

The Effect of Nurse-Patient Ratios on Clinical Outcomes: An In-Depth Review of Evidence and Healthcare Implications

Jabril Abdulrahman Jabril Alzubaidi¹, Khadijah Ibrahim Alasiri², Kholoud Yahia Ibrahim Assiri³, Salha Yahia Ibrahim Asiri⁴, Halima Yahia Ibrahim Assiri⁵, Khalid Abdullah Ali Alharbi⁶, Hassan Hamad Alshaikh⁷, Fatimah Tariq Abdullah ALhemiary⁸, Sari Hamad Mohammed Alyhyawi⁹, Ramiah Osamah Mahmoud Arif¹⁰

1 Ksa, Ministry of Health, King Fahad General Hospital Jeddah second Health Cluster

2 Ksa, Ministry of Health, King Fahad General Hospital Jeddah second Health Cluster

*3 Ksa, Ministry of Health, Primary Health Care Center Bin Malik
Aseer Health Cluster*

4 Ksa, Ministry of Health, Primary Health Care Center Alsarhan Aseer Health Cluster

*5 Ksa, Ministry of Health, Primary Health Care Center Al-Mansak.
Aseer Health Cluster*

6 Ksa, Ministry of Health, Irada and Mental Health Complex - Irada services - Jeddah

7 Ksa, Ministry of Health, Irada and Mental Health Complex - Irada services - Jeddah

8 Ksa, Ministry of Health, Irada and Mental Health Complex - Irada services - Jeddah

9 Ksa, Ministry of Health, Eradah and mental health complex - Eradah services

10 Ksa, Ministry of Health, King Fahad General Hospital Jeddah second Health Cluster

Abstract

Background: The connection between nurse-patient ratios and clinical outcomes has received considerable focus, particularly in surgical and medical settings. However, the implications for mental health nursing are less understood. This review seeks to synthesize existing evidence regarding the effects of nurse skill mix and staffing ratios in inpatient mental health environments.

Methods: A thorough literature review was conducted, focusing on studies that evaluate the relationship between nursing levels and patient outcomes in mental health settings. Multiple databases were searched to identify observational studies that met specific inclusion criteria.

Results: The review found a limited number of studies directly linking nurse-patient ratios to clinical outcomes in mental health settings. Some evidence suggests that higher nurse staffing levels may lead to reduced readmission rates, though the overall quality of the studies was inconsistent. Methodological challenges, including reliance on self-reported data and variations in the definition of adverse outcomes, were common.

Conclusion: This review reveals a significant gap in the literature concerning the impact of nursing skill mix on patient outcomes in mental health settings. The findings highlight the need for robust research to establish clear correlations and inform staffing policies in psychiatric care.

Keywords: Nurse-patient ratios, mental health, clinical outcomes, nursing skill mix, inpatient care.

1. Introduction

As of now, a minimum of 21 observational studies have examined the correlation between nurses' educational preparation and patient outcomes [1-21]. Fifty percent of this research has focused only on surgical patients. The remaining individuals have been in medical, critical care, and specialized units. The first research examining the correlation between nurse skill mix and patient outcomes was published in 1976 [22]. The majority of these studies (15 out of 20) originate from a common cohort of authors and have predominantly employed a similar methodology, specifically estimating the skill mix, education, and nurse-to-patient ratio through nurse surveys [11,16,21] and obtaining aggregated patient mortality data from hospital administrative records. Research consistently indicates a substantial correlation between a better-educated nursing staff and a reduced mortality risk [12,15,16].

Significant methodological constraints must be acknowledged when evaluating this skill-mix research, especially regarding the measurement of skill mix. Five studies [9,10,16,20,21] have used the same questionnaire to assess skill mix. Although several writers claim that the questionnaire has undergone validation, this assertion is challenging to verify in the existing literature. We have been unable to get a copy of the questionnaire from the original authors due to obvious copyright complications. A self-reported assessment of skill mix may lack accuracy; for instance, nurses queried about their credentials may exaggerate their accomplishments.

Findings from medical and surgical skill-mix studies do not apply to mental health contexts, as nurses engage with distinct populations—primarily individuals with severe mental disorders—requiring a unique blend of psychosocial interventions, risk assessment, containment, and medication management [23-25]. Psychosocial therapies are crucial in mental health and have shown efficacy in alleviating symptoms of anxiety, sadness, and posttraumatic stress disorder. It is essential to examine the relationship between nurse skill mix and patient outcomes in inpatient psychiatric environments. This review seeks to consolidate research about the correlation between the mental health-to-registered nurse ratio and patient outcomes, namely relapse as indicated by hospital admissions, in inpatient mental health environments.

2. The Composition of Nursing Skills and Patient Outcomes in Mental Health Environments

A prior comprehensive evaluation investigated the correlation between mental health nurse skill mix and relapse [26, 27]. The evaluation focused on community mental health nurses and included two research, comprising 356 patients. The studies were assessed as possessing a low to moderate risk of bias [27]. The authors indicated insufficient data to determine if community mental health nursing reduced the risk of admission to psychiatric inpatient institutions.

In the [27] review, admission rather than mortality was used as the main outcome of interest because of the relative rarity of death in mental health contexts. Establishing a correlation between skill mix and mortality would need an impractically huge sample size. In addition to psychiatric hospital admission, other potential outcomes for mental health nursing skill-mix study include adverse occurrences such as violence and aggressiveness, absconding, isolation, and physical and mechanical restraint [28-30].

Adverse occurrences have already been used in the assessment of mental health treatment interventions. Chou et al. [31] performed observational research to examine the correlation between patient, environmental, and nurse staffing characteristics with attacks by patients on doctors and other patients in acute inpatient psychiatric wards. The authors included 287

patients and 855 incidents of assault. The research demonstrated a correlation between clinical experience, violent training, and the likelihood of attack. Nonetheless, the authors may have inflated the true incidence of attacks by including aggression against objects and verbal threats in their count. The inconsistency in defining and measuring adverse occurrences significantly limits their validity as a metric in mental health research.

The use of adverse occurrences (violence, hostility, constraint, and isolation) as a study result requires meticulous deliberation. A minimal proportion of individuals with mental illness admitted to hospitals exhibit violent or aggressive behavior. Should this be used as a study endpoint, any identified link will probably be confined to a small minority of patients (i.e., those exhibiting aggressive behavior). Evidence suggests that mental health physicians operating in various settings possess divergent perspectives on what defines an adverse occurrence [32]. The threshold for reporting violent occurrences is deemed elevated in Psychiatry Intensive Care Units (PICU) in contrast to normal acute-inpatient wards [32]. The frequency of adverse occurrences may also fluctuate throughout the observation of ward practices as part of a research project or clinical audit. For instance, if nurses recognize that a study is being conducted in their ward with the end measure being the frequency of adverse episodes, they may be disinclined to disclose such instances to satisfy the researcher, reflecting a kind of social desirability bias. Consequently, the number of reported occurrences may seem to decrease while no actual change occurs [33].

Individuals with mental illness are hospitalized for urgent intervention of severe psychiatric symptoms (hallucinations, delusions, and mania) that induce suffering and may endanger themselves or others. It has been contended that some admissions to mental hospitals are premeditated, such as for the commencement of clozapine treatment. Nevertheless, few data exist to indicate that this is a prevalent phenomenon [34,35]. Mental diseases are chronic conditions, and the majority of individuals hospitalized in a psychiatric ward will have recurrent hospitalizations [36,37]. Schennach et al. [38] investigated recurrence and its determinants in schizophrenia patients within one year post-hospital release. Two hundred participants participated in the trial. The authors indicated that 104 patients (52%) had at least one relapse during the first year after hospital release, whereas 34 patients (17%) encountered numerous relapses. Of the patients who relapsed, 78 (75%) were hospitalized due to the worsening of their symptoms [38].

Admission data may be dependable, given they are documented as part of standard hospital administrative procedures [39-42]. Researchers worldwide have used admission data for many years in both medical and psychiatric contexts [40,43]. Nonetheless, there are significant constraints associated with using readmission as an outcome in mental health research. Patients may move or alter their residence address to a different catchment area and be admitted to another hospital. Although not an infallible indicator, admission to a psychiatric hospital serves as a valuable proxy for relapse and has significance for patients, their families and friends, mental health services, and the broader society [44-46].

3. Composition of Nursing Skills in Mental Health Wards

A mental health nurse is a nurse who has undergone specialized post-qualification training in mental health nursing, enhancing foundational generalist nursing education. The composition of nursing skills in mental health environments significantly differs among nations. In the UK, psychiatric facilities are solely staffed by nurses with specialized mental health registration [47]. Other nations use a combination of qualified mental health professionals and registered nurses inside psychiatric inpatient units [48,49]. Certain nations

lack mental health nurses in psychiatric hospitals; while nurses are registered, they possess no specialized education [50-52].

Han et al. [53] investigated the correlation between nurse staffing levels and mental health care readmissions within 30 days post-discharge across 114 hospitals in South Korea. Data were obtained from the National Health Insurance claims dataset. The authors indicate a correlation between readmission rates (within 30 days post-discharge) and the quantity of nurses employed in the hospital. The probability of readmission decreased by 5% for each additional 10 nurses per hospital. The research presents data suggesting that the composition of nursing skills may correlate with patient outcomes in inpatient mental health environments. Nevertheless, the authors provide little information about the precision and comprehensiveness of the data they obtained. For instance, the extent of the missing data remains ambiguous, as does the presence of any systematic factors contributing to their absence. Crucial data on nurse staffing, such as age, credentials, education, and years of experience, seems to have been omitted. These factors are probable confounders; the authors fail to explain the exclusion of these critical variables from the study. The authors' inability to sufficiently control for confounding variables in this research significantly diminishes the validity of the claimed connection.

De Lacy et al. [54] established the correlation between the nursing skill mix (nurse-to-patient ratio and the proportion of registered to non-registered nurses) and the incidence of seclusion and restraint in six public mental institutions in the United States. The nurse-to-patient ratio for each participating institution was computed daily during the four-year research period. The nurse-to-patient ratio was computed by dividing the total number of full-time equivalent (FTE) nurses, both registered and unregistered, by the average patient count in the hospital throughout the research period. Utilizing the average number of inpatients as the denominator in this computation may result in an inaccurate assessment of the nurse-to-patient ratio since the inpatient count fluctuates over time. For instance, during weekends or public holidays, there may be a decrease in the patient count at the hospital. We sought to verify our understanding of the skill mix calculation, but the publication (a university thesis) did not include the author's contact information. The ratio of registered to unregistered nurses was computed daily by dividing the number of full-time equivalent registered nurses by the total number of nurses employed in the participating institutions [54]. Similar limitations apply to the calculation of the skill mix, as with the nurse-to-patient ratio.

The De Lacy et al. [54] investigation resulted in seclusion and constraint. This was computed at the hospital level by dividing the total number of documented seclusion incidents by the average daily patient headcount. The utilization of the probable average number of hospital patients affects the accuracy of the metric. De Lacy et al. [54] do not find a significant correlation between the two skill-mix metrics (the nurse-to-patient and registered-to-unregistered nurse ratios) and the use of seclusion and restraint. The authors assert a statistically significant correlation between both skill-mix metrics and the frequency of isolation and restraint incidents. The authors recognized that significant confounders were not controlled for in this study (e.g., diagnosis, psychoactive drugs, and the quantity of planned individual and group therapies provided). The reported connection must be viewed with significant care.

Bowers et al. [55] performed observational research to ascertain if a rise in nurse staffing levels before or succeeded alterations in the rates of conflict and containment in inpatient psychiatric wards. The research included 32 acute wards in England. The authors used the Patient-Staff Conflict Checklist (PCC-SR) to assess the frequency of conflict and containment.

The PCC-SR is a report finalized by nurses after their shift, detailing the incidence of conflict and containment events, such as aggressiveness, physical restraint, absconding, and forced medicine delivery. Several possible sources of bias in the research [55] must be addressed when evaluating the data. The authors reference the validity of PCC-SR, referencing their research [56,57]. The author documented a statistically significant, although small, association ($r = 0.24$) between the PCC-SR and "officially reported incidents" [57]. The validity of the PCC-SR based on the given correlational data remains speculative. It is well acknowledged that "official reports" tend to underestimate the true incidence of events; hence, the PCC-SR serves as a legitimate metric for a measure often regarded as invalid [58-60]. In the research by Bowers et al. [55], the authors chose a sub-sample of 32 from the 136 participating wards for this secondary analysis. The chosen wards showed a significant degree of adherence to completing the PCC-SR after the shift. The analysis seems to be post hoc rather than designed a priori, although this is not explicitly stated. The authors affirm that the selected wards differed from the whole sample; for instance, they had a greater number of beds. Bowers et al. [55] minimize the differences between the two groups by using temperate language (e.g., slightly higher and marginally lower) in the findings part of their publication. The main finding in the [55] research was that an increase in the number of nurses on a shift correlated with a higher incidence of events. The predominant reason for the observed correlation is bias; thus, we contend that the findings should be approached with caution.

4. Discussion

This review sought to find and consolidate information regarding the correlation between the mental health-to-registered nurse ratio and relapse rates in inpatient mental health environments. No papers satisfied our inclusion criteria; thus, we provide an empty review. We have recognized the need for a high-caliber skill-mix study to ascertain appropriate and safe staffing in mental inpatient environments.

An empty review is a systematic review that identifies no primary studies suitable for inclusion [61]. Empty reviews are prevalent; for instance, in 2010, 9% of the 4,320 reviews submitted to the Cochrane Library were devoid of content [61]. Paper [62] indicated that there is evidence suggesting writers refrain from submitting empty reviews due to the perceived difficulty in achieving publication. Vacant reviews significantly enhance our comprehension of issues by highlighting knowledge deficiencies that need attention in further study [61].

Although several comprehensive studies have shown a correlation between nursing skill mix and patient outcomes [28,31,54], little research has investigated the impact of mental health nursing skill mix on patient outcomes. There is a partial presence of nursing skill-mix research in mental health. We identified two studies that examined the relationship between the nurse-to-patient ratio and patient outcomes, specifically the incidence of violence and aggressiveness, in inpatient mental health environments [53,55]. Readmission has been used as an outcome in skill-mix studies inside both general and psychiatric wards. For instance, [53] indicated that mental institutions with increased nurse staffing levels correlated with reduced admission rates.

5. Constraints

Our review has several limitations that need consideration. One may argue that a scoping study of the mental health nursing skill-mix research should have been conducted to assess the feasibility of a systematic evaluation. A scoping review is a review that offers an initial evaluation of the possible extent and breadth of the existing research material. It might indicate

to researchers the need to do a comprehensive systematic review. Scoping reviews cannot be considered a definitive output due to their inherent limits in rigor and length, which may introduce bias [63].

This study focused on admission to acute services as the primary outcome of interest. This conclusion is often used in mental health services research [46]. Research on skill mix in medical and surgical environments has mostly used mortality as an outcome measure [3]. This would be unsuitable in mental health contexts since death is an uncommon—though not unprecedented—occurrence. Adverse episodes serve as an alternate metric but are fundamentally unquantifiable in a legitimate manner. The definition and documentation of adverse episodes differ between institutions, making it unfeasible to consolidate them into a significant metric. A hospital may classify an incidence as an adverse incident, although another hospital may not categorize it similarly. Incidents in hospitals are often underreported. We identified papers in which the number of adverse occurrences was the stated result. A systematic evaluation focusing on adverse occurrences as the result of interest may be warranted.

This review focused on one principal consequence. We may have included skill-mix studies with any result. Nonetheless, there exists a significant danger of selective reporting bias, whereby the research authors retrospectively choose the most compelling results. Our review was limited to the English language and excluded gray literature. Unpublished papers or studies in other languages about our issue may have been overlooked.

6. Conclusions

This comprehensive review has illuminated the significant gaps in research regarding the correlation between nurse-patient ratios and clinical outcomes specifically in mental health settings. Although the existing literature highlights some positive associations between higher staffing levels and improved patient outcomes, particularly regarding readmission rates, the evidence remains sparse and methodologically weak.

The majority of studies encountered in this review faced critical limitations, including small sample sizes, inconsistent definitions of key variables, and a reliance on self-reported data, which can introduce bias. Additionally, the lack of consensus on what constitutes an "adverse outcome" complicates the synthesis of findings across different studies. The implications of these limitations are profound, as they hinder the ability to draw definitive conclusions about the effectiveness of nurse staffing models in psychiatric care.

Moreover, the review revealed a concerning absence of peer-reviewed research directly examining the impact of mental health-to-registered nurse ratios on crucial outcomes such as relapse rates and psychiatric admissions. This represents a significant knowledge deficiency that warrants immediate attention from researchers and policymakers alike.

Future studies should aim to adopt more rigorous methodologies, including larger sample sizes and standardized measures of outcomes. Additionally, exploring the nuances of mental health nursing, including the specific skills required for effective patient care, will be essential in developing staffing guidelines that enhance patient safety and care quality. In conclusion, addressing these research gaps is imperative to inform evidence-based staffing policies that ultimately improve the quality of care in mental health settings.

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تأثير نسب التمريض إلى المرضى على النتائج السريرية: مراجعة شاملة للأدلة وآثارها على الرعاية الصحية

الملخص

الخلفية: لقد حظيت العلاقة بين نسب التمريض إلى المرضى والنتائج السريرية باهتمام كبير، خاصة في السياقات الجراحية والطبية. ومع ذلك، فإن الآثار المترتبة على التمريض في مجال الصحة النفسية أقل فهمًا. تهدف هذه المراجعة إلى دمج الأدلة الموجودة حول تأثيرات مزيج مهارات التمريض ونسب التوظيف في بيئات الرعاية النفسية للمستشفيات.

الطرق: تم إجراء مراجعة شاملة للأدبيات، مع التركيز على الدراسات التي تقيم العلاقة بين مستويات التمريض ونتائج المرضى في بيئات الصحة النفسية. تم البحث في العديد من قواعد البيانات لتحديد الدراسات الملاحظة التي تلي معايير الإدراج المحددة.

النتائج: أظهرت المراجعة وجود عدد محدود من الدراسات التي تربط مباشرة بين نسب التمريض إلى المرضى والنتائج السريرية في بيئات الصحة النفسية. تشير بعض الأدلة إلى أن زيادة مستويات التوظيف قد تؤدي إلى تقليل معدلات إعادة الدخول إلى المستشفى، رغم أن الجودة العامة للدراسات كانت غير متسقة. وكانت التحديات المنهجية، بما في ذلك الاعتماد على البيانات المبلغ عنها ذاتيًا والتفاوتات في تعريف النتائج السلبية، شائعة.

الختاتمة: تكشف هذه المراجعة عن فجوة كبيرة في الأدبيات المتعلقة بتأثير مزيج مهارات التمريض على نتائج المرضى في بيئات الصحة النفسية. وتسلط النتائج الضوء على الحاجة إلى إجراء أبحاث قوية لإثبات الروابط الواضحة وإرشاد سياسات التوظيف في الرعاية النفسية.

الكلمات المفتاحية: نسب التمريض إلى المرضى، الصحة النفسية، النتائج السريرية، مزيج مهارات التمريض، الرعاية داخل المستشفى.