

The Effect of Increasing the Health Practitioner's Workload on Patients and Their Safety

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Abstract

The clinical healthcare system has been burdened due to various disease outbreak such as COVID 19 outbreak. Clinical Workloads on healthcare workers and practitioners lead to fatigue and mental exhaustions, causing medical errors. About 98 000 patients globally expires due to preventable medical errors in hospitals due to workload of health practitioners. (Philibert, *et al.*, 2002) The majority of mistakes are made by well-meaning people operating under poor systems, procedures, or circumstances. The healthcare workers and physicians have been facing intense workloads due small workforce, physician working hours and financial pressures on hospitals and healthcare centers. However, very limited research has been conducted on association of workload of healthcare workers and safety of patients. Therefore, we aimed to design the systematic review on evaluation of effect of increasing the health practitioner's workload on patients and their safety. To fulfill aims of study, we conducted a systematic review & meta-analysis by following "Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)" (Selçuk, 2019) guidelines related to title which was "effect of increasing the health practitioner's workload on patients and their safety". About 5 databases were used for data search, collection and extraction include PubMed, MEDLINE, EMBSE, Cochrane library, and PsycInfo, on 2 November, 2022. To search data, we used MeSH keywords of "effect of workload on health practitioners", "Healthcare workers workload" "its effects on patients' safety, effect of workload on medical errors" "Mental stress among workers" and "patient safety" among all databases. Only those research articles were extracted that have been published during March 2020 to October 2022, keeping the COVID 19 pandemic in context. There were five qualitative studies that evaluated the value of psychological treatment for mental illness. Stress resulting from worries about infecting close relatives and anxiety and fear of getting infection worries about the health professionals were two interwoven elements in all five investigations. Our findings could be explained by an increase in resident physician workload that followed programmers' elimination of 24-hour shifts. There is evidence to suggest that patient safety may suffer when healthcare workers and doctors care for more than more patients each day.

Keywords: Health practitioner's workload, patients' safety, effect of workload.

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INTRODUCTION

Clinical Workloads on healthcare workers and practitioners lead to fatigue and mental exhaustions, causing medical errors. About 98 000 patients globally

expires due to preventable medical errors in hospitals due to workload of health practitioners (Philibert, *et al.*, 2002). The majority of mistakes are made by well-meaning people operating under poor systems, procedures, or circumstances. Having too much clinical

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training to do is one such situation. Work-hour constraints have been put in place for doctors because of the link between increasing medical errors and a burden that is too intense to prevent physician weariness. A new cross-sectional investigation of nurses revealed a substantial link between low employment and patient death. To tackle nurse employment, 14 states have passed laws or established rules (Jagsi *et al.*, 2008).

Other factors that are raising the requirements on hospital employees include the severity of disorders resulting from demographic shift, rising operational specifications, and the demand for useful techniques and advancements (Needleman *et al.*, 2011). Work schedule and working conditions influence doctors' safety at work as well as patient safety and the standard of care. In German, the rates of nurses experiencing depression and stress at work have both substantially enhanced. From around 15% in 1999 to 30.1% in 2011, fatigue rates were more than twice than earlier conditions (Reifferscheid *et al.*, 2016).

The current economic and health burden during COVID 19 outbreak have directly affected the nursing working schedule and imposed workload on them to reduce costs of system. Research areas have emerged to try and ascertain how this impacts the patient, who is the recipient of support (Dall *et al.*, 2009). These studies have often concentrated on issues that relate to hospital treatment, excluding issues that relate to primary care, which serves as the entry point to healthcare. The amount of scientific research in this area of primary care has increased recently. It has made an effort to look into how it impacts the person receiving the support. There have also been authors who have taken a different, less well-known route, they have sought to understand what occurs with healthcare professionals and how this is related to the effectiveness of service (Brooks *et al.*, 2012).

Stress, occupational tiredness, and its connections to employee satisfaction, satisfaction with life at work, depressive risk, in addition to care and patient safety and fulfilment, have all gained importance in light of the decline in nurses' health. Since there is research in many labor situations at the worldwide level, the problem has a global scope (Kane *et al.*, 2007). The increased demand on healthcare, despite the identification of protective characteristics, has been shown in multiple studies to be one of the key drivers in the genesis of this phenomena. Due to the characteristics of the patient who requests aid, this fact indicates a developing tendency in the coming years (Aiken, *et al.*, 2002).

Consequently, it becomes sense to assume that if the workload for providing care grows and burnout follows, this will have an even greater impact on associated issues like staff wellness, the standard of

care, and patient safety (Aiken *et al.*, 2014). Studies have shown a connection between work overload and an increase in patient death while in the hospital. In furthermore, they have shown a connection between the numbers of patients allocated to a nurse and the percentage of staff members who experience burnout. There are studies on hospital care, but finding studies in patient healthcare that quantify the connection between labor and the expert's health, the standard of treatment, and patient safety is difficult (Gené Badia, *et al.*, 2011).

In this demanding atmosphere, it is essential to ensure patient and employee safety. To accomplish this, hospital supervisors and managers must provide supportive psychological conditions for workers and demonstrate good leader. Numerous research that used perceptions of the working environment in hospitals to support their findings furthered the support for this connection (Brooks *et al.*, 2012).

The healthcare workers and physicians have been facing intense workloads due small workforce, physician working hours and financial pressures on hospitals and healthcare centers. However, very limited research has been conducted on association of workload of healthcare workers and safety of patients. Therefore, we aimed to design the systematic review on evaluation of effect of increasing the health practitioner's workload on patients and their safety.

METHODS

2.1 Introduction

To fulfill aims of study, we conducted a systematic review & meta-analysis by following "Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)" (Selçuk, 2019) guidelines related to title which was "effect of increasing the health practitioner's workload on patients and their safety". PRISMA guidelines were followed in recent study, for selection and screening of collected research articles, as shown in PRISMA flowchart, (Athikarisamy, & Patole, 2021) as Figure 1.

2.2 Search Strategy

For recent systematic review, the comprehensive search strategy designed for data collection and extraction in accordance with research aims and title. About 5 databases were used for data search, collection and extraction include PubMed, MEDLINE, EMBSE, Cochrane library, and PsycInfo, on 2 November, 2022. To search data, we used MeSH keywords of "effect of workload on health practitioners", "Healthcare workers workload" "its effects on patients' safety, effect of workload on medical errors" "Mental stress among workers" and "patient safety" among all databases. Only those research articles were extracted that have been published during March 2020 to October 2022, keeping the COVID 19 pandemic in context.

After that, we designed a PICO model for selection of research articles, according to aims of systematic review. A good PICO question has four parts to identify the research population (P), type of implicated strategy or intervention (I), comparison (C) among experimental and control groups and outcomes

(O). For recent systematic review, we designed PICO question for data selection as follows:

- P—Healthcare Workers
- I— effect of workload
- C— experimental vs control group
- O— patient safety

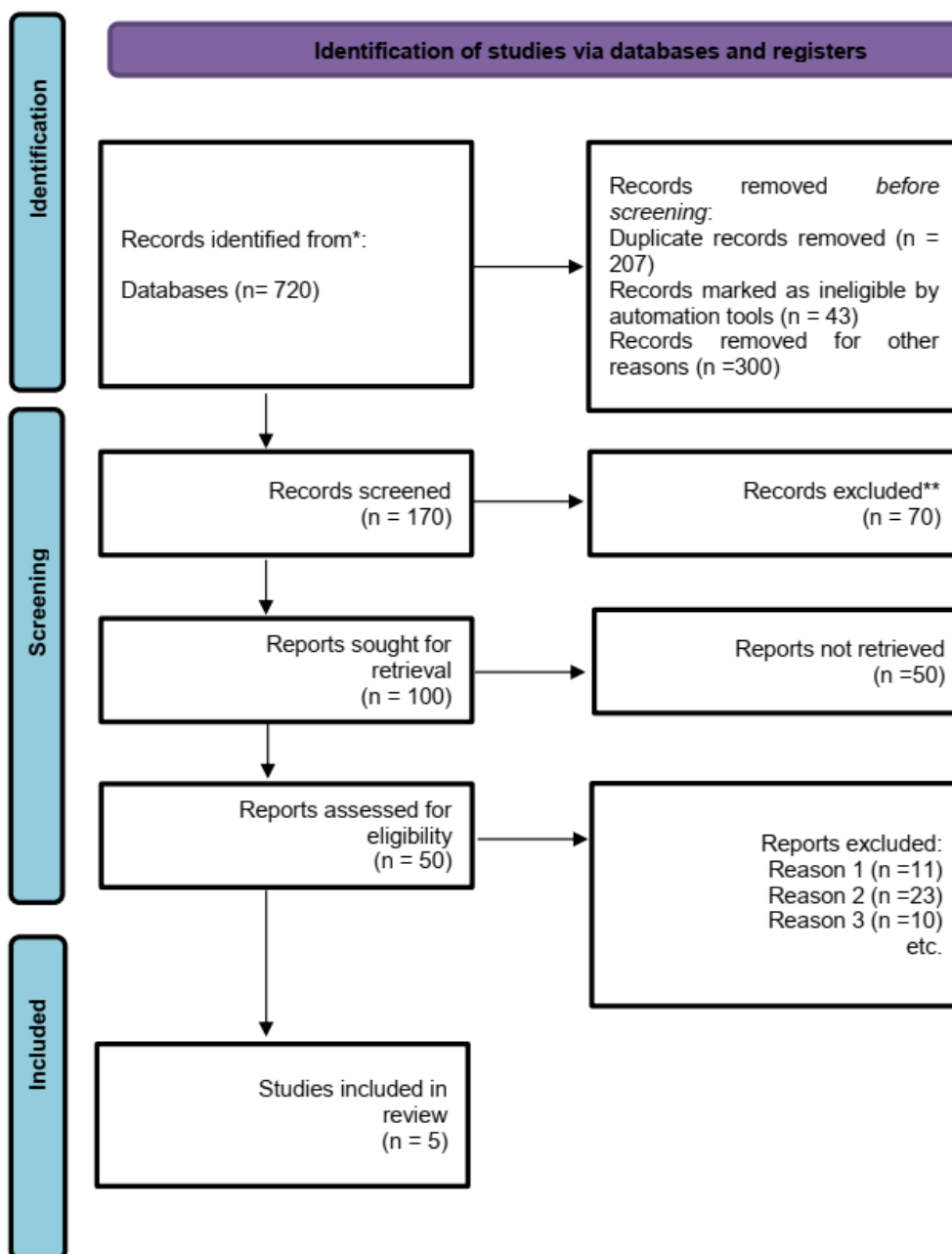


Fig 1: The PRISMA flowchart for screening and selection of standardized Research Articles

2.3 Study Selection

The study selection criteria (as including both inclusion and exclusion criteria) were designed for screening and selection of collected data in recent systematic review. To pursue PRISMA guidelines, the PRISMA flowchart was used for screening and selection of collected research articles. The selected

articles were related to research aims including according to PICO question.

The inclusion criteria for recent systematic review include papers dealing with (1) randomized controlled trails, cohort studies, and pilot studies (2) study population are healthcare workers (3) evaluation of effect of workload on patient safety (4) measuring

outcomes as patient health and safety (5) research articles published in English language.

The exclusion criteria for this study were (1) case studies, narrative reviews, and already done systematic review or meta-analysis (2) Research articles discussing other types of effects of health workers issue (3) studies dealing with health worker population (4) articles published in other language rather than English.

2.4 Data Extraction

After following PRISMA guidelines for screening and selection, we extracted necessary data including author, year of publication, study type, research aim, sample size, research area, primary outcomes and results as Table 1. The effect of increasing the health practitioner's workload on patients and their safety.

2.5 Assessment of study quality

The quality of including studies were assessed through Mixed Methods Appraisal Tool (MMAT). In Mixed Methods Appraisal Tool (MMAT) [26], the quantitative and qualitative aspects were assessed for mixed methods studies. The quality of included studies was measured by scoring against five criteria, on basis of 'Yes,' 'No' or 'not added, and not determined, instead of numerical score for reflection of quality assessment for included studies. At the end, each study would be scored as Low (three or less criteria met), medium (four criteria met) and high (all five criteria met) [27].

2.6 Data synthesis and analysis

In recent systematic review, we have used the data synthesis technique which can integrate, interpret and analyze the data from qualitative, quantitative and mixed studies. Studies that had numerous features were coded to each of the indicated intervention areas and based on the study's reliability, which resulted in some of them being included multiple times in the results section. This method of categorizing treatments by similarities rather than taking into account the numerous

parts of the treatment in its entirety unit is advised for reviews in order to assess the efficiency of certain program areas. The assessment of the research was then reported using a thematic analysis.

2.7 Ethical Considerations

In recent systematic review, there is no need of ethical approval because we are extracting data from previous published studies. Among those publishers of those studies, informed consent was obtained by research owners that have been retrieved and analyzed.

2.8 Summary

From data collection to screening and selection, all steps of recent study have been performed by following PRISMA guidelines. After extraction, the MMAT tool have been utilized for quality appraisal of included studies.

3. RESULTS

3.1 Identified Studies

For recent systematic review, we collected about 45 studies related to the effect of increasing the health practitioner's workload on patients and their safety through searching from above mentioned databases. According to the inclusion criteria, 15 papers were found to be related and reputable, as well as meeting the study's objectives. Due to duplication, around 5 study papers were removed from 15 studies using exclusion criteria. About 5 out of remaining papers were up to the standard and met the above-mentioned criteria.

3.2 Descriptive analysis of identified Studies

Among 8 selected studies, all were randomized controlled trails, cohort studies being conducted in Italy, south Korea, China, Spain and Germany which represent different regions of world, with high, low and moderate economies. All of these healthcare workers were exposed to play based intervention and outcomes were mental illness, cognitive abilities, social competence and communication skills.

Table 1: The characteristics of included and selected studies

Authors, year	Study location	Study population	Study design	Objective	Findings
Landrigan, <i>et al.</i> , 2021	Chicago	38,821 patient-days	multicenter, cluster-randomized,	To assess how reducing long shifts for resident doctors will affect patient safety is still debatable.	We discovered that the efficacy of the intervention schedule was significantly impacted by local systems of care and variations in execution.
Al Ma'mari <i>et al.</i> , 2020	Oman	270 critical care nurses	cross-sectional predictive design	to determine whether critical care nurses' views of patient safety can be predicted by exhaustion, workload, depression, and the work environment.	The patient health and safety in Omani hospitals must be improved and upgraded by addressing these variables and discovering additional elements that have an impact on it.

Authors, year	Study location	Study population	Study design	Objective	Findings
Seljemo, <i>et al.</i> , 2020	Norway	165 healthcare workers	cross-sectional survey	to evaluate the connections between job requirements and supplies, patient safety procedures, and staff perceptions of patient safety in nursing homes	Developing and maintaining a solid patient safety culture in nursing homes may benefit from the application of transformational leadership techniques.
Al omer <i>et al.</i> , 2018	Saudi Arabia	1074 healthcare workers	cross-sectional study	To establish the level of WPB concern among Saudi Arabian healthcare professionals and whether they believe it has an impact on the standard of treatment and patient safety.	The majority of healthcare professionals are concerned about WPB, particularly its detrimental effects on patient safety and the standard of treatment.
Aiken <i>et al.</i> , 2021	Chile USA	1652 hospital nurses	multilevel cross-sectional study	To estimate the judgement on the viability, financial implications, and anticipated improvements in outcomes of boosting nurse resources in public hospitals.	In Chile, increased patient satisfaction, less readmissions, and decreased patient mortality were all connected to improved hospital nurse staffing.

3.3 Key Results

There were five qualitative studies that evaluated the value of psychological treatment for mental illness. Stress resulting from worries about infecting close relatives and anxiety and fear of getting infection worries about the health professionals were two interwoven elements in all five investigations.

These studies focused with how patients health can be affected by nursing' and healthcare professionals' burden compliance to patient-safety rules. For example, mistakes in the delivery and preparation of medicines as well as a nurse's disregard for pharmaceutical safety guidelines have both been documented. The deviation that posed a significant risk to patient safety occurred when nurses failed to supervise and monitor patients' parents or colleagues when they administered medications. Unseen or supervised delivery goes against the idea of administering medications, which calls for a nurse's direct supervision; this is an important factor in the reduction of abuse and patient refusal to take medications as directed. Additionally, despite the focus on patient involvement in patient safety programs, nursing failovers were frequently performed outside of the examination room, or individuals were not informed of the goal and procedure of monitoring of patients. The active participation of patients in their own safe treatment may be hampered by these variations. Additionally, nurses hardly ever asked patients about their discomfort or comfort because the sole method of communication between them was the call bell. These problems imply lost chances for the nurses' ongoing monitoring duty to spot harm early and avoid it during handoff from the cardiac ward.

DISCUSSION

The major goal of the study was to determine if workload indicators of regular data were connected to perceptions of job stress and strain. Second, we sought to see if routine data that showed patient outcomes were connected with perceived patient safety culture and perceived patient safety. Our findings indicate two things: first, that staff members' perceptions of work-related psychosocial stress and strain are related to objectively measured workload; second, that perceived poorer aspects of safety culture (teamwork, specifically) as well as patient-related burnout are related to poorer patient outcomes as measured by readmissions and longer stays. Additionally, there is a relationship between improved patient metrics and perceived patients' overall safety.

The above lends support to the idea that an increase in the amount of unbiased work a person has to do can result in more stress and strain at work, which in turn can have an impact on both staff wellness and clinical outcomes. As a result, bettering workplace conditions may have a direct impact on health care.

First off, the effort of physicians as shown by reported overtime closely matched the felt numerical requirements. The scale workload clearly illustrates the needed pace and incapacity to finish the task (during regular working hours), which is matched by the actual overtime done. Additionally, job tensions and emotional pressures were reflected in the overtime hours performed by physicians (Shihundla *et al.*, 2016) As a result, physicians are working longer hours due to their inability to complete tasks as they should be, perceived conflicting or superfluous expectations, and emotional

trying circumstances. In addition to having a significant impact on how much work is actually done, organization and collaboration issues can lead to expensive and perhaps wasteful overtime. It is generally known that cooperation, employee happiness, and care quality are related. Additional compensation and perceived stress and strain at work have both been found to have a detrimental effect on employees' wellbeing. In order to reduce overtime and absence, Jeffs and colleagues emphasized the critical importance of strong and compassionate leaders who foster a supportive work environment (Liu, *et al.*, 2016).

According to Ochsmann *et al.*, young doctors' stress levels and recuperation times are predicted by overtime work and a lack of supervisory input. Our research confirmed this; we found that working overtime was associated with an increase in work-privacy conflicts, which may be explained by the fact that working extra cuts into time for personal and family obligations. In contrast to what we predicted, the implementation of a schedule in six paediatric ICUs that did away with extended shifts for resident doctors was linked with higher incidence of major medical mistakes. Nevertheless, it showed a substantial number of site-level variation in the intervention's impact (Tadzong-Awasum, 2022). Three sites had higher occurrences of serious medical mistakes with the intervention timetable than with the prolonged shift schedule (the control schedule), one site had very few severe clinical mistakes with the interference schedule, and two others had no discernible difference in the incidence of serious medical errors between the two schedules. Differences in the demographics or complexity of the patients' illnesses could not account for this information. Researchers did see that the treatment had the worst effects in the institutions with the highest resident physician responsibilities (Islam *et al.*, 2019).

However, this conclusion should be seen as experimental, further analyses revealed that the outcomes may have been impacted by concurrent increases in workload with the intervention. The rise in handoff frequency across sites may be one reason why patient safety has deteriorated despite gains in sleep and neurobehavioral function. All six locations had an increase in the number of patients whose care was transferred each evening during the intervention schedule. However, just three locations had lower improved patient results under the interventions program than under the extended-shift schedule, and only one had noticeably higher improved patient results; this implies that the general increase in handoff communication was improbable to be the cause of our findings. Furthermore, despite more handoffs in our prior research, safety rose after prolonged shifts were dropped. There were no overt patterns that stood out to support the idea that specific handoff processes would have protected against safety degradations more

successfully than processes at other sites (Feldman, & Rohan, 2022).

Our findings could be explained by an increase in resident physician workload that followed programmers' elimination of 24-hour shifts. There is evidence to suggest that patient safety may suffer when ICU doctors care for more than seven patients each day. A supplemental member practitioner was included on the roster in experiment units all through months with the intervention schedule (i.e., four resident physicians were in the units during the intervention schedule vs. three during the control schedule), in our previous trial, in which a schedule eliminating extended work shifts (intervention schedule) was shown to be beneficial, in order to maintain the daily workload for resident physicians as each resident's average work hour 11-13. In contrast, when the intervention schedule was implemented in the current experiment, the overall workload of the resident physicians rose. We did not see increases in mistakes during the intervention schedule in secondary analyses that took into account the rise in effort. Furthermore, researchers did not specifically set out to examine how workload affected our intervention (Deng, 2022).

There are several restrictions on this experiment. First off, assessing and categorizing medical mistakes is an imprecise science even though our methods for gathering data on them are well documented. The occupants' itineraries were known to our primary data gatherers. To reduce bias and unpredictability in data collection, we offered uniform training to all main data collectors. In additional, two separate physicians who had no knowledge of the location or the timetable made the final categorization of every occurrence at a later stage and did so with system stability. Although these precautions, some variation in data collecting among sites may have happened, but we think this is unlikely to account for our research results. Second, even though our data imply that workload variability may have affected the intervention, other site-level variables (such as unquantified variations in handoff procedures and visiting doctors' supervision or effectiveness) might have affected these outcomes. Though they highlight the prospect that the discussion about health care provider-patient ratios presently taking place in some jurisdictions may be relevant to physicians as well as to nurses, our workload results should be treated as exploratory and examined further in future studies.

REFERENCES

- Philibert, I., Friedmann, P., & Williams, W. T. (2002). New requirements for resident duty hours. *Jama*, 288(9), 1112-1114.
- Jagsi, R., Weinstein, D. F., Shapiro, J., Kitch, B. T., Dorer, D., & Weissman, J. S. (2008). The Accreditation Council for Graduate Medical Education's limits on residents' work hours and

- patient safety: a study of resident experiences and perceptions before and after hours reductions. *Archives of internal medicine*, 168(5), 493-500.
- Needleman, J., Buerhaus, P., Pankratz, V. S., Leibson, C. L., Stevens, S. R., & Harris, M. (2011). Nurse staffing and inpatient hospital mortality. *New England Journal of Medicine*, 364(11), 1037-1045.
 - Reifferscheid, A., Pomorin, N., & Wasem, J. (2016). Nursing Care Deficits in German Hospitals-Results of a Nationwide Survey of Supervisory Staff in Hospital. *Gesundheitswesen (Bundesverband der Ärzte des Öffentlichen Gesundheitsdienstes (Germany))*, 78(S 01), e97-e102.
 - Brooks Carthon, J. M., Kutney-Lee, A., Jarrín, O., Sloane, D., & Aiken, L. H. (2012). Nurse staffing and postsurgical outcomes in black adults. *Journal of the American Geriatrics Society*, 60(6), 1078-1084.
 - Dall, T. M., Chen, Y. J., Seifert, R. F., Maddox, P. J., & Hogan, P. F. (2009). The economic value of professional nursing. *Medical care*, 97-104.
 - Kane, R. L., Shamlivan, T. A., Mueller, C., Duval, S., & Wilt, T. J. (2007). The association of registered nurse staffing levels and patient outcomes: systematic review and meta-analysis. *Medical care*, 1195-1204.
 - Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J., & Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *Jama*, 288(16), 1987-1993.
 - Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., ... & Sermeus, W. (2014). Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *The lancet*, 383(9931), 1824-1830.
 - Gené Badia, J., Borràs Santos, A., Contel Segura, J. C., Camprubí Casellas, M., Cegri Lombardo, F., Heras Tebar, A., ... & Hidalgo García, A. (2011). Nursing workload predictors in Catalonia (Spain): a home care cohort study. *Gaceta Sanitaria*, 25, 308-313.
 - Shihundla, R. C., Lebese, R. T., & Maputle, M. S. (2016). Effects of increased nurses' workload on quality documentation of patient information at selected Primary Health Care facilities in Vhembe District, Limpopo Province. *Curationis*, 39(1), 1-8.
 - Liu, Y., Aunguroch, Y., & Yunibhand, J. (2016). Job satisfaction in nursing: a concept analysis study. *International nursing review*, 63(1), 84-91.
 - Tadzong-Awasum, G., Ghislaine, M. M., Adelphine, D., Boris, K. A., & Seraphine, M. N. (2022). Nurses' experiences with the adoption and use of the nursing process in four urban hospitals. *International Journal of Africa Nursing Sciences*, 16, 100411.
 - Islam, M. N., Aadeeb, M. S., Munna, H., Mahadi, M., & Rahman, M. (2022). A deep learning based multimodal interaction system for bed ridden and immobile hospital admitted patients: design, development and evaluation. *BMC Health Services Research*, 22(1), 1-26.
 - Feldman, K., & Rohan, A. J. (2022). Data-Driven Nurse Staffing in the Neonatal Intensive Care Unit. *MCN: The American Journal of Maternal/Child Nursing*, 10-1097.
 - Deng, S., Mao, X., Meng, X., Yu, L., Xie, F., Huang, G., & Duan, Z. (2022). A comparison of Knowledge, attitude and practice (KAP) of nurses on nursing Post-stroke dysphagia patients between iii-A and ii-A hospitals in China: a propensity score-matched analysis. *BMC nursing*, 21(1), 1-9.
 - Selçuk, A.A., (2019). A guide for systematic reviews: PRISMA. Turkish archives of otorhinolaryngology, 57(1), p.57.
 - Athikarisamy, S., & Patole, S. (2021). Reporting of Meta-Analysis (PRISMA). In Principles and Practice of Systematic Reviews and Meta-Analysis (pp. 111-123). Springer, Cham.
 - Landrigan, C. P., Rahman, S. A., Sullivan, J. P., Vittinghoff, E., Barger, L. K., Sanderson, A. L., ... & Czeisler, C. A. (2020). Effect on patient safety of a resident physician schedule without 24-hour shifts. *New England Journal of Medicine*, 382(26), 2514-2523.
 - Al Ma'mari, Q., Sharour, L. A., & Al Omari, O. (2020). Fatigue, burnout, work environment, workload and perceived patient safety culture among critical care nurses. *British journal of nursing*, 29(1), 28-34
 - Seljemo, C., Viksveen, P., & Ree, E. (2020). The role of transformational leadership, job demands and job resources for patient safety culture in Norwegian nursing homes: a cross-sectional study. *BMC Health Services Research*, 20(1), 1-8.
 - Al Omar, M., Salam, M., & Al-Surimi, K. (2019). Workplace bullying and its impact on the quality of healthcare and patient safety. *Human resources for health*, 17(1), 1-8.
 - Aiken, L. H., Simonetti, M., Sloane, D. M., Cerón, C., Soto, P., Bravo, D., ... & Lake, E. T. (2021). Hospital nurse staffing and patient outcomes in Chile: a multilevel cross-sectional study. *The Lancet Global Health*, 9(8), e1145-e1153.