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ORIGINAL RESEARCH

The Association of Nurse Burnout with Patient Satisfaction from Nurse Perspective Mediated by Nurse Job Satisfaction and Caring Behavior

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Abstract

Background: The COVID-19 pandemic represents a substantial threat to world health, economic stability, and civilization in general. In the COVID-19 era, health workers, particularly frontline nurses, face increasing pressure which further affects patient satisfaction. However, empirical studies that connected burnout, job satisfaction, and caring behavior toward patient satisfaction from the nurses' point of view are still scarce.
Purpose: This study aimed to explore the relationship between nurse burnout with patient satisfaction mediated by work satisfaction and nurse caring behavior at a private COVID-19 referral hospital from the nurses' perspective.
Methods: A quantitative survey with a cross-sectional approach was conducted from March to April 2021 to test the framework on the population obtained from full-time nurses who worked at a private COVID-19 referral hospital in Manado, North Sulawesi, Indonesia. The researcher analyzed the empirical data generated from purposive sampling resulting in 170 eligible respondents. Data were collected through a self-completed online questionnaire with the Likert scale. The data analysis deployed the PLS-SEM approach.
Results: The findings indicate that nurse burnout is associated significantly (p<0.05 and CI 95%) with the delivery of patient satisfaction from the nurses' perspective, mediated by job satisfaction and nurses' caring behavior. The mediation relationship was found with β=0.021, while the direct relation from caring behavior to patient satisfaction was β=0.277 and from job satisfaction was β=0.582. The proposed model demonstrated adequate prediction of patient satisfaction as the dependent variable (R^2=0.633).
Conclusion: This study concluded that nurse burnout which consists of three dimensions mediated by job satisfaction and caring behavior had an association with patient satisfaction. Increased burnout will result in decreased job satisfaction and caring behavior. This study provides suggestions to the hospital manager to improve the quality of care by understanding nurse burnout and preventing it.

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1. Introduction

The coronavirus disease 2019 (COVID-19), which was initially found in Wuhan, China, spread rapidly around the world, raising worries about the safety of front-line healthcare personnel (WHO, 2020). Numerous measures have been taken to disrupt the disease's chain of transmission, one of which is the deployment of frontline health personnel such as physicians and nurses around the region (De Los Santos & Labrague, 2021). In this condition, nurses have serious psychological and mental difficulties, which can result in mental tiredness, decreased productivity, job errors, and a lack of focus when dealing with patients. The second wave of COVID-19 is currently sweeping the world, and the number of nurses in danger of burnout is increasing in health institutions (Garcia & Calvo, 2020).

It was estimated that 83% of health professionals in Indonesia experience moderate to severe burnout, which has impacted the workforce's life and psychological productivity (Humas FKUI,

2020). Additionally, it was discovered that frontline medical staff was twice as likely to develop burnout during the COVID-19 pandemic (Asif et al., 2019; Regina et al., 2021). To avoid or minimize burnout, it is critical to assess and monitor the work environment, identify problems, and take preventative action (Altinoz, 2016; Babapour et al., 2022; De Los Santos & Labrague, 2021). Burnout is a psychological condition described as a negative emotional response to work as a result of a prolonged stressful work environment (Galanis et al., 2021). To avoid or minimize burnout, it is critical to assess and monitor the work environment, identify problems, and take preventative action (Altinoz, 2016; De Los Santos & Labrague, 2021).

The Maslach Burnout Inventory was used to determine burnout (MBI). The MBI evaluates three dimensions of burnout: emotional weariness, depersonalization, and diminished sense of achievement (García & Calvo, 2012). Burnout results in decreased motivation, decreased productivity, and increased negative attitudes and actions at work (Andy et al., 2022; Raudenská et al., 2020). These three factors can contribute to patient dissatisfaction with medical care. Nursing burnout from work-related stress has a detrimental impact on nurses' quality of life and health. It may also overshadow nursing performance and diminish nursing care behaviors, which could be a contributing cause to patient satisfaction (Babapour et al., 2022).

Patient satisfaction is a generally accepted predictor of the quality of medical services and a positive indicator of a variety of factors, including patient compliance with treatment, malpractice claims, hospital personnel job satisfaction, and financial success (Garrosa et al., 2011; Tervo-Heikkinen et al., 2008). Patients are generally unlike the customer due to their emotional, psychological, and physical characteristics. They require both care and satisfaction. Meanwhile caring conduct refers to the physical and emotional components of nursing care delivered to patients. In this study, patient satisfaction was measured through the perspective of nurses who interact with patients, this is following previous research (Topaz et al., 2016).

There are several empirical research on the mental health of clinical healthcare professionals during the COVID-19 pandemic (Jason & Antonio, 2021; Jun et al., 2021; Regina et al., 2021). However, limited were focus on nurse caring behavior and its impact on patient satisfaction although it is a crucial factor in the quality of care (Kibret et al., 2022). Nursing is affected by hospital nurses' capacity to offer great care while managing stress at work (Adella et al., 2024; Jun et al., 2021). Therefore, understanding patient satisfaction from the nurse's perspective who is directly involved in the front line of service should be done before the management initiative on service improvement. The purpose of this study was to identify the association of nurse burnout with patient satisfaction mediated by nurse job satisfaction and caring behavior in a private COVID-19 referral hospital during the pandemic, as well as the impact on patients. The findings of this study may help to a better understanding of nurses' views of caring behavior and job satisfaction, which may influence hospital delivery of care. In that regard, it is due to hospital management's ability to resolve this issue in the future.

2. Methods

2.1. Research design

This is a quantitative survey following a cross-sectional design with hypothesis tests on the relation between variables in the model. This study is non-interventional and has no treatment for the subjects. The conceptual framework was developed from the previous study by Jun et al. (2021), Rego et al. (2010), and Weng et al. (2011). The variables related to this study were nurse burnout (NB, including emotional exhaustion [EE], depersonalization [DP], and personal accomplishment [PA]), nurse job satisfaction (JS), nurse caring behavior (CB), and patient satisfaction (PS), which were the parameters. The description of the association is illustrated as the conceptual framework shown in Figure 1, with the proposed hypotheses listed below.

H1: Nurse burnout has a negative association with nurse job satisfaction.
H2: Nurse burnout has a negative association with nurse caring behavior.
H3: Nurse job satisfaction has a positive association with nurse caring behavior.
H4: Nurse job satisfaction has a positive association with patient satisfaction.
H5: Nurse caring behavior has a positive association with patient satisfaction.

2.2. Setting and samples

The analysis unit is an individual analysis unit, which means the data obtained from individuals on each respondent report (Bougie & Sekaran, 2020). Since the scope of this study is

the nurse perspective following the previous studies (Topaz et al., 2016), the chosen population was full-time nurses who worked at the hospital, taking care of suspected or confirmed COVID-19 patients during 2021 and working for more than a year in the hospital. The main criteria that needed to be fulfilled for respondents were a permanent or full-time nurse, and providing service during the pandemic. The nurses who were sick at the time the questionnaire was distributed were excluded. Nurses were reasonably chosen as an analysis unit because they interact more with COVID-19 patients compared to other health workers. The study is based on a private COVID-19 referral hospital in Manado, North Sulawesi, Indonesia, that has been treating COVID-19 patients since the pandemic started.

Respondents were chosen using the purposive sampling method. The respondents were obtained from March to April 2021 during the COVID-19 pandemic. A number of 170 respondents fulfilled the requirements and this amount met the naive criteria of the 160 minimum sample requirement based on guidance for analysis with partial least squares structural equation modeling (PLS-SEM) with inverse square root calculation (Kock & Hadaya, 2018).

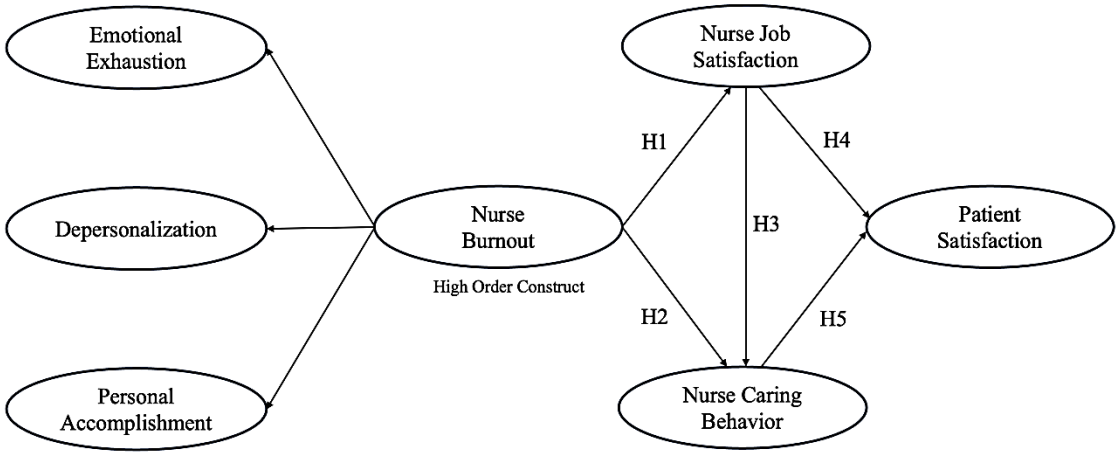

Figure 1. Conceptual framework

2.3. Measurement and data collection

This survey used the Likert scale from 1 (strongly disagree) to 5 (strongly agree) to determine the variants between components and facilitate data report conversion from the respondents into number format. The scale instrument to measure the latent variable was developed from previous studies (see Table 2). The burnout instrument was adapted from García & Calvo (2020), while job satisfaction was adapted from Giacopelli et al. (2013), and caring behavior from Rego et al. (2010). Patient satisfaction from a nurse perspective was adapted from Cleven et al. (2016). The instrument was translated into Indonesian by a linguist and then underwent face validity consisting of five experts. In content validity, the Aiken value was found to be above 0.6 for all instrument items so it was said to be adequate. Several question sentences were revised after face validity was carried out to make them easier for respondents to understand. In addition, the item content validity index (I-CVI) met the average value of 4 from the five experts.

Data were obtained by a self-completed online questionnaire. It was done by sending a link to an online questionnaire to all respondents who fulfilled the previously determined criteria. In distributing this questionnaire, coordination was carried out with hospital management to ensure that the questionnaire was filled in by the right person.

2.4. Data analysis

This study employed a hierarchical component with a reflective-reflective measurement (dimension) for nurse burnout. The overall model included four variables, namely nurse burnout, nurse job satisfaction, nurse caring behavior, and patient satisfaction, and three burnout dimensions, which were emotional exhaustion, depersonalization, and personal accomplishment. Data were analyzed using the PLS-SEM method due to the complex structural model with many

indicators and paths in the model. Furthermore, this was also an explorative and predictive-oriented study that gives insight and predictive ability for further development (Hair et al., 2019).

The PLS-SEM analysis was applied through SmartPLS™ version 3.3.8 (SmartPLS GmbH, Oststeinbek, Germany), which was selected as it provides a bootstrapping menu to test significance (Memon et al., 2021). Two types of models analyzed by PLS-SEM were the outer and inner models. The outer model tested the relationship between indicators and construct variables to establish reliability and validity while the inner model or structural model provided the relationship between constructs in the study model. Before filling out the questionnaire each respondent was given informed consent. Respondents were given clear information that this study was voluntary and anonymous.

2.5. Ethical considerations

This study was approved by the Institutional Review Board (IRB) of Universitas Pelita Harapan with a reference number 048/MARS-FEB-UPH/II/2021. Before filling out the questionnaire, potential respondents were informed in writing that this questionnaire was voluntary and anonymous and the confidentiality of data from respondents would be treated as well. Informed consent was obtained from all respondents.

3. Results

3.1. Respondents' characteristics

Out of 170 respondents who fulfilled the study criteria, such respondents were full-time nurses who worked during the pandemic. The 132 respondents were women and 38 were men. The majority of the respondents were in the 21-30 years age group, who were categorized as young nurses within the age distribution between 21 to 50 years old. Overall, 170 respondents had a proper education, where 45.89% of respondents finished their nurse professional education, and 34.12% graduated with a diploma in nursing. With this educational background, the respondents were considered a match for the purpose of the nursing study sampling. Most respondents worked in the inpatient ward, which can be related to the caring level of the nurses, especially for hospitalization. In addition, 75% of respondents have been confirmed infected with COVID-19. The following describes the respondents' profiles in this study (Table 1).

Table 1. Respondents' characteristics

Characteristics		f	%
Gender	Male	38	22.36
	Female	132	77.64
Age	21-30 years	125	73.53
	31-40 years	38	22.36
	41-50 years	7	4.11
	>50 years	0	0
Education	Nursing school or equivalent	0	0
	D3 nursing (3-year diploma)	58	34.12
	D4 nursing (4-year diploma)	5	2.94
	S1 nursing (undergraduate)	29	17.05
	Nurse profession	78	45.89
Length of work in the hospital	<1 year	0	0
	1-2 years	138	81.18
	3-4 years	32	18.82
	>4 years	0	0
Department	Outpatient	15	8.90
	Inpatient	77	45.30
	Emergency	41	24.10
	ICU	8	4.70
	Operating theatre	29	17.00
History of confirmed COVID-19	Yes	128	75.00
	No	42	25.00

3.2. Descriptive score of variables

From the survey results, the average value on a scale of 1 to 5 for the patient satisfaction variable was 4.239 (SD=0.679) with a minimum observed of 3 and a maximum of 5, so it can be interpreted that the majority of respondents felt they had provided services to patient satisfaction. For the caring behavior variable, the average value is 4.225 (SD=0.623) while for job satisfaction it is 4.023 (SD=0.712). For the dimensions of burnout, the mean value of personal accomplishment is 3.620 (0.811) depersonalization 3.667 (SD=0.783), and emotional exhaustion 3.797 (SD=0.765). The highest mean score is from personal exhaustion and this shows the condition of nurses when working to serve patients in the pandemic era.

3.3. Reliability and validity of the instrument

Based on the results of the outer model in the PLS-Algorithm, 21 reflective indicators of variables had an outer loading of more than 0.70 as required. Several indicators with an outer loading value of < 0.7 were deemed invalid, so they had to be eliminated from further analysis. Indicators that were taken out include EE3, EE5, and EE6 from the emotional exhaustion variable; indicators DP3, and DP4 from the depersonalization variable; indicator PA3 from the personal accomplishment variable; indicators JS5, JS6, JS7, and JS8 from the job satisfaction variable; indicator CB4, CB5, CB6, and CB7 from the caring behavior variable; and indicator PS5, PS6 from the patient satisfaction variable. After the elimination, it can be seen in Table 2, that the 21 indicators had an outer loading greater than 0.70. Thus, all reflective indicators in this study were reliable in measuring their constructs.

Table 2. Construct reliability and validity

Variables	Indicators		Outer Loading	CA	CR	AVE
Emotional Exhaustion	EE1	I feel my emotions drain because of work.	0.894	0.875	0.923	0.800
	EE2	I feel very tired at the end of the working day.	0.908			
	EE4	I often feel frustrated with this job.	0.881			
Depersonalization	DP1	I often treat patients as if they were just objects.	0.860	0.818	0.892	0.736
	DP2	I often become insensitive to other people because of this workload.	0.941			
	DP5	I feel that patients often blame me for their problems.	0.763			
Personal Accomplishment	PA1	I can easily understand how patients feel about the things they want.	0.891	0.914	0.940	0.795
	PA2	I feel I can resolve patient complaints effectively.	0.887			
	PA4	I feel passionate about doing my job serving and helping patients.	0.904			
	PA5	I tend to easily create a comfortable atmosphere with patients.	0.886			
Job Satisfaction	JS1	I feel satisfied when I can complete the task in accordance with the allotted time.	0.832	0.810	0.876	0.639
	JS2	I feel satisfied when given a task according to my abilities.	0.792			
	JS3	I feel satisfied when my work is better than before.	0.864			
	JS4	I feel satisfied when my work performance is recognized by the supervisor.	0.700			
Caring Behavior	CB1	I treat patients humanely and show concern for patients' complaints.	0.914	0.864	0.917	0.786
	CB2	I show that I am there when the patient needs me.	0.900			
	CB3	I often ask patients how they would like to be treated.	0.845			
Patient Satisfaction	PS1	Patients feel that they are sufficiently informed about their treatment process by the doctor.	0.902	0.891	0.924	0.754
	PS2	Patients feel that they are getting health services according to their expectations.	0.861			
	PS3	Patients feel that they get good communication from the medical staff.	0.894			
	PS4	Patients receive quality medical services according to their needs.	0.813			

Notes: EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment; JS: Job Satisfaction; CB: Caring Behavior; PS: Patient Satisfaction; CA: Cronbach's Alpha; CR: Composite Reliability; AVE: Average Variance Extracted

Nurse burnout consists of three dimensions, which are emotional exhaustion, depersonalization, and personal accomplishment. Based on Table 2. above, the assessment for emotional exhaustion, depersonalization, and personal accomplishment was reliable by observing the outer loading of the respective indicator.

Aside from outer loading, reliability needs to be tested by measuring construct reliability (Cronbach's alpha and composite reliability). Further the validity test through the Average Variance Extracted (AVE), and discriminant validity through the Heterotrait-Monotrait (HTMT) ratio as suggested by Hair et al. (2019). Table 2 described that Cronbach's alpha value of all constructs was higher than 0.7 and the composite reliability value had fulfilled the requirement for composite reliability criteria less than 0.95. To determine reliability, all variables should have a value of 0.7 to 0.95. Therefore, it could be said that all indicators were reliable to measure its construct respectively. The results show that each construct has an AVE value of more than 0.50, thus the indicators are valid to measure the construct.

The discriminant validity test with the result in Table 3 was aimed to determine the match of the indicators and the construct across the model. Discriminant validity was measured from the cross-loading value between each variable. If the correlation between variables and indicators is higher than the correlation between a variable and another variable, then the variable is said to be able to predict its indicator better than other variables (Hair et al., 2019). The data above provided an HTMT ratio which is known as more precise to gain the discriminant validity. It was found each variable was under 0.9, except for nurse burnout on emotional exhaustion and depersonalization which cannot be established. This is because the burnout variable was tested with the repeated indicator approach to test the dimension, whereas the same indicators were used in the three dimensions and variables. It can be concluded that all model indicators have been well discriminated and can measure their construct.

Table 3. Discriminant validity

Variables	CB	DP	EE	JS	NB	PS	PA
Caring Behavior	1						
Depersonalization	0.711	1					
Emotional Exhaustion	0.622	0.653	1				
Job Satisfaction	0.792	0.808	0.692	1			
Nurse Burnout	0.725	*0.844*	*1.020*	0.754	1		
Patient Satisfaction	0.743	0.807	0.784	0.886	0.865	1	
Personal Accomplishment	0.678	0.729	0.806	0.627	*1.002*	0.769	1

Notes: CB: Caring Behavior; DP: Depersonalization; EE: Emotional Exhaustion; JS: Job Satisfaction; NB: Nurse Burnout; PS: Patient Satisfaction; PA: Personal Accomplishment

3.4. Structural model analysis

To assess the multicollinearity problems between variables in this model and the common method bias probability, the inner variance inflation factor (VIF) was used with a result of lower than 5 in all variables. From the VIF result it can be concluded that all variables in this study model had an ideal inner VIF and therefore no multicollinearity issue was found in the model. The explanatory and predictive ability of this model was tested using R^2 and Q^2*_predict* as recommended (Hair et al., 2019; Sarstedt et al., 2017, 2022). The test showed that patient satisfaction has R^2=0.633, which was categorized as moderate to strong predictive accuracy. Patient satisfaction is a dependent variable that could be explained by 63.3% of the variables in the model and 36.7% by other variables outside this model.

To determine the predictive ability of this model, the authors conducted a blindfolding procedure (Hair et al., 2017, 2019). The Q^2 (predictive relevance) value between 0 to 0.25 can be considered to have a medium predictive relevance. A Q^2 value of more than 0.5 is considered to have a large predictive relevance. The higher the Q^2 value, the higher the ability of a variable to predict (Hair et al., 2019). In this study, the patient satisfaction variable had a medium predictive relevance with a Q^2 value of 0.460 and a Q^2*_predict* of 0.568 and was considered adequate to predict patient satisfaction.

Out of five hypotheses tested on the nurses in this model, all were proven significant due to the T-statistic value >1.645 (one-tailed test with 0.05 alpha). Confidence interval within a positive

range for H3, H4, and H5 with a lower limit of 5% and an upper limit of 95%. Meanwhile, the two H1 and H2 had negative confidence interval ranges were nurse burnout on job satisfaction and, nurse burnout on caring behavior, meaning the higher burnout the lesser job satisfaction and caring behavior. All five hypotheses in Table 4 had a valence standardized coefficient (β) which followed the directional hypothesis.

Table 4. Significance and coefficients

Hypothesis		Standardized Coefficient	T-statistics	5.0% CI	95.0% CI	P-Value	Result
H1	NB → JS	-0.667	16.350	-0.732	-0.599	0.000*	Hypothesis Supported
H2	NB → CB	-0.360	4.424	-0.504	-0.236	0.000*	Hypothesis Supported
H3	JS → CB	0.437	5.298	0.290	0.562	0.000*	Hypothesis Supported
H4	JS → PS	0.582	9.665	0.479	0.676	0.000*	Hypothesis Supported
H5	CB → PS	0.277	4.556	0.181	0.379	0.000*	Hypothesis Supported

*Sig. at $p \leq 0.05$; CI: Confidence Interval

A direct effect on patient satisfaction came from nurse job satisfaction and nurse caring behavior where nurse job satisfaction provided a larger effect on patient satisfaction. It also had a significant direct effect on nurse caring behavior. If nurse job satisfaction increases, then caring behavior and patient satisfaction will also increase. Job satisfaction most strongly affected caring behavior (β=0.437). The nurse burnout construct can be explained most strongly by the personal accomplishment dimension, followed by emotional exhaustion and depersonalization.

Every path to patient satisfaction indicated a significant relation in the indirect effect (Table 5). This showed that the two mediator factors played a significant role that needed to be considered in the process of providing patient satisfaction. The predominantly path was shown from nurse burnout to job satisfaction, and then to caring behavior. This result confirms the mediation effect of job satisfaction and caring behavior as well.

Table 5. Specific indirect effect test result

Path	Coefficients	T-statistics
Job Satisfaction → Caring Behavior → Patient Satisfaction	0.033	3.718
Nurse Burnout → Job Satisfaction → Patient Satisfaction	0.051	7.567
Nurse Burnout → Job Satisfaction → Caring Behavior	0.053	5.489
Nurse Burnout → Caring Behavior → Patient Satisfaction	0.037	2.668
Nurse Burnout → Job Satisfaction → Caring Behavior → Patient Satisfaction	0.021	3.842

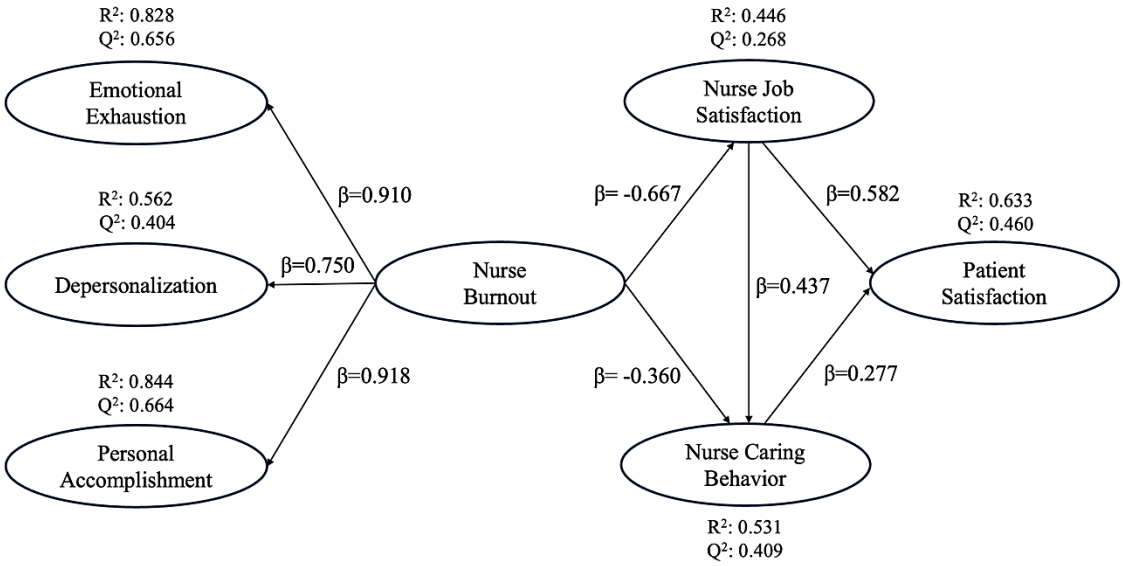

Figure 2. Research result model

3.5. Importance-Performance Map Analysis

The advanced analysis was through the Importance-Performance Map Analysis (IPMA), which is an approach used to obtain two-dimensional input, this is through the descriptive mean score of each variable and important score, measured by total effect. The importance and performance analysis focused on the effect of the dependent variable as the target in the study model (Hair et al., 2019; Ringle & Sarstedt, 2016). The interpretation of this map image is that the more the indicator plot is positioned to the right, the more important it is in the eyes of the respondent. The higher the indicator plot, the better the actual condition from the respondent's perspective. Management needs to focus on indicators that are important from the respondent's perspective but do not yet show good conditions.

Figure 3 depicted that job satisfaction indicators 2, 3, and 4 can be seen on the upper right of the figure therefore need to be prioritized by the hospital management to improve patient satisfaction in the hospital. However, JS1 consists of the item "I feel satisfied when I can complete the task per the allotted time" which shows lesser performance in the mapping and subsequently in the area of improvement.

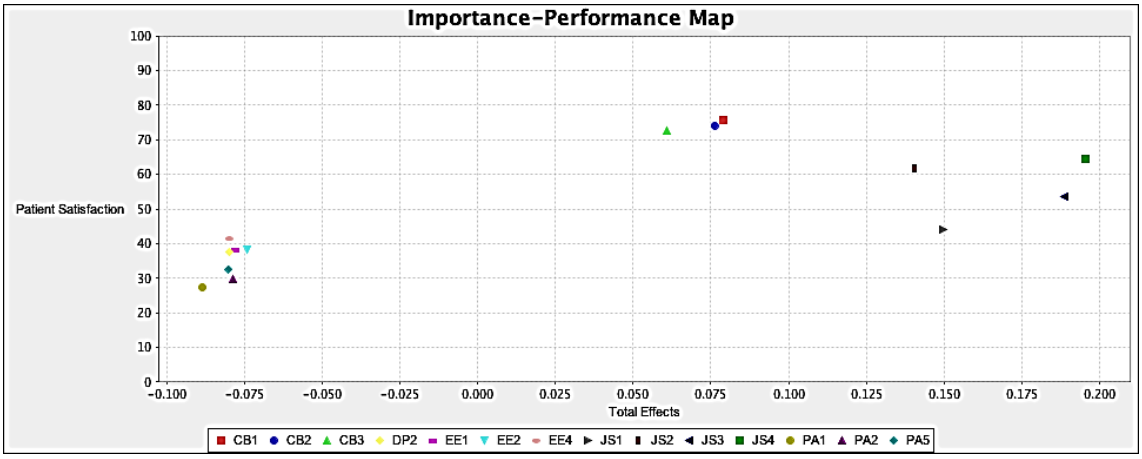

Figure 3. IPMA Indicators

4. Discussion

This study aimed to determine how nurse burnout affected patient satisfaction through the mediation of job satisfaction and caring behavior. The findings of this study showed a significant negative relationship with nurse burnout. If nurse burnout increases, then job satisfaction, caring behavior, and patient satisfaction will decrease. This was in line with previous studies by Jason & Antonio (2021), and Jun et al. (2021). Therefore, this study confirmed that to improve hospital service, nurse burnout must be managed by the hospital management by taking care of the effect of nurse burnout on emotional exhaustion, depersonalization, and personal accomplishment. Previous studies (Meeusen et al., 2011; Mudallal et al., 2017) found that the more dominant dimension of nurse burnout was affected by emotional exhaustion. However, in this study, the personal accomplishment dimension was more dominant. This finding can be attributed to the relatively younger age of the respondents. This is aligned with the study by (Moya-Salazar et al., 2023) shown the age of young nurses is a predictor of burnout syndrome during the care of patients with COVID-19. In this situation, they tend to be dissatisfied with their self-achievement, work, and life. This can also be related to work-life balance problems that are often found in young nurses as shown in the previous studies (Adella et al., 2024; Topaz et al., 2016).

The variables discussed in this study pointed out that burnout has a relationship with patient satisfaction mediated by nurses' caring behavior and job satisfaction. This result can be used as an empirical model based on the results obtained. Out of five paths tested, three were proven significant and had a direction in accordance with the hypothesis. Therefore, the proposed model can be applied and tested on a wider population based on geographical coverage and different types of hospitals. The structural model provided a result that this study model had adequate predictive capability on patient satisfaction as a dependent variable. However, this result needs

to be tested in a longitudinal study to obtain predictive results over time, particularly in post-pandemic working conditions.

This study showed that caring behavior also has a direct relationship with patient satisfaction, although nurse job satisfaction was still more dominant. This was in line with other findings on the relation of job satisfaction and patient satisfaction by Mahmoud & Reisel (2014), Andy & Antonio (2022), and Asif et al. (2019). The findings of this research add to the understanding of the relationship between nurse burnout and patient satisfaction which is mediated by caring behavior in the pandemic setting. Likewise, job satisfaction was seen to have a positive effect on nurse caring behavior when encountering the patient. The higher the nurse job satisfaction, the higher the nurse caring behavior (Xiaoming et al., 2014). Therefore, the hospital management must routinely monitor the satisfaction level of nurses, especially those who work on the front line. Results of IPMA indicated that for managerial implication, CB3, "I often ask patients how they want to be treated", should be taken into account in the nurse supervision and coaching since the existing response was still below average.

This study model with the independent variable of patient satisfaction had an R^2 value of 0.633, which was a medium to strong predictive accuracy for in-sample prediction, and a Q^2 predict of 0.568 for out-of-sample prediction value was categorized as a large predictive relevance. This means that despite any changes in the data set, the model will provide similar results. Compared to the other study, Weng et al. (2011) found a different result because the context of this study was carried out at a different time, which was during the COVID-19 pandemic this period provided a stronger stressor, both from the side of the disease and the management that needed to be adapted to the new policy. Interestingly, 75% of the respondents recovered from the infection by COVID-19. This personal experience in the pandemic situation can make they were more aware of their condition.

Despite the adequate result model as depicted in Figure 2, the conceptual framework in this study did not involve confounding factors which include age, gender, length of work, education level, work unit, and career stage. Each confounding factor can influence job satisfaction, caring behavior, and patient satisfaction. A previous study (Moya-Salazar et al., 2023) already indicates that age-related, particularly young nurses were more prone to burnout during the COVID-19 pandemic. Therefore, the interpretation of the result model needs to be done cautiously.

With the proposed model prediction value, the models can be recommended and replicated in future studies, especially by including confounding factors, or by carrying out subgroup analysis. This study provided a new contribution to the hospital treating COVID-19 patients that nurse burnout is possible to occur but can be well-managed by considering depersonalization, emotional exhaustion, and personal accomplishment. Nurse burnout is confirmed to have a negative influence, especially on nurse job satisfaction. Both nurse job satisfaction and nurse caring behavior have a direct relation to patient satisfaction, although nurse job satisfaction has a stronger value. However, the caring behavior shown by nurses is pivotal because this will appear when nurses interact with patients and could provide a good experience to the patients as stated in a previous study (Babapour et al, 2022; Kibret et al., 2022). To that end, hospital management needs to pay attention to caring behavior through routine surveys with both nurse and patient respondents. The results of such a survey will provide useful feedback for service improvement

5. Implications and limitations

The research findings provide the implication that relates to nurse burnout in the time of the pandemic. Even though the pandemic period has ended, this provides important lessons if in the future this pandemic event will recur. If the nurse cannot cope with the stressor that causes emotional exhaustion and the condition related to depersonalization and feelings of needing to complete personal accomplishments it will affect the level of patient satisfaction. The hospital management needs to consider nurse burnout in order to improve patient satisfaction with the hospital service. In the process in coping with the stressor, management can deploy support, for example, by providing adequate personal protective equipment (PPE) and the guiding safety of the work environment to protect nurses' work. On the other hand, management can also encourage supervision and coaching for nurses by paying more attention to emotional conditions, especially with the topic to increase the sense of personal accomplishment and reduce the feeling of exhaustion.

This study has several limitations, including the samples obtained by online questionnaire because of the COVID-19 pandemic. An online questionnaire has a disadvantage because the respondents cannot be directly observed. For instance, the emotional condition when filling out the questionnaire can be the bias. It is suggested that further studies should obtain data or distribute questionnaires face-to-face following the recommended health protocols. The other limitation is this study is related to generalization due to the limited sample size and source of the respondents. Further studies are suggested to broaden the respondents from various types of hospitals in different geographies. A more specific study on the type of department that the respondents work in is also suggested since it can affect answers. In various departments, during COVID-19, the workload of the nurses in each department is not the same, such as in the intensive care unit thus providing different stressors for the nurses. By specifying the department where the nurse works, the data can be analyzed more deeply to provide better insight for the hospital management.

6. Conclusion

This study was conducted on nurses in private hospitals during the COVID-19 pandemic period, which concluded that nurse burnout harmed job satisfaction and caring behavior. On the other hand, job satisfaction and caring behavior had a direct positive association with patient satisfaction from the nurse's perspective. Job satisfaction and caring behavior can mediate the negative relationship between nurse burnout and patient satisfaction. The higher nurse burnout the more reduction in job satisfaction and caring behavior. Therefore, for managerial implications, nurse burnout should be minimized and job satisfaction and caring behavior should be increased. This study showed that the strongest nurse burnout dimension was reflected by personal accomplishment followed by emotional exhaustion. In this study, nurse burnout was found to have a negative association with job satisfaction and nurse caring behavior. From this study, the suggestion can be made to increase patient satisfaction, especially by preventing nurses from having burnout. This can be done with supervision and coaching which increases the sense of personal accomplishment and avoids emotional exhaustion. Work stress including emotional exhaustion will affect nurse's well-being, thus reducing the sense of personal accomplishment. But if the nurses are aware and prepared that each work has a different difficulty level and challenges, they can respond without causing a heavy burden or pressure, hence they can perceive more job satisfaction. By understanding the process of burnout in nurses, preventive steps and interventions can be taken by hospital management to maintain the delivery of care.

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Author contribution

Conception and design of the study: F.A.; Supervision: F.A. and J.M.; Data collection: F.A. and A.A.; Data analysis: A.A. analyzed the data which was confirmed by F.A. and J.M. for accuracy; Drafting of the manuscript: F.A. and A.A.; Review and editing of the manuscript: A.A. All the authors are in agreement of the final version of the manuscript.

Conflict of interest

None declared.

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