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REVIEW

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A systematic review and meta-analytical synthesis of the relationship between work engagement and job satisfaction in nurses

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Abstract

Purpose: This study aimed to clarify the mixed conclusions regarding work engagement and job satisfaction in the nursing research literature by conducting a systematic review and meta-analysis.

Design and Methods: This meta-analytic review synthesized 15 independent studies published between 2007 and 2021.

Findings: An overall effect size of random-effect model was calculated as $r = 0.47$ ($k = 15$, $N = 3{,}818$, 95% confidence interval [0.43;0.51]). Data collection method and presence of control variable, as significant moderators, accounted for 43.6% and 43.8%, respectively, of the effect size heterogeneity.

Practice Implications: While the positive relationship between work engagement and job satisfaction was higher in studies using the face-to-face data collection method, it was lower in studies using the control variable in their research models.

KEYWORDS

job satisfaction, meta-analysis, nurse, nursing, work engagement

1 | INTRODUCTION

Nurses, as healthcare professionals, are vitally important to a sustainable healthcare system. The importance of nurses to the healthcare system has become more evident in the ongoing Coronavirus disease2019 (Covid-19) pandemic (Yildiz & Elibol, 2020). The pandemic's unusual and unpredictable changes have drawn attention to the need for improvement of unfavorable working conditions of nurses on the one hand and the sustainability of existing positive attitudes and affective, motivational states on the other. Because most of the healthcare workforce consists of nurses and they spend most of their work hours with patients and care services, their levels of job satisfaction and work engagement become essential topics in the literature. In nursing research, there is some consensus on the relationship between work engagement and job satisfaction (De Simone et al., 2018; Giallonardo et al., 2020; Yan et al., 2019; Giallonardo et al., 2010; Orgambídez-Ramos & de Almeida, 2017). However, the results of others are mixed; some research has found that these two variables are positively associated, while the others have found that they are negatively associated or the link between the two is nonsignificant. To explain this inconclusiveness, this meta-analytic systematic review was conducted.

Job satisfaction and work engagement are two closely related but distinct constructs. While the former is related to the job itself and developed as an attitude toward a job, the latter is related to the content of the work itself (Garg et al., 2018).

Work engagement is defined as "a state including vigor, dedication, and absorption" Schaufeli et al. 2002, p. 74). While vigor represents a high level of positive energy and mental resilience, dedication is characterized by one's approaching his/her job with enthusiasm, meaning, and challenge. Lastly, absorption refers to "being fully concentrated and happily engrossed in one's work, whereby time passes quickly, and one has difficulties with detaching oneself from work" (Schaufeli et al., 2002, p. 75). Past research has indicated that work engagement, as an affective motivational state (Karanika-Murray et al., 2015), is triggered by resourceful and

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challenging work and positive affectivity, which in turn lead to positive organizational outcomes such as organizational commitment, personal initiative, extra-role behaviors, and improved performance (Schaufeli & Bakker, 2010). Work engagement also positively affects numerous individual-level positive outcomes such as work ability (Tomietto et al., 2019), innovative work behaviors (Van Zyl et al., 2021), employee well-being and organizational commitment (Santos et al., 2016), and job satisfaction (Orgambídez-Ramos & de Almeida, 2017; Yan et al., 2019).

Job satisfaction is defined as "the attitude of workers toward the company, their job, their fellow workers and other psychological objects in the work environment" (Beer, 1964, p. 34). As this definition suggests, this attitude is developed toward tangible objects as well as intangible psychological phenomena. Past research has indicated that job satisfaction, being one of the most critical positive psychology topics, is closely related to various positive outcomes, such as psychological well-being (Comellas, 2020), psychological ownership (Mustafa et al., 2016), organizational citizenship behaviors (Murphy et al., 2002), and organizational commitment (Chegini et al., 2019). One of these positive outcomes is work engagement, classified as an affective-motivational state (Karanika-Murray et al., 2015).

This study examined the work engagement–job satisfaction relationship considering social identity theory (Akinci, 2018; Karanika-Murray et al., 2015). According to social identity theory (Tajfel et al., 1979), people need to sense belongingness to their membership groups. From this lens, this kind of belongingness is one of the normal cognitive processes. According to Scheepers and Ellemers (2019), a sense of social identity motivates employees to develop more positive attitudes, behaviors, and emotions toward their colleagues and organizations. This theory is reflected in the area of organizational behavior as the concept of organizational identification. Organizational identification is defined as "a person's sense of belonging within the organization in which they work" (Karanika-Murray et al., 2015). A recent meta-analysis on organizational identification reported that organizational identification was strongly associated with job satisfaction, affective commitment, and job involvement (Riketta, 2005). Supporting these findings, another study reported that work engagement is an essential motivational state in improving the job satisfaction of nurses (Orgambídez-Ramos & de Almeida, 2017). As can be understood from these explanations, work engagement and job satisfaction are closely related to each other and result from the perception of organizational identification, which is an extension of the social identity theory.

2 | METHODS

2.1 | Aim

This study aims to synthesize studies investigating the relationship between nurses' work engagement and job satisfaction. In this respect, the current study tried to answer the following research questions:

RQ1: What is the overall effect size of the relationship between work engagement and job satisfaction?

RQ2: What is the structure of the overall effect size of the relationship between work engagement and job satisfaction (homogenous or heterogeneous)?

RQ3: What kind of moderators might have caused researchers to arrive at mixed conclusions?

2.2 | Design

The Joanna Briggs Institute (JBI) (Joanna Briggs Institute, 2019) guidelines and the PRISMA checklist (Mother et al., 2010) were followed for this meta-analysis. By following the JBI guideline, first, the research questions were formulated to address gaps in the literature. Second, the search strategy was designed by two researchers. Third, the inclusion and exclusion criteria were determined through the consensus of the two researchers. Next, a 13-item structured quality assessment tool (Cicolini et al., 2014) was used for selecting and evaluating the studies. Also, the overall risk of bias and individual risk of bias was assessed. Following this step, the data extraction process was performed, and lastly, the collected data were synthesized by using robust meta-analytical techniques.

2.3 | Search methods

The studies focusing on the relationship between nurses' work engagement and job satisfaction were searched for in the following databases: Web of Science (SSCI, SCI, SCI-Expanded), Scopus, PubMed, and ProQuest. To conduct a comprehensive literature search, the time limit of the publications in the aforementioned online databases was set as before June 2021. EndNote (v.20) software was used for the literature search; using this tool, we searched for the following keywords: "nurse" OR "nursing" AND "work engagement" AND "job satisfaction" in the publications' title, keywords, and abstract sections (see Table 1). Finally, a total of 1379 publications published between 2007 and 2021 in English, including gray literature on work engagement and job satisfaction, were retrieved from the aforementioned databases and other online sources.

2.4 | Search outcome

2.4.1 | Inclusion criteria

To manage the literature pool and select relevant studies, the researchers developed an inclusion criteria list. The inclusion criteria of the study were as follows: (1) the publications should be written in English, (2) studies should have been conducted using a quantitative research design, (3) the studies should report the correlation

TABLE 1 Search results

Database (no time limit)	Number of articles	Search terms
Web of Science (SSCI)	355	Nursing[a] nurse[a], job-satisfaction[a], work engagement[a]
Web of Science (SCI)	270	
Web of Science Core Collection	439	
Scopus	128	
PubMed	106	
ProQuest	43	
Additional records identified through other sources	38	
Duplicates removed	308	
Studies selected for synthesis by three reviewers	78	
Study selection (after quality appraisal)	23	

[a]These keywords were searched in title, keywords, and abstract of the selected databases by using EndNote (v.20) software.

coefficient between job satisfaction and work engagement or provide sufficient data and statistics to calculate effect sizes, (4) the samples should consist of nurses, (5) the measurement instruments used in the studies should be valid and reliable, (6) the country in which the research was performed should be mentioned, and (7) the sample size of the studies should be reported.

2.4.2 | Exclusion criteria

The studies excluded from the meta-analysis had the following criteria: (1) the studies mentioned in their abstracts but did not include the study variables, (2) the studies were written in languages other than English, (3) the studies measured work engagement or job satisfaction using nonvalidated and nonreliable measures, (4) the sample of the studies did not consist of nurses, (5) the studies had poor statistics or data, (6) the studies were replications (simultaneously published in another article, conference paper, or books), (7) the samples consisted of nurses who worked in managerial positions, and (8) the studies were conducted on nurses, but had insufficient statistical analyses and their authors did not respond to emails for clarification.

2.5 | Study selection and outcomes

At the initial stage of the search process, 1341 publications were identified for review. After excluding duplications, 308 publications were left for the screening phase. At this stage, the title, abstract keywords, construct definitions, measures, and statistical results of the 308 publications were screened, and 228 publications were excluded that did not meet the inclusion criteria. Thus, at the next stage, 80 full-text publications were searched in depth. At this stage, 57 out of 80 publications were excluded from the review for the following reasons: (a) 31 studies' samples consisted of nurses and other healthcare workers, (b) three studies' samples were nursing faculty staff, (c) 17 studies' correlation coefficients were not reported, (d) two studies' subjects were nurse supervisors, and (e) four studies' samples consisted of nursing students. Finally, 23 publications, of which seven were dissertations and 16 of which were articles, were analyzed in the synthesis stage (see Figure 1).

2.6 | Quality appraisal

Due to the correlational meta-analytic nature of this study, to assess the quality of the relevant publications, we used a quality assessment instrument (Quality Assessment and Validity Tool for Correlational Studies) adapted from Cicolini et al. (2014). The instrument consists of 13 criteria assessing the design (one item), sample (five items), measurement (five items), and statistical analysis (two items). The total score of the instrument is 14 and is categorized into three subgroups, namely low (0–4), medium (5–9), and high (10–14). Before assessing the qualities of the studies, a coding book that stated the procedure was also created as a reference to minimize uncertainties. Following this, three researchers assessed and coded the included studies. The results of the quality assessment are presented in Table 2.

A publication was selected at random and assessed simultaneously by two raters to test interrater reliability. The "psych" package (Revelle, 2021) was used to calculate Cohen's κ coefficient. The average Cohen's κ correlation coefficient for all raters ($r = 0.78$, 95% confidence interval (CI) [0.48–1.00]) and average weighted κ correlation ($r = 0.82$) for all raters was found to be satisfactory at all levels.

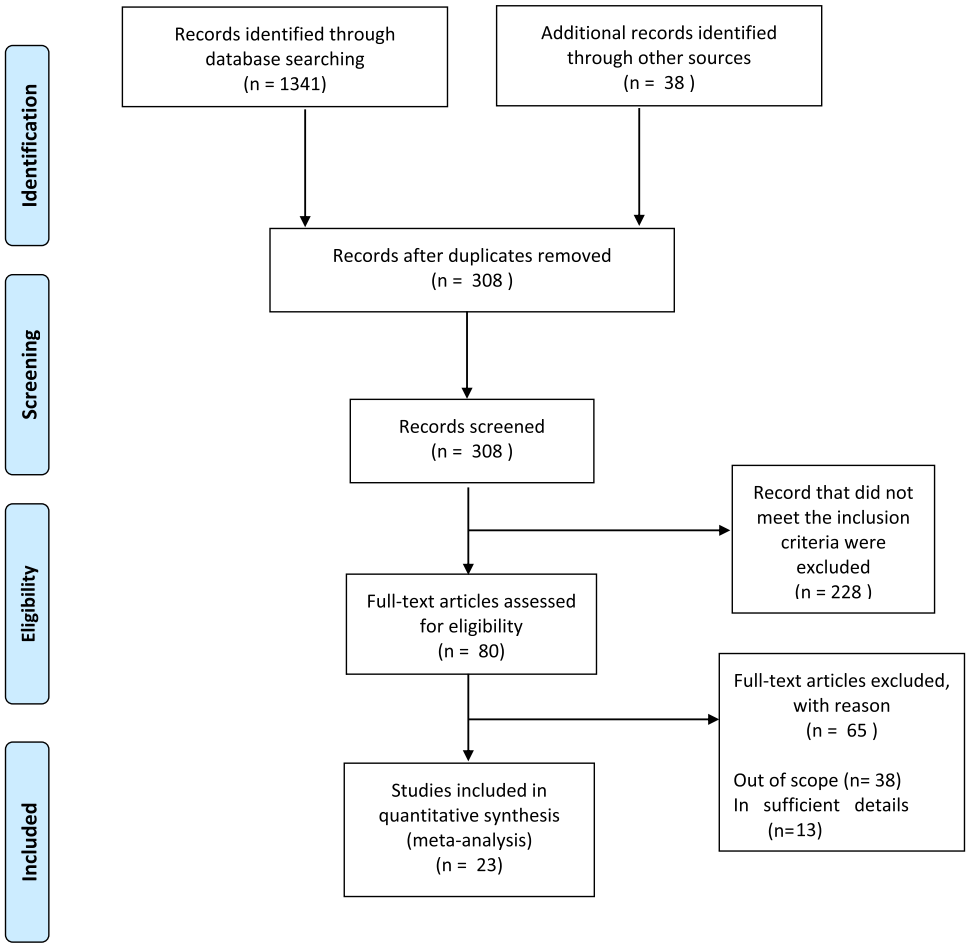


FIGURE 1 Flow diagram of literature search [Color figure can be viewed at wileyonlinelibrary.com]

2.7 | Data abstraction

The following criteria were abstracted from the 23 eligible studies: country name, sample size, correlation coefficients, aim, theoretical lens, name of work engagement scales and job satisfaction, research design, mean age, reliability coefficients of the measures, type of research (article, thesis, or dissertation) conducted analyses, and quality assessment scores, both continuous and categorical. One of the evaluation indicators of heterogeneity is the I^2 statistic, an indicator that assesses the heterogeneity stemming from studies, not sampling error.

2.8 | Synthesis

The overall effect size of individual study correlations and the heterogeneity level of the included correlations were calculated using *R* environment (R Core Team, 2020) and the following specific *R* packages: "metafor" (Viechtbauer, 2010), "dmetar" (Harrer et al., 2019), "meta" (Balduzzi et al., 2019), and "robumeta" (Fisher et al., 2017). Using the "dmetar" package, influence tests were conducted to detect whether a study was an influencing study or not. The results of the analysis indicated that there were eight influencing studies (Baumgardner, 2014; De Los Santos Labrague, 2021; De Simone et al., 2018; Giménez-Espert et al., 2020; Orgambídez-Ramos de Almeida, 2017; Stover, 2020; Varghese, 2017; Yan et al., 2018) that excluded from further analyses because of their influencing effect on overall effect size. After excluding the outliers, the initial heterogeneity level of the 23 studies ($I^2 = 91.4$, 95% CI [88;96], $p < 0.001$) were dramatically reduced (34.2%) to $I^2 = 62$ ($k = 15$, 95% [34;78], $p < 0.001$).

Next, to assess the "file drawer problem" that refers to sampling bias due to editors preferentially publishing significant results or authors preferentially submitting significant results (Sackett, 1979), Rosenthal's (1979) approach was used. Using this method, the failsafe number was found to be $N = 5075$. As this suggests, an additional 5075 studies would be needed to change the overall test results to nonsignificance. Therefore, the significance level of the overall effect size was considered to be robust.

To test publication bias, three frequentist approaches, namely funnel plots (see Figure 2), Egger's (Egger et al., 1997) regression ($z = -1.2066$, $p = 0.2276$), and rank correlation test (Kendall's $\tau = -0.1810$, $p = 0.3795$) (Begg & Mazumdar, 1994), were performed.

TABLE 2 Quality assessment scores

	Criteria	Giallonardo et al. (2010)	Giménez-Espert et al. (2020)	Gong et al. (2020)	Hassona Hussein (2013)	Jinmei et al. (2020)	Iida et al. (2021)	Nguyen et al. (2018)	Orgambídez et al. (2020)	Pohl and Galletta (2017)	Orgambídez-Ramos and de Almeida (2017)	De Los Santos and Labrague (2021)	De Simone et al. (2018)	Walker and Campbell (2013)	Yan et al. (2018)	Yan et al. (2019)
	Design															
1	Was the study prospective? (cross-sectional, descriptive, longitudinal)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Sample															
2	Was probability sampling used?	1	1	0	1	1	1	1	1	0	1	1	1	0	0	0
3	Was sample size justified?	0	0	0	0	1	1	0	1	1	0	1	0	0	1	1
4	Was sample drawn for more than one site?	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	Was anonymity protected?	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1
6	Response rate was more than 60%?	0	1	0	0	1	1	0	1	1	0	1	0	0	0	0
	Measurement															
	Job satisfaction (IV) [assess for IV correlated with DVs only]															
7	Was the outcome measured reliably?	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
8	Was the outcome measured using a valid instrument?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Influence on the measure of work engagement (DV)?															
9	Was the dependent variable measured using a valid	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1

(Continues)

TABLE 2 (Continued)

	Criteria	Giallonardo et al. (2010)	Gimé-nez-Espert et al. (2020)	Gong et al. (2020)	Hassona Hussein (2013)	Jinmei et al. (2020)	Iida et al. (2021)	Nguyen et al. (2018)	Orgambídez et al. (2020)	Pohl and Galletta (2017)	Orgambídez-Ramos and de Almeida (2017)	De Los Santos and Labrague (2021)	De Simone et al. (2018)	Walker and Campbell (2013)	Yan et al. (2018)	Yan et al. (2019)
	instrument?															
10	If a scale was used for measuring the dependent variable, was the internal consistency ≥0.70?	2	2	2	2	2	0	2	2	2	2	0	0	2	2	2
11	Was a theoretical framework used for guidance?	1	1	1	0	1	1	1	1	0	0	0	1	0	0	0
	Statistical analysis															
12	If multiple outcomes were studied, are correlation analyzed?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Were outliers managed?	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0
	Total	10	11	10	10	12	9	10	12	10	11	8	8	9	9	10
	Overall study validity rating (circle one)	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3
	(0–4 = LO; 5–9 = MED; 10–14 = HI)															

	Criteria	Al-Khaduri (2018)	Al-Sheyab (2018)	Baumgardner (2014)	Cooke (2017)	Edwards-Dandridge (2019)	Simpson (2007)	Stover (2020)	Varghese (2017)
	Design								
1	Was the study prospective? (crossectional, descriptive, longitudinal)	1	1	1	1	1	1	1	1
	Sample								
2	Was probability sampling used?	1	1	1	1	1	1	1	1
3	Was sample size justified?	1	0	0	0	0	0	0	1
4	Was sample drawn for more than one site?	1	1	1	0	1	1	1	1
5	Was anonymity protected?	1		1	1	1	1	0	0

TABLE 2 (Continued)

	Criteria	Al-Khaduri (2018)	Al-Sheyab (2018)	Baumgardner (2014)	Cooke (2017)	Edwards-Dandridge (2019)	Simpson (2007)	Stover (2020)	Varghese (2017)
6	Response rate was more than 60%?	0	0	0	0	0	0	0	1
	Measurement								
	Job satisfaction (IV) [assess for IV correlated with DVs only]								
7	Was the outcome measured reliably?	1	1	1	1	1	1	1	1
8	Was the outcome measured using a valid instrument?	1	1	1	0	0	1	1	1
	Influence on the measure of work engagement (DV)?								
9	Was the dependent variable measured using a valid	1	1	1	1	1	1	1	1
	instrument?								
10	If a scale was used for measuring the dependent variable, was the internal consistency ≥0.70?	2	2	2	2	2	2	2	2
11	Was a theoretical framework used for guidance?	1	1	1	1	1	1	1	0
	Statistical analysis								
12	If multiple outcomes were studied, are correlation analyzed?	1	1	1	1	1	1	1	1
13	Were outliers managed?	1	1	1	1	1	1	1	1
	Total	13	12	12	10	11	12	11	12
	Overall study validity rating (circle one)	3	3	3	3	3	3	3	3
	(0–4 = LO; 5–9 = MED; 10–14 = HI)								

Because these frequentist asymmetry tests indicated nonsignificant results ($p > 0.05$), it was concluded that there was no publication bias.

In this meta-analysis, Hunter and Schmidt's (1990) three-stage meta-analysis approach was followed. First, the overall effect size of the 15 studies was calculated. Second, the level of heterogeneity was calculated, and lastly, potential moderators that could explain the source of heterogeneity were tested.

The overall effect size of the included studies was $r = 0.47$ (95% CI [0.43;0.51]). According to Cohen's classification, this size enters the medium class. However, an updated version of this classification labels it as exigent (Gignac & Szodorai, 2016). Gignac & Szodorai's umbrella review indicated that the effect sizes of past meta-analytic studies were mostly smaller than the suggested values of Cohen. Therefore, they recategorized the effect-size classification as small ($r = 0.10$), moderate ($r = 0.20$), and large ($r = 0.30$) (Gignac & Szodorai, 2016). Because this approach is viewed as more parsimonious, recent studies have also used this parsimonious classification (Velotti et al., 2021; Yildiz et al., 2021). Thus, the calculated effect size was regarded as largely based on Gignac and Szodorai's (2016) effect-size classification.

In terms of heterogeneity, Higgins and colleagues defined the ranges of heterogeneity as low (25%), medium (50%), and high (75%). To assess the level of heterogeneity, the I^2 value was used (Higgins & Thompson, 2002). The I^2 value of the 15 studies was $I^2 = 62\%$ (95% CI [34;78]), which fell in the range of medium heterogeneity. Also, Q statistics, $Q(14) = 36.87$, $p < 0.001$, and τ^2 statistics ($\tau^2 = 0.0067$, 95% CI [0.0014;0.0240]) support this result. Due to the unique characteristics of the individual studies and the significant I^2 value, the structure of the included studies was determined to be heterogeneous. Therefore, a random-effect model was used to assess heterogeneity.

Considering the medium level of heterogeneity observed, a set of moderators was examined to explain the sources of the heterogeneity. The moderators that were tested in this study were as follows: publication type (published/gray literature), work setting (hospital/other healthcare institutions), outliers management (yes/no), data collection type (face-to-face/online or others), tenure (less than 1 year/more than 1 year), presence of control variable (yes/no), quality assessment scores (low (0–4)/medium (5–9)/high (10–14)), age (continuous), and national culture scores from Hofstede's (2021) country comparison tool (the values range from 0 to 100). According to this tool, each country was assessed with six dimensions of the national culture, namely power distance, uncertainty avoidance, masculinity, long-term orientation, indulgence, and individualism.

3 | RESULTS

After selecting studies to include in our analysis, the correlation between work engagement and job satisfaction was assessed. Following this, the effect of potential moderators was determined by performing a series of meta-regression analyses.

3.1 | Study characteristics

The 15 individual articles (evaluated studies are marked with double asterisks in the reference list) were published between 2007 and May 30, 2021. All the studies were conducted before the Covid- 19 pandemic. Most of the publications were conducted in the USA ($k = 4$) and China ($k = 3$), and the remaining publications were conducted in Australia ($k = 2$), Japan ($k = 1$), Belgium ($k = 1$), Egypt ($k = 1$), Spain ($k = 1$), United Arab Emirates (UAE) ($k = 1$), and Canada ($k = 1$). The 15 studies' mean age was 36.61 years (SD = 8.47, $k = 15$). The studies consisted of nurses ($N = 3818$; mean = 255; SD = 150) mostly working in public hospitals ($k = 13$). Additional characteristics and details of the studies are presented in Table 3.

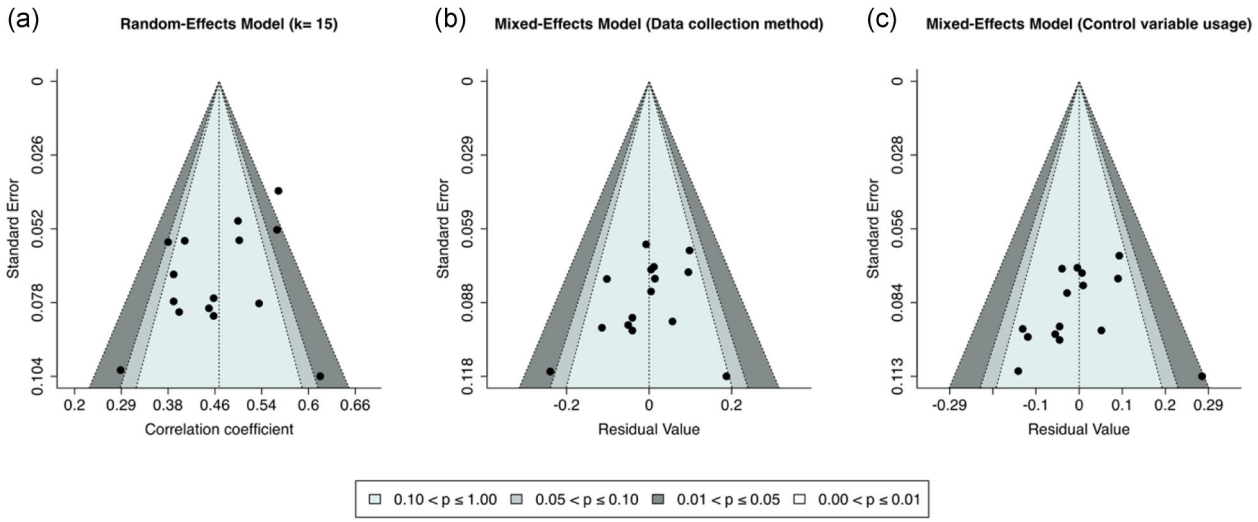


FIGURE 2 Funnel plots of random effect (A) and mixed effect (B) models [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 3 Characteristics of studies used in the analysis

Author(s), year, country, type	Study design	Aim	Subjects	Theory	Measures	Reliability Cronbach's α	Mean age	Analysis	Quality assesment
Giallonardo et al. (2010)	Cross-sectional	To examine the relationships between new graduate nursesperceptions of preceptor authentic leadership, work engagement and job satisfaction	170 Nurses who worked in anacute care setting	Theory of AuthenticLeadership	WE – Schaufeli and Bakker, (2003); JS – Stamps, (1997)	WE – 0,86 JS – 0,90	27,71	Correlation analysis;Regres-sion analysis; and mediation analysis	10
Gong et al. (2020)	Cross-sectional	To explore the impact of psychological empowerment and work engagement in thelink between trait EI and job satisfaction	370 Nurses attending threehos-pitals	The Job Demands–Resources Theory	WE – Schaufeli et al., (2006); JS – Thompson and Phua, (2012)	WE – 0,89 JS – 0,87	29,63	Correlation analysis; SEM analysis; and mediation analysis	10
Hassona, (2013)	Cross-sectional	To identify the relationship between structural empowerment, work engagement, and job satisfaction among nursing staff at Zagazig University Hospitals	100 full time staff nurses from eight hospitals	N/A	WE – Schaufeli et al. (2002); JS – Ironson et al., (1989)	WE - 0,82 JS-	33,45	Correlation analysis; regression analysis	10
Jinmei et al. (2020)	Cross-sectional	To examine the level of job satisfaction, leader empowering behaviors and work engagement, and to identify the relationships between work engagement and its two related factors including job satisfaction and leader empowering behaviors among nurses in seven tertiary hospitals of Kunming, the People's Republic of China.	418 nurses from seven tertiary hospitals	N/A	WE – WE – Schaufeli et al. (2002); JS – Stamps (1997)	WE – 0,85 JS – 0,94	29,79	Correlation analysis	12
Lida et al. (2020)	Cross-sectional	To develop and examine the reliability and validity of a scale to measure team job crafting.	175 Nurses from two hospitals	Job Crafting Theory	WE – WE – Schaufeli et al. (2002); JS – Locke (1976)	N/A	35.8	Correlation analysis; regression analysis	10
Nguyen et al. (2017)	Longitudinal	To examine the consequences of changes on nursing work	220 Nurses from public hospitals	The Job Demands-Resources Theory	WE – Schaufeli and Bakker (2003); JS – Cook et al. (1981)	WE – 0, 83 JS – 0,92	N/A	Correlation analysis; path analysis; and mediation analysis	10

(Continues)

TABLE 3 (Continued)

Author(s), year, country, type	Study design	Aim	Subjects	Theory	Measures	Reliability Cronbach's α	Mean age	Analysis	Quality assesment
Orgambidez-Santos et al. (2020)	Cross-sectional	To explore the effect of work engagement, as an intermediary variable, on the relationship between self-efficacy, and job satisfaction and affective organizational commitment as individual indicators of quality of working life (QWL)	321 Nurses from public hospital	N/A	WE – Schaufeli et al. (2002); JS – Melia and Peiro (1989)	WE – 0, 91 JS – 0,88	39,43	Correlation analysis; path analysis; and mediation analysis	12
Pohl & Galletta (2017)	Cross-sectional	To examine the moderating role of supervisor emotional support (group-level variable) on the relationship between work engagement and job satisfaction (individual-level variables).	323 Nurses from urban hospitals	N/A	WE – Schaufeli et al. (2006); JS –Stamps (1998)	WE – 0,86 JS – 0,92	27,3	Correlation analysis; hierarchical linear modeling	10
Walker & Campbell (2013)	Cross-sectional	To explore the relationships between work readiness and a number of work outcomes (job satisfaction, work engagement, and intention to remain).	96 graduated nurses from regional hospitals	N/A	WE – Schaufeli and Bakker (2003) ; JS – Hills et al. (2012)	WE – 0,88 JS – 0,86	26	Correlation analysis; regression analysis; path analysis; and mediation analysis	9
Yan et al. (2019)	Cross-sectional	To examine the role of work engagement in the associations between personality (core self-evaluations (CSE), proactive personality) and well-being.	316 Nurses from hospitals	N/A	WE – Seppälä et al. (2009); JS – Vegt et al. (2000)	WE – 0,91 JS – 0,84	29,41	Correlation analysis, SEM analysis, mediation analysis	10
Al-Khadhuri, J. (2018)	Cross-sectional	This comparative international study was to examine and compare the relationships among demographic characteristics, job resources, job demands, job satisfaction, and work engagement in health care workforces in the Sultanate of Oman and the United Arab Emirates	677 Nurses	Social Exchange Theory	WE - Schaufeli et al. (2002) JS - Camman et., al. (1979)	WE - 0,86 JS - 0,83	NA	Multiple Block Regression, Correlation, Qualitative Data Analysis	13

TABLE 3 (Continued)

Author(s), year, country, type	Study design	Aim	Subjects	Theory	Measures	Reliability Cronbach's α	Mean age	Analysis	Quality assesment
Al-Sheyab, (2018)	Cross-sectional	This study investigated how engagement, job satisfaction, and intrinsic motivation will affect retention among nurses.	150 Nurses	Saks' Multidimensional Model of EmployeeEngage-ment and the Self-Determination Theory and Work Motivation (SDT).	WE - Schaufeli et al. (2004) JS - Weiss et al. (1967).	WE - 0,92 JS - 0,94	NA	Transformative design, Correlation, Linear regression	12
Cooke, (2017)	Cross-sectional	Fill several gaps in the research literature between team work engagement and patient outcomes, nurses' perceptions of team work engagement, relational coordination as a variable that predicts team work engagement and the role of team work engagement as a mediator betweenrelational coordination and patient outcomes	160 Oncology Nurses from a cancer organization	Relational coordination Theory	WE - Costa et al. 2014 JS - NA	WE - 0,87 JS - N/A	43	Exploratory analysis, Correlation, Regression	10
Edwards-Dandridge, (2019)	Cross-sectional	The purpose of this quantitative correlational study was to determine whether work engagement and job satisfaction predicted nurse turnover intention in hospitals	155 Nurses	Theory of reasoned action	WE - Schaufeli et al. (2004) JS - Spector (1985)	WE - 0,89 JS - 0,87	43.95	Correlation, Multiple linear regression	12
Simpson, (2007)	Cross-sectional	The purpose of this design was to examine nurses' work engagement and its relationship to turnover cognitions, job satisfaction, job search behavior and registered nurse demographic variables.	167 Nurses	Maslow's theory of human needs	WE - Schaufeli et al. (2003)JS - Stamps (1997)	WE - 0,93 JS - 0,91	38.63	Correlation, ANOVA, Multiple linear regression	12

Abbreviations: ANOVA, analysis of variance; JS, job satisfaction; NA, non-available; WE, work engagement.

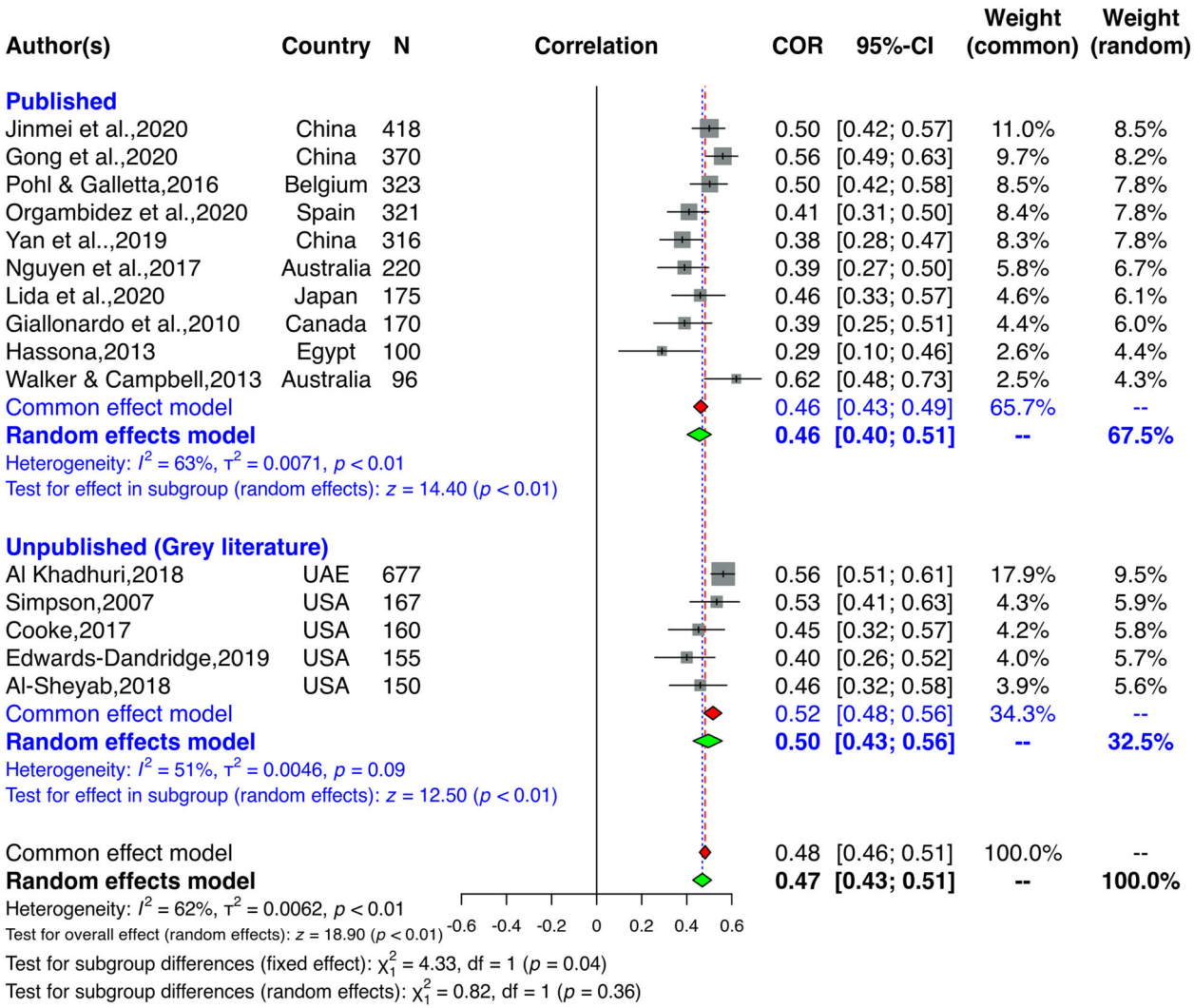


FIGURE 3 Forest plot. CI, confidence interval; COR, correlation coefficient [Color figure can be viewed at wileyonlinelibrary.com]

3.2 | Correlations between job satisfaction and work engagement

The 15 studies' work engagement–job satisfaction correlation ranged from r = 0.29 to r = 0.62, and all positive correlation coefficients were statistically significant. The random-effect model summary (I^2 = 0.62, 95% CI [34;78]; τ^2 = 0.0067, 95% CI [0.014;0.240]; k =5), overall effect size (r = 0.47, 95% CI [0.43;0.51], p < .001), individual effect sizes, and correlation coefficients of each individual study are presented in the forest plot (see Figure 3).

3.3 | Power analysis

Due to the small number of studies included in this study, we examined the statistical power of the meta-analysis using power analysis. To calculate the power score of the meta-analysis, we used the "metapower" package (Griffin, 2020) and a specific *R* script developed by Winterton and Quintana (2019). The average sample size, the number of studies, and the heterogeneity level of the studies (I^2) were entered into the equation, and the power analysis was performed. The results indicated that this meta-analysis's statistical power was 100%. Also, to test the robustness of the result, as suggested by Winterton et al. (2020), the overall effect size was set to r = 0.10, and the level of heterogeneity of overall effect size was set to low heterogeneity (I^2 = 0.25) and the statistical power was tested again. Despite these changes, the statistical power remained at 75%. Based on these results, we determined that our results were robust.

3.4 | Meta-analysis of the correlation between work engagement and job satisfaction

The average effect size of the work engagement–job satisfaction relationship was relatively large (r = 0.47, 95% CI [0.42, 0.50], p < 0.001) (Gignac & Szodorai, 2016). Supporting this result, the robust variance estimation (RVE) also indicated that the correlation

between work engagement and job satisfaction was large, positive, and significant ($r = 0.47$, 95% CI [0.42, 0.50], $p < 0.001$) with a medium level of heterogeneity, Q (14) = 36.87, $p < 0.001$, with RVE: $\tau^2 = 0.0067$, $I^2 = 0.62$. As these indicators suggest, the heterogeneity among the variables mostly originated from true effect size heterogeneity, not sampling error within studies. All 15 studies' effect sizes are presented in a forest plot (Figure 3).

3.5 | Moderator analysis

To explain the sources of the heterogeneity, a series of moderator analyses were conducted. Results showed that the moderating effect of publication type, Q_M (1) = 0.018, $p > 0.05$, national culture, Q_M (6) = 5.454, $p > 0.05$], type of job satisfaction scale, Q_M (2) = 1.731, $p > 0.05$, type of work-engagement scale, Q_M (4) = 3.055, $p > 0.05$], data collection type, Q_M (1) = 0.004, $p > 0.05$], tenure, Q_M (4) = 5.096, $p > 0.05$, quality, Q_M (2) = 0.772, $p > 0.05$], outliers management, Q_M (1) = 1.638, and age, Q_M (1) = 0.056, $p > 0.05$, were not found as statistically significant. On the other hand, only two moderators, namely data collection method (face-to-face/online or envelope box), Q_M (1) = 4.975, $p < 0.05$, and presence control variable, Q_M (1) = 4.046, $p < 0.05$, were statistically significant (see Tables 4 and 5).

The result of the moderator analysis showed that the face-to-face data collection method was statistically significant ($\beta = 0.13$, 95% CI [0.02;0.25], $p < 0.05$). In other words, the face-to-face data collection method had a positive impact on the effect size of the work engagement–job satisfaction relationship. Specifically, face-to-face data collection led to a 0.13 unit increase in the work engagement–job satisfaction relationship and explained 43.6% of effect size heterogeneity. When the data collection method was controlled, the level of heterogeneity decreased from its initial level ($I^2 = 62\%$) to $I^2 = 46.76\%$ ($\tau^2 = 0.0038$, SE = 0.0032).

The results of the second moderator analysis showed that using control variables that indicates the difference were found as statistically significant ($\beta = -0.10$, 95% CI [−0.2032;−0.0026], $p < 0.05$). In other words, the presence of control variables has a negative impact on the effect size of the work engagement–job satisfaction relationship. Specifically, the presence of control variables leads to a −0.10 unit of decrease in the work engagement–job satisfaction relationship and explained 43.8% of effect size heterogeneity. When the presence of control variables controlled, the level of heterogeneity decreased from its initial level ($I^2 = 62\%$) to $I^2 = 47.53\%$ ($\tau^2 = 0.0037$; SE = 0.0032).

4 | DISCUSSION

In this study, 23 individual quantitative research papers were synthesized initially. The results of these studies were mixed. Although the majority of the studies found a statistically significant and positive relationship between work engagement and job satisfaction, two of them were not consistent with the majority. While one study, Giménez-Espert et al. (2020), found a negative and significant relationship between work engagement and job satisfaction, another, Stover (2020), found a nonsignificant relationship between the two. Because these two studies' data were collected during the Covid-19 pandemic, one reason for this inconsistency could be Covid-19's unusual and harsh working conditions. These conditions have had enormous negative effects, such as anxiety, depression, insomnia, and overall psychological problems (Que et al., 2020), on healthcare professionals, and especially in nurses (Savitsky et al., 2021). Therefore, the level of overall effect size and the direction of the work engagement–job satisfaction relationship might be affected by this situation. After testing for influence, these two studies (Giménez-Espert et al., 2020; Stover, 2020), and seven additional studies (Baumgardner, 2014; De Los Santos & Labrague, 2021; De Simone et al., 2018; Varghese, 2017; Yan et al., 2018), eight studies were determined to be outliers that have an abnormal contribution to effect size heterogeneity. Therefore, these studies

TABLE 4 Meta-regression results for data collection method (mixed-effect model)

Moderators	k	N	β	SE	z	p	%Var	95% CI	Q_E	Q_M
Data collection method										
Intercept		3818	0.41	0.05	7.791	0.001***	43.6	[0.30;0.51]	24.885 (*df* = 13)	4.975 (*df* = 1)
									p < 0.05	*p* < 0.05
Face to face	12	3818	0.13	0.06	2.231	0.026*		[0.02;0.25]		

				Between groups			Within groups		
	K	r	95% CI	τ^2	Q	df	p	Q	df	p
Results for subgroups (random-effect model)										
Online or envelope box	3	0.39	[0.30;0.47]	0.0038	11.99	1	0.001***	24.9	13	0.02*
Face to face	12	0.48	[0.44;0.52]	0.0038						

Abbreviations: CI, confidence interval; CV, control variable.
*$p < 0.05$; ***$p < 0.001$.

TABLE 5 Meta-regression results for control variable usage (mixed-effect model)

Moderators	k	N	β	SE	z	p	%Var	95% CI	Q_E	Q_M
Presence of control variable										
Intercept		3818	0.54	0.03	19.212	0.001***	43.8	[0.49;0.60]	24.777 (*df* = 13)	4.046 (*df* = 1)
CV—yes	5	3818	−0.10	0.05	−2.114	0.044*		[−0.203;−0.003]	*p* < 0.05	*p* < 0.05

					Between groups			Within groups		
	k	r	95% CI	τ^2	Q	df	p	Q	df	p
Results for subgroups (random-effect model)										
CV—no	10	0.50	[0.45;0.54]	0.0037	4.05	1	0.04*	24.78	13	0.02*
CV—yes	5	0.41	[0.34;0.48]	0.0037						

Abbreviations: CI, confidence interval; CV, control variable.
*$p < 0.05$; ***$p < 0.001$.

were excluded from the further analyses; the remaining 15 studies were synthesized.

The 15 studies consisted of mostly published studies ($k = 11$). Only eight of the 15 studies referenced to theoretical backgrounds; job demands—resources theory (Gong et al., 2020; Nguyen et al., 2018), self-determination theory (Al-Sheyab, 2018), relational coordination theory (Cooke, 2017), the theory of reasoned action (Edwards-Dandridge, 2019), authentic leadership theory (Giallonardo et al., 2010), job crafting theory (Iida et al., 2021), social exchange theory (Al-Khaduri, 2018), and Maslow's theory of human needs (Simpson, 2007) were tested.

The result of the meta-analysis ($k = 15$) indicated that there is a positive and statistically significant relationship ($r = 0.47$, $p < 0.001$) between work engagement and job satisfaction. Supporting this notion, Karanika-Murray et al. (2015) assert that work engagement is strongly associated with job satisfaction because work engagement is one of the positive results of organizational identification. Past literature in nursing research has reported a strong correlation between organizational identity and work engagement (Lyu et al., 2020) that is also consistent with social identity theory (Tajfel & Turner, 1979). Other studies have identified that work engagement is also associated with job satisfaction (Jinmei et al., 2020; Pohl & Galletta, 2016; Simpson, 2007). Based on these findings, the results of this meta-analytic synthesis are consistent with social identity theory and the results of published studies.

The overall effect size of this relationship was large (Gignac & Szodorai, 2016), and the heterogeneity level of the effect size was medium ($k = 15$, $I^2 = 0.62$). Controlling for data collection type explained 43.6% of the effect size heterogeneity. As this suggests, the level of work engagement–job satisfaction relationship was higher in the studies in which a face-to-face data collection method was conducted. This result may be attributed to social desirability bias, defined as "the tendency for people to present a favorable image of themselves on self-report measures" (Charles & Dattalo, 2018, p. 587). Due to the fact that face-to-face data collection was conducted during working hours, nurses may have exaggerated their positive thoughts and attitudes to win the favor of their managers or because they were concerned that the results might be visible to others. Supporting this notion, Andersen and Mayerl (2017) emphasize that social desirability is not considered in social sciences, but has a significant effect on the results. Because social desirability bias was not controlled in the included individual studies, it is possible that these results might be affected by social desirability bias.

Lastly, when the control variable existence as the second significant moderator was controlled, it negatively affected the job satisfaction–work engagement relationship. Further, this intervention explained 43.8% of effect size heterogeneity. Control variables are not in focus in the relationship between the independent and dependent variables, but can potentially affect this relationship (York, 2018). However, using control variables in nonexperimental studies, unfortunately, did not receive its deserved attention because of the lack of methodological and technical knowledge (Breaugh, 2008) asserts that. Also, this lack of information leads to misunderstanding and misrepresentation of the statistical results (York, 2018). Based on these explanations, the relationship between work engagement and job satisfaction in the studies that did not include control variables in their models might be affected (exaggerated) by unaccounted-for variables that were not controlled.

5 | IMPLICATIONS FOR PSYCHIATRIC NURSING PRACTICE

The number of studies included was limited because there were not enough studies that have been conducted on nurses. To conduct more comprehensive meta-analyses, more individual work is needed. Most of the studies included used a cross-sectional research design that limits causal inference of the relationship. Therefore, further research could conduct longitudinal research to test causality. The variability in the measurement of job satisfaction also limits the

generalizability of the results. Further research could minimize this variability by including studies that use more homogeneous scales. Although numerous moderator analyses were conducted to explain sources of heterogeneity, the heterogeneity level was significantly reduced when controlling for the data collection method as a moderator. Further research should consider other potential moderators to explain variation within the studies. The number of studies conducted during the Covid-19 pandemic ($k = 2$) was relatively small compared to the prepandemic period. Therefore, after the Covid-19 pandemic, a meta-analysis could be done to uncover the negative effects of Covid-19 on the work engagement–job satisfaction relationship. Many of the studies investigated used the face-to-face data collection method; however, social desirability might have caused a bias. Therefore, future researchers could use the social desirability bias as a control variable in their research models. Most of the studies did not use control variables in their models, which might be caused higher correlation coefficients between ween the two. Further research should use control variables to see isolated relationships and minimize the possibility of misrepresenting the results. Finally, despite this study assessing the work engagement–job satisfaction relationship with a social identity lens; interestingly, none of the studies tested this theory in their own research. Further research could fill this gap by testing work engagement–job satisfaction relationship with other variables in their research models in light of the social identity theory.

6 | CONCLUSION

This meta-analytic review provided evidence for the significant relationship between nurses' work engagement and job satisfaction. Based on this finding, we infer that providing a work environment that enables job satisfaction and work engagement is vital to the sustainability of healthcare systems. Our results might also be useful in formulating strategies to foster nurses' work engagement and job satisfaction. From a practical point of view, given the importance of the social identity and, in turn, organizational identity, managers and policymakers should provide a human-oriented and positive work climate/atmosphere (i.e., high in organizational justice, perceived organizational support, organizational trust, and empowerment) that supports the belongingness of nurses to their organizations.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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