



REVIEW ARTICLE

Worldwide prevalence and associated factors of nursing staff turnover: A systematic review and meta-analysis

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Abstract

Aims: To systematically assess the worldwide prevalence of nurse turnover and discuss its influencing factors.**Design:** Systematic review and meta-analysis.**Methods:** PubMed, the Cochrane Library, Web of Science, CINAHL, China Knowledge Resource Integrated Database, Wanfang Database were searched from their commencement date to 25 March 2021. Two authors independently reviewed the studies. Stata 15.0 software package was used for statistical analysis, with estimates of data on the prevalence of nurse turnover using a random-effects model. This review was performed according to the Joanna Briggs Institute (JBI) manual for evidence synthesis and the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) Statement. PROSPERO Registration Number:CRD42020208873.**Results:** A total of 15 studies covering 852,317 nurses were included in the analyses. The pooled prevalence of nurse turnover was 18% (95% CI: 11% to 26%, $I^2 = 99.86%$, $p < 0.0001$). Geographic regions (Asia), published years (2001 to 2010) and respondents (new nurses) were significantly associated with the prevalence of nurse turnover. Additionally, several risk factors for turnover were identified in the literature, involving demographic factors (young, single, have short working hours, lower level of education and male nurses), organizational factors (small-scale hospitals, low salary levels, larger workload, developed region and absence of labour union), satisfaction (dissatisfaction with organization, profession, job and competence).

KEYWORDS

factors, meta-analysis, nurses, prevalence, systematic review, turnover

1 | INTRODUCTION

2020 was the International Year of nurses and midwives, which recognized the contributions of nurses and midwives to the health and well-being of the world's population. Especially during COVID-19, nurses have been serving at the very front lines

and playing a central role in the battle against COVID-19 (Daly et al., 2020). However, the shortage of nursing has become a critical issue faced by healthcare organizations around the world. Increased nurse turnover can lead to shortages of health professionals, which is currently affecting the health care sector worldwide (Cox et al., 2014). The rate of nurse turnover across

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the world is considered high. Nurse turnover rate is 15.6% in China (Guo et al., 2018), 36.6% in Jordan (Hayajneh et al., 2010), 19.9% in Canada (O'Brien-Pallas et al., 2010) and 11.7%–46.7% in the United States (American Health Care Association, 2011; Lerner et al., 2014). The turnover rate for all nurses in Korea is 10.1%–20.4% and 27.8%–33.0% for nurses who have worked for less than one year (Kim et al., 2013; Korean Hospital Nurses Association, 2017). Frequent nurse turnover in hospitals can lead to a reduction in staffing level, which negatively impacts on the quality of care and patient safety (Antwi & Bowblis, 2018). Therefore, nurse turnover rate has been closely concerned by health policymakers and hospital administrators.

2 | BACKGROUND

Many factors could lead to nurse turnover. Numerous studies have examined individual factors that may influence turnover behaviour. Such as turnover is associated with younger age (Dewanto & Wardhani, 2018), fewer years of working (Liu et al., 2015), lower education (Gan et al., 2020; Toren et al., 2012), being male (Fochsen et al., 2006) and single (Dewanto & Wardhani, 2018). In addition, some of the literature on nurse turnover uses a relevant conceptual framework. Brewer et al. (2012) synthesis model includes four groups of variables: (1) personal characteristics; (2) work attributes (e.g. wages, type of shift, working overtime), (3) opportunity (e.g. RN staffing levels), (4) shocks (e.g. injuries, pregnancy, satisfaction). The decision to leave is likely the result of a process that has many simultaneous underlying causes. Such as the Nurses' Early Exit study research model (Estryn-Behar et al., 2010) is based on the assumption that the individual's decision to leave is a function of (1) demands at work and in private life, (2) pathways of exposure, (3) individual conditions and resources, (4) possible alternatives and (5) outcome to leave or stay. There is a lot of literature on nurse turnover linking job satisfaction, intent to stay and actual turnover (Chen et al., 2008; Ramoo et al., 2013). Kovner et al. (2009) found that job search, organizational commitment, job satisfaction, and intent to stay are intervening variables to turnover. It is supposed that these factors form a complex system of interactions.

Many countries have been working hard to relieve the shortage of nurses and its possible impact on the health care system (Chan et al., 2013). The government continues to increase enrolment in nursing colleges, but the number of in-service nurses has not increased significantly (Lee et al., 2014). Therefore, the most effective strategy is to maintain the current workforce in the profession.

Although many studies have been published on nurse turnover, most previous studies were focused on turnover intention (Kim & Kim, 2021), which investigates the extent to which nurses intend to leave rather than the actual turnover. By rapid literature search, no systematic study has been conducted to explore the prevalence rates and factors relative to the actual turnover. Therefore, this systematic review was to examine the worldwide prevalence of nurse turnover and its influencing factors.

In our study, nurse turnover is defined as external turnover, which is defined as the process of transferring nurses from one unit to another in an organization (Jones, 1990).

The turnover rate was calculated by dividing the total number of resigned nurses in a specified time period over the total number of employees during the same period and multiplied by 100% (Armstrong, 1998).

3 | METHODS

3.1 | Design

The reporting of this review was guided by the standards of the PRISMA statement (PRISMA; Boutron et al., 2020), which aims to help the authors appropriately report on different approaches to knowledge synthesis and ensure that all aspects of such studies are reported accurately and transparently. However, the PRISMA statement should not be used as a methodological guideline for design, nor as a tool for evaluating the methodological quality of reviews (Sarkis-Onofre et al., 2021). Therefore, this review adopted methods from the JBI manual for evidence synthesis (Aromataris & Munn, 2020). The protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO) with the registration number CRD42020208873, which is available on the website: <https://www.crd.york.ac.uk/prospero>.

3.2 | Search method

The Cochrane Library, PubMed, Web of Science, CINAHL, CNKI, Wanfang Databases from their commencement date to 25 March 2021 were independently searched by two investigators. The following search words were used: 'turnover', 'departure', 'quit', 'nurs*', 'registered nurses', 'survey', 'investigation', 'cross-sectional', 'rate', 'prevalence', 'factor', 'determinants'. The PubMed database was searched using terms (((nurse OR nurses OR nursing staff OR nursing personnel OR registered nurses) AND (turnover OR departure OR quit OR resign OR resignation OR separation OR dimission)) AND (survey OR investigation OR cross-sectional)) AND (rate OR prevalence OR proportion OR percentage OR factors OR determinants). Reference lists of relevant articles and reviews were searched manually for any additional studies.

3.3 | Study selection and data extraction

After removing duplicate studies, two members of the research team independently evaluated eligible publications by screening titles and abstracts according to the inclusion and exclusion criteria. Full-text studies were retrieved when at least one reviewer considers an abstract to be eligible for inclusion.

Studies were included if they met the following criteria: (a) study participants were nurses met the eligibility criteria of practicing; (b) prevalence personnel turnover was reported; (c) the studies had to be observational. (d) the language of the publication was English or Chinese; The exclusion criteria were: (a) studies that reported intent to leave/turnover; (b) studies that contained incomplete data; (c) full texts unavailable.

Data were extracted from the included studies by two independent researchers. The following study characteristics were extracted and tabulated: first author name, publication year, country, sample and the prevalence of nurse turnover.

3.4 | Quality appraisal

After study selection, the methodological quality of the included studies was independently appraised according to the 'Agency for Healthcare Research and Quality (AHRQ) for assessing the quality of cross-sectional studies in meta-analysis' (Zeng et al., 2015). The instrument includes 11 items, a score ranging from 0 to 11, with 'No' and 'unclear' signed 0 scores, and 'yes' signed 1 score. An AHRQ score of 8–11 was defined 'high', 4–7 was defined 'medium', 0–3 was defined 'low'.

3.5 | Data analysis

The data synthesis was conducted using the Stata version 16. I^2 statistics was used to measure the heterogeneity of studies, with I^2 values of <50%, 50%–75% and >75% being considered to indicate low, moderate and high heterogeneity, respectively. The random-effects model was used if the I^2 was larger than 75%; otherwise, the fixed-effects model was applied (Higgins et al., 2003). To explore the sources of heterogeneity, subgroup analyses were conducted, such as regions (Asia, North America, Europe), published years (2001–2010, 2011–2020) and respondents (New nurses, All nurses).

4 | RESULTS

4.1 | Search results

2311 articles were initially retrieved, of which 833 were duplicates. After examining the titles and abstracts, 1275 articles were excluded. The full texts of the remaining 203 articles were then retrieved and assessed for eligibility. Of them, 128 articles were excluded due to inappropriate research content, mainly because their research focused on turnover intention, 33 articles were eliminated for the lack of data on the prevalence and/or factors, and 27 were excluded due to qualitative studies. Finally, a total of 15 studies that met the inclusion and exclusion criteria were utilized for the meta-analysis (Figure 1).

4.2 | Study characteristics and quality assessment

The 15 studies (852,317 participants) included were conducted in Europe, North America and Asia. The sample size among nurses ranged from 308 to 816,656. One study, with a large sample of 816,656 participants, was based on data from the National Database of Nursing Quality reported by 940 hospitals from 30 provinces of China (Gan et al., 2020). One multinational study reported on nurse turnover rates in eight European countries (Estryn-Behar et al., 2010), and 12 of the articles were multicentre studies. The quality of the 15 studies meets the requirements needed for a meta-analysis. The 6 studies were considered as 'high quality' and 9 studies were considered as 'medium quality'. Study characteristics are summarized in Table 1. Included basic information: first author, published year, country, sample size, study design, quality score, the prevalence and associated factors of turnover among nurses.

4.3 | The prevalence of nursing staff turnover

In the 15 studies available for the meta-analysis, the reported prevalence varies widely, ranging from 2.2%–50.0%. Based on a random-effects model, the meta-analysis estimated that the nurse turnover rate was 18% (95% CI: 11% to 26%, $I^2=99.86%$, $p<0.0001$) (Figure 2).

4.4 | Subgroup analyses

Stratified prevalence of nurse turnover according to regions, published years, respondents. The estimates of pooled turnover prevalence calculated for Asia, North America and Europe were 20%, 15%, 7%, respectively. According to published years, the nurse turnover prevalence from 2001 to 2010 was higher than that from 2011 to 2020. The turnover prevalence of new nurses was higher than all nurses. There were statistically significant differences across continents, published years and respondents ($p<0.001$). The results of subgroup analysis are shown in Table 2.

4.5 | Related factors of nursing staff turnover

Because nurse turnover is influenced by multiple factors, and the included studies vary widely in the assessment and results of relevant factors, it is not possible to synthesize these factors using meta-analysis. In most of the included studies, demographics are a relevant factor, with results showing that young, single nurses or those with fewer years on the job are more likely to leave (Dewanto & Wardhani, 2018; Fochsen et al., 2006; Sun, 2013; Toren et al., 2012), male nurses have a higher turnover rate than female nurses (Lee, 2019), lower level of education is associated with the higher turnover rate (Gan et al., 2020; Guo et al., 2018; Sun, 2013; Toren et al., 2012), while a study found that more education increase turnover (Brewer et al., 2012).

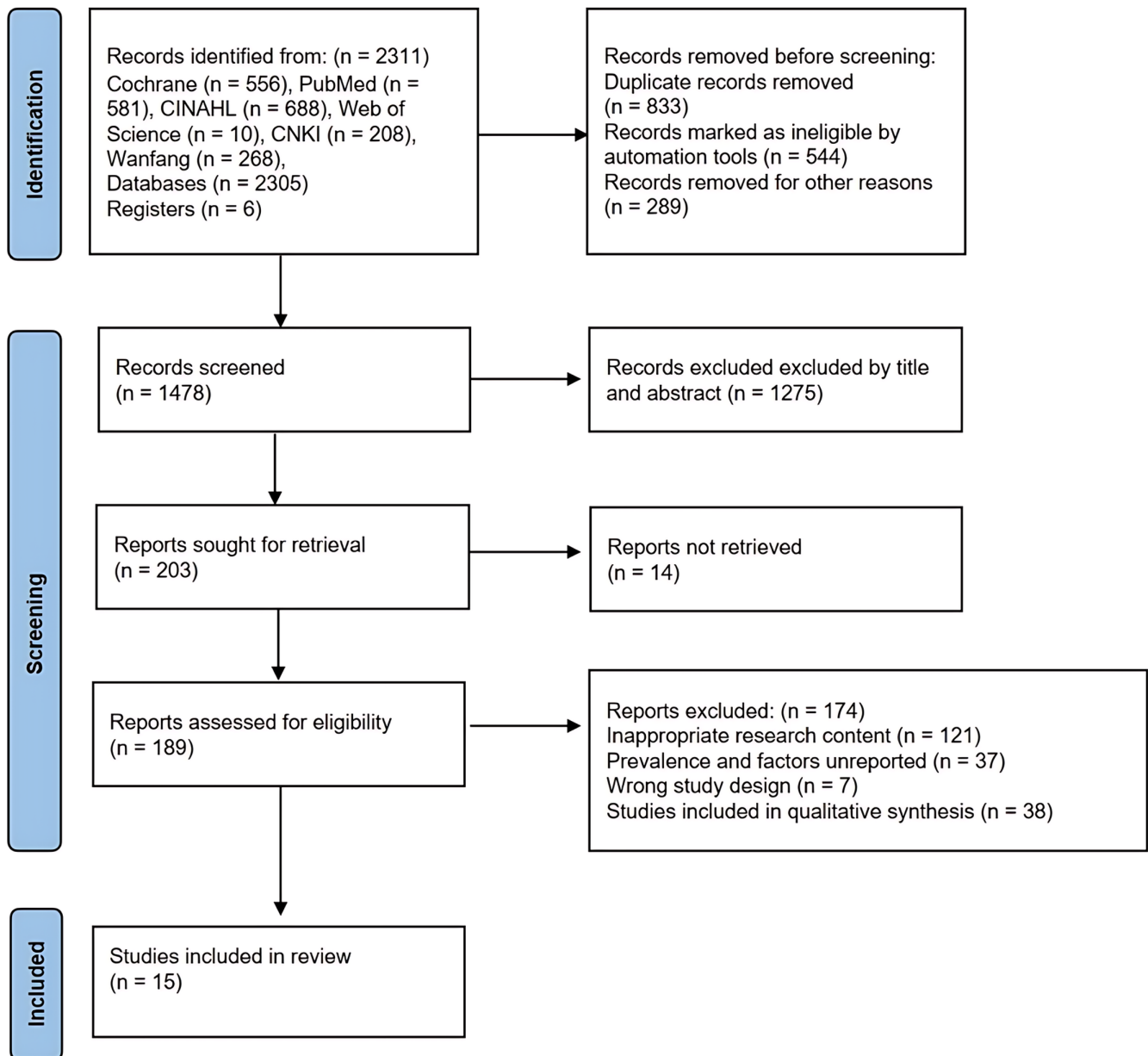


FIGURE 1 PRISMA flow diagram for the study selection.

In addition, nurse turnover is influenced by organizational factors, which include hospital size, geographical region, salary, union, department type, workload. In this review, small-scale hospitals (Gan et al., 2020; Hayajneh et al., 2010; Lee, 2019), low salary levels (Estryn-Behar et al., 2010; Lee, 2019; Liu et al., 2015) and absence of labour union (Lee, 2019) have the higher turnover rates. However, nurses are more likely to leave their job when they worked regions with relatively high economic levels (Gan et al., 2020; Hayajneh et al., 2010). Furthermore, workload (Chen et al., 2008) and department (Guo et al., 2018; Liu et al., 2015; Suzuki et al., 2006) have a statistically significant effect on actual turnover, with larger workload and assignment to a ward contrary to individual desire, the greater the likelihood of nurses leaving.

Moreover, five studies have considered satisfaction as a related factor in nurse turnover, including satisfaction with the organization (Gan et al., 2020), satisfaction with the profession (Toren et al., 2012), job satisfaction (O'Brien-Pallas et al., 2010), satisfaction with use of one's competence (Estryn-Behar et al., 2010), satisfaction with the ward assigned (Suzuki et al., 2006). The consensus was that lower satisfaction was associated with higher turnover rates.

5 | DISCUSSION

This systematic review and meta-analysis of 15 studies involving 852,317 participants found that worldwide nurse turnover rates

TABLE 1 Characteristics of the studies included.

| Author/year | Country | Sample | Quality | Prevalence (%) | Risk factors |
|------------------------------|-----------|---------|---------|----------------|--|
| Gan et al. (2020) | China | 816,656 | High | 2.15 | Degree of the hospital, region, nurse-bed ratio, nurse-patient ratio, average care time in 24 h for one hospitalized patient, degree |
| Lee et al. (2019) | Korea | 652 | Medium | 50 | Hospital size, salary levels, gender, union, dissatisfaction |
| Guo et al. (2018) | China | 995 | Medium | 15.58 | Degree, starting in 2010 or later, department |
| Dewanto et al. (2018) | Indonesia | 515 | High | 14.95 | Being up to 30 years old, single, having worked in the hospital up to 3 years |
| Liu et al. (2015) | China | 1198 | Medium | 10.18 | Department type, salary, years of working |
| Lerner et al. (2014) | USA | 1151 | Medium | 11.7 | Quality of Care, total selected deficiencies |
| Sun (2013) | China | 1819 | Medium | 21.77 | Age, degree, skill level |
| Brewer et al. (2012) | USA | 1653 | High | 15 | Full-time employment, voluntary overtime, more than one job, more sprains and strains, intent to stay |
| Toren et al. (2012) | Israel | 4500 | Medium | 23 | Young age, part-time work, lack of advanced professional education, academic education, low satisfaction with the nursing profession |
| O'Brien-Pallas et al. (2010) | Canada | 3844 | High | 19.9 | Role ambiguity, role conflict, physical health, job satisfaction, medical errors |
| Estryn-Behar et al. (2010) | European | 14,882 | Medium | 5.8 | Working conditions, family reasons |
| Hayajneh et al. (2009) | Jordanian | 2126 | Medium | 36.6 | Geographical region, health sector, place of residence |
| Chen et al. (2008) | China | 308 | High | 42.9 | Workload |
| Fochsen et al. (2006) | Swedish | 1095 | High | 26 | Health variables, physical working conditions |
| Suzuki et al. (2006) | Japan | 923 | Medium | 4 | Graduation from vocational nursing school, dissatisfaction with assignment to a ward contrary to their desire, no peers for support |

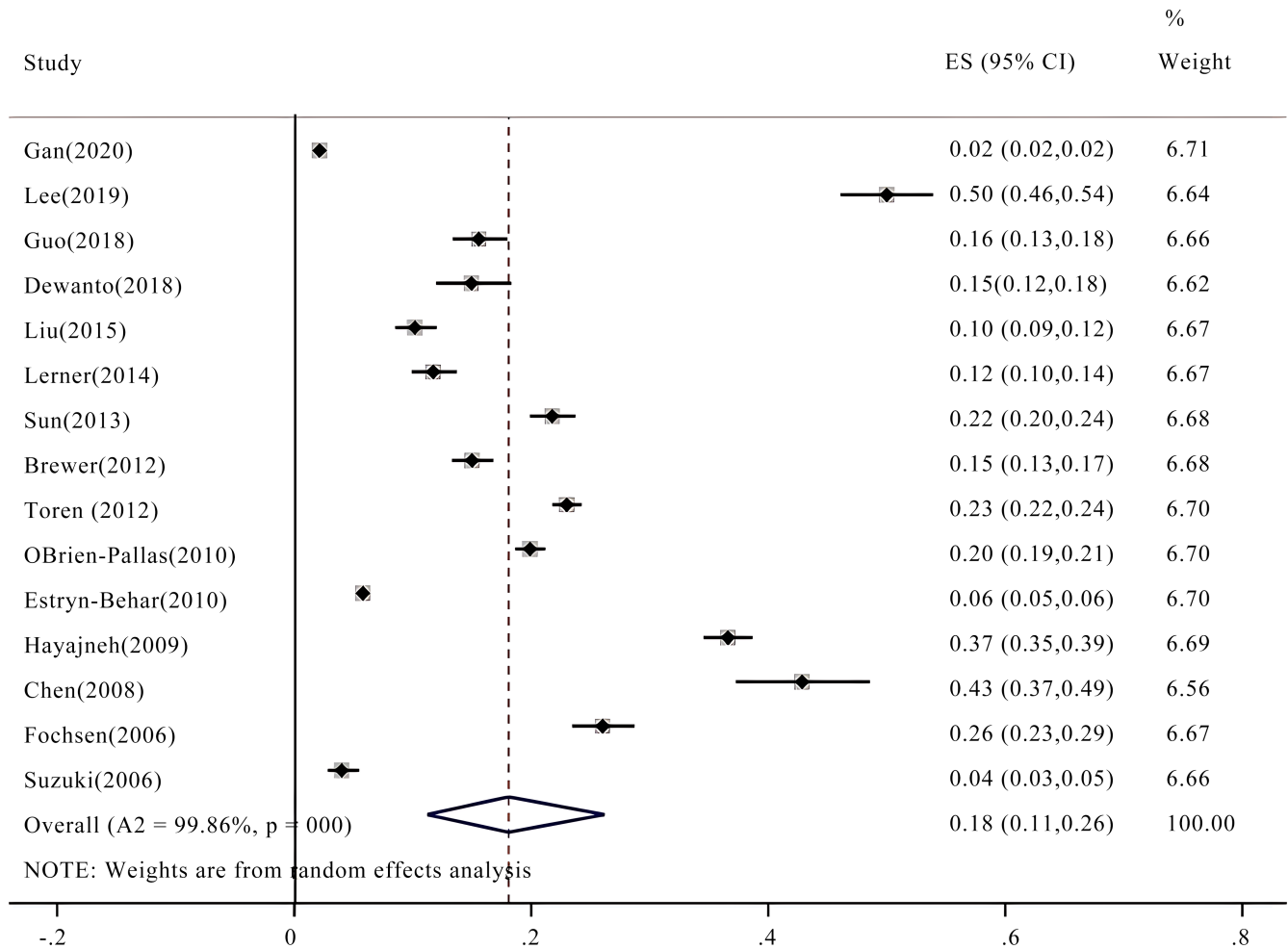


FIGURE 2 Forest plot of prevalence of nurse turnover.

| Subgroups | Studies | Sample | Prevalence | 95% CI | I^2 | p Value |
|-----------------|---------|---------|------------|---------|--------|-----------|
| Regions | | | | | | |
| Asia | 10 | 829,692 | 20% | 9%–34% | 99.87% | <0.001 |
| North America | 3 | 6648 | 15% | 11%–21% | 96.17% | <0.001 |
| Europe | 2 | 15,977 | 7% | 6%–7% | 0 | <0.001 |
| Published years | | | | | | |
| 2001–2010 | 6 | 829,139 | 20% | 9%–34% | 99.75% | <0.001 |
| 2011–2020 | 9 | 23,178 | 17% | 7%–29% | 99.85% | <0.001 |
| Respondents | | | | | | |
| New nurses | 3 | 3228 | 20% | 3%–47% | 99.62% | <0.001 |
| All nurses | 12 | 849,089 | 18% | 10%–26% | 99.88% | <0.001 |

TABLE 2 Subgroup analyses regions, published years and respondents.

ranged from 2.2% to 50% and identified that the pooled prevalence is 18%. The reported prevalence varies widely and there was statistically significant heterogeneity among studies, which may be explained by the diversity of regional and cultural backgrounds caused by nurses coming from different hospitals in 17 countries on three continents.

5.1 | Subgroup analyses results

In this meta-analysis, subgroup analyses were performed by continents, published years and respondents. The prevalence of nursing staff turnover was highest in Asian countries (20%), followed by North American countries (15%) and European countries (7%).

The difference in nurse turnover rates among countries may be related to economic and medical levels and cultural factors (Gan et al., 2020). Nurses in economically developed regions have higher turnover, because the medical level in these regions is relatively high, and hospitals treat more difficult diseases, so the work of nurses is more difficult, intensive and medical risks are greater. Moreover, with abundant medical resources in economically developed areas and more opportunities for employment and advancement, nurses prefer to choose hospitals with better pay and working environment or even change careers (Gan et al., 2020; Luo, 2017).

According to published years, the nurse turnover prevalence from 2001 to 2010 was higher than that from 2011 to 2020. This may be related to the different work needs and values of each nurse at different times (Takase et al., 2009). With the strengthening of the discipline of nursing in many parts of the world and further investment and support for nursing at all levels of government, nurses are now attracting the attention of the public, where they are seen as trusted health professionals and their status has been significantly enhanced (Daly et al., 2020; Guo et al., 2018).

According to respondents, we found that new nurses are likely to leave their job. Newly graduated nurses are an important part of nurses who leave their jobs (North et al., 2013). Among those transferring, the turnover of new nurses was about 30%, more than twice that of existing nurses (Korean Hospital Nurses Association, 2017). Liu et al. (2015) showed that 77.87% of the nurses who had worked for less than 5 years were among those who left. New nurses have less working experience, lower salaries and are mainly engaged in heavy clinical front-line work, so they generally have the higher turnover intention (Chan et al., 2013; Xu et al., 2016).

5.2 | Related factors of nursing staff turnover

Nurse turnover is influenced by multiple determinants. For this review, these factors were classified into demographic factors, organizational factors and satisfaction. Firstly, in terms of demographic factors, younger age and fewer years of experience are associated with turnover (Dewanto & Wardhani, 2018; Fochsen et al., 2006; Sun, 2013; Toren et al., 2012). This is consistent with subgroup analysis of the population, with younger, single, fewer years of working and new nurses being at high risk of leaving. These three demographic characteristics seem to be closely related to new nurses, as new nurses are generally young, single and have short working hours. Young nurses may experience more life changes, such as getting married and having children, leading to job instability and high turnover (Cté, 2016; Dewanto & Wardhani, 2018). Additionally, Lee (2019) showed that male nurses have a higher turnover rate than female nurses. However, most of the included literature showed no difference in turnover rates between male and female nurses (Dewanto & Wardhani, 2018; Guo et al., 2018; Hayajneh et al., 2010; Liu et al., 2015). Further research is needed to confirm

the association between gender and turnover. Besides, there are opposite views on the level of education. The majority view is that a lower level of education is associated with a higher turnover rate (Gan et al., 2020; Guo et al., 2018; Sun, 2013; Toren et al., 2012), as nurses with higher education have more development opportunities, obtain a sense of professional achievement and have the intention to stay in the profession (Ye et al., 2012). A few studies show that more education increases turnover, because highly educated nurses may have more job options, they don't commit to a particular workplace (Brewer et al., 2012).

Secondly, regarding organizational factors, small-scale hospitals (Gan et al., 2020; Hayajneh et al., 2010; Lee, 2019), low salary levels (Estryn-Behar et al., 2010; Lee, 2019; Liu et al., 2015), larger workload, the developed region and absence of labour union (Lee, 2019) have the higher turnover rates. The higher level of medical technology in economically developed regions, where hospitals are large and treat more difficult diseases, makes the work of nurses more difficult and intense, so nurses' intention to leave is higher. Whereas, the benefits and resources available in large-scale hospitals are obviously better than those of small-scale hospitals, which helps motivate nurses and reduce their risk of leaving (Gan et al., 2020). It can be seen that the favourable and unfavourable factors related to turnover are simultaneous and multifaceted, and therefore, some scholars have explored the relationship between satisfaction, a comprehensive evaluation indicator and turnover.

Finally, with regard to satisfaction, the turnover was significantly higher when respondents were dissatisfied with their job. Results of the satisfaction survey showed that the turnover risk of the dissatisfied group is 2.74 times that of the satisfied group or normal group (Lee, 2019). Job satisfaction is a key predictor of nurse turnover (Hayes et al., 2012). It is a complex fact influenced by many components which involve any aspect of the job, including organization (Lee, 2019), profession (Toren et al., 2012), competence (Estryn-Behar et al., 2010), in addition to wages, working environment, stress, opportunities for advancement and so on (Barrientos-Trigo et al., 2018; Sasso et al., 2019). Previous studies have found a positive correlation between specific components of job satisfaction and the intention to leave their job (Liu et al., 2011; Li et al., 2020). Therefore, it is necessary for nursing managers to pay more attention to nurses' work satisfaction degree and take effective measures (e.g. improving working conditions, implementation of a supportive leadership style and introducing a flexible rotating shift system) to meet work demands to improve nurses' job satisfaction (Choi et al., 2012; Lin et al., 2014).

5.3 | Limitations

There are several limitations to this review. Firstly, there is a high level of heterogeneity in the studies, yet as is often the case with many published meta-analyses of prevalence. Secondly, publication bias and sensitivity analyses are not reported in the study; however,

it is common in this type of study and the small number of studies that have comprehensively assessed publication bias. Due to this meta-analysis of prevalence, the results of its publication bias and sensitivity analysis are often unsatisfactory. Finally, although the included studies were published early and span a large period of time, which shows that this is an ongoing topic and also facilitates the comparison of separation rates grouped over the preceding and following decade.

5.4 | Implications for clinical practice

Nursing shortage this systematic review revealed the high rates of nurse turnover that demand more attention from nursing managers. Furthermore, according to the influencing factors of nurse turnover, young, single and male nurses, nurses with less working experience and lower levels of education tend to leave, so efforts should be targeted at these specific groups. Hospital administrators should realize and address the needs of nurses to stay in the workforce and improve their job satisfaction, such as: improving the working environment, implementation of a supportive leadership style, reasonable distribution of remuneration, attention to young nurses training and so on. Hence, an understanding of the factors affecting nurses' turnover could help to improve nurses' intention to stay and reduce nurse turnover. Finally, although many studies have been published on turnover intention, there is a large discrepancy between studies on turnover and turnover intention (Falatah & Salem, 2018). No comprehensive and systematic study of nurse turnover has been conducted, necessitating this study.

6 | CONCLUSION

The study conducted a comprehensive review of the available evidence on nurse turnover rates and found the wide variability in different regions. This systematic review revealed that the pooled prevalence of nurse turnover was 18%. Additionally, several risk factors for turnover were identified in the literature, involving demographic factors (young, single, have short working hours, lower level of education and male nurses), organizational factors (small-scale hospitals, low salary levels, larger workload, developed region and absence of labour union), satisfaction (dissatisfaction with organization, profession, job, competence). The findings of this review could provide a reference for nurse managers to make decisions, continuously optimize and stabilize the nursing team.

AUTHOR CONTRIBUTIONS

Feixia Wu, Yuewen Lao and Ying Feng conceptualized this review. Feixia Wu, Jiaqing Zhu, Yating Zhang and Liuyan Li performed literature search, screened studies and performed data extraction. Yuewen Lao and Jiaqing Zhu performed meta-analysis and interpretation. Feixia Wu and Ying Feng drafted the manuscript. All authors

critically reviewed the manuscript and approved final version for submission.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests.

DATA AVAILABILITY STATEMENT

Author elects to not share data.

ETHICS STATEMENT

This study is a review and a secondary study of the literature in the database, which does not require ethics.

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