unique opportunity to study staffing dynamics in a high- demand environment.

Target Population

The target population included nurses, midwives, medical officers, and administrators working in the hospital. Patients' medical records would be also reviewed to gather data on outcomes such as mortality rates, re-admissions, and infection rates.

SAMPLE SIZE AND SAMPLING TECHNIQUE

A purposive sampling technique would be use to select departments and healthcare professionals directly involved in patient care. Based on the hospital's total healthcare workforce, a sample of 150 healthcare professionals was selected, including:

Staff Category	Sample Size
Nurses & Midwives	90
Medical Officers	30

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Administrators	10
Allied Health Staff	20

Additionally, 50 patients' records were randomly selected from each ward, totaling 300 patient records.

Data Collection Instruments

Structured Questionnaire

A self-administered questionnaire was used to collect data on perceptions of staffing adequacy, work overload, patient care quality, and hospital performance. The questionnaire consisted of 30 items divided into five sections: demographics, staffing levels, patient outcomes, hospital performance indicators, and job satisfaction.

Interview Guide

A semi-structured interview guide was developed for administrators and senior nurses to explore deeper insights into staffing challenges, resource allocation, and administrative decisions affecting workforce distribution.

Document Review Checklist

A checklist was used to extract relevant data from hospital records such as nurse-patient ratios, length of hospital stays, readmission rates, infection rates, and staff absenteeism reports from January to June 2025.

Data Collection Procedure

Before data collection, ethical approval was obtained from the hospital's ethical review board. Informed consent was also secured from all participants. Data were collected over six weeks, from June to August 2025, using the following procedure:

Administering questionnaires to selected staff during shift transitions.

Scheduling interviews with unit heads and senior management.

Reviewing hospital records using the checklist tool

Data Analysis

Quantitative data from questionnaires and hospital records were entered into SPSS (version 25) for analysis. Descriptive statistics (mean, median, standard deviation) and inferential statistics (chi-square tests and regression analysis) were used to examine the relationship between staffing ratios and patient outcomes.

Qualitative data from interviews were transcribed and analyzed thematically. Themes included "workload perception," "staff morale," "patient safety," and "resource constraints."

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Presentation Of Staffing Ratios

The table and chart below illustrate the disparity between recommended and actual nurse-patient ratios in various departments of the hospital:

Table 3.1: Recommended Vs Actual Nurse-Patient Ratios by Department

Department	Recommended Ratio	Actual Ratio	Recommended Patients/Nurse	Actual Patients/Nurse
Medical Ward	1:5	1:10	5	10
Surgical Ward	1:4	1:8	4	8
Pediatrics	1:4	1:7	4	7
Maternity	1:3	1:6	3	6
ICU	1:2	1:4	2	4
Emergency	1:3	1:5	3	5

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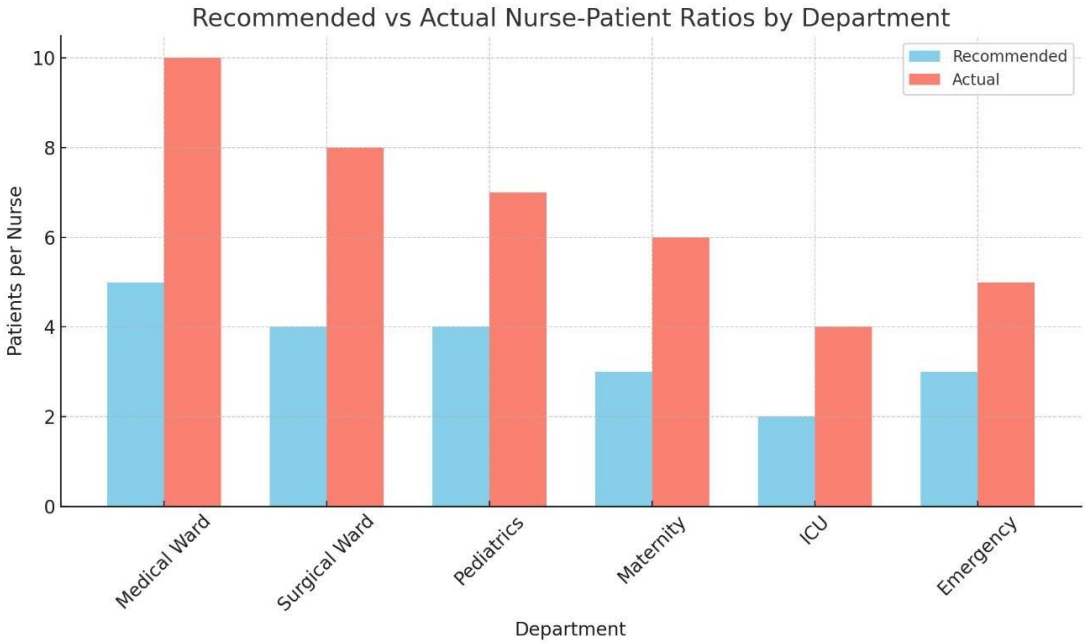

The chart shows a clear disparity in all departments, particularly in the Medical and surgical wards, where actual ratios are double the recommended thresholds.

Validity And Reliability

To ensure validity, the data collection instruments were reviewed by two research experts and pilot-tested among 10 healthcare workers in a similar facility. Reliability was ensured by calculating Cronbach's alpha, which yielded a score of 0.82, indicating high internal consistency of the questionnaire items.

Ethical Considerations

Ethical clearance was obtained from the 69 Airborne Force Hospital Ethical Review Committee. Information consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the research process. Data collected were stored securely and used solely for academic purposes

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Results And Discussion

Introduction

This chapter presents and interprets the findings of the study based on the data collected from healthcare workers and hospital records. The results are organized according to key research variables—staffing ratios, patient outcomes, and hospital performance indicators. Quantitative and qualitative data are triangulated to provide a deeper understanding of the issues.

Demographic Characteristics of Respondents

Out of the 150 healthcare workers sampled, 138 completed the questionnaire, representing a 92% response rate. The demographic distribution is as follows:

Variable	Frequency	Percentage (%)
GENDER		
Male	58	42.0
Female	80	58.0
PROFESSION		
Nurses & Midwives	85	61.6
Medical Officers	28	20.3
Administrators	10	7.2
Allied Health Staff	15	10.9
Years of Experience		

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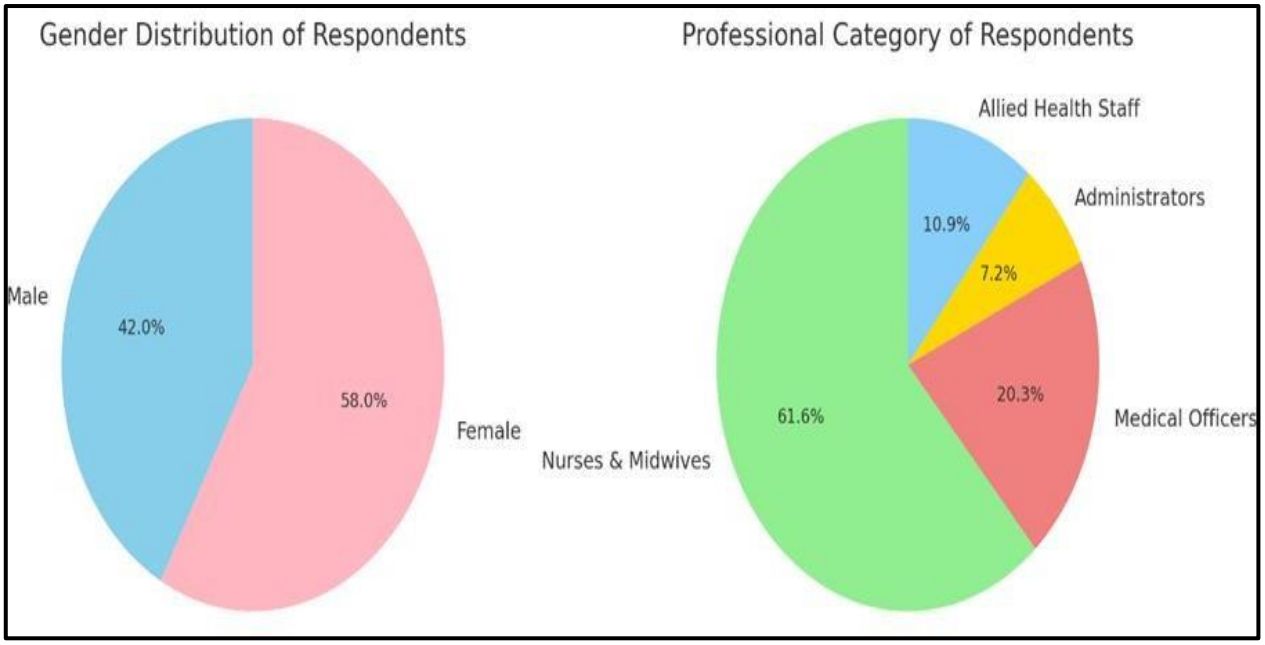
Less than 5 years	48	34.8
5–10 years	60	43.5
Over 10 years	30	21.7



The pie charts above representing the demographic characteristics of respondents:

Left chart: Gender distribution (Male vs Female)

Right chart: Professional categories (Nurses & Midwives, Medical Officers, etc.)

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Nurse-Patient Staffing Ratios

Analysis of hospital staffing data revealed actual nurse-patient ratios were twice as high as recommended levels in all departments.

Table 4.1: Staff-Patient Ratios by Department (Actual vs Recommended)

Department	Recommended Ratio	Actual Ratio	% Deviation
Medical Ward	1:5	1:10	+100%
Surgical Ward	1:4	1:8	+100%
Pediatrics	1:4	1:7	+75%
Maternity	1:3	1:6	+100%
ICU	1:2	1:4	+100%
Emergency	1:3	1:5	+66.7%

Respondents rated staffing adequacy as follows:

- **Adequate**: 12%
- **Somewhat Adequate**: 25%
- **Inadequate**: 63%

This aligns with interview feedback from senior nurses who cited "severe under staffing especially during night shifts and weekends."

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Patient Outcomes

Patient outcome indicators such as mortality and infection rates were significantly associated with departments with higher patient-to-nurse ratios. The data revealed that wards with the worst ratios (1:10 and 1:8) had the highest mortality and infection rates.

Figure 4.1: Mortality and Infection Rates by Department

From the chart:

Medical Ward recorded a 14% mortality rate and 12% infection rate.

ICU, with a relatively better staffing ratio, had the lowest mortality (6%) and infection rate (5%).

This confirms previous studies that link high patient loads per nurse to increased patient complications (Aiken et al., 2014; Griffiths et al., 2018).

4.5 HOSPITAL PERFORMANCE INDICATORS

Hospital performance was measured through indicators such as:

Average Length of Stay (ALOS): Ranged from 5–9 days depending on ward and patient acuity.

Readmission Rate (within 30 days): Averaged 15%, highest in surgical and maternity wards.

Staff Turnover Rate: Reported at 22% annually, mainly among nurses under age 30.

Respondents indicated that delayed response time, incomplete documentation, and increased burnout were common due to staffing constraints. Administrators admitted that resource limitations and bureaucratic constraints affected their ability to recruit more staff.

STAFF WELLBEING AND BURNOUT

When asked about job satisfaction:

Satisfied: 18%

Neutral: 25%

Dissatisfied: 57%

Over 66% of nurses reported working overtime, while 71% experienced symptoms of burnout such as fatigue, irritability, and lack of motivation. These findings are consistent with Maslach & Leiter (2016), who emphasized the correlation between burnout and workload imbalance.

Qualitative Themes from Interviews

Theme 1: Excessive Workload

"Sometimes you're alone in the ward with over 20 patients. It's overwhelming." Nurse, Medical Ward

Theme 2: Patient Complaints

"Patients complain of delays, and some think we are negligent, but the truth is we are few." Nurse, Emergency Unit

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Theme 3: Administrative Constraints

"We are aware of the shortage

, but we don't have the budget to

hire more."

— Hospital Administrator

Discussion

The findings from this study affirm the strong correlation between inadequate staffing and poor patient outcomes. Departments with the worst nurse-patient ratios had higher mortality and infection rates, aligning with studies by Aiken et al. (2002, 2014) and Twigg et al. (2013). Moreover, burnout and dissatisfaction among staff negatively affect hospital efficiency, consistent with global and national reports (GRNMA, 2021; WHO, 2022).

The gaps in resource allocation, lack of policy enforcement, and rising attrition rates underscore the urgent need for policy reform and workforce investment. These findings provide a localized evidence base to guide staffing interventions in Ghana's healthcare system, particularly in military facilities.

CHAPTER 6:

Recommendations

POLICY AND ADMINISTRATIVE REFORMS

The Ministry of Health and Ghana Armed Forces Health Directorate should review and enforce minimum staffing standards in all military hospitals.

Budgetary allocations must be increased to allow for recruitment and equitable distribution of healthcare staff.

Workforce Expansion and Support

Immediate recruitment drives should target nurses, especially for Medical, Surgical, and Emergency Wards.

Establish rotational shift structures to reduce burnout and enhance work-life balance.

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Capacity Building

Implement continuous professional development (CPD) programs to boost staff morale and competencies.

Introduce mentorship programs for new recruits to retain talent and reduce early turnover.

Infrastructure and Technology

Use electronic staffing systems to monitor real-time workload and redistribute staff as needed.

Invest in telemedicine and support staff (e.g., healthcare assistants) to reduce nurses' burden.

MONITORING AND EVALUATION

Develop a hospital-level staffing audit tool to evaluate staffing adequacy quarterly.

Institute feedback loops where staff can report workload issues anonymously for administrative review.

CHAPTER 7:

Limitations

The study was limited to one facility; hence generalization may be constrained.

Some respondents may have provided socially desirable answers despite anonymity assurances.

Staffing ratios were examined primarily for nurses and midwives; other cadres (e.g., cleaners, orderlies) were not studied in detail.

Suggestions for further Research

Comparative studies across multiple military and civilian hospitals in Ghana.

Longitudinal studies tracking staffing levels and outcomes over 12+ months.

Investigations into the economic impact of under staffing on hospital expenditure and patient care costs.

Final Remarks

Ensuring safe and efficient staffing levels in healthcare is not merely a human resource issue. It is a moral, clinical, and systemic priority. The findings from 69 Airborne Force Hospital present a call to action for policymakers, administrators, and stakeholders. With the right strategies, the hospital can evolve into a benchmark for quality care delivery in Ghana and beyond.

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CHAPTER 8

Conclusion

The study concludes that inadequate staffing ratios significantly impact patient outcomes and hospital performance. There is a direct correlation between staffing shortages and elevated mortality, infection rates, re-admissions, and staff burnout.

The evidence affirms the global consensus that adequate nurse staffing is a critical determinant of healthcare quality and safety. In the context of 69 Airborne Force Hospital, persistent staffing gaps especially in high-acuity departments present a critical risk to both patients and staff well- being.

Without immediate interventions, these challenges will continue to compromise the delivery of care, strain hospital systems, and affect Ghana's overall progress toward Universal Health Coverage and SDG-3.

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CHAPTER 9:

Summary

This chapter summarizes the key findings of the study, draws conclusions based on the data presented, and provides actionable recommendations for improving staffing ratios and hospital performance at the 69 Airborne Force Hospital, Tamale. The chapter also outlines limitations of the study and areas for future research.

Summary Of Key Findings Study Objective and Approach

The study aimed to assess the impact of staffing ratios on patient outcomes and hospital performance. Using a mixed-methods descriptive cross-sectional design, data were collected through structured questionnaires, interviews, and review of hospital records.

STAFFING RATIOS AND ADEQUACY

Actual nurse-patient ratios in all departments exceeded the recommended levels by 66– 100%, particularly in the Medical and Surgical Wards.

63% of respondents reported staffing as inadequate, citing overwork, low morale, and delayed response to patient needs.

ICU, although better staffed, still operated at double the recommended workload.

Patient Outcomes

Departments with poor staffing ratios had higher mortality and infection rates, with the Medical Ward recording 14% mortality and 12% infection.

Better-staffed wards (e.g., ICU) showed significantly lower mortality and infection rates

Hospital Performance Indicators

Readmission rates averaged 15%, highest in maternity and surgical units.

Staff turnover rate was reported at 22%, attributed largely to burnout.

Only 18% of staff expressed job satisfaction, while 71% reported burnout symptoms.

Qualitative Insights

Recurring themes from interviews included:

Severe workload stress

Patient dissatisfaction

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Administrative constraints on recruitment and budget

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CHAPTER 10

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