

The Relationship Between Job Crafting, Work Engagement, and Psychological Well-Being Among Nurses in Saudi Arabia: A Structural Equational Modeling

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Aim: Given the demanding nature of the nursing profession, heavy workloads, and emotional strain, nurses' psychological well-being is often compromised. Job crafting has been identified as a proactive approach to managing mental health distress and enhancing work engagement. Despite its importance, little is known about the relationship between job crafting, work engagement, and psychological well-being among nurses in Saudi Arabia.

Purpose: To examine the relationship between job crafting, work engagement, and psychological well-being among nurses in Saudi Arabia and to explore the role of work engagement as a mediator.

Methods and Design: A cross-sectional descriptive correlational design, a convenience sampling method was used to recruit 287 nurses in Saudi Arabia. Nurses completed the Mental Health Continuum Short Form (MHC-SF), the Job Crafting Questionnaire (JCQ), and the Utrecht Work Engagement Scale (UWES). Descriptive and inferential statistics, including multivariable linear regression analyses and Pearson correlation coefficients, were conducted. Additionally, Structural Equation Modeling was applied using the Preacher & Hayes method.

Results: The mean score for job crafting was 5.0 ± 0.8 , work engagement was 4.1 ± 1.2 , and psychological well-being was 20.8 ± 6.2 . A moderately positive relationship was found between job crafting and psychological well-being ($r = 0.53, p < 0.001$) and work engagement and psychological well-being ($r = 0.47, p < 0.001$). As well as a strong positive correlation between job crafting and work engagement ($r = 0.68, p < 0.001$). Work engagement also mediated the relationship between job crafting and psychological well-being ($p < 0.001$).

Conclusion: Job crafting is important in improving psychological well-being among nurses, which can enhance their work engagement. Nurse managers should develop training programs that are designed to enhance nurses' job crafting skills to engage nurses in the work and promote nurses' psychological well-being.

Keywords: job crafting, work engagement, psychological well-being, nurses, Saudi Arabia, nurse managers

Introduction

Nurses face various challenges including workforce shortage, low job satisfaction, and burnout, which affect quality of care and organization effectiveness. The 12-hour shifts with limited rest periods and emotional labor led to high levels of stress and negative mental health outcomes.¹ A study found that nurses who report burnout frequently use crafting activities to improve both their clinical expertise and confidence which foster interpersonal connections and personal growth.² These global challenges indicate the urgent need to identify the factors that can enhance nurses' wellbeing, engagement, and retention.

Job crafting is defined as an active process that employees use to change how they do tasks or personal relationships in their work environment.³ There are three types of job crafting: task, relational, and cognitive. Task crafting is changing

how to perform the task, its type, and its quantity. Relational crafting is changing the frequency and quality of social relations with others. Cognitive crafting changes one's perception of one's job.³ Job crafting can be used to increase employees' motivation and enhance work productivity.⁴ The changing of work procedures by the employees to boost their ability to connect with work and increase its perceived importance led to improved work performance.⁵ Based on this, study also highlighted the strong correlation between work engagement and job crafting.⁶ Although these findings are promising, a lack of clarity in existing literature on how job crafting contributes to psychological wellbeing among nurses. Job crafting can enhance nurses' psychological well-being through increasing personal resources such as autonomy, competence, and control, that help nurses to manage job demands effectively.

Work engagement is defined as a satisfying, emotionally driven, and pleasant state of job-related well-being.⁷ Work engagement is characterized by being active and vigor, which represents both professional identity and work performance. It involves dedication (a passion of work and a sense of honor), vigor (high energetic and resilience in workplace), and absorption (dedication to work and reluctance to put work aside).^{7,8} Engaged employees are more likely to make more effort at work, which is beneficial for the success of the health organization as well as for employee personal development.⁵ Higher levels of engagement among employees are an outcome of trust and support, which breed loyalty, alignment, and a sense of worth.⁹ Nurses' work engagement has a direct impact on patient health outcomes.¹⁰ Nurses with higher work engagement provide higher-quality care,¹¹ and have high job satisfaction, performance, and quality of care.¹² Work engagement can build high psychological status that lead to higher well-being of worker.¹³

Psychological well-being (PsyWb) refers to the personal experience of positive functioning and the realization of individual potential.¹⁴ It consists of six dimensions: autonomy, environmental mastery, personal progress, positive relations with others, purpose in life, and self-acceptance.¹⁴ There are numerous factors that can influence the psychological well-being of nurses. Workplace resilience has a positive impact on nurses' psychological well-being by enabling them to manage job-related stress more effectively and maintaining emotional stability.¹⁵ Furthermore, nurses' psychological well-being is negatively impacted by excessive stress in the workplace, resulting from conflicts with other coworkers, patient interactions, and workload, which decreased productivity and increased burnout.¹⁶

Previous research indicated that job crafting and work engagement were correlated with nurses' well-being.¹⁷ Similarly, in Egypt, a study found that job crafting had a negative impact on mental health distress, where work engagement mediated between health outcomes and job crafting.¹⁸ Little is known about the relationship between job crafting, work engagement, and psychological well-being among nurses in Saudi Arabia. Although recent studies have examined job crafting and work engagement among nurses^{1,2,4}, the majority have not examined job crafting, work engagement, and psychological well-being within a single model, leaving gaps in understanding these relationships, which is important for informing strategies to enhance nurses' wellbeing, motivation and patient care outcomes. Evidence from Saudi Arabia remains scarce,^{17,18} making it necessary to examine these relationships.

In contrast, this study addresses this gap by using Structural Equation Modeling (SEM) to provide a comprehensive analysis of these relationships. Further, this study contributes to academic literature by providing a new theoretical insight into interrelationships between job crafting, work engagement, and psychological well-being among nurses in Saudi Arabia. The findings of this study may help policymakers and healthcare administrators develop educational programs, workplace regulations, and interventions that encourage job crafting and engagement, which would ultimately increase nurses' productivity, retention rates, and overall job satisfaction.¹⁷ Therefore, this study aims to examine the relationship between job crafting, work engagement, and psychological well-being among nurses in Saudi Arabia and to explore the mediating role of work engagement using SEM.

Materials and Methods

Research Procedure and Sample

The design was a cross-sectional descriptive correlational study, using a convenience sampling method. A convenience sampling method was used due to the availability and willingness of nurses to participate during data collection period across three hospitals, which allowed efficient recruitment and maintain diversity of demographic characteristics. The inclusion criteria for the study were nurses with a minimum of one year of experience, to ensure that participants had

sufficient exposure to clinical work to be engaged in job crafting and work. The exclusion criteria were nurses with less than one year of experience, nurse students, or nurse interns, as they may lack of professional experiences that contribute to study variables. To determine an appropriate sample size for the structural equation modeling (SEM) analysis, we performed a series of simulations using the lavaan package in R to ensure sufficient statistical power. The data were generated from a specified population model over varying sample sizes ($n = 100$ to 500 in steps of 50). For each sample size, 100 simulations were executed, and model fit was evaluated using the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). The results indicated that a sample size of 250 provided satisfactory fit indices, with CFI and TLI values above 0.95 , RMSEA well below 0.05 , and an SRMR of 0.045 , all suggesting a good fit to the data. Based on these findings, we determined that a sample size of 250 would be sufficient to ensure reliable model estimation while optimizing resource use. This sample size enables a confident analysis of the proposed relationships and mediation effects within the study's framework. The final sample size was 287 nurses. To ensure a diverse and representative sample, participants were recruited from multiple hospitals units in central of Saudi Arabia, which reflect a range of age groups, gender, educational levels, and years of experiences. The Consolidated Criteria for Reporting Qualitative Research were followed in preparing this manuscript.

Following the Institutional Review Board (IRB) approval at King Abdullah International Medical Research Center (KAIMRC), the data collection phase begun from December 2024 to February 2025. The researchers contacted the Nursing Education Service Center to help in identifying eligible nurses across three tertiary hospitals in central Saudi Arabia. Eligible participants were officially approached by Email invitations, which coordinated with nursing unite managers. Data were collected from eligible nurses using both Microsoft Forms and hard copy of printed surveys, to maximize respond rates and to accommodate participants' preferences. The survey consisted of a cover page with the study's aim, consent form, and study tools. The estimated time to complete the survey was $5\text{--}7$ minutes.

Research Instruments

The participants filled out the demographic data along with three scales: the Mental-Health Continuum Short Form (MHC-SF), the Job Crafting Questionnaire (JCQ), and the Utrecht Work engagement scale (UWES)

1- The demographic data included age, gender, level of education, unit, year of experience, and the hospital name.

2- Job Crafting Questionnaire (JCQ): Job crafting was measured using JCQ and developed by Wrzesniewski and Dutton's³ to understand the job crafting concept and was modified by.^{38, 19} It consisted of 15 items with three sub-scales: task crafting, relational crafting, cognitive crafting. Participants rated each item on 7 -point Likert scale with higher scores indicates a greater level of job crafting. The overall reliability was 0.91 , and the sub-scales were: task job crafting, 0.87 ; relational job crafting, 0.83 ; cognitive job crafting, 0.89 . This tool has a convergent validity and states that JCQ is strong measure that can be used to advance job- crafting research.¹⁹ In this study, the Cronbach's alpha for job crafting was 0.92 (95% CI: $0.91\text{--}0.94$), indicating excellent internal consistency.

3- Utrecht Work engagement scale (UWES) was developed by Schaufeli & Bakker,²⁰ which consisted of nine items with three sub-scales (vigor, dedication, and absorption) that corresponded to the underlying fundamental aspects of work engagement. A 6 -point Likert scale is used in this tool, the higher scores suggest greater work engagement, and lower scores suggest less work engagement. Convergence validity was reported with a 0.92 reliability index.²¹ In this study, the internal consistency for work engagement was excellent, with a Cronbach's alpha of 0.91 (95% CI: $0.89\text{--}0.93$).

4- Mental-Health Continuum Short Form (MHC-SF) was developed by Keyes,²² which classified well-being concept into three subdomains: social, emotional, and PsyWb. The psychological subscale was used in this study, which consisted of six items using six-point Likert scale, that include assessing self-acceptance, personal growth, and purpose in life. The scores are summed and range between $0\text{--}30$. With high scores ($24\text{--}30$) that suggests high PsyWb and indicates a strong fulfillment and functioning in self, purpose, and personal relationships. Moderate PsyWb ($12\text{--}23$) shows people with good sense of self- acceptance, purpose, and personal relationships. Lastly, low PsyWb score ($0\text{--}11$) suggests struggling with aspects of self-acceptance, purpose, and personal relationships. The overall reliability of 0.89 and has strong construct validity that efficiently measures the constructs of emotional, psychological, and social well-being.²³ In this study, the Cronbach's alpha for PsyWb was 0.86 (95% CI: $0.82\text{--}0.89$), indicating good internal consistency.

Ethical Approval

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethical Committee of King Abdullah International Medical Research Center (KAIMRC) (IRB # 0000098024/NRR24/101/12). The written informed consent, includes the study's purpose and informs participants that they can withdraw from the study at any time, was obtained from all participants involved in the study. The confidentiality and privacy were maintained.

Data Analysis

All statistical analyses were conducted using R version [4.2.2]. Descriptive statistics, including means, standard deviations, frequencies, and percentages and inferential statistics including multivariable linear regression analyses and Pearson correlation coefficients were used to answer research questions. Mediation analysis was conducted using the Preacher & Hayes method via the “mediation” package in R to examine the indirect effect of Job Crafting on PsyWb through WE, and bootstrapping with 1000 resamples was applied to estimate the indirect effects and 95% CIs. SEM was performed using the lavaan package in R to test the hypothesized relationships among Job Crafting, WE, and PsyWb, with standardized path coefficients (β), p-values, and fit indices including chi-square/df ratio, CFI, TLI, RMSEA, and SRMR reported to assess model fit. A p-value < 0.05 was considered statistically significant for all analyses.

Common method bias was assessed using the full collinearity assessment approach introduced by Kock (2015). Each construct (Job Crafting, Work Engagement, and Psychological Well-being) was regressed on the remaining constructs, and variance inflation factors (VIFs) were examined.

Convergent and discriminant validity of the measurement model were assessed using the average variance extracted (AVE) and the heterotrait–monotrait (HTMT) ratio, respectively. Convergent validity was considered adequate when AVE values were ≥ 0.50 . Discriminant validity was evaluated using the HTMT ratio, with values below 0.85 indicating acceptable discriminant validity.

Results

Participants Characteristics

Table 1 presents the demographics and professional data of the study sample (N = 287). The mean age of participants was 35.9 ± 8.4 years, with nearly half aged 30–39 years (47.4%), followed by 20–29 years (24.0%). The sample was predominantly female (85.4%), and the majority held a bachelor's degree (88.5%). Most participants were from hospital A (68.3%), with others from hospital B (18.5%) and hospital C (13.2%). The most common units were critical care (32.8%) and medical (29.6%). The mean years of experience were 9.4 ± 7.1 , with 70.4% having 1–10 years of experience.

Table 1 Demographics and Professional Data of the Study Sample (N = 287)

Variable	Frequency (%)
Age	
Mean $\pm$ SD	35.9 $\pm$ 8.4
Categories	
20-29	69 (24.0)
30-39	136 (47.4)
40-49	52 (18.1)
50 and above	30 (10.5)
Gender	
Male	42 (14.6)
Female	245 (85.4)

(Continued)

Table 1 (Continued).

Variable	Frequency (%)
Level of Education	
Diploma	22 (7.7)
Bachelor's degree	254 (88.5)
Master's degree	9 (3.1)
PhD	2 (0.7)
Hospital	
A	196 (68.3)
B	53 (18.5)
C	38 (13.2)
Unit	
Critical care	94 (32.8)
Cardiac	20 (7.0)
Medical	85 (29.6)
Surgical	39 (13.6)
Ob/Gyn	30 (10.5)
Pediatrics	19 (6.6)
Years of experience	
Mean $\pm$ SD	9.4 $\pm$ 7.1
Categories	
1-5	101 (35.2)
6-10	101 (35.2)
11-15	41 (14.3)
16-20	21 (7.3)
More than 20 years	23 (8.0)

Notes: Continuous variables (age and years of experience) are summarized as mean $\pm$ standard deviation. Categorical variables are presented as frequencies and percentages. Age and years of experience were additionally grouped into meaningful categories for descriptive purposes. Hospital and clinical unit categories reflect the organizational structure and clinical departments within the participating institutions. Percentages are calculated based on complete data with a total sample size of N = 287.

Levels of Job Crafting, Work Engagement, and Psychological Well-Being

Table 2 presents the levels of job crafting, work engagement, and psychological well-being among the study sample. The mean averaged score for job crafting was 5.0 ± 0.8 , with subscale means of 5.2 ± 0.9 for cognitive crafting, 5.0 ± 1.0 for relational crafting, and 4.9 ± 0.9 for task crafting. For work engagement (WE), the mean total score was 4.1 ± 1.2 , with dedication having the highest mean score (4.4 ± 1.3), followed by absorption (3.9 ± 1.3) and vigor (3.8 ± 1.2). PsyWb had a mean total score of 20.8 ± 6.2 , with a mean averaged score of 3.5 ± 1.0 . The majority of participants reported moderate (49.1%) to high (41.5%) levels of psychological well-being, while 9.4% reported low levels. The median Likert-based scores of all items for the subscales are available in [Supplementary Table S1](#).

Internal Consistency Reliability of Study Measures

The internal consistency of all study scales was evaluated using Cronbach's alpha with corresponding 95% confidence intervals. As shown in Table 2, the Job Crafting subscales demonstrated good to excellent reliability, with alpha values ranging from 0.81 to 0.92. Similarly, the Work Engagement subscales showed strong reliability, with coefficients between 0.77 and 0.91. The Psychological Well-Being scale also exhibited high internal consistency ($\alpha = 0.86$, 95% CI: 0.82–0.89).

Table 2 Levels of Job Crafting, WE, and PsyWb

Scales	Mean $\pm$ SD
Job crafting	
Task crafting	4.9 $\pm$ 0.9
Cronbach's alpha (95% CI)	0.81 (0.76, 0.85)
Cognitive crafting	5.2 $\pm$ 0.9
Cronbach's alpha (95% CI)	0.92 (0.89, 0.95)
Relational crafting	5.0 $\pm$ 1.0
Cronbach's alpha (95% CI)	0.87 (0.83, 0.90)
Total Job crafting	5.0 $\pm$ 0.8
Cronbach's alpha (95% CI)	0.92 (0.90, 0.94)
Work Engagement (WE)	
Vigor	3.8 $\pm$ 1.2
Cronbach's alpha (95% CI)	0.77 (0.70, 0.83)
Dedication	4.4 $\pm$ 1.3
Cronbach's alpha (95% CI)	0.88 (0.85, 0.91)
Absorption	3.9 $\pm$ 1.3
Cronbach's alpha (95% CI)	0.83 (0.77, 0.88)
Total WE	4.1 $\pm$ 1.2
Cronbach's alpha (95% CI)	0.91 (0.89, 0.93)
PsyWb	
Total score	20.8 $\pm$ 6.2
Categories	
High	119 (41.5)
Moderate	141 (49.1)
Low	27 (9.4)
Average PsyWb	3.5 $\pm$ 1.0
Cronbach's alpha (95% CI)	0.86 (0.82, 0.89)

Notes: Job Crafting scores are based on the three subdimensions of task, cognitive, and relational crafting. Work Engagement scores reflect the vigor, dedication, and absorption subscales of the Utrecht Work Engagement Scale (UWES). Psychological Well-Being represents the psychological well-being dimension of the Mental Health Continuum–Short Form (MHC-SF). Cronbach's alpha coefficients with 95% confidence intervals are reported to indicate the internal consistency reliability of each subscale and total scale. Higher scores on all scales represent more favorable levels of job crafting, work engagement, and psychological well-being.

Abbreviations: SD, Standard Deviation; WE, Work Engagement; PsyWb, Psychological Well-Being.

Univariable Associations Between Demographics and Professional Characteristics with Job Crafting, Work Engagement, and Psychological Well-Being

Table 3 presents the univariable associations between participants' demographics and professional data and the average scores of job crafting, WE, and PsyWb. For job crafting, significant associations were observed with age ($p < 0.001$), hospital ($p = 0.039$), and years of experience ($p < 0.001$). Participants aged 50 and above reported the highest mean score (5.4 ± 0.6), and those with more than 20 years of experience also scored higher (5.4 ± 0.6). No significant associations were found for gender, education level, or unit. Regarding WE, significant associations were found with age ($p = 0.023$) and hospital ($p = 0.033$). Participants aged 50 and above had the highest mean score (4.6 ± 1.0). No significant associations were detected for gender, education level, unit, or years of experience. For PsyWb, significant associations were observed with age ($p < 0.001$). Participants aged 40–49 reported the highest mean score (3.9 ± 0.8). No significant associations were found for gender, education level, hospital, unit, or years of experience.

Table 3 Univariable Associations Between Participants' Demographics/Professional Data and Average Scores of Job Crafting, Work Engagement (WE), and Psychological Well-Being (PsyWb)

Variable	Average Job Crafting		Average WE		Average PsyWb	
	Mean $\pm$ SD	p	Mean $\pm$ SD	p	Mean $\pm$ SD	p
Age						
20–29	4.8 $\pm$ 0.7	< 0.001*	3.9 $\pm$ 1	0.023*	3.2 $\pm$ 1	< 0.001*
30–39	4.9 $\pm$ 0.8		4 $\pm$ 1.2		3.4 $\pm$ 1.1	
40–49	5.3 $\pm$ 0.7		4.3 $\pm$ 1.4		3.9 $\pm$ 0.8	
50 and above	5.4 $\pm$ 0.6		4.6 $\pm$ 1		3.8 $\pm$ 0.8	
Gender						
Male	5 $\pm$ 0.8	0.8092	4 $\pm$ 1.1	0.900	3.5 $\pm$ 1.1	0.894
Female	5 $\pm$ 0.8		4.1 $\pm$ 1.2		3.5 $\pm$ 1	
Level of Education						
Diploma	5.2 $\pm$ 0.5	0.3239	4.2 $\pm$ 0.9	0.543	3.8 $\pm$ 0.8	0.334
Bachelor's degree	5 $\pm$ 0.8		4 $\pm$ 1.2		3.4 $\pm$ 1	
Master's degree/PhD	5.3 $\pm$ 0.8		4.4 $\pm$ 1.4		3.5 $\pm$ 1.1	
Hospital						
A	5.1 $\pm$ 0.8	0.039*	4.1 $\pm$ 1.2	0.033*	3.5 $\pm$ 1	0.082
B	4.8 $\pm$ 0.8		3.7 $\pm$ 1		3.2 $\pm$ 1.1	
C	5.1 $\pm$ 0.7		4.3 $\pm$ 1.2		3.6 $\pm$ 1	
Unit						
Critical care	5 $\pm$ 0.7	0.8323	4.1 $\pm$ 1.1	0.422	3.4 $\pm$ 1.1	0.280
Cardiac	5 $\pm$ 0.8		4.1 $\pm$ 1		3.5 $\pm$ 0.9	
Medical	5 $\pm$ 0.8		4.1 $\pm$ 1.1		3.6 $\pm$ 1	
Surgical	5 $\pm$ 0.9		3.7 $\pm$ 1.4		3.4 $\pm$ 1.1	
Ob/Gyn	5.2 $\pm$ 0.7		4.3 $\pm$ 1.2		3.6 $\pm$ 1	
Pediatrics	4.9 $\pm$ 0.8		4 $\pm$ 1.1		3 $\pm$ 1	
Years of experience						
1–5	4.8 $\pm$ 0.8	< 0.001*	3.9 $\pm$ 1.1	0.144	3.3 $\pm$ 1.1	0.054
6–10	4.9 $\pm$ 0.8		4 $\pm$ 1.1		3.5 $\pm$ 1	
11–15	5.2 $\pm$ 0.6		4.2 $\pm$ 1.2		3.6 $\pm$ 1	
16–20	5.3 $\pm$ 0.5		4.2 $\pm$ 1		3.8 $\pm$ 0.9	
More than 20 years	5.4 $\pm$ 0.6		4.6 $\pm$ 1.2		3.8 $\pm$ 0.9	

Notes: Univariable associations were examined using independent-samples t-tests for binary variables and one-way ANOVA for variables with more than two categories. Mean differences represent unadjusted comparisons between groups. P-values indicate the statistical significance of between-group differences in average Job Crafting, Work Engagement, and Psychological Well-Being scores. A p-value < 0.05 was considered statistically significant, and statistically significant results are marked with an asterisk (*). Higher mean scores reflect more favorable levels of job crafting, work engagement, or psychological well-being.

Multivariable Regression Analysis of Demographic and Professional Factors on Job Crafting, Work Engagement, and Psychological Well-Being

Table 4 presents the results of multivariable linear regression analyses examining the effect of participants' demographics and professional data on the average scores of Job Crafting, WE, and PsyWb. For Job Crafting, nurses working in Hospital B reported significantly lower average Job Crafting scores compared with those in Hospital A (MD = -0.27 , 95% CI: -0.53 to -0.00 , $p = 0.048$), while no significant associations were observed for age, gender, level of education, unit, or years of experience. Regarding WE, participants in surgical units had significantly lower WE scores than those in critical care units (MD = -0.44 , 95% CI: -0.87 to -0.01 , $p = 0.047$), with no other demographic or professional characteristics showing significant associations. For PsyWb, age was significantly associated with higher scores: nurses aged 40–49 years (MD = 0.59 , 95% CI: 0.15 to 1.03 , $p = 0.009$) and those aged 50 years and above (MD = 0.60 , 95% CI:

0.03 to 1.17, $p = 0.040$) demonstrated higher PsyWb scores compared with those aged 20–29 years. No significant associations were observed between PsyWb and gender, education level, hospital, unit, or years of experience.

Correlations Among Job Crafting, Work Engagement, and Psychological Well-Being

Figure 1 illustrates the Pearson correlations between Job Crafting, WE, and PsyWb. Figure 1A shows a moderate positive correlation between Job Crafting and PsyWb ($r = 0.53$, $p < 0.001$), suggesting that higher levels of job crafting are associated with greater PsyWb. Figure 1B demonstrates a moderate positive correlation between WE and PsyWb ($r = 0.47$, $p < 0.001$), indicating that increased work engagement is linked to higher psychological well-being. Figure 1C presents

Table 4 Multivariable Linear Regression Analyses for the Effect of Participants' Demographics/Professional Data on the Total Scores of Job Crafting, WE, and PsyCap

Factor	Average Job Crafting		Average WE		Average PsyWb	
	MD (95% CI)	p	MD (95% CI)	p	MD (95% CI)	p
(Intercept)	5.08 (4.62, 5.54)	< 0.001*	4.05 (3.36, 4.75)	< 0.001*	3.53 (2.91, 4.15)	< 0.001*
Age						
20-29	Reference					
30-39	−0.02 (−0.28, 0.24)	0.883	0.05 (−0.34, 0.44)	0.798	0.08 (−0.26, 0.42)	0.643
40-49	0.21 (−0.12, 0.54)	0.206	0.29 (−0.21, 0.78)	0.254	0.59 (0.15, 1.03)	0.009*
50 and above	0.25 (−0.18, 0.68)	0.263	0.59 (−0.05, 1.23)	0.074	0.60 (0.03, 1.17)	0.040*
Gender						
Male	Reference					
Female	−0.05 (−0.31, 0.21)	0.713	−0.08 (−0.47, 0.31)	0.695	−0.12 (−0.47, 0.23)	0.516
Level of Education						
Diploma	Reference					
Bachelor's degree	−0.19 (−0.53, 0.16)	0.294	−0.12 (−0.63, 0.40)	0.657	−0.33 (−0.79, 0.13)	0.156
Master's degree/PhD	−0.04 (−0.60, 0.53)	0.900	0.12 (−0.73, 0.97)	0.783	−0.38 (−1.13, 0.38)	0.327
Hospital						
A	Reference					
B	−0.27 (−0.53, −0.00)	0.048*	−0.37 (−0.76, 0.02)	0.066	−0.17 (−0.52, 0.17)	0.327
C	−0.14 (−0.73, 0.44)	0.630	0.50 (−0.38, 1.38)	0.269	0.37 (−0.41, 1.15)	0.356
Unit						
Critical care	Reference					
Cardiac	−0.05 (−0.42, 0.33)	0.808	−0.02 (−0.58, 0.55)	0.957	0.02 (−0.48, 0.52)	0.925
Medical	0.07 (−0.16, 0.30)	0.562	0.08 (−0.26, 0.43)	0.635	0.23 (−0.07, 0.54)	0.139
Surgical	−0.09 (−0.38, 0.20)	0.548	−0.44 (−0.87, −0.01)	0.047*	−0.02 (−0.41, 0.36)	0.915
Ob/Gyn	0.28 (−0.35, 0.91)	0.387	−0.33 (−1.27, 0.62)	0.499	−0.15 (−0.99, 0.69)	0.732
Pediatrics	0.11 (−0.31, 0.52)	0.619	0.18 (−0.44, 0.80)	0.572	−0.26 (−0.82, 0.29)	0.351

(Continued)

Table 4 (Continued).

Factor	Average Job Crafting		Average WE		Average PsyWb	
	MD (95% CI)	p	MD (95% CI)	p	MD (95% CI)	p
Years of experience						
1-5	Reference					
6-10	0.06 (−0.18, 0.30)	0.637	0.12 (−0.24, 0.47)	0.525	0.12 (−0.20, 0.44)	0.451
11-15	0.29 (−0.02, 0.60)	0.070	0.21 (−0.25, 0.68)	0.374	0.17 (−0.25, 0.58)	0.429
16-20	0.35 (−0.07, 0.77)	0.107	0.05 (−0.59, 0.68)	0.889	0.26 (−0.31, 0.82)	0.373
More than 20 years	0.28 (−0.17, 0.73)	0.219	0.26 (−0.41, 0.93)	0.445	−0.02 (−0.61, 0.58)	0.959

Notes: Multivariable linear regression models were used to examine the adjusted associations between participants' demographic and professional characteristics and the average scores of Job Crafting, Work Engagement, and Psychological Well-Being. Mean differences (MD) represent the adjusted difference in outcome scores compared with the designated reference category for each variable. Ninety-five percent confidence intervals (95% CI) and corresponding p-values are reported for all estimates. A p-value < 0.05 was considered statistically significant and indicated with an asterisk (*). Reference categories were selected based on conceptual relevance and adequate sample size. Higher scores indicate more favorable levels of job crafting, work engagement, or psychological well-being.

Abbreviations: MD, Mean Difference; CI, Confidence Interval; SD, Standard Deviation; WE, Work Engagement; PsyWb, Psychological Well-Being.

a strong positive correlation between Job Crafting and WE ($r = 0.68$, $p < 0.001$), suggesting that job crafting is strongly associated with higher levels of WE. All correlations were statistically significant at $p < 0.001$.

Mediation Analysis of Work Engagement in the Job Crafting–Psychological Well-Being Relationship

Table 5 presents the results of the mediation analysis for the relationship between the average scores of Job Crafting, WE, and PsyWb. The analysis revealed a significant indirect effect of Job Crafting on PsyWb through WE ($\beta = 0.17$, 95% CI: 0.04 to 0.31, $p = 0.010$), indicating that WE partially mediate this relationship. The direct effect of Job Crafting on PsyWb was also significant ($\beta = 0.53$, 95% CI: 0.35 to 0.71, $p < 0.001$), as was the total effect ($\beta = 0.71$, 95% CI: 0.59 to 0.82, $p < 0.001$). The proportion of the effect of Job Crafting on PsyWb that was mediated through WE were 0.25 (95% CI: 0.06 to 0.46, $p = 0.010$), suggesting that a quarter of the effect was explained by the mediating role of WE.

Structural Equation Modeling Results for Job Crafting, Work Engagement, and Psychological Well-Being

Figure 2 illustrate the SEM examining the relationships between, Job Crafting, WE and PsyWb. The measurement models demonstrated that all observed variables significantly loaded onto their respective latent constructs, with standardized coefficients ranging from 0.69 to 0.88 ($p < 0.001$), indicating strong and reliable indicators for each latent variable.

In the structural model, Job Crafting had a substantial direct effect on WE ($\beta = 0.82$, $p < 0.001$) and on PsyWb ($\beta = 0.53$, $p < 0.001$). However, the direct effect of WE on PsyWb was not statistically significant ($\beta = 0.07$, $p = 0.549$). The indirect effect of Job Crafting on PsyWb through WE were also non-significant ($\beta = 0.06$, $p = 0.547$), suggesting that the effect of Job Crafting on PsyWb was predominantly direct rather than mediated by WE. The total effect of Job Crafting on PsyWb was significant ($\beta = 0.59$, $p < 0.001$). The model also highlighted that age was positively associated with Job Crafting ($\beta = 0.04$, $p < 0.001$), while working in a surgical unit had a significant negative effect on WE ($\beta = -0.31$, $p = 0.015$).

Model Fit Indices and Full Collinearity Assessment

The model fit indices indicated an excellent fit to the data, with $\chi^2/df = 1.55$, CFI = 0.99, TLI = 0.98, RMSEA = 0.044, and SRMR = 0.029, confirming the robustness of the proposed model. The full collinearity assessment yielded VIF values of 1.40 for Job Crafting, 1.66 for Work Engagement, and 4.90 for Psychological Well-being, all below the acceptable threshold of 5.0 for SEM models incorporating measurement error, indicating that common method bias was not a concern.

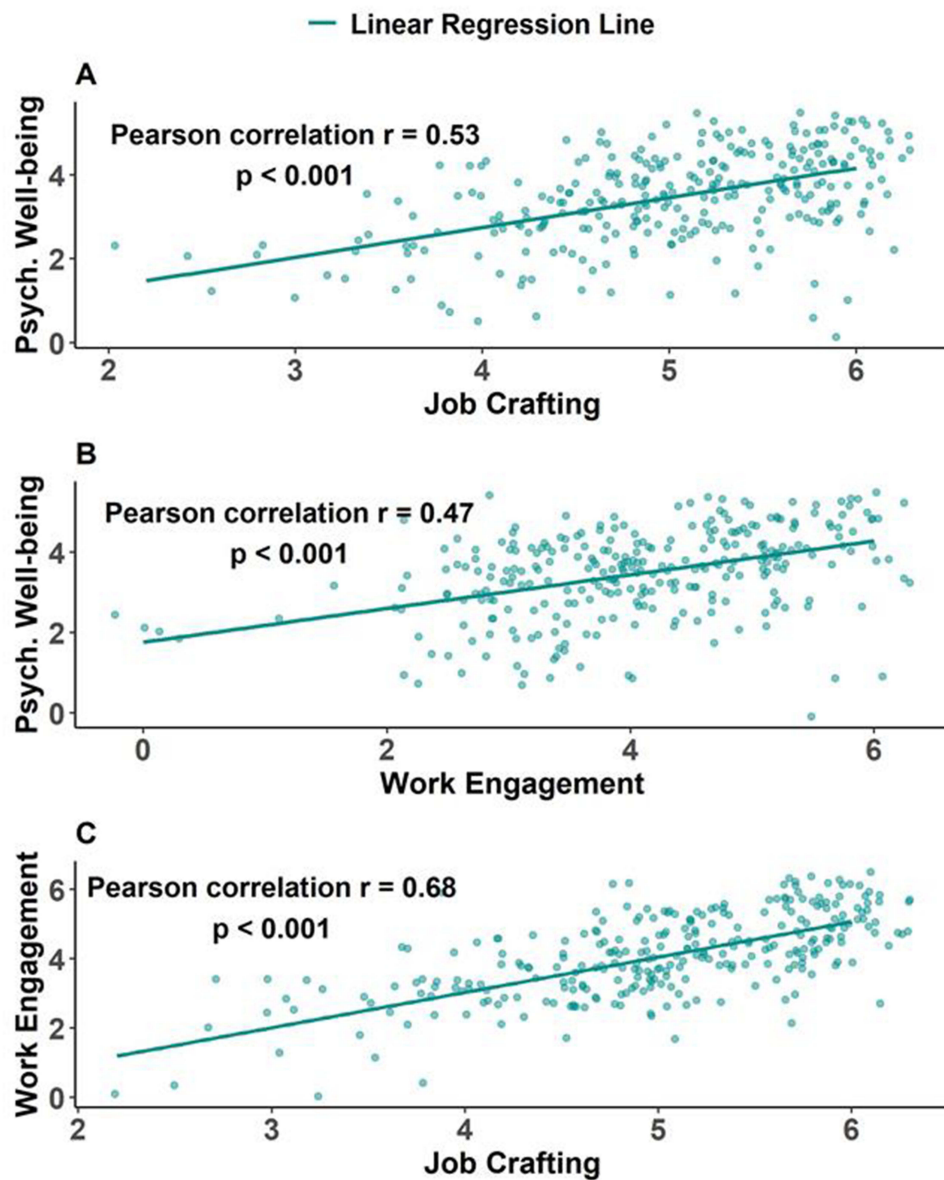


Figure 1 (A) Illustrates a correlation between Job Crafting and PsyWb. (B) illustrates a moderate positive correlation between WE and PsyWb. (C) illustrates a correlation between Job Crafting and WE.

Convergent Validity and Discriminant Validity of the Measurement Model

The measurement model demonstrated satisfactory convergent and discriminant validity. As presented in [Supplementary Table S2](#), both latent constructs showed adequate convergent validity, with average variance extracted (AVE) values

Table 5 Mediation Analysis for the Relationship Between the Average Scores of Job Crafting, WE, and, PsyWb

Effects	B (95% CI)	p
Average Causal Mediation Effect of Job crafting on PsyWb through WE (indirect effect)	0.17 (0.04, 0.31)	0.010*
Average Direct Effect of Job crafting on PsyWb	0.53 (0.35, 0.71)	< 0.001*
Total effect of Job crafting on PsyWb	0.71 (0.59, 0.82)	< 0.001*
Proportion of Mediated effect of Job crafting through WE	0.25 (0.06, 0.46)	0.010*

Note: * Statistically significant.

Abbreviations: B, Regression coefficient; CI, Confidence Interval.

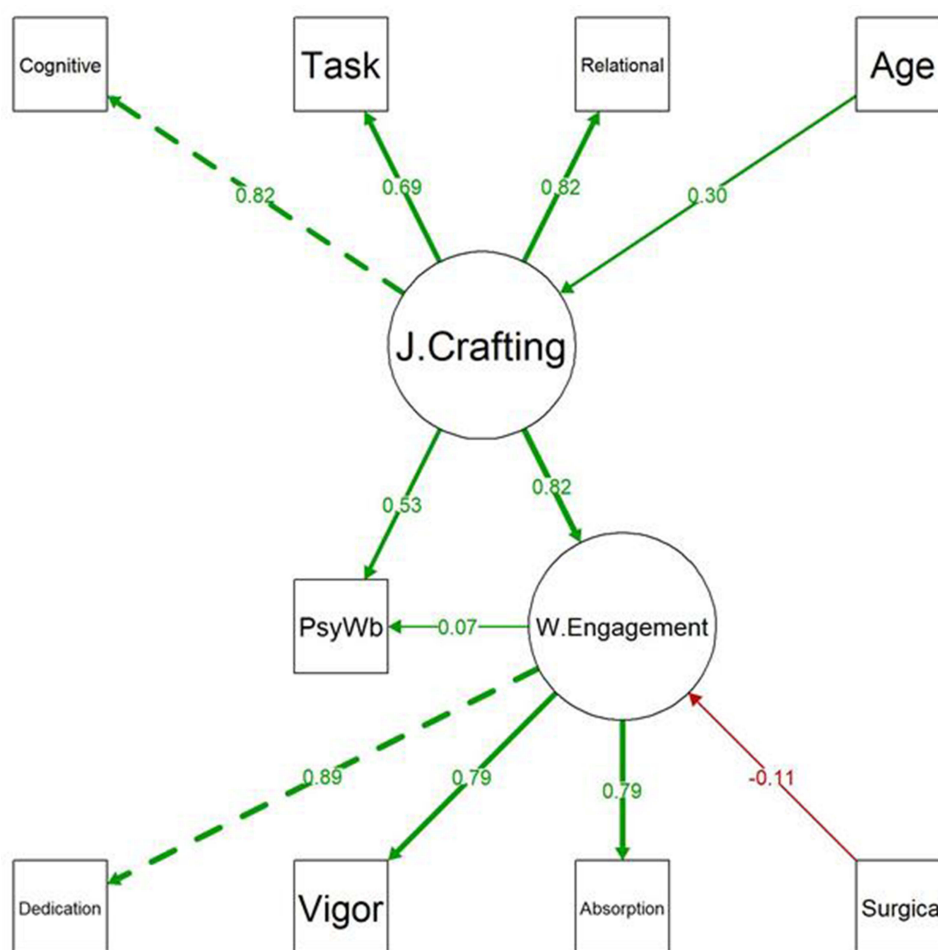


Figure 2 Illustrates the SEM examining the relationships between Job Crafting, WE and PsyWb.

exceeding the recommended threshold of 0.50 (AVE = 0.61 for Job Crafting and 0.69 for Work Engagement). Discriminant validity was also supported, as indicated by the HTMT ratio of 0.82 between Job Crafting and Work Engagement, which falls below the conservative cutoff of 0.85. Together, these results confirm that the indicators reliably and distinctly measure their respective latent constructs.

Discussion

This study provided insights into the relationship between job crafting, WE, and PsyWb among nurses. The findings of this study indicate a significant correlation between job crafting and age and years of professional experience. Participants aged 50 and above, with more than 20 years of experience, have higher job crafting scores. Similar to studies that indicated that older employees are more inclined to engage in job crafting.^{24,25} This suggests that more experienced and senior employees have more autonomy and experiences to modify their jobs and are more active in shaping their job roles shape their roles.¹¹ Furthermore, senior employees may possess more coping strategies and understand organizational routines, which may allow them to craft their jobs more efficiently.

WE were found to be significantly associated with age, with the highest engagement levels reported by participants aged 50 and above. This finding is consistent with a previous study that implied employees aged 50 years and older demonstrated statistically significantly higher levels of WE compared to their counterparts under the age of 50.²⁶ This suggests the fact that older employees appear to be more engaged and committed in their work, likely because longer years of experience, improved emotional regulation, and a more developed sense of purpose contribute to this increased engagement.²⁷ Further, the study findings show that nurses who work in a surgical unit had a small significant negative

effect on WE, which suggests that emotional stressors and amount of work in surgical unit environments may reduce nurses' engagement to work. This finding is consistent with a previous study.²⁸ Correspondingly, PsyWb was significantly related to age. Participants aged 40–49 reported the highest scores for PsyWb. This finding is consistent with previous studies, which suggests that well-being tends to improve with age.^{29,30}

The result of this study shows a moderate positive correlation between job crafting and PsyWb, which can suggest that nurses who actively shape their work environment experience higher levels of PsyWb. This finding is consistent with a previous study.¹⁷ This explained by³¹ that job crafting involves nurses proactively modifying their work aspects to have a better alignment with their skills and interests, which enhance their mental health.

The study findings indicate a moderate positive correlation between WE and PsyWb, which means that highly engaged employees are more likely to experience high level of PsyWb. This finding is consistent with various studies.^{17,32} This may be justified by the fact that engaged nurses tend to be more active, committed, and deeply involved in their work, which helps protect them from the emotional burnout³². The positive correlation between job crafting and WE highlight the value of proactive adjustments to one's role in boosting engagement³². This aligns with previous studies that suggest nurses can enhance their job crafting by their task performance and WE.¹⁷ Job crafting allows nurses to align their roles with their personal beliefs and goals. When nurses have the freedom to modify their work environment, relationships, and tasks, they are more likely to feel in control and fulfilled. This sense of empowerment helps to increase motivation, greater happiness, and a stronger emotional connection to their work, all of which may contribute to higher levels of work engagement. The results of this study indicate that WE has a mediating role in the relationship between job crafting and PsyWb. This findings are consistent with previous research.¹⁷ This indicated that WE plays a key role in well-being, which is linked to higher creativity, task performance, and client satisfaction.³³

Theoretical Implications

The results of this study contribute to the exiting knowledge of Job Demands-Resources (JD-R) theory on job crafting, WE, and PsyWb. JDR theory explained that job and personal resources have positive impact on promoting WE, and job performance.³⁴ Our results extend JD-R theory by explaining how job crafting play roles as a proactive resource which enhances WE, and PsyWb among nurses. This indicate that nurses with higher crafting their task and relationship helped them optimize demands and resources. Furthermore, our results highlight that job crafting has extend beyond WE, fostering nurses' PsyWb.

Practical Implications

The results of this study emphasize that leaders could increase staff engagement through job crafting, which in turn enhances PsyWb. Managers can facilitate job crafting behaviors by supporting nurses to adjusting their task and decision-making autonomy. Targeted interventions in a high-demand units such as optimiz staffing, provide flexible scheduling, and enhance team support can enhance well-being. Further, organizational policies may integrate job crafting into nurses' performance appraisals, professional development plans to foster engagement and psychological health among nurses.

Limitation and Future Research Recommendation

This study has several limitations that should be considered. First, due to its cross-sectional design, the study captures data at a single point in time, which limits the possibility to establish causal relationships between variables. Additionally, the study was conducted in one region of Saudi Arabia which may not be generalizable to other healthcare settings or broader populations with different demographics and healthcare access. The use of self-reported measures could result in social desirability bias. Future studies should consider multi-center research or longitudinal designs to enhance the validity and applicability of the findings.

The findings of the current study provide several important directions for future research and further development of the literature on job crafting, work engagement, and psychological well-being among nurses. First, future studies should implement longitudinal data to assess the long-term effects of WE on job crafting and PsyWb among nurses. Additionally, future research may investigate the mediator or moderator roles of variables such as cultural background, personality traits, and organizational factors in strengthening or weakening the relationship between job crafting, PsyWb, and WE.

Conclusion

The findings of this study underscore the significance of job crafting in enhancing WE and PsyWb among nurses. This highlights the importance of promoting job crafting strategies to support nurses' PsyWb and improve their overall WE. Nursing managers should focus on cultivating job crafting behaviors, such as modifying job tasks, enhancing social interaction, and reframing perception of job roles to find grater meaning and purpose among nurses. Alos, nurse managers should develop training programs that are designed to enhance nurses' job crafting skills to engage nurses in the work and promote nurses' PsyWb. Healthcare organizations can foster job creation among nurses by granting them more autonomy and structure job roles with flexible responsibilities and schedules to adapt nurses' needs. Policymakers and healthcare administrators should align policy and practices with job crafting fundamentals to empower nurses to reshape their tasks, relations, and perception of their role.

Abbreviations

WE, Work Engagement; PsyWb, Psychological well-being; IRB, institutional review board; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual (SRMR).

Acknowledgments

We sincerely thank all participants who agreed to participate in this study. Additionally, we are thankful to the Office of Research at King Saud bin Abdulaziz University for Health Sciences for language editing services and the King Abdullah International Medical Research Center, Riyadh, Saudi Arabia.

Disclosure

The authors report no conflicts of interest in this work.

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