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Balancing Mind and Body: The Impact of Mental and Physical Demands on Nurse Fatigue at Benyamin Guluh Hospital, Kolaka Regency

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ABSTRACT

Introduction: Based on the results of observations, it shows that the workload of nurses is quite high, where according to information from the head of the room, some nurses complain of fatigue and visible changes in mood, sleep disturbances, lack of enthusiasm and decreased concentration while working, which are part of the signs and symptoms of fatigue which are possible due to the load. work, it is known that the treatment room at Benyamin Guluh Hospital is still implementing group treatment for all diseases.

Method: This type of research is quantitative research with a case control research design. The population of this study consisted of 136 people who served as nurses in treatment rooms (VIP & VVIP, Class I, Class 2 & 3, Postpartum and ICU). The sample in this study was taken using a simple random sampling survey method, totaling 101 respondents using the Lemeshow formula.

Result: Statistical analysis shows that there is a significant relationship between mental demands and the level of fatigue (p value = 0.003, calculated $X^2 = 8.979 > X^2$ table = 3.841), with a contingency coefficient (ϕ) of 0.381. There is a significant relationship between physical demands and the level of fatigue (p value = 0.009, X^2 calculated = 6.803 X^2 table = 3.841).

Conclusion: There is a significant positive relationship between Mental Demand and Physical Demand and the level of fatigue in nurses at Benyamin Guluh Hospital, Kolaka Regency.

Introduction

The issue of nurse workload is a significant challenge throughout the world, both in developed and developing countries. In developed countries, such as the United States or Europe, nurses often face high workloads due to factors such as labor shortages, increased administrative demands, and

the stress of complex health situations.[1] Meanwhile, in developing countries, nurses may be faced with different challenges, including limited resources, limited access to training and working conditions that may be less supportive. Both of these contexts require serious attention to workforce planning, improving working conditions and developing policies that support the well-being of nurses so that they can provide optimal and sustainable services.[2]

According to the World Health Organization (WHO), the development of nurses' workload throughout the world represents a growing challenge. Factors such as the increasing complexity of cases, overflowing hospital capacity and the increasing need for health care have led to increased pressure on nurses. WHO underlines the importance of managing nurse workload as an integral part of a sustainable health care system. Policy planning and training efforts that focus on managing and supporting nurses in dealing with complex workloads are key to ensuring that they can provide high-quality care without compromising their own well-being.[3]

Data from the Ministry of Health as of August 2023 records the presence of around 657 thousand nurses in Indonesia, which is part of a total of 1.6 million health workers. The morbidity rate in Indonesia in 2022 will reach 13.04%, a decrease from the previous 14.46%. With a total of 460,267 nurses spread across 34 provinces, it can be seen that every nurse in Indonesia has to face the responsibility of caring for approximately 141 people in the community. This condition indicates a high workload for nurses in responding to public health needs. Managing nurses' workload is essential to ensure optimal service quality, as well as the welfare and safety of nurses amidst ever-growing health demands.[4]

In Indonesia, the development of nurse workload analysis reflects significant dynamics in the context of health services. Population growth, changing disease patterns and increasing public access to health services have become the main factors that strengthen the role of nurses. In recent years, there has been an increase in the complexity of nurses' tasks, along with developments in medical technology and paradigm changes in service delivery.[5]

Problems or factors that increase the workload of nurses in Indonesia involve a number of systemic and operational challenges. Firstly, the disproportionate number of nurses to population needs is a crucial issue, with a shortage of health workers causing excessive workloads. In addition, geographically unequal distribution between urban and rural areas can exacerbate inequalities in access and workload.[6]

Analyzing the workload of nurses in Indonesia is very important because it has a direct impact on the quality of health services and the welfare of nurses. This analysis provides an in-depth understanding of how many duties and responsibilities nurses must carry out in the context of a dynamic health system. Benefits include identifying potential risks of physical and mental fatigue, determining training and development needs, and improving operational efficiency. By understanding the workload of nurses, strategic steps can be taken to reduce pressure, improve work balance and ensure the continuity of a productive workforce.[7] The positive impact is increased welfare of nurses, better quality of health services and higher patient satisfaction, in line with efforts to realize a sustainable health system in Indonesia, one of which is workload analysis.[8]

One method for analyzing nurses' workload is the NASA-TLX Method (NASA Task Load Index), because this method provides a comprehensive framework for measuring workload based on six main dimensions, including mental, physical and temporal demands. The main reason for its use among nurses is its proven ability to provide an accurate picture of the extent of workload experienced by an individual or team of nurses. By taking into account factors such as cognitive demands, physical fatigue and temporal aspects, the NASA-TLX Method provides a more holistic insight for designing work environments

that support nurse well-being and overall health care efficiency.[9]

The NASA Task Load Index (NASA-TLX) method has been implemented since the mid-1980s as a comprehensive workload evaluation instrument. This method was first discovered by Dr. Sandra Hart in 1986 as a result of research conducted at NASA Ames Research Center. Dr. Hart and his team developed NASA-TLX to evaluate workload levels and their impact on performance in complex work environments.[10]

The NASA Task Load Index (NASA-TLX) method was designed to take into account six key dimensions to measure subjective workload according to expert assessments. First, the Multiple Tasks dimension describes the extent to which the workload is increased by concurrent tasks. Mental Demand measures the level of intelligence and mental calm required, while Physical Demand assesses physical engagement. The Temporal Demand dimension reflects the extent to which time influences workload, while Effort evaluates the level of physical and mental effort. Finally, the Frustration Level dimension describes the level of emotional discomfort or frustration experienced by individuals while carrying out tasks.[11]

The workload index for nurses in Indonesia is closely related to high morbidity rates, creating major challenges in providing effective and quality health services. Nurses are often faced with high workloads, including excessive physical and mental demands, increasing patient numbers, and the need to provide intensive care. The high morbidity rate reflects the significant workload for nurses who must respond to complex and diverse health conditions. This can impact the availability and quality of health services, resulting in a potential increased risk of medical errors and nurse burnout.

From the results of initial observations and interviews with nurses in several rooms on January 2 2024, it was discovered that several nurses stated that the workload of nurses was quite high. According to information from the head of the room, some nurses complained of fatigue and visible changes in mood, sleep disturbances, lack of enthusiasm and decreased concentration when working where this is part of the signs and symptoms of fatigue which are possible due to workload, it is known that the treatment room at Benyamin Guluh Hospital still applies joint care for all diseases (Surgery Department, Internal Department, Orthopedic Department, Eye Department, Nervous Department, Pediatric Department , Dental Department and ENT Department), so that the instructions given by the doctor in charge of the patient are different, which results in the increasing workload of nurses who not only provide health services in the patient's ward but mobilize many to other places according to their wishes/ the needs of the doctor in charge of the patient.

The level of fatigue of nurses at Benyamin Guluh Hospital, Kolaka Regency with each NASA-TLX indicator depicts an in-depth picture of the dynamics of the subjective workload they face in their work environment. In evaluating the relationship between levels of fatigue and mental demands, nurses appeared to experience higher levels of fatigue if they felt constantly burdened by the need to process complex information or make critical decisions in rapidly changing situations. Physical demands can be an important factor, especially in terms of physical fatigue that nurses may feel due to job demands that require intense physical activity, such as lifting or moving patients.[12]

Analysis of nurse workload is related to fluctuations in the number of patient visits at various health services at Benyamin Guluh Hospital. Although there was a decrease in visits in 2020, there is a trend of increase until 2022. An imbalance between the number of patients and nurses can create a situation where nurses face high work pressure, increasing the risk of medical errors and reducing the level of job satisfaction.

In order to realize a sustainable health system, the need for further research and implementation of policies based on nurse

workload analysis is an urgent need. This will support the welfare of nurses, improve the quality of health services and ensure optimal patient satisfaction at Benyamin Guluh Hospital, Kolaka Regency.

Method

This type of research is quantitative research with a case control research design. This research was carried out at Benyamin Guluh Hospital, Kolaka Regency with the address. Jl. Mekongga Indah By Pass Kolaka-Pomalaa Kel. Tahoa District. Kolaka. Telephone. 0405-2321042. The population of this study consisted of 136 people who served as nurses in treatment rooms (VIP & VVIP, Class I, Class 2 & 3, Postpartum and ICU). The sample in this study was taken using a simple random sampling survey method, totaling 101 respondents using the Lemeshow formula.

Technique Data collection was carried out using a technique with the following steps, namely: providing an explanation to respondents regarding the purpose of this research, providing a consent form to become a respondent, giving respondents the opportunity to study, inviting respondents to sign as a form of readiness to be used as research objects and providing a questionnaire Respondents are first explained how to answer or how to fill it in in the form of questions and checklists.[13]

Result

Table 1 showed that there were 49 respondents with high mental demands, of which 37 (75.51%) experienced high levels of fatigue, while 12 (24.49%) experienced low levels of fatigue. In contrast, of the 52 respondents with low mental demands, 23 (44.23%) experienced high levels of fatigue, and 29 (55.77%) experienced low levels of fatigue. Statistical analysis shows that there is a significant relationship between mental demands and the level of fatigue (p value = 0.003, calculated $X^2 = 8.979 > X^2$ table = 3.841), with a contingency coefficient (ϕ) of 0.381. These results indicate that although high mental demands tend to increase fatigue, there are also respondents who show low levels of fatigue even though their mental demands are high, and conversely, some respondents experience high fatigue even though their mental demands are low. This is influenced by several factors such as physical fitness, social support, stress management, and effective coping strategies which play an important role in influencing a person's level of fatigue regardless of the mental demands faced.

Table 2 showed that there were 54 respondents with high physical demands, of which 39 (72.22%) experienced high levels of fatigue, while 15 (27.78%) experienced low levels of fatigue. In contrast, of the 47 respondents with low physical demands, 21 (44.68%) experienced high levels of fatigue, and 26 (55.32%) experienced low levels of fatigue. Statistical analysis shows that there is a significant relationship between physical demands and fatigue levels (p value = 0.009, calculated $X^2 = 6.803 > X^2$ table = 3.841), with a contingency coefficient (ϕ) of 0.280. These results indicate that although high physical demands tend to increase fatigue, there are also respondents who show low levels of fatigue even though their physical demands are high, and conversely, some respondents experience high fatigue even though their physical demands are low. This shows that other factors such as individual adaptation to work demands, work experience, and overall working conditions play a role in influencing a person's level of fatigue.

Table 1
Relationship between Mental Demand and Fatigue Level

Mental Demand	Fatigue Level				Total		Statistical analysis		
	Tall		Low						
	f	%	f	%	Σ	%	Chi-Square		ϕ
Tall	37	75.51	12	24.49	58	100	The X^2 hits 8,979 P-Value 0.003	X^2 tab 3,841 Sig. 0.05	0.381
Low	23	44.23	29	55.77	92	100			
Total	60	59.41	41	40.59	150	100			

Table 2
Relationship between Physical Demand and Fatigue Level

Physical Demands	Fatigue Level				Total		Statistical analysis		
	Tall		Low						
	f	%	f	%	Σ	%	Chi-Square		ϕ
Tall	39	72.22	15	27.78	54	100	The X^2 hits 6,803 P-Value 0.009	X^2 tab 3,841 Sig. 0.05	0.280
Low	21	44.68	26	55.32	47	100			
Total	60	59.41	41	40.59	101	100			

Discussion

The Relationship between Mental Demand and the Level of Nurse Fatigue at Benyamin Guluh Hospital, Kolaka Regency

The results showed a significant relationship between mental demands and fatigue levels ($p = 0.003$, $\chi^2 = 8.979$, $\phi = 0.381$). Most respondents (75.51%) with high mental demands experienced high fatigue, but there were variations where some respondents showed low levels of fatigue even though mental demands were high, and vice versa. This phenomenon can be explained through Hobfoll's Conservation of Resources (COR) theory, which states that individuals try to obtain, maintain and protect their resources. When facing high mental demands, some individuals may have better personal resources (such as effective coping strategies, social support, or physical fitness) that help them manage stress and prevent burnout. In contrast, individuals with low mental demands but experiencing high fatigue may experience resource depletion due to other factors or lack of recovery capacity.[14] Job Demands-Resources (JD-R) theory from Demerouti et al. also supports these findings, explaining that the balance between job demands (including mental demands) and available resources influences employee fatigue and engagement levels.[15]

Observation results confirmed through questionnaires show that the perceptions of nurses at Benyamin Guluh Hospital, Kolaka Regency regarding their mental burden vary greatly. The majority of respondents assessed that the influence of workload on their mental load was at a moderate to high level. The highest percentage of respondents felt that their work required a very high level of concentration (35.64%) and was involved in tasks that required intelligence and deep understanding (17.82% to 25.74%).

This relationship between Mental Demand and Fatigue Level can be explained by the cognitive load experienced by nurses in carrying out their duties.[16] The high mental demands of nursing work, such as rapid decision making, monitoring patient conditions and managing complex medical information, can drain nurses' cognitive resources.[17] Nurses may experience mental fatigue which then impacts overall fatigue levels. These findings emphasize the importance of effective mental workload management in the hospital environment to maintain nurse health and productivity.

According to the theory put forward by Karasek and Theorell (1990) in the Job Demand-Control model, high job demands, including mental demands, can cause work stress and fatigue if not balanced with adequate control (Theorell, 2020). In the nursing context, high mental demands, such as critical decision making, complex patient information management and multidisciplinary care coordination, can increase the risk of mental and physical fatigue in nurses. This theory emphasizes the importance of balance between job demands and nurses' ability to control aspects of their work. [17]

Maslach and Leiter in their burnout theory explain that fatigue is one of the main components of burnout syndrome. They argue that excessive job demands, including high mental load, can drain workers' emotional and cognitive resources, ultimately leading to chronic fatigue. In the nursing profession, where Mental Demand is often high and ongoing, the risk of fatigue and burnout is significant.[18] This theory emphasizes the importance of effective human resource management and organizational support to prevent burnout in nurses.

Hockey proposed a Cognitive-Energetical Framework that explains how individuals manage their cognitive resources in dealing with task demands. This theory states that when facing high Mental Demand, individuals must expend additional effort to maintain performance, which can result in fatigue.[19] In the nursing context, nurses may need to continuously exert high levels of cognitive effort to meet the demands of their work, which can drain their mental energy and lead to burnout. Hockey emphasizes the importance of self-regulation and energy management strategies to prevent burnout resulting from ongoing cognitive demands.

Previous research on 96 nurses in Switzerland found a positive relationship between mental demands and fatigue. The results showed that increased mental demands were significantly correlated with increased levels of fatigue ($r = 0.45$, $p < 0.001$). Nurses who report high mental demands tend to experience greater fatigue at the end of their shifts. Researchers recommend implementing organizational interventions to reduce mental workload, such as task rotation, increased job autonomy and the provision of better social support from supervisors and coworkers.20

Worker demands include mental demands, with chronic fatigue. This study found that high mental demands were consistently associated with increased chronic fatigue over a 12-month period ($\beta = 0.31$, $p < 0.001$). Nurses working in units with high mental demands, such as emergency departments and intensive care, show higher levels of burnout.[20] Recommendations from this research include the development of stress management programs that focus on cognitive coping strategies, as well as reviewing staff allocation to ensure a more even distribution of mental workload.

A cross-sectional study of hospital nurses explored the relationship between various dimensions of workload, including mental demands, and burnout. The results showed that mental demands had a significant positive correlation with mental fatigue ($r = 0.62$, $p < 0.001$) and physical fatigue ($r = 0.48$, $p < 0.001$). Nurses who reported higher mental demands also reported higher levels of burnout.[17] Researchers recommend the development of more comprehensive workload assessment tools to identify nurses at risk of excessive fatigue. They also suggest implementing training programs that focus on energy management techniques and cognitive recovery strategies to help nurses manage the mental demands of their work more effectively.

The results of the research show that there is a positive and significant relationship between mental demands and fatigue levels in nurses at Benyamin Guluh Hospital, Kolaka Regency. The high mental demands of nursing work are consistently associated with increased mental and physical fatigue. Based on these findings, it is recommended that hospitals implement strategic steps to manage nurses' mental workload.

Recommendations include the provision of stress management programs, increased work autonomy, job rotation, and better social support from supervisors and coworkers. With these steps, it is hoped that the health and productivity of nurses can be maintained, and the risk of fatigue and burnout can be minimized.

Relationship between Physical Demand and Fatigue Levels of Nurses at Benyamin Guluh Hospital, Kolaka Regency

The results showed a significant relationship between physical demands and fatigue levels ($p = 0.009$, $\chi^2 = 6.803$, $\phi = 0.280$). The majority of respondents (72.22%) with high physical demands experienced high fatigue, but there were variations where some respondents showed low levels of fatigue even though physical demands were high, and vice versa. This phenomenon can be explained through the Effort-Recovery Model theory from Meijman and Mulder, which states that fatigue occurs when the effort expended is not balanced by adequate recovery. Individuals with high physical demands but low fatigue may have better physical capacity or effective recovery strategies. In contrast, those with low physical demands but high fatigue may experience accumulated stress or be less effective in energy management.[21] Karasek's Job Demands-Control (JDC) theory is also relevant, explaining that the interaction between job demands (including physical demands) and the level of control a worker has influences stress and fatigue levels. Factors such as an individual's adaptation to work demands, work experience, and overall working conditions also play an important role in influencing a person's level of fatigue.[22]

This research was confirmed based on the recapitulation of questionnaire answers that the perceptions of nurses at Benyamin Guluh Hospital regarding the physical demands of their work varied greatly. Most respondents felt that vigorous physical activity was at a moderate to high level, with 38.61% rating the demands in the 61-80% range. In addition, 35.64% of respondents reported experiencing high physical fatigue (61-80%) after completing their tasks. Demands for physical strength and mobility also showed a similar pattern, with many respondents feeling that their jobs required significant physical demands. Overall, these data suggest that nurses in these settings often face high physical demands in their work.

The relationship between Physical Demand and the Fatigue Level of Nurses at Benyamin Guluh Hospital, Kolaka Regency shows that the higher the physical demands faced by nurses, the higher the level of fatigue they experience.

The results of the study revealed a significant impact of high physical demands on the level of fatigue of nurses at Benyamin Guluh Hospital. Key impacts include increased risk of severe fatigue, potential reduction in quality of care due to reduced concentration and performance, and risk of long-term health problems. Factors that contribute to this impact include excessive physical workload such as lifting patients and standing for long periods, lack of rest time due to long shifts and busy schedules, limited resources that increase physical load, and the complexity of tasks that require a combination of physical and mental skills.[23] Given the magnitude of the impact and the variety of causal factors, it is critical to develop effective workload management strategies and comprehensive wellbeing programs for nurses to reduce the risk of burnout and improve the quality of health services.[24]

Karasek and Theorell - Job Demand-Control Model: In the Job Demand-Control model, Karasek and Theorell explain that high physical demand can increase the risk of fatigue if it is not balanced with an adequate level of job control. Heavy physical loads, such as lifting patients, standing for long periods and performing other physical tasks, can cause physical stress and fatigue.[25] When nurses do not have enough control or autonomy in their work, such as determining the best way to complete physical tasks, the risk of burnout increases. This model emphasizes the importance of balance between the

physical demands of the job and the ability of nurses to control how they do the job.[26]

Maslach and Leiter - Burnout Theory: In the burnout theory proposed by Maslach and Leiter, physical fatigue is one of the main components of burnout syndrome. They state that excessive physical demands in the workplace, such as heavy and repetitive physical work, can drain workers' physical and mental energy, ultimately leading to chronic fatigue. In the nursing profession, high physical demands can cause significant physical fatigue, which can then impact nurses' mental and emotional health.[24] This theory emphasizes the need for effective management and organizational support to reduce physical burden and prevent burnout among nurses.

Hockey - Cognitive-Energetical Framework: Hockey developed the Cognitive-Energetical Framework which explains how individuals manage their physical and cognitive resources in dealing with work demands. This theory states that high physical demands require additional effort which can drain workers' physical energy.[27] In the nursing context, nurses who face high physical demands may need to expend more physical effort to meet the demands of their work, which can lead to fatigue.[28] Hockey emphasizes the importance of self-regulation and energy management strategies to prevent burnout resulting from ongoing physical demands. This theory supports the importance of providing adequate rest time and physical recovery strategies for nurses who face high physical loads.

Previous research involving nurses in the United States found that nurses who reported high levels of Physical Demand also reported higher levels of fatigue. This study shows that heavy physical load, including repetitive physical tasks and standing for long periods, contributes significantly to physical fatigue and burnout.[7] Researchers recommend hospitals improve physical and mental support for nurses, including introducing shorter work shifts and providing adequate rest facilities in the workplace.

Observations at Benyamin Guluh Hospital show a situation that reflects research findings. Nurses often appear exhausted, especially at the end of long shifts, with some complaining of muscle aches and mental fatigue. The treatment room appeared busy, with nurses constantly moving between patients, lifting and positioning them, and handling heavy medical equipment. Break time is limited, with many nurses only having short breaks to eat or take a break. Staffing shortages were apparent, with some nurses seeing more patients than they should. Although nurses strive to provide the best care, signs of burnout are sometimes apparent in their interactions with patients and coworkers. This situation highlights the urgency to implement better workload management strategies and wellbeing programs to support nurses.

The conclusion of this study shows that there is a significant relationship between physical demands and the level of fatigue in nurses at Benyamin Guluh Hospital. The finding that 72.22% of nurses with high physical demands experienced high fatigue, compared with only 44.68% in the low physical demands group, underscores the substantial impact of physical workload on nurses' well-being. The implications of these results emphasize the urgency for hospital management to develop and implement comprehensive strategies to manage nurses' physical workload. This could include optimizing staff allocation, providing ergonomic aids, more effective shift scheduling and wellbeing programs that support nurses' physical and mental recovery. Implementation of these measures will not only improve nurses' health and job satisfaction, but also have the potential to improve the quality of patient care and overall hospital operational efficiency.

Conclusion

There is a significant positive relationship between Mental Demand and Physical Demand and the level of fatigue in nurses at Benyamin

Guluh Hospital, Kolaka Regency. So, it is necessary to optimize task allocation to balance mental, physical and temporal demands on nurses. Implementation of a stress and fatigue management program needs to be carried out to support the welfare of nurses. Evaluating and improving work schedules is also important to reduce excessive workload.

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