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Enhancing job satisfaction measurement tool in healthcare settings: Insights from a University Hospital in Vietnam

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Abstract

Background and objectives: Extensive scrutiny within organizational research has positioned job satisfaction as a pivotal factor contingent upon organizational contexts. Our study aimed to refine job satisfaction measurement tools for diverse healthcare settings using insights from a university hospital in Vietnam, enhancing the validity and applicability of these instruments.

Methods: The procedure for the contextualization of a job satisfaction measurement tool was established encompassing six key steps: (1) Developing, selecting, or modifying the questionnaire; (2) Assessing face validity; (3) Ensuring content validity; (4) Designing the research for field testing; (5) Assessing the tool reliability and validity; and (6) Assessing discriminant validity between two tools. This procedure served as the foundation for a cross-sectional study involving 216 healthcare staff at a university hospital in Vietnam.

Results: The modified tool, comprising 35 items (6 fewer than the original 41-item reference tool), was derived through evaluations of face, content, and construct validity, conducted with 216 healthcare staff. The validity of the modified tool was subsequently confirmed through Confirmatory Factor Analysis, demonstrating favorable fit indices for the job satisfaction item, including a Chi-square/degrees of freedom ratio of 3.15, Comparative Fit Index of 0.86, Tucker Lewis Index of 0.85, and Root Mean Squared Error of Approximation of 0.1. Additionally, the modified tool exhibited a high Cronbach's alpha of 0.97, a good convergence ranged from 0.4 to 0.6 and a good divergence with the maximum shared variance values were lower than the corresponding average variance extracted values. The job satisfaction scores obtained using the modified tool surpassed significantly those of the original reference tool ($p < 0.01$), with percentages of 52.7% and 43.1%, respectively.

Conclusion: This contextualization procedure has been demonstrated to be both feasible, practical and yielded valid and reliable results, thus recommending its adoption in other healthcare settings along with further validation and adaptation, including rural settings.

Keywords

Confirmatory factor analysis, exploratory factor analysis, job satisfaction, reliability, validity, university hospital

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Introduction

Job satisfaction (JS) has garnered significant attention in organizational research and is a widely studied variable within the context of organizational behavior.[1] Multiple definitions of JS exist, with one commonly cited definition characterizing JS as a positive emotional state stemming from an individual's job-related experiences.[2] Another definition describes JS as a favorable sentiment about one's job resulting from an evaluation of job characteristics.[3] Researchers may express interest in measuring overall JS or specific facets of JS. Overall, JS can be

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viewed as a formative construct, encompassing satisfaction with distinct job dimensions, presenting an effective approach for evaluating satisfaction across various attributes.[4]

Studies have demonstrated a link between health workers' JS and the quality of health services, prompting extensive research on JS among diverse healthcare professionals such as doctors, nurses, and administrative staff in the healthcare sector.[5–10] However, research focusing on JS within university health facilities remains limited. Assessing healthcare workers' JS has proven challenging due to the diverse nature of healthcare settings, leading to a lack of a standardized procedure for contextualizing JS measurement tools specifically tailored to healthcare settings such as university hospitals. These facilities blend the provision of hospital services with medical education and research, leading to their healthcare staff assuming dual roles as both healthcare providers and medical educators.

Job satisfaction measurement tools vary because of the different healthcare settings, cultures, and eco-social conditions. Even though they are developed using the same algorithm, the methods for customizing these tools also differ. However, there is currently no standard procedure for this. In Vietnam, only two validated JS tools exist for health workers, one for preventive health centers and the other for administrative staff in an Obstetrics and Gynecology Hospital.[11,12] There is a pressing need to verify the validity and reliability of instruments for measuring JS among health staff working at university hospitals in Vietnam. This study aims to refine and validate JS measurement tools within the unique context of a university hospital in Vietnam, with the goal of enhancing their practical effectiveness. By leveraging the specific insights gained from this environment, the research seeks to contribute to the broader adaptation and validation of these measurement instruments across diverse healthcare settings.

Methods

The procedure of refining JS measurement tool

The process for refining the JS measurement tool was defined following a structured approach comprising six key steps:

(1) Questionnaire self-development or selection or modification.
The construction of the questionnaire involved the selection of a reference tool or the compilation of questions derived from a variety of articles, scales, and instruments related to JS.

(2) Content validity evaluation
Content validity was assessed by engaging a panel of experts, consisting of at least seven individuals with expertise in relevant fields, including sociologists, hospital staff, public health specialists, and representatives from the Ministry of Health. The feedback and comments provided by these experts were used to revise the content of the questionnaire. Additionally, the Content Validity Index (CVI) was utilized to quantitatively assess the validity of the content. This involved analyzing the degree of agreement among the experts regarding the relevance and clarity of each item in the questionnaire.[13]

(3) Face validity assessment
The face validity of the questionnaire was evaluated through a pre-test, during which comments and feedback on the questions were gathered from a minimum of 10 participants, representing different roles within the organization (such as managers, quality assurance personnel, healthcare, and administrative staff). This process aimed to ensure that the questions were formulated in a clear and comprehensible manner that was acceptable to the target population.

(4) Research design for the field test
The study population was carefully defined to encompass a distinct group of healthcare personnel operating within a specific context. In accordance with established guidelines for studies employing Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), a recommended sample size of 3–20 individuals per item/question was adopted as a standard practice.[14]

(5) Assessing the tool's reliability and validity
Before conducting the factor analysis, several criteria were evaluated, including:

(i) The inter-item correlations were required to exceed 0.4.

(ii) The Kaiser–Meyer–Olkin measure needed to surpass the recommended threshold of 0.6, indicating the adequacy of the sample size for factor analysis.[15,16]

(iii) The Bartlett's Test of Sphericity needed to yield statistically significant results with $p < 0.05$.[17]

(iv) Varimax rotation was utilized to interpret the identified factors, with factors possessing Eigenvalues greater than 1 being retained for analysis.[16]

(v) The internal consistency reliability of the instrument was confirmed through Cronbach's alpha, where a value exceeding 0.7 was considered acceptable.[18]

CFA was employed to validate the exploratory factors using the Comparative Fit Index (CFI), Tucker Lewis Index (TLI), and Root Mean Squared Error of Approximation (RMSEA).[19] The following criteria were established for a satisfactory model fit:

(i) The Chi-square/degrees of freedom (*df*) ratio should fall between 1 and 5.

(ii) CFI and TLI values were expected to approach 1.[15,20,21]

(iii) RMSEA should not exceed 0.1, with 90% confidence interval values below 0.1.[15] Additionally,

standardized regression weights were utilized to assess whether values below 0.9 indicated that all variables adequately represented significant indicators and predictors for latent variables.[22]

Convergent validity is an approach used to validate all items of the same construct. It evaluates whether the items converge and share a high proportion of variance with other items measuring the same construct, as opposed to items of different constructs within the same measurement. The average variance extracted (AVE) provides information on the amount of variance captured by the construct relative to the amount of variance due to measurement error. The formula for calculating AVE is the sum of the squared factor loadings divided by the number of items. Each construct should be evaluated against its correlation with other constructs, and the AVE for each factor should be greater than 0.5 to indicate good convergent validity. If the AVE is less than 0.5, it is suggested to rely on composite reliability (CR) greater than 0.6 to conclude the validity of the construct as adequate.[23]

Divergent validity is established when the maximum shared variance (MSV), which is the square of the correlation between constructs, is lower than the AVE for all the constructs. Alternatively, the square root of the AVE for each of the latent variables should be higher than the highest correlation with any other latent variables. This rule is known as the Fornell–Larcker criterion, and it indicates that the construct is distinct from other constructs in the model.[23]

(6) Outcomes discriminant validity between two tools.

In the event of utilizing a reference tool, it is imperative to conduct a comparative analysis of the JS scores obtained through both the original reference tool and the modified tool.

*A cross-sectional study of healthcare staff's JS at a university hospital in Vietnam

The study was conducted from September 2019 to October 2020.

Questionnaire selection as a typical example. A study was conducted in Vietnam to evaluate the healthcare staff's JS at the district health center.[24] A questionnaire consisting of 41 questions was created to assess JS and was validated in this study at the university hospital. Participants were directed to complete a self-administered online Google form questionnaire.

The 41-item tool assessed eight domains of JS:

(b1.) Workplace environment;
(b2.) Co-workers;
(b3.) Personal empathy;
(b4.) Supervision;
(b5.) Salary and allowance;
(b6.) Training and promotion;
(b7.) Working condition;
(b8.) Discipline and reward.

Each item was rated on a 5-point Likert-type scale, with responses varying from 1 (disagree very much) to 5 (agree very much).[25]

Content validity evaluation. Content validity assessment involved expert reviews, with the instrument being submitted to seven experts in Vietnam for evaluation. These experts included two sociologists, three hospital staff members (comprising a doctor, a nurse, and an administrative staff) from the university hospital, a public health specialist, and an officer from the Ministry of Health. The instrument was subsequently revised based on their feedback. The CVI, as recommended by Polit, Beck, and Owen, was utilized to evaluate the content validity of the instrument.[13]

Face validity assessment. A meeting involving 10 participants was carried out to ensure the appropriate phrasing of items and their alignment with the hospital context. The participants included two members of hospital management, two staff from the hospital's quality assurance department, four of the hospital's health workers (comprising 2 doctors, 1 nurse, and 1 administrative staff), and two managers from the hospital's clinical departments. The results of the group discussion indicated that the majority of the questions were easily comprehensible and straightforward to respond to. Additionally, all questions were formulated in a culturally suitable manner. The participants recommended only a few minor adjustments in wording. As the instrument was initially developed to gauge JS among district health workers, the phrases "preventive medicine workers" and "preventive health centers" were advised to be replaced with "health workers" and "hospital," respectively. Furthermore, the participants suggested that the phrase "Salary compares to their contribution or to the market's level" should be clarified.

The questions suggested by Anh et al.[11] were:

- Is any item too difficult to understand?
- Is any item too difficult to answer?
- Is any item easy to misunderstand?
- Is any word not acceptable?
- Is there any repetitive item? If so, please list the items.
- Is there any word/item that needs to be reworded/rephrased? If so, please list the words/items.

Research design for the field test. The healthcare staff employed at the university hospital willingly consented to participate in the survey and furnished signed consent forms. The subject inclusion criteria were health staff who have an official labor contract and have worked in clinical and para-clinical departments at the university hospital for over 6 months. The subject exclusion criteria were those who have long-term study, take maternity leave, or take sick leave.

A cohort of 216 health staff members was enlisted for the study, determined through descriptive sample calculations with an emphasis on those exhibiting the lowest JS rates (15.5%) highlighted in earlier research conducted in Vietnam.[26] The sample size encompassed roughly two-thirds of the entire health staff population, and a convenient sampling approach was employed to recruit participants until the requisite number was achieved ($n = 216$).

Assessing the tool's reliability and validity. The data underwent analysis using SPSS version 20 and Amos version 24. The convergent validity of the instrument was determined through EFA.

Outcomes discriminant validity between two tools. We conducted a comparative analysis of the JS scores obtained through both the original reference tool (41 items) and the modified tool (35 items). To ease data analysis and interpretation regarding the prevalence of JS, the JS scores and all domains subscales were dichotomized, utilizing a recommended cut-off point whereby a score ranging from 164 to 205 points was classified as "Satisfied."[24]

Ethical consideration: This study was approved by the Ethics Committee for Biomedical Research at Hanoi University of Public Health, Hanoi, Vietnam (approval number: 213/2020/YTCC-HD3 dated May 15, 2020). Participants provided written informed consent at the commencement of the self-administered questionnaire and were apprised that all collected data would be treated anonymously.

Results

Study population description

Among the 216 health staff members who participated in our survey, several significant characteristics were observed: The majority of participants were female, constituting two-thirds (66.2%) of the sample. A significant proportion of the sample comprised young staff, with 53.7% being younger than 30 years old. A noteworthy percentage of staff were married, accounting for 79.2% of the sample. Furthermore, health staff who were the primary earners made up double the amount of those who were not, at 69.4% and 30.6%, respectively. A majority of the respondents (42.1%) reported a monthly income below $400, with a comparable distribution in the ranges of $400–$650 and over $650. Additionally, a higher proportion of health staff had less than 5 years of working experience compared to those with over 5 years, at 59.3% and 40.7%, respectively.

Comparison between original reference tool and modified tool

The original tool, comprising 41 items, was revised to 35 items following face and content validity evaluations. There were six items excluded due to Eigenvalue less than 0.9 and a loading factor of less than 0.5. The percentage difference of Cronbach's alpha for each JS domain was found to be less than 5%, indicating an insignificant difference equivalent to 5% of errors (p-value < 0.05). The overall percentage difference was determined to be 1% (Refer to Table 1 for details).

Based on Eigenvalues of 0.9 and above (indicating the variance explained by each factor) and a minimum factor loading of 0.5 (representing the correlation coefficient between variables and factors), we have proposed a reordering and regrouping of the factors in the modified tools. The factors are arranged from the highest Eigenvalue to the lowest as follows:

Factor 1: Co-workers, personal empathy, and supervision;
Factor 2: Salary and allowance;
Factor 3: Discipline and reward;
Factor 4: Working condition;
Factor 5: Workplace environment;
Factor 6: Training and promotion.

It is noteworthy that this new model with six factors was less than eight in the original tool due to distinct cultural aspects, perceptions, and expectations among health workers within the university hospital context (Refer to Table 2 for details).

CFA of the modified tool. The final analysis for building the JS items involved Structural Equation Modeling. CFA was utilized with survey data on health workers' JS to authenticate the adapted factors derived from EFA and to validate these constructs. The adjusted JS constructs demonstrated favorable fit indices, indicated by a Chi-square/df value of 3.15 (<5), as well as satisfactory RMSEA (0.1), CFI (0.86), and TLI (0.85) values. Consequently, all variables can be considered significant indicators and predictors for latent variables (Refer to Figure 1).

Convergent and divergent validity. The assessment of convergent and discriminant validity for the factors in this study followed the recommended guidelines. For discriminant validity, the square root of the AVE for each factor was found to be more than the correlation between the latent variables. The correlation between the latent variables ranged from 0.27 to 0.68. The factors of Co-workers, Personal Empathy, and Supervision and Training and Promotion had a relatively higher correlation of 0.68 compared to the other factors. The lowest correlation of 0.27 was observed between the factors of Salary and Allowance and Working Conditions (as shown in Table 3).

Regarding convergent validity, the factors of Co-workers, Personal Empathy, Supervision, Salary and Allowance, and Workplace environment and Training and Promotion demonstrated good convergent validity, with estimated AVE values of 0.50, 0.51, 0.50, and 0.60, respectively (as in Table 3). However, the factors of Discipline and Reward and Working

Table 1. Cronbach's alpha comparison between original tool and modified tool.

Job satisfaction domains (item codes) (non-classified by reliability order)	Cronbach's alpha (number of items)		% Difference (absolute value)
	Original tool	Modified tool	
Workplace environment (b1a→b1d)	0.88 (5)	0.86 (4)	2.3%
Co-workers (b2a→b2d)	0.93 (5)	0.93 (4)	0%
Personal empathy (b3a→b3c)	0.94 (3)	0.94 (3)	0%
Supervision (b4a→b4c)	0.90 (3)	0.90 (3)	0 %
Salary and allowance (b5a→b5h)	0.95 (8)	0.95 (8)	0%
Training and promotion (b6a→b6f)	0.94 (6)	0.93 (3)	1.1%
Working condition (b7a→b7f)	0.92 (6)	0.91 (5)	1.1%
Discipline and reward (b8a→b8e)	0.97 (5)	0.97 (5)	0%
Overall	0.96 (41)	0.97 (35)	1%

Conditions had poor convergent validity, with AVE values of 0.40 and 0.42, respectively. Nonetheless, the CR values for these factors were higher than 0.6, suggesting the constructs are still acceptable.

For divergent validity, all six factors exhibited good divergent validity, as the MSV values were lower than the corresponding AVE values (as shown in Table 3). The square root of the AVE values was calculated as follows: Co-workers, Personal Empathy, and Supervision (0.707), Salary and Allowance (0.714), Discipline and Reward (0.632), Working conditions (0.648), Workplace environment (0.707), and Training and Promotion (0.775).

Outcomes discriminant validity between two tools. The scores for all domains of JS from the two tools (original and modified) were dichotomized using a cut-off point of 80%, where a score falling between 164 and 205 points was categorized as "Satisfied." Two domains, specifically "Working environment" and "Training and Promotion," exhibited statistically significant differences, and the overall level of satisfaction also showed significance between the original tool and the modified tool, with proportions of 43.1% and 52.7%, respectively (Refer to Table 4 for details).

Discussion

Our study encompassed a comprehensive review of previous research and culminated in the development of a consensus procedure for contextualizing the measurement of healthcare staff's JS across diverse healthcare settings. This procedure comprises six key steps: Developing, selecting, or modifying the questionnaire; (2) Assessing face validity; (3) Ensuring content validity; (4) Designing the research for field testing; (5) Assessing the tool reliability and validity; and (6) Assessing discriminant validity between two tools. Application of this procedure in the university hospital study resulted in the reduction of domains from eight to six in the modified tool, stemming from the implementation of a new model (including a new order and new grouping), and a reduction in the number of items from 41 to 35, while maintaining the same Cronbach's Alpha with an overall percentage difference of 1%. Notably, the modified tool yielded a more precise JS score of 52.7%, significantly higher than the original tool's score of 43.1% ($p < 0.01$).

In our study, a consensus procedure consisting of six key steps allowed for the comprehensive contextualization and validation of JS measurement tools. The most critical of these steps include developing a questionnaire, assessing face validity, ensuring content validity, and selecting a study population. The final two steps, evaluating construct validity and discriminant validity, involve employing well-defined statistical techniques with specific standard values. Previous studies have largely focused on statistical analysis, particularly in evaluating convergent validity, which measures the similarity between the scores of an instrument and those of another instrument designed to measure the same concept.[27,28] Acceptable convergent validity is typically indicated by a moderate to high correlation, with a threshold of 0.50 or higher. Content validity, another critical aspect, is assessed by comparing relevant work factors from the literature with those included in the instruments under evaluation. Additionally, discriminant validity, which determines the extent to which a JS instrument's score differs from that of one measuring a related but distinct concept, is also crucial.[28] Therefore, various tools for measuring JS exist, but only a select few meet the stringent criteria for high levels of reliability and construct validity.

The primary challenge in JS measurement tools lies in identifying the factors or domains within the questionnaire. In the previous studies mentioned in a systematic review, work factors were classified into 11 interrelated domains, encapsulating aspects such as Work content; Autonomy; Growth/Development; Financial rewards; Promotion; Supervision; Communication; Co-workers; Meaningfulness; Workload; and Work demands.[28] In the context of Vietnam, Quyen et al.[29] utilized a tool comprising seven domains such as: Personal empathy; Discipline and Reward; Co-workers Collaboration; Training and Promotion; Workplace Environment; and Salary and Allowance.[29] While our study initially employed the original tool with eight domains,

Table 2. Item content, Eigen value, loading factor min value, and rotating matrix value.

Code	Items starting with "You are satisfied with. . ."	Rotating matrix value
Factor 1: Co-workers; Personal Empathy; Supervision**, Eigenvalue = 24.5, Loading factor min value = 0.57**		
b2a	the support and assistance provided by your leader	0.678
b2b	the collaboration and cooperation within the team	0.698
b2c	the tasks and responsibilities assigned in your job	0.669
b2e	the involvement in the development of internal policies and regulations	0.595
b3a	the attentive and communicative leadership	0.732
b3b	the care and regard shown by your leader	0.776
b3c	the support from leaders and colleagues in your professional life	0.760
b4a	the encouragement of employees by your leader	0.614
b4b	the motivation of employees by your leader	0.577
b4c	the focus on staff development provided by your leader	0.594
Factor 2: Salary & Allowance**, Eigenvalue = 2.1, Loading factor min value = 0.55**		
b5a	the salary aligning with your workload	0.727
b5b	the additional bonuses and allowances	0.795
b5c	the comparing the salary to the labor market	0.783
b5d	the fair bonuses and allowances	0.734
b5e	the fairness of your hospital's salary	0.721
b5f	the equity in bonuses and allowances	0.691
b5g	the allocation of welfare funds	0.662
b5h	the support system for sick leave, weddings, funerals, etc.	0.552
Factor 3: Discipline & Reward**, Eigenvalue = 1.6, Loading factor min value = 0.62**		
b8a	the hospital's approach to problem resolution	0.626
b8b	the regulations for handling and discipline	0.690
b8c	the fairness in handling and discipline procedures	0.725
b8d	the discipline that aligns with staff contribution	0.755
b8e	the discipline that fits the context of the hospital	0.712
Factor 4: Working Condition**, Eigenvalue = 1.5, Loading factor min value = 0.58**		
b7a	the infrastructure of the hospital	0.710
b7b	the equipment in the hospital	0.604
b7c	the working hours at the hospital	0.750
b7d	the self-improvement or personal development	0.588
b7f	the organizational structure of the hospital	0.607
Factor 5: Workplace Environment**, Eigen value = 1.1, Loading factor min value = 0.58**		
b1a	the appropriateness of your job	0.614
b1b	your workload	0.581
b1c	the proactive approach in your work	0.704
b1d	the outcomes of your work	0.750
Factor 6: Training & Promotion**, Eigen value = 0.9, Loading factor min value = 0.65**		
b6b	the ongoing training (short-term and long-term)	0.689
b6c	the arranging training sessions	0.653
b6d	the fairness in learning and advancement opportunities	0.704
(i) Overall Cronbach's Alpha = 0.97; (ii) KMO = 0.95; (iii) Barlett's test : p<0.01		
6 excluded items		
b1e	the acknowledgment of your performance by leaders	**Excluded due to Eigenvalue <0.9 Loading factor <0.5**
b2d	the review of your work	
b6a	the employee planning	
b6e	the promotion and appointment	
b6f	the evaluation and reward of work performance	
b7e	the healthy and equitable work environment	

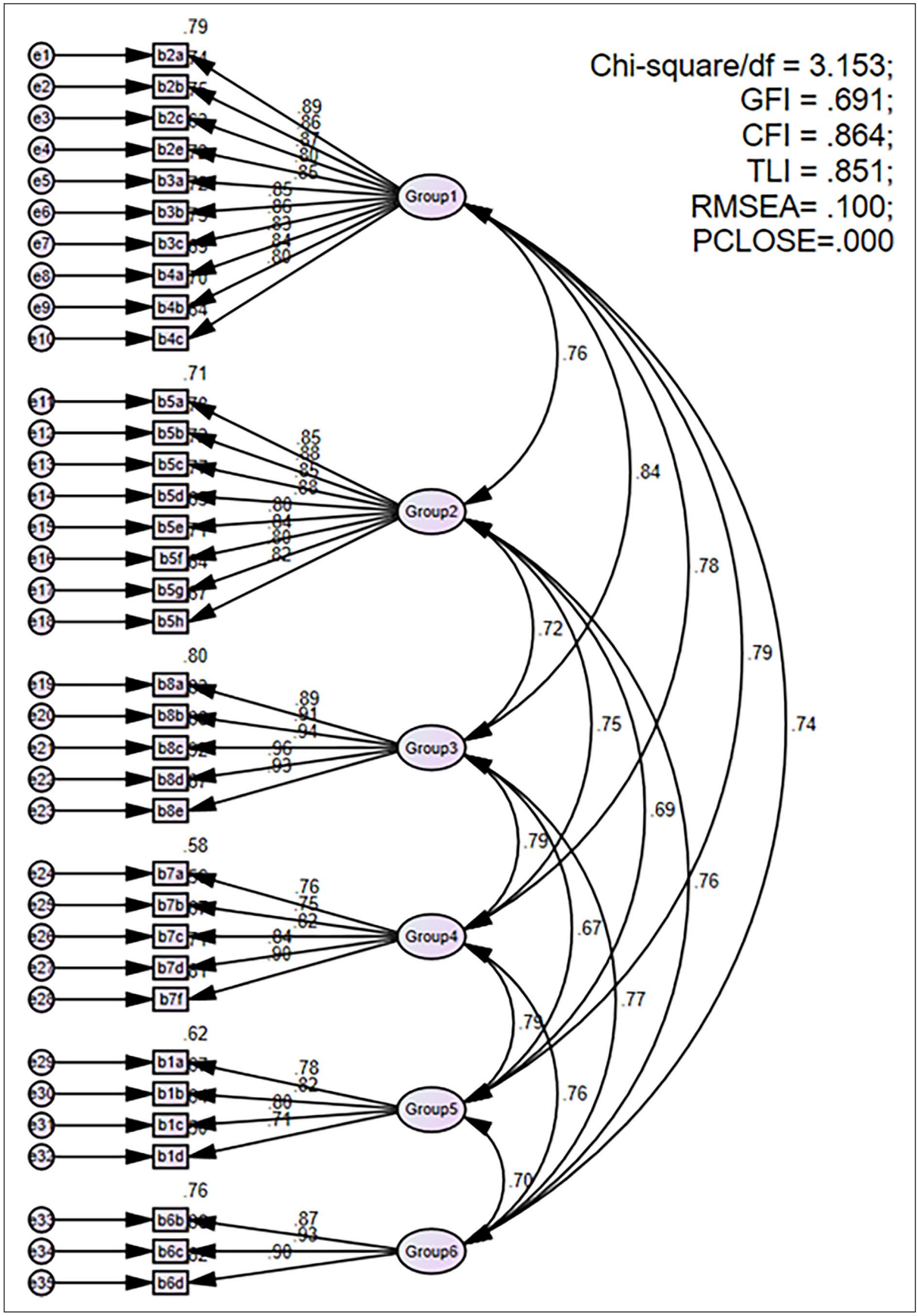

Figure 1. Measurement model for the dimension of health workers' job satisfaction.

Table 3. Convergent and divergent validity of job satisfaction measurement tool at a university hospital in Vietnam.

Factor/group	AVE	CR	MSV	F1	F2	F3	F4	F5	F6
Group 1	0.50	0.897	0.457	0.707					
Group 2	0.51	0.875	0.292	0.540	0.714				
Group 3	0.40	0.764	0.217	0.466	0.463	0.632			
Group 4	0.42	0.685	0.185	0.430	0.268	0.313	0.648		
Group 5	0.50	0.751	0.264	0.514	0.473	0.431	0.281	0.707	
Group 6	0.60	0.882	0.149	0.676	0.472	0.467	0.386	0.518	0.775

Group 1: co-workers, personal empathy, and supervision; Group 2: salary and allowance; Group 3: discipline and reward; Group 4: working conditions; Group 5: workplace environment; Group 6: training and promotion.

Table 4. Job satisfaction level comparison between original tool and modified tool.

Job Satisfaction domains (item codes) (classified by reliability order)	% Satisfied (cutoff 80%)		*p*-Value (Chi-square)
	Original tool	Modified tool	
Co-workers (b2a→b2d)	65.3	66.7	NS*
Personal empathy (b3a→b3c)	70.8	70.8	NS*
Supervision (b4a→b4c)	67.6	67.6	NS*
Salary and allowance (b5a→b5h)	44.9	44.9	NS*
Working condition (b7a→b7f)	57.4	58.3	NS*
Working environment (b1a→b1d)	57.4	60.2	<0.05
Discipline and reward (b8a →b8e)	67.6	67.6	NS*
Training and promotion (b6a→ b6f)	63.0	73.1	<0.01
Overall	43.1	52.7	<0.01

*NS: not significant ($p > 0.05$).

subsequent contextualization led to a modified tool with six domains, maintaining the same Cronbach's alpha and offering a more precise assessment of JS. All criteria in CFA analysis were strictly adhered to in order to validate the tool.[14,19] The adjusted JS constructs exhibited favorable fit indices, as evidenced by a Chi-square/*df* value of 3.15 (<5), as well as satisfactory RMSEA (0.1), CFI (0.86), and TLI (0.85) values. Therefore, domains could be renamed based on the item content through considerations of face and content validity.

The second challenge in validating JS measurement tools pertains to the study population, as the characteristics of the participants significantly impact the diversity of the data. Various typical populations, such as heterogeneous groups, physicians/doctors, nurses, program directors in hospitals, generalists in hospitals, accountants, administrative employees, emergency physicians, scientists, social workers, dentists, and community nurses, have been identified.[28] In our study, we specifically focused on heterogeneous healthcare staff with some physicians and nurses also working as lecturers at the university hospital. It is important to note that different populations may present different models of factor interactions. Therefore, the reordering and regrouping of domains can be achieved through the lens of construct validity specific to the targeted population. Our findings demonstrated a reduction in domains from eight to six in the modified tool, resulting from the implementation of a new model (including a new order and new grouping), and a decrease in the number of items from 41 to 35. The contextualized tool proved to provide more precise JS scores compared to the original tool (52.7% vs 43.1%, $p < 0.01$).

This study possesses notable strengths, such as the consensus procedure used for contextualizing JS measurement tools and validating JS among healthcare staff operating within a university hospital. For others in other healthcare settings, it should be done with further validation and adaptation. However, the study is also subject to limitations. Firstly, the absence of comparable studies conducted on university hospitals in Vietnam restricts the ability to compare JS levels. Secondly, the inevitable utilization of different cut-off points to determine "satisfied" or "dissatisfied" may potentially impact the assessment of JS.

Conclusion

The study demonstrated the successful adaptation of JS measurement tools in the specific context of a university hospital in Vietnam. The refined procedure and validated outcomes provide valuable insights into enhancing JS assessment within healthcare settings, with implications for broader applications. Further validation and adaptation, including in rural settings, can leverage the demonstrated feasibility and practicality of this approach, thereby

contributing to the comprehensive understanding of JS dynamics in diverse healthcare settings.

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Author contributions

All authors participated in the process of completing the manuscript, including developing the procedure, searching for references, writing, and editing the manuscript according to reviewers' comments.

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Ethics approval

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Informed consent

All participants provided written informed consent.

Trial registration

Not applicable.

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Supplemental material

Supplemental material for this article is available online.

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