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The Mediating Effect of Sleep Quality and Burnout Toward Work Engagement Among Healthcare Workers

***Ahmad Naufal Darydzaky**[1], **Putri Mega Desiana**[1]
[1]Department of Management, Faculty of Economics and Business, Universitas Indonesia, Depok, Indonesia
Correspondence*:
Address: Jl. Prof. Dr. Sumitro Djojohadikusumo, UI Depok 16424, Indonesia | e-mail: ahmadnaufaldd@gmail.com

Abstract

Objective: This study examines the interrelationship among job stress, work engagement, sleep quality, and burnout on JD-R Model. Moreover, this study also analyzes the mediating effect of sleep quality and burnout, which is usually a dependent variable.
Methods: This study was conducted on 236 healthcare workers from various hospitals in Indonesia. The data were collected from an online survey using a 4-Point Likert scale, which was analyzed using Lisrel 8.80 through Structural Equation Modelling (SEM).
Findings: The results show that job stress is positively associated with work engagement and burnout. Sleep quality mediates job stress toward work engagement and burnout. Burnout mediates the relationship between job stress and sleep quality. This study also found that job stress was not associated with sleep quality.
Originality: Many studies are competing to understand the emergence and process of burnout and work engagement. This research is heading in a different direction and focuses on exploring and analyzing the variables of burnout, job stress, sleep quality, and work engagement and their interrelationship.
Practical/Policy implication: Given the results, this study recommends that healthcare workers be aware of their oath and live a healthy lifestyle. In addition, health institutions could conduct a job analysis and create HR policies that imply productivity and fairness.

Keywords: Healthcare workers (HCWs), Job stress, Sleep quality, Burnout, Work engagement.

JEL Classification: J53, M54

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1. Introduction

Health workers in Indonesia are vulnerable to experiencing job stress during the Covid-19 pandemic. At the start of the pandemic, every job felt the effects of job stress, but health workers were the population most vulnerable to experiencing job stress (Couarraze et al., 2021). Menon et al. (2022) state that health workers are vulnerable to mental health problems, such as anxiety and depression, during the Covid-19 pandemic. Even though it was not during the Covid-19 pandemic, health workers experienced higher stress than other professions (Putri & Syaebani, 2018). The causes are excessive working hours, patient care, and the number of patients (Choy & Wong, 2017; Maslach, n.d.; Mintjelungan et al., 2019; Teo et al., 2021).

Prolonged stress is not good for workers. Continuous job stress can cause burnout in workers (Bakker & Demerouti, 2007). Based on the Job Demands-Job Resources (JD-R) Model, high job demands must be supported with balanced resources to avoid burnout (Schaufeli et al., 2014) . In addition, according to the JD-R Model, saturation can be avoided with high job demands supported by balanced work resources. This study will use the JD-R Model as a theoretical framework regarding the four variables: sleep quality, burnout, job stress, and work engagement.

Referring to Bakker and Demerouti (2007), the JD-R model consists of two components and processes. The first component is job demand or work demands. This can be in the form of physical, psychological, expertise, or organizational work demands related to physical or psychological costs that are at risk of becoming a stressor, such as the work demands of health workers dealing with highly dependent patients or working outside working hours. Thus, it can be a job stressor and have a negative impact on workers. The second component is work resources, such as physical, psychological, and organizational aspects that influence goal attainment, reduce work demands, and stimulate self-development. For example, the work resources they have are rest sessions. Workers choose to spend their time doing hobbies or a positive organizational work climate or avoiding boredom. According to Sonnentag and Fritz (2020), employees maintain their psychological well-being or avoid boredom while resting after work. Based on this, good rest sessions can reduce the negative impact of work demands and replenish work resources.

Research proves that improving sleep quality impacts life satisfaction and psychological well-being, reducing depression, frustration, stress, and anxiety (Kang et al., 2020; Lai, 2018; Scott et al., 2021). Bakertzis and Myloni, (2021) state that increased sleep quality can improve work performance. However, good sleep quality is strongly influenced by job stress (Zhao et al., 2020). Health workers who experience increased job stress and long working hours will have poor sleep quality and daytime sleepiness (Jassem et al., 2022; Yigitoglu et al., 2021; Zhao et al., 2020). In contrast, previous research has mostly analyzed the emergence of burnout and work engagement. This study analyzes and explores the variables of burnout, job stress, and the role of sleep quality in health workers.

According to research by Klein et al. (2020), burnout can mediate the relationship between work stress and work engagement. Research belonging to Slåtten et al. (2022) found that work engagement with nurses impacts job satisfaction and the quality of patient care. According to Couarraze et al. (2021) and Menon et al. (2022), health workers are a profession that is very prone to experiencing burnout, so they must be able to maintain the availability of their working resources. Hence, they remain involved in their work. Previous research has only focused on two variables: job stress and burnout. Therefore, this study will analyze each variable to see how sleep quality, burnout, job stress, and work engagement influence each other.

Our research contributes to several important things. First, this research can enrich theoretical findings, especially regarding the JD-R Model related to the relationship between burnout, job stress, work engagement, and sleep quality. In that statement, research results can add to scientific publications and scientific references to human resources. Second, this study uses sleep quality as a variable mediating work engagement, while burnout also mediates the relationship between job stress and sleep quality. The research results obtained have the potential to be considered for making new policies for HR managers in organizations. Third, the right policy can create working conditions that focus on the quality of employee rest, which affects work engagement and productivity. This study will test two different serial mediations of each pathway. This research is expected to enlighten knowledge about work involvement. In addition, this research is also expected to criticize HR managers' policies in related professions and consider a sleep behavior intervention curriculum. Then, it is hoped that the findings of this study can add to knowledge about the observed variables, namely job stress, fatigue, sleep quality, and work involvement.

The literature review will be discussed by explaining the theory and previous research along with the hypotheses obtained for this research. Then explained the research method and presented the results of data analysis. After that, this research will be discussed and closed with a conclusion. The following is the order in which this research article is compiled after the introduction.

2. Literature Review

2.1 Theoretical Background

Demerouti et al. (2001) is the first figure that describes the Job Demands-Job Resources (JD-R) Model and is updated by Bakker & Demerouti (2007). This model tries to combine Karasek's (1979) Demand Control-Model (DCM)

with Siegrist's (1996) Effect Reward Imbalance Model (ERI) because they are felt to be related to one another. Based on Bakker & Demerouti (2007), the essence of the JD-R model is that every job has risk factors associated with job stress. There are two components of risk factors in the JD-R model. The first component is job or work demands, which can be physical, psychological, or organizational work demands related to physical or psychological costs and can become stressors (Bakker & Demerouti, 2007). Referring to Veldhoven (2014) explains that job demands are divided into two types, qualitative work demands and quantitative work demands. First, qualitative work demands relate to a task's difficulty level and the kind of expertise or effort required to complete a particular task or job. Both quantitative work demands are related to how quickly or much work must be done in a certain period. The second component of the JD-R Model is job resources. This component is in the form of physical, psychological, and organizational aspects that affect achieving goals, reduce the effect of job demands, and stimulate self-development. The JD-R model consists of two simultaneous processes. Referring to Schaufeli and Taris (2014), the previous JD-R model was only related to the work context or work environment. However, a new component was formulated in the more recent JD-R, namely, personal resources. Schaufeli and Taris (2014) explained that personal work resources are personal aspects related to resilience and individual ability to control and influence the environment well. Personal resources have the same management and goals as work resources.

Referring to Bakker & Demerouti (2007), two different processes in the JD-R Model cause job strain or trigger motivation. The first process causes job stress or health problems. All resources work physically and psychologically in this first process, causing fatigue and health problems. Then the second process is that work resources have a motivational impact that leads to high work involvement and good performance. Work resources have the role of intrinsic motivation because they can encourage the growth and development of workers, as well as act as extrinsic motivation in achieving work goals. This is because job stress is part of work demands, and sleep quality is part of work resources. Then, saturation and work engagement as outcome variables, such as tension or motivation outcomes. Based on the JD-R model, this research is part of the overall JD-R Model.

According to research by Klein et al. (2020), finding job demand and job resources is an important predictor of one's well-being and organizational outcomes. Radic et al.'s research (2020) found that job resources positively relate to work involvement. Then Salmela-Aro et al. (2019) found that work resources, such as job autonomy, rewards, and recognition, influence work engagement. Then in the study, workers found that work engagement mediated work demands and work resources on innovative work behavior.

2.2 Hypotheses Development

According to Selye (1977), job stress is a non-specific response the body gives after receiving a lot of external pressure and various reactions. Klein et al. (2020) state that job stressors include work pressure, workload, heavy responsibility, lack of power, and role ambiguity. Based on this explanation, this study argues that job stress is the body's reaction when under pressure, workload, heavy responsibility, lack of autonomy, and ambiguous roles. Thus, the readers have the same knowledge about the definition of job stress.

Nelson et al. (2021) define sleep quality as individual satisfaction with all aspects of sleep, namely efficiency, latency, duration, and awakening from sleep. Four aspects affect sleep: physiological, psychological, environmental, and a combination of all aspects (Nelson et al., 2021). Based on the previous sentence, it can be concluded that the quality of sleep is the satisfaction felt by individuals who are influenced by physiological, psychological, environmental, and all combined aspects.

HCWs have various sources of job stress. Referring to research conducted by Teo et al. (2021) found that the source of stress for HCWs is related to excessive working hours. Research conducted by Mintjelungan et al. (2019) stated that one source of stress for HCWs comes from many patients. Furthermore, research conducted by Choy and Wong (2017) concluded that the source of burnout for dentists has a lot to do with serving their patients, for example, dealing with patients who are easily anxious and uncooperative. Nainggolan (2019) researched nurses working in the emergency room of the Sumatran regional government hospital and found that almost half of the nurses at the hospital had high stress. He found that this high-stress level was related to relatively short work experience and a high workload. While treating their patients during the pandemic or not, the HCWs faced many patients worried about their illnesses. Kahn and Byosierre (1992) define job stress as various factors in job settings that negatively impact physical or psychological. Sonnentag et al. (2020) stated that job stress could be grouped into physical stressors, career stressors, task and obligation stressors, role stressors, traumatic events, and changes in work that have a negative impact. Wu et al. (2021) found that job stress is a predictor of burnout in nurses. Knudsen et al. (2007) found that job stress is related to poor sleep, making it harder for a person to fall asleep. Zhao et al. (2020) found that HCWs who experience psychological stress and long working hours will have poor sleep quality. This is supported by Yigitoglu et al. (2021), who found that the workload of HCWs, such as caring for and educating patients, can hurt the quality of their sleep. Recent research) stated that an increase in job stress scores would have implications for their poor sleep quality scores (Deng et al., 2020). Therefore, the researchers put forward the following hypothesis,

H1: There is a negative association between job stress and sleep quality.

Work engagement is a condition experienced by workers with their work. Based on the previous definition, work engagement is workers' behavior and positive thoughts towards their work, marked by enthusiasm and commitment to completing their tasks. According to Kahn (1990), work engagement is a person's expressive behavior for his work by showing sincerity. Schaufeli et al. (2008) define work engagement as a positive attitude towards work characterized by passion and dedication.

Based on research belonging to Diab and Nagar (2019), increased work stress can exacerbate work engagement because their work environment or the daily tasks they perform make their work engagement level drop. According to Demerouti et al. (2001) and Bakker & Demerouti (2007), high work demands, if not followed by commensurate work resources, lead to withdrawal by workers from their work. However, according to Agustina et al. (2022), Zahra et al. (2022), and Inoue et al. (2014) stated that work stress could motivate workers.

Klein et al. (2020), found that job stress has a negative and significant correlation with work engagement. Research by Diab and Nagar (2019) supports these findings. These two findings are supported by earlier research by Padula et al. (2012) that there is a significant relationship between job stress and work engagement. Then, the researcher proposes a hypothesis

H2: There is a negative association between job stress and work engagement.

Burnout is a condition experienced by someone when they feel tired. According to Maslach & Jackson (1981, 1984, Maslach, 1993), burnout is a psychological condition with symptoms such as depersonalization, decreased self-achievement, and emotional exhaustion. Schaufeli and Taris (2014) argue that burnout is a long-term impact of work demands followed by an imbalance of resources that causes fatigue. Based on this description, burnout is a psychological condition experienced by a person after receiving high work demands that trigger fatigue.

Burnout has a negative impact on workers and organizations. According to Maslach & Jackson (2002), burnout experienced by workers will affect work performance. This, of course, will slow down the organization in achieving its target because workers desire to stop working or rarely work, so their tasks take a long time to complete. Prasad-Reddy et al. (2021) said fugitives could impact personal and worker performance. Thus, burnout is dangerous because it can worsen work performance and trigger physical and psychological health problems.

Quoting Bakker & Demerouti (2007), an increase in workload that is not supported by balanced work resources can trigger burnout. The study by Klein et al. (2020) found that job stress has a positive and significant correlation with burnout. Further research, courtesy of Abarghouie et al. (2017), found that job stress has a positive and significant correlation with all burnout dimensions. Recent research by Wu et al. (2021) stated that job stress is a predictor of burnout, so the researchers put forward a hypothesis,

H3: There is a positive influence between job stress and burnout.

Sleep quality is believed to reduce the bad effects of burnout. Health workers have high work demands due to the many patients they treat (Maslach, 2007; Choy & Wong, 2017). According to Bakker & Demerouti (2007), ongoing stress causes burnout in workers. Rest is needed to avoid burnout due to job stress. Referring to the Job Demands-Job Resources (JD-R) Model, a high workload must be balanced with commensurate work resources to avoid burnout (Schaufeli & Taris, 2014). According to Sonnentag and Fritz (2020), workers can maintain their psychological well-being by resting after work. Schaufeli and Taris (2014) argue that personal resources can reduce boredom and increase work engagement. Research courtesy of Scott et al. (2021) found that improving sleep quality impacts psychological well-being, such as reducing depression, frustration, stress, and anxiety.

It can be concluded that sleep quality is an important process for HCWs to remain healthy physically and psychologically HCWs do productively even though they face heavy tasks at work and play a very important role in physical health. This finding is supported by earlier research belonging to Lai (2018) that good quality sleep can improve one's psychological well-being and life satisfaction. The next study, courtesy of a meta-analysis by Kang et al. (2020) found that sleep quality interventions carried out by nurses can improve the health of nurses and encourage their work performance.

Referring to Nelson et al. (2021), sleep quality is defined as individual satisfaction with all aspects of sleep. The sleep quality dimension covers sleep efficiency, latency, duration, waking after falling asleep, and sleep disturbances. Yigitoglu et al. (2021), conducted a qualitative study on HCWs during the pandemic. They found that the poor quality of sleep experienced by HCWs was associated with the level of depression they experienced. Sleep quality is an important factor in rest sessions research by Schleupner and Kühnel (2021) found that sleep quality is positively and significantly related to work engagement. These findings are supported by Kühnel et al. (2017) that sleep quality has a positive and significant relationship with work engagement. Previous research belonging to Barber et al. (2013) found that a low sleep quality score would impact a low work engagement coefficient. Based on this, the researcher proposes a hypothesis,

H4: There is a positive association between sleep quality and work engagement.

Sayilan et al. (2021) showed that an increase in the burnout coefficient would exacerbate the sleep quality coefficient. These findings are supported by Arora et al. (2015) research that increasing the burnout coefficient will

worsen a person's sleep quality. The latest publication by Yella and Dmello (2022) found that burnout predicts poor sleep quality. Grossi et al. (2021) stated that sleep is essential for human life and has a handling function for the physical and psychological. Based on the JD-R model, good sleep quality can restore the impact of the exploitation of work resources, which is the impact of job demands and workload (Bakker & Demerouti 2007), Based on this, the researcher proposes a hypothesis,

H5: There is a negative effect between burnout and sleep quality.

Schaufeli et al. (2008) define work engagement as positive thoughts related to work characterized by enthusiasm, dedication, and appreciation. Work engagement is permanent and comprehensive in the affective-cognitive aspect. Research by Slåtten et al. (2022) found that work engagement in nurses, in addition to impacting job satisfaction, also impacts the quality of patient care. According to Aryatno (2019), Hakanen et al. (2006), Klein et al. (2020), Salmela-Aro et al. (2019), and Schaufeli et al. (2008), this is in contrast and contradiction to burnout where the variable shows how a person dislikes and is less passionate about their work. Klein et al. (2020), show that burnout is associated negatively with work engagement. Hakanen et al. (2006) found that burnout will decrease someone's work engagement level, especially when one has poor job resources. These findings were also supported by Schaufeli et al. (2008), who found that all burnout dimensions had a negative and significant correlation with all dimensions of work engagement. Based on this, the researchers proposed the following,

H6: There is a negative effect between burnout and work engagement.

Besides reducing the negative effects of burnout, the benefits of quality sleep are increasing work engagement and productivity. The most recent study by Barber et al. (2013) found that sleep quality influences one's work engagement. Next, a more recent study by Kühnel et al. (2017) found that a worker who has good quality sleep at night and rests in the afternoon can increase their work engagement. These two studies are supported by recent research by Schleupner and Kühnel (2021), which found that good quality sleep will increase work engagement and improve psychological health. Based on this, it can be concluded that sleep quality can improve work engagement and even a worker's mental health.

Enjoying good quality sleep is greatly influenced by job stress. Furthermore, Zhao et al. (2020) research found that HCWs who experience increased psychological stress and long working hours will have poor sleep quality. Further research belonging to Yigitoglu et al. (2021), found that factors in the work of HCWs, such as caring for and educating patients, can cause them to experience depression and harm the quality of their sleep. These two findings are supported by a recent study by Jassem et al. (2022) HCWs tend to have poor sleep quality and even make them feel sleepy when working in the middle of the day. Based on this, the question arises whether the sleep quality variable effectively reduces burnout or the adverse effects of job stress. Referring to the research of Zhao et al. (2020), Yigitoglu et al. (2021), and Deng et al. (2020), who found that job stress is associated negatively with sleep quality. Furthermore, Klein et al. (2020), Diab and Nagar (2019), and Padula et al. (2012) stated that job stress is also negatively associated with work engagement. However, referring to Schleupner and Kühnel's publication (2021), Kühnel et al. (2017), and Barber et al. (2013), which states that sleep quality affects work engagement, we propose the hypothesis,

H7: Sleep quality mediates the association between job stress and work engagement.

Another reference from the publication of Abarghouie et al. (2017) and Wu et al. (2021) states that job stress is associated with burnout. Followed by the findings of Klein et al. (2020), Diab and Nagar (2019), and Padula et al. (2012), which state that job stress is correlated with work engagement. Subsequent research from Klein et al. (2020), Hakanen et al. (2006), and Schaufeli et al. (2008) showed that burnout has a negative and significant correlation with work engagement. Therefore, the researcher proposes a hypothesis,

H8: Burnout mediates the association between job stress and work engagement.

According to Sonnentag and Fritz (2020), burnout is avoidable if the workers take a break after work. Referring to the publication of Abarghouie et al. (2017), Klein et al. (2020), and Wu et al. (2021) stated that job stress is correlated with burnout. Further, recalling publications by Schleupner and Kühnel (2021), Kühnel et al. (2017), and Barber et al. (2013) state that job stress affects the quality of a person's sleep. Finally, the research by Sayilan et al. (2021), Arora et al. (2015), and Yella and Dmello (2022) found that burnout is correlated with the quality of one's sleep. Then, the researcher proposes a hypothesis:

H9: Burnout mediates the association between job stress and sleep quality.

3. Method

Design and Sample

The research design is non-experimental correlational quantitative that does not require manipulating the research variables. In this study, the participants were both men and women who worked as HCWs and had worked for at least six months/passed the probationary period. These requirements are needed because after a probationary

period then HCWs can work independently. Sampling will be done using an online survey. The survey will contain a research questionnaire, informed consent, and demographic data. The data collection began in early September and finished in the second week of October. We collected the data mainly from Java Island, Indonesia.

Measurements

Work engagement as the dependent variable will be measured using the short version of the Utrecht Work Engagement Scale developed by Schaufeli & Bakker (2004). UWES has a Likert scale of 1 (strongly disagree) to 4 (strongly agree). The higher the score, the more one feels engaged. The burnout will be measured with Oldenburg Burnout Inventory (OLBI) developed by Demerouti et al. (2001) and has been adapted by Radikun (2019) into The Indonesian Quality of Work Life Questionnaire (IQWiQ). OLBI has a Likert scale of 1 (disagree) to 4 (strongly agree). The higher the score, the more tired a person feels. Sleep quality as a mediating variable will be measured using the sleep quality scale developed by Yi et al. (2006) with 6 dimensions. Other than that, the SQS has a Likert scale answer choice of 1 (rarely) to 4 (always). The higher the score, the better the sleep quality. The Job stress will be measured using a job stressor (JS) from Frone et al. (1995), which has a Likert scale of 1 (never) to 4 (always). A higher score individual will experience worse job stress. An example of an item from each scale is shown in the table below.

Table 1. Examples of Measurement Items

No	Variable	Definition	Measurement Items	Measurement Scale
1.	Work Engagement (WE)	Positive thinking behavior related to work is characterized by enthusiasm, dedication, and appreciation (Schaufeli et al., 2002)	● WE1: At work, I feel full of energy ● WE2: I feel passionate about my work ● WE3: I am engrossed in my work ● WE4: At work, I feel strong and energized ● WE5: I take pride in my work ● WE6: I get carried away at work ● WE7: When I wake up in the morning, I am excited to go to work ● WE8: My work inspires me ● WE9: I feel happy when I work hard	Utrecht Work Engagement Scale Likert scale: 1. Very likely 2. Likely 3. Unlikely 4. Very unlikely
2.	Burnout	Negative feelings towards work include work disengagement and emotional exhaustion (Demerouti et al., 2001).	● BO1: I rarely encounter new and exciting things in my work ● BO2: There are days when I feel exhausted before arriving at work ● BO3: I complain more and more about my job ● BO4: After work, I tend to take longer than in the past to relax and feel better ● BO5: I do not tolerate pressure well at work ● BO6: These days, I tend to work without thinking but only mechanically ● BO7: My work is uninteresting to me ● BO8: At work, I often feel drained of my emotions ● BO9: Over time, a person may become discouraged or indifferent to this type of work ● BO10: After work, I do not have the energy to enjoy leisure ● BO11: Sometimes, I feel disgusted with my job ● BO12: After work, I usually feel low and tired ● BO13: I have too much work to do. I cannot allocate my time properly ● BO14: I find it increasingly difficult to do my job	Oldenburg Burnout Inventory 1. Strongly Agree 2. Agree 3. Disagree 4. Strongly Disagree

No	Variable	Definition	Measurement Items	Measurement Scale
3.	Sleep Quality (SQS)	individual satisfaction on all aspects of sleep, namely sleep efficiency, sleep latency, sleep duration, and waking after falling asleep (Nelson et al., 2021)	● JS1: I have too much work to do ● JS2: I feel I have much responsibility for the work of others ● JS3: I work very hard both physically and mentally ● JS4: I feel pressured when I am required to follow the latest techniques at work ● JS5: I am required to make potentially costly decisions if something goes wrong ● JS6: I have too long working hours ● JS7: I have a little help from co-workers to get the job done well ● JS8: I have few tools to get the job done well* ● JS9: I feel pressured when I have very high	Sleep Quality Scale Likert scale: 1. Never 2. Rarely 3. Often 4. Always
4.	Job Stress (JS)	Individuals experience of experiencing high job demands due to workload and heavy responsibilities (Frone et al., 1995)	● SQS1: I fall asleep easily. ● SQS2: I fell into a deep sleep. ● SQS3: I do not wake up easily. ● SQS4: If I wake up in the middle of my sleep, it will be easy to fall back asleep. ● SQS5: I wake up easily when I hear voices* ● SQS6: When I sleep, I toss and turn* ● SQS7: After sleeping, I feel refreshed* ● SQS8: Lack of sleep gives me headaches* ● SQS9: I get enough sleep* ● SQS10: Getting enough sleep makes me want to eat. ● SQS11: Getting enough sleep does not make me irritable. ● SQS12: Getting enough sleep makes it easy for me to think. ● SQS13: I feel energized after falling asleep. ● SQS14: Getting enough sleep makes me excited to work. ● SQS15: Sleep takes away my tiredness. ● SQS16: Getting enough sleep keeps me from making mistakes at work.	Job Stressor 1. Rarely 2. Sometime 3. Often 4. Always
			● SQS17: I am satisfied with my sleep ● SQS18: Getting enough sleep makes it easier for me to forget. ● SQS19: Getting enough sleep makes it easy for me to concentrate. ● SQS20: My daily activities are not disturbed by sleepiness. ● SQS21: Lack of sleep makes me lose the will to do something. ● SQS22: I have trouble getting out of bed* ● SQS23: Lack of sleep makes me tired easily at work. ● SQS24: My mind is clear after I fall asleep. ● SQS25: Getting enough sleep makes it easier for me to do my activities.	

Statistical Analyses

Structural Equation Modeling (SEM) is a multivariate method used to test the effect or causality relationship between variables (Fan et al., 2016). Hair et al. (2021) stated that SEM is a method that allows researchers to model complex relationships of several variables in research that are generally difficult to observe and result in precise measurement. After the SEM testing is appropriate, we will analyze the hypothesis using the path model ($t \geq 1.465$, Sig. 1 tail). This research uses the serial mediation analysis method. Which is a combined causality relationship between mediators in a certain direction (Charalambous et al., 2019). Furthermore, Zhao et al. (2020) stated that a variable can mediate if the mediator variable has a significant value impact on the indirect relationship (a x b).

4. Result and Discussion

Researchers used software tools to analyze this study's reliability and validity tests. The software of IBM SPSS 25 was used to analyze the reliability and validity tests. This research also used Lisrel 8.80 for the fit measurement test.

Results

The descriptive analysis of this research is shown in table 1. There are 225 respondents. Most of them is a woman (n=169), most of them are in the range of age 22-33 (n= 105), and most of them are working on Java Island (n=167).

Table 2. Demographic

Characteristic	Category	Quantity	Percentage
Gender	Male	56	24.9%
	Female	169	75.1%
Age	22-33	105	46.7%
	33-45	70	31.1%
	45-56	50	22.2%
Working Location	Java Island	161	71.6%
	Outside Java Island	64	28.5%

Measurement Model

The validity and reliability tests are the first step in the measurement model. The validity test shows that the questionnaire is under the research to be conducted. Validity is the suitability of the test scores with their original conditions (Kaplan & Saccuzzo, 2005). Wijanto (2015) says that the purpose of testing the validity at this stage is to find out whether the items are valid and whether they affect latent variables. The validity test conducted for this study refers to Hair et al. (2021) by using factor analysis to summarize variable information. Based on Hair et al. (2021), this factor analysis considers the component matrix/factor loading coefficient, Kaiser-Meyer Olkin coefficient (KMO), and Bartlett's Sphericity test. According to Wijanto (2015), values and indicators of the Standardized Loading Factor (SLF) are valid if the value is ≥ 0.5. From table 3, it can be seen that all items are valid.

A reliability test was conducted to determine the items' internal consistency level to measure latent variables. According to Cohen and Swerdlik (2009), a reliability test was conducted to determine the consistency of a measuring instrument with Cronbach's alpha. According to Kaplan and Saccuzzo (2005), a good interpretation of Cronbach's alpha for reliability coefficients ranging from 0.7 to 0.8. Testing is done by looking at the Construct Reliability (CR) coefficient (Hair et al., 2021). The questionnaire is considered feasible if the coefficient of the construct is ≥ 0.6 and the Average Variation Extracted (AVE) coefficient is ≥ 0.5. If the AVE is less than 0.5, it is still acceptable if the CR coefficient is ≥ 0.6 (Fornell & Larcker, 1981). The CR-AVE coefficient is obtained from the standard loading factor (SLF), which consists of each item's SLF coefficient and measurement error. However, several items on the Sleep Quality Scale questionnaire have very low scores, so they must be excluded: daytime dysfunction (SQ1-SQ8) and satisfaction with sleep (SQ21-SQ23). In addition, 1 out of 9 items in the Job Stress questionnaire have a coefficient value of less than 0.50, so these items are not used. Based on Table 4, the reliability test (CR-AVE) results show that all measuring instruments have a coefficient value above ≥ 0.6, declared reliable.

Structural Model

The second step is the model fit test or structural equation modelling. The model suitability test or fit measurement test functions to determine the suitability of each item. The compatibility test will refer to the goodness of fit index at this stage. Based on the structural test results, the RMSEA coefficient is .083. This value is still acceptable (Fabrigar, 1999). Besides the RMSEA coefficient to declare the fitness of a structural model, there is another approach where a minimum of one coefficient from each absolute indices and incremental indices fit above the requirement can be considered as "fit".

Table 3. Work Engagement, Job Stress and Burnout Factor Loading

Variable	Indicator	Factor Loading		Description
		1st run	2nd run	
Work Engagement	WE1	.82		Valid
	WE2	.84		Valid
	WE3	.82		Valid
	WE4	.87		Valid
	WE5	.61		Valid
	WE6	.77		Valid
	WE7	.50		Valid
	WE8	.50		Valid
	WE9	.80		Valid
Job Stress	JS1	.58		Valid
	JS2	.58		Valid
	JS3	.59		Valid
	JS4	.76		Valid
	JS5	.54		Valid
	JS6	.66		Valid
	JS7	.53		Valid
	JS8	.44	-	Not Valid
	JS9	.64		Valid
Burnout	BO1	.54		Valid
	BO2	.83		Valid
	BO3	.71		Valid
	BO4	.60		Valid
	BO5	.70		Valid
	BO6	.79		Valid
	BO7	.78		Valid
	BO8	.69		Valid
	BO9	.71		Valid
	BO10	.70		Valid
	BO11	.71		Valid
	BO12	.72		Valid
	BO13	.76		Valid
	BO14	.74		Valid
Sleep Quality	SQS1	.62	-	-
	SQS2	.75	-	-
	SQS3	.48	-	-
	SQS4	.65	-	-
	SQS5	-		-
	SQS6	-		-
	SQS7	-		-
	SQS 8	-		-
	SQS9	.40	-	-
	SQS10	.33	-	-
	SQS11	.39	-	-
	SQS12	.64	.60	Valid
	SQS13	.76	.75	Valid
	SQS14	.82	.83	Valid
	SQS15	.76	.76	Valid

Variable	Indicator	Factor Loading		Description
		1st run	2nd run	
	SQS16	.64	.64	Valid
	SQS17	.58	.55	Valid
	SQS18	.72	.73	Valid
	SQS19	.83	.84	Valid
	SQS20	.45	-	-
	SQS21	.68	-	-
	SQS22	.41	-	-
	SQS23	.85	-	-
	SQS24	.74	.73	Valid
	SQS25	.88	.89	Valid

Table 4. Convergent Reliability-AVE

Scale	Cronbach's Alpha	CR	AVE	Description
Work engagement	.93	.91	.55	Reliable
Job Stress	.79	.94	.51	Reliable
Sleep Quality	.92	.95	.54	Reliable
Burnout	.78	.83	.38	Reliable

Table 5. Good Fit Model.

	GOFI Indicator	Requirement	Result	Description
Absolut Fit Indices	RMSEA	≥.08 - ≤ .1	.083	Marginal Fit
	SRMR	≤ .08	.065	Good Fit
	GFI	.8 ≤ GFI ≤ .9	.87	Good Fit
	AGFI	≥ .90 or .8 ≤ AGFI ≤ .9	.83	Good Fit
Incremental Fit Indices	NFI	≥ .90	.94	Good Fit
	NNFI	≥ .90	.95	Good Fit
	CFI	≥ .90	.96	Good Fit
	IFI	≥ .90	.96	Good Fit
	RFI	≥ .90	.92	Good Fit

Discussion

First, the relationship between job stress and sleep quality among health workers is insignificant (0.81≤ -1.96). Even though H1 is not supported and the difference between Deng et al. (2020), Yigitoglu et al. (2021), and Zhao et al. (2020) is that job stress has a negative effect on sleep quality. This is because there is no significant relationship between job stress and sleep quality. These findings indicate that health workers perceive stress at work, making it difficult to sleep. Given the dimensions of the variable quality of sleep, the most powerful in this study is difficulty sleeping. This also explains why the t-value coefficient on the relationship between job stress and sleep quality is positive.

Second, the relationship between job stress has a positive and significant effect (3.39 ≥ 1.96) on work engagement in health workers. Even though H2 is not supported and the difference is from Diab and Nagar's research (2019), Klein

et al. (2020), and Padula et al. (2012), which state that job stress has a negative effect on work engagement. Health workers stated that higher perceived job stress had a negative effect on worker involvement. However, this study proves another direction of the relationship between job stress and job involvement.

Several studies prove that job stress and work engagement can be positively related. Research by Agustina et al. (2022) found that job stress has a positive effect on work engagement because workers can focus on their work and feel overly excited. In addition, Zahra et al.'s research (2022)) states that over time a person will become more involved in his work because the focus is on completing his tasks, and tasks that are considered complicated provide additional motivation for workers. Research findings by Agustina et al. (2022), Zahra et al. (2022), and Inoue et al. (2014) support the findings in this study and explain that workload can motivate workers to stay motivated. This finding also confirms that one form of stress is eustress (Selye, 1977). Eustress is good stress that causes a positive reaction in a person and stimulates positive and excited emotions (Bienertova-Vasku et al., 2020).

Third, the association between job stress (10.73 ≥ 1.96) and burnout in HCWs shows a significant positive relationship. Though H3 is supported and in line with Abarghouie et al. (2017), Klein et al. (2020), and Wu et al. (2021), which state that job stress is a predictor of burnout. Another finding in this study found that job stress has a positive effect on burnout, as in many previous studies such as that of Klein et al. (2020), Reith (2018), Maslach (2007) Choy & Wong (2017). Job stress or workload for HCWs includes the large number of patients to be served, taking care of patients, especially those who are not independent, long working hours, and much administrative work. This finding confirms Selye's (1977) writing about distress or negative stress. Distress is stress that makes individuals react negatively to the situation they face and has a negative effect on their physical and psychological levels (Bienertova-Vasku et al., 2020).

Fourth, an association between sleep quality (8.53≥ 1.96) and work engagement in HCWs shows a significant positive relationship. Tough H4 is supported and in line with the research by Barber et al. (2013), Kühnel et al. (2017), Schleupner and Kühnel (2021), which state that sleep quality has a positive influence on work engagement. Referring back to the JD-R Model, spending his work resources must be balanced with good work resources (Bakker & Demerouti, 2007). Good quality sleep is the best resource for health workers to generate job stress exploitation and improve work. This justifies the mediating effect of sleep quality on the relationship between job stress and job involvement.

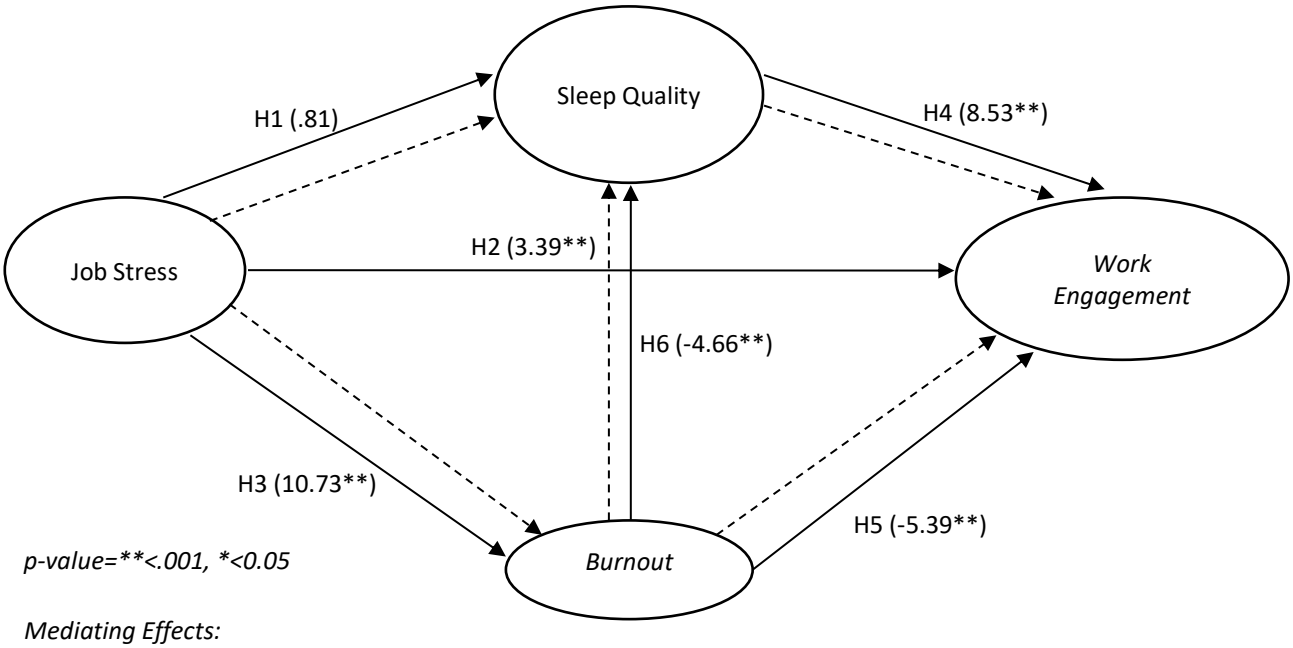
Fifth, an association between burnout (-5.39 ≤ -1.96) and work engagement in HCWs shows a significant negative relationship. Tough H5 is supported and in line with Hakanen et al. (2006), Schaufeli et al. (2008), and Klein et al. (2020), which state that burnout worsens one's work engagement. Research by Klein et al. (2020) states that burnout is the opposite of work engagement. Likewise, the study of Schaufeli et al. (2008) found a negative correlation between burnout and work engagement due to fatigue and negative emotions at work. These findings should provide clarity that burnout and work engagement can be analyzed simultaneously without having to see which one appears first

Sixth, the association between burnout (-4.66 ≤ -1.96) and sleep quality in HCWs shows a significant negative relationship. H6 is accepted and supported by research from Sayilan et al. (2021), Arora et al. (2015), and Yella and Dmello (2022), who stated that burnout worsens one's sleep quality. Finally, this study found that burnout has a negative effect on sleep quality. These findings support the findings of previous research belonging to Grossi et al. (2021) and May et al. (2020), which state that burnout has a negative relationship with the quality of sleep one has. Grossi et al. (2021) stated that sleep is very important for human life and has a restorative function for the physical and psychological when it is associated with the JD-R Model. Good quality sleep can restore the impact of the exploitation of work resources, which is the impact of work demands and workload.

Table 8. Path Coefficient

Path	T-Value	Coefficient	Result
Job stress ➔ Sleep Quality	.81	.08	H1 Not Supported
Job stress ➔ Work engagement	3.39**	.27	H2 Not Supported
Job stress ➔ Burnout	10.73**	.67	H3 Supported
Sleep Quality ➔ Work engagement	8.53**	.48	H4 Supported
Burnout ➔ Work Engagement	-5.39**	-0.44	H5 Supported
Burnout ➔ Sleep Quality	-4.66**	-0.43	H6 Supported
Job Stress➔Sleep Quality➔Work Engagement	4.47**	.30	H7 Supported
Job Stress➔Burnout➔Work Engagement	-57.8**	-0.02	H8 Supported
Job Stress➔Burnout➔Sleep Quality	-50.0**	.36	H9 Supported

*= .083, p-value=**<.001, *<0.05*



Mediating Effects:
H7 (Job Stress - Sleep Quality - Work Engagement): .30**
H8 (Job Stress - Burnout - Work Engagement): -0.02**
H9 (Job Stress - Burnout - Sleep Quality): .36**

Figure 1. Research Model and Results

The results of testing the mediating effect of sleep quality variables on the relationship between job stress and work engagement by adding up the total value of the effect of direct and indirect relationships show a value of $t \geq 1.96$. Thus, sleep quality mediates the relationship between job stress and work engagement in health workers. Based on this, H7 is accepted by previous research by Deng et al. (2020), Yigitoglu et al. (2021), Zhao et al. (2020), Diab and Nagar (2019), Klein et al. (2020), and Padula et al. (2012) which shows that each variable affects one another. These findings provide that sleep quality can be a mediating variable and have a different role in previous studies which acted only as a dependent or independent variable, such as Yigitoglu et al. (2021) and Zhao et al. (2020). Reith (2018) states that HCWs are a profession that is highly trusted by the community and has very good ethics at work. The heavy workload of HCWs is perceived as dedication to their work, and the presence of quality sleep can strengthen work engagement because HCWs think of their patients. HCWs must also always be alert, especially when dealing with patients with high emergencies or dependencies.

The results of testing the mediating effect of the burnout variable on the association between job stress and work engagement by adding up the total value of the effects of direct and indirect relationships show a value of $t \leq -1.96$. It can be concluded that burnout mediates the relationship between job stress and work engagement in HCW's. Based on this, H8 is accepted by previous research by Abarghouie et al. (2017), Deng et al. (2020), Yigitoglu et al. (2021), Zhao et al. (2020), Diab and Nagar (2019), Klein et al. (2020), Padula et al. (2012), Hakanen et al. (2006), and Schaufeli et al. (2008), and Wu et al. (2021) which shows that each variable affects one another. These findings provide a view that burnout can be a mediating variable and have a different role than in previous studies, which acted only as a dependent or independent variable such as that of Deng et al. (2020), Klein et al. (2020), and Wu et al. (2021). The results of this study indicate that job stress increases work engagement, and the presence of burnout in this relationship can have a mediating effect. Researchers believe that the right workload will motivate workers to be enthusiastic about completing their tasks, as stated by Inoue et al. (2014). Researchers think that work engagement comes earlier than burnout because it refers to the definition of burnout, namely negative feelings towards work in the form of disengagement and emotional exhaustion (Demerouti et al., 2001). Negative feelings towards work are achieved when a person cannot balance the demands of work and work resources.

The results of the mediating effect of the burnout variable on the association between job stress and sleep quality by adding up the total value of the effects of direct and indirect relationships show the t value ≤ -1.96. It can be concluded that burnout mediates the relationship between job stress and sleep quality in HCWs. Based on this, H9 is accepted and by previous research by Abarghouie et al. (2017), Klein et al. (2020), Wu et al. (2021), Schleupner and Kühnel (2021), Kühnel et al. (2017), Barber et al. (2013), Sayilan et al. (2021), Arora et al. (2015), and Yella and Dmello (2022)which show that each variable affects one another. We also found that burnout mediates the relationship between

job stress and sleep quality. This finding supports previous research studies such as those of Schleupner and Kühnel (2021), Kühnel et al. (2017), Barber et al. (2013). The mediating effect of the burnout variable can have a significant influence on the relationship between job stress and sleep quality in this study. Full detail shown table below.

5. Conclusion

Based on the research results on job stress, sleep quality, burnout, and work engagement. It can be concluded that sleep quality mediates the relationship between job stress and work engagement. Work can be a risk factor for job stress. In the JD-JR model, health workers need special expertise to carry out medical procedures and serve many patients, which can affect the number of working hours. Thus, health workers can take the initiative to divide their time properly, so that rest time is sufficient and has an effective coping mechanism to continue providing optimal service. The better the quality of sleep that HCW's have, the more work engagement they experience, which is caused by job stress which the HCW's perceive as motivation and dedication to their work. These findings also justify that there is one type of good stress known as eustress. Secondly, burnout mediates the relationship between job stress and work engagement in HCW's. In this study, job stress and work engagement have a positive relationship, but with the presence of burnout, HCW's tend to have the desire to "disengage" from their work. This finding also justifies that there is another type of stress, namely distress, which is negative stress and impacts badly on individuals. Based on this finding, we recommend for HCW's to balance their job-stress or job demand with their job resources, one of which is having a good sleep quality that is not only impacted by the job itself but also their lifestyle. For HR managers to assign tasks or positions for employees or HCW's, it must be clear so the clarity of the given task could motivate HCW's and complete their job. Health institutions can provide a break for HCW's, especially those who have very long working hours to sleep for a few hours since sleep is a "tool" that can restore both physical and psychological condition. Health institutions may also consider adding additional staff if they are short in staff based on the results of workload analysis. Health institutions have to create a regulation of working hours for their HCW's. Health institutions can create remuneration systems, incentives, and HR policies that encourage productivity and fairness, for example, facilitating leave permits for HCW's or regulating how many medical operations each HCW can attend weekly.

The research design used was cross-sectional, so the exact relationship between actual working conditions and all scale dimensions cannot be interpreted simply. Longitudinal studies are needed to validate the hypotheses in this research model. In addition, this research was carried out in the service sector, specifically health workers who have responsibility for the lives of others. Although this research was conducted in Indonesia, none of the respondents came from central and eastern Indonesia. Then, many of the respondents in this study were health workers who had worked for a long time and had significant experience in dealing with various situations. The final weakness of this study is regarding the sleep quality scale because we reduced many items that might affect the results of this study. Future research is expected to find or create a sleep quality scale suitable for Indonesian workers, conducting studies on other sectors or on a more micro scale. In addition, future research can make new research from each variable or dimension in this study to produce more detailed findings.

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Author Contribution

Author 1 created the conceptualization, writing the original draft, data collection, data analysis, investigation, and methodology.
Author 2 provided the review and editing, supervision, and validation.

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Conflict of Interest

The authors declare that this research was conducted without any commercial or financial beneficiaries, leading to a conflict of interest.

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