**Title: Resilience, Stress, and Psychological Well-Being in Nursing Students: A Systematic Review**

**ABSTRACT**

**Objective:** Synthesize the evidence relating to the interaction of resilience, stress, and well-being in undergraduate nursing students across countries.

**Design:** Systematic review.

**Data sources:** Peer reviewed studies published from 2008 to December 2018 were searched in CINAHL, Web of Science, Medline (OVID), PsycINFo and four biomedical databases originating from China (China National Knowledge Infrastructure, WanFang Data, VIP and CMB).

**Review methods:** Adhering to the preferred reporting items for Systematic Reviews and Meta-analyses guidelines, eight databases were searched. Twelve studies, which met the inclusion criteria, were extracted, and subject to quality appraisal by two researchers.

**Results:** In total, 12 papers were included. Outcome analysis revealed the level of resilience as moderate; stress levels were high and the incidence of negative psychological health accounts for a proportion of nursing students. The interaction between resilience and stress and well-being was high. Resilience and low stress were found to better predict well-being. All the studies cited recommendations to inform educational policy and practice in relation to resilience, well-being, and stress among undergraduate nursing students.

**Conclusions:** This was the ﬁrst systematic review to synthesize the evidence relating to the interaction of resilience, stress, and well-being in undergraduate nursing students across cultural settings. Evidence confirms the importance of resilience in nursing students influencing stress and psychosocial morbidity. Nursing educational strategies that foster and enhance resilience is recommended.

***Word count***: 221 (max 300)

**Key words:**Resilience; Stress; Well-being; Nursing students; Undergraduate; Systematic review.

**INTRODUCTION**

Globally the study of nursing is reported by students to be stressful (Edwards *et al.* 2010; Chernomas and Shapiro 2013; Oner Altiok and Ustun 2013; Walker and Mann 2016; Tung *et al.* 2018), more so than by students from any of the other trainee healthcare disciplines (Pulido‐Martos *et al.* 2012; Reeve *et al.* 2013; Turner and McCarthy 2017). During clinical education, nursing students are exposed to the realities of nursing in practice. They must learn to provide care for acutely ill patients (Zhao *et al.* 2015) often in situations with staff and resource shortages, and with an overriding fear of making mistakes (Yıldırım *et al.* 2017). Academically, high intensity workloads have led to competitive and stressful learning environments (Evans 2008; Reeve *et al.* 2013). On a personal level, nursing students are facing increased financial pressure as well as the demands of balancing their private lives (MacDonald *et al.* 2016; Turner and McCarthy 2017).

Stress can have a myriad of negative effects on the quality of student learning (Goff 2011; Ten Hoeve *et al.* 2017; Ayaz-Alkaya *et al.* 2018), on physical (Cantrell *et al.* 2017; Al‐Gamal *et al.* 2018; Labrague *et al.* 2018a; Labrague *et al.* 2018b) and on psychological well-being (Ratanasiripong and Wang 2011; Tee *et al.* 2016; Yıldırım *et al.* 2017). A protection factor, presented in academic literature (Thomas *et al.* 2012; Thomas and Revell 2016), and in educational and workforce policy (Challen *et al.* 2011; Howell and Voronka 2012; Çam and Büyükbayram 2017; McFadden *et al.* 2018) is resilience. Although various definitions of resilience have been formulated. It is generally described as a complex and dynamic phenomenon relating to the ability of a person to overcome adversity (Windle 2011; Hegney *et al.* 2015). However, despite the importance of resilience and its close relationship with stress and psychological well-being it remains an unexplored area (Thomas and Asselin 2018). Whilst individual reviews of resilience (Aburn *et al.* 2016; Thomas and Revell 2016), psychological well-being (Walker *et al.* 2016) and stress (Turner and McCarthy 2017; Tung *et al.* 2018) among nursing students do exist, knowledge of the interaction of these concepts is lacking.

**BACKGROUND**

Stress is considered a global feature among nursing students, with levels ranging from moderate to severe (Amr *et al*. 2011; Geslani and Gaebelein 2013; Shukla *et al*. 2013; Labrague *et al*. 2017; Smith and Yang 2017; He *et al*. 2018; Ozsaban *et al*. 2019). Stress has wide-ranging implications, impacting on sleep, memory, attention and appetite (Goff 2011; Kurebayashi *et al*. 2012). Psychological health can be affected by making students feel unsafe, nervous, irritable, sad, anxious and depressed (Fröjd *et al*. 2008; Hjern *et al*. 2008). Academically, it can affect attrition within nurse education (Pryjmachuk *et al*. 2009), student performance (Gibbons *et al*. 2009; Grobecker 2016), and the ability to cope (Goff 2011). Consequently, it impacts negatively on the ability to learn which is indispensable in academic environments (Dinsen *et al*. 2017). Upon qualification it also has repercussions on the effectiveness of communication and work effort, ultimately, decreasing the quality of health-care services (Rafati *et al*. 2017). Therefore, maintaining a good level of psychological well-being is considered a vital component in the training and development of future nurses (Ratanasiripong and Wang 2011).

Resilience is believed to counteract the negative effects of stress and enhance a person’s well-being. In nursing, researchers have found resilience to be an influence on the adverse psychological outcomes, such as anxiety, depression and post-traumatic stress disorder (Mealer *et al*. 2012; Taylor and Reyes 2012), as well as poor health outcomes and difficult management of chronic diseases (Dyer *et al*. 2004; Bradshaw *et al*. 2007; Jackson *et al*. 2007). There is wide agreement among researchers that resilience has a significant correlation with positive psychological well-being (Gibbons *et al*. 2011; He *et al*. 2018; Rios-Risquez *et al*. 2018).

However, the prevalence rates of resilience, stress and psychological well-being among nursing students have shown variabilities internationally, attributed to the inconsistency of the definition of the concept, the type of collection tools utilised (Shukla *et al*. 2013; Zhao *et al*. 2015; He *et al*. 2018; Ozsaban *et al*. 2019) and cultural differences (Chow *et al.* 2018). However, there is little evidence from cross cultural and/ or cross country of the relationship between these variables or the interaction of resilience, stress, and well-being. To date, most research focuses on studies reporting individual concepts mainly from western countries (Brennan 2017; Pines *et al.* 2012; Lo 2002) however increasing attention is originating from Asian settings (Zhao *et al.* 2015; Chow *et al.* 2018). It is therefore important to expand our understanding of different cultural backgrounds in which research on these topics is being undertaken. Thus, the aim of this review is to collate the evidence relating to the interaction of resilience, stress, and psychological well-being among undergraduate nursing students across countries.

### METHODS

A [systematic](https://www.sciencedirect.com/topics/nursing-and-health-professions/taxonomy) search was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidelines (Moher *et al*. 2010) of quantitative and qualitative studies.

### Data Sources

The following academic databases were searched from January 2008 to December 2018, of CINAHL, Web of Science, Medline (OVID), PsycINFo, CNKI, WanFang Data, VIP and CMB. Search terms were developed and Boolean operators OR and AND were applied (Whittemore and Knafl 2005). Selected medical subject headings were combined with free text terms following MeSH (medical subject heading) terms relating to resilience. These included: (MH "Hardiness", resilien\*, strength\*, cop\*, adaptation), stress (MH "Anxiety+", MH "Stress+", MH "Hardiness", stress\*, financial strain, anxiety, distress, burnout), well-being (well-being, well being, well-being, wellness, positive affect, happiness, MH "quality of life", MH "mental health", life satisfaction), nursing student (nurs\* n2 student, undergraduate nurse, MH "Students, Nursing+", MH "Students, Nursing, Practical”). This was adjusted for use in other databases using appropriate search symbols and Boolean operators (see table 1). Meanwhile, cited reference retrievals were also performed. In addition, reference lists of included studies were checked for potentially relevant studies.

***<< Please insert table 1 here>>***

### Eligibility Criteria

All methodological studies which have reported the effects of resilience, stress, and well-being in undergraduate nursing students were included. Key study eligibility criteria included: (a) Undergraduate nursing student; (b) Primary outcomes included resilience, stress, and well-being in undergraduate nursing student; (c) Peer reviewed studies available in full text; (d) Published from 2008 to 2018; (e) Published in the English or Chinese language.

### Study Selection and Data Extraction

All retrieved articles were imported into Endnote software and duplicate articles were removed. According to the eligibility criteria, two reviewers (ZSL and FH) independently read and eliminated irrelevant studies from title and abstract. The remaining full texts were obtained and critically reviewed by both reviewers independently for inclusion. Any discrepancies in data extraction or study selection were discussed by both reviewers and adjudicated by a third reviewer (KM). Two reviewers (ZSL and FH) independently extracted the data into a pre-designed form: (a) author and location of research; (b) publication year; (c) aim; (d) characteristics of the subjects, including course year, technique, total population and number that took part; (e) design and method; (f) data collection; (g) reliability and validity; (h) major finding and (i) limitations (see table 2).

***<<Please insert table 2 here>>***

### Search Outcomes

A total of 567 articles were identified. Twenty-three duplicate articles were removed, leaving 544 papers for further screening. Afterwards, titles and abstracts were evaluated by two reviewers based on inclusion criteria. In total, thirty-five articles were included for full-text review. From these, 12 studies met the inclusion criteria as shown in the PRISMA ﬂowchart in Figure 1 (Moher *et al*. 2010).

### Quality Appraisal

All studies included in this review were assessed for risk of bias independently by two reviewers (HF and ZSL) using the CASP tool (Critical Appraisal Skills Programme (CASP) checklists 2018) for qualitative studies and random clinical trial, as well the NHLBI Quality Assessment Tool (The NHLBI Quality Assessment Tool 2018) for observational studies. Meanwhile, reliability and validity of quantitative studies and trustworthiness of qualitative studies were also extracted for assessment of their methodological rigor. These appraisals were summarised respectively and presented the grading using a range of coding systems. In terms of quality grading, of the nine papers accessed using a grading system developed by Uloko *et al*. (2018) for the NHLBI assessment tool, the quality of the study was accessed as `good’ if the rating was 70%, `fair` if 50% and `poor’ if its rating was less than 50%. As outlined, three were rated good, five fair and one poor (see table 3). The remaining three papers accessed using Hall et al. (2019) coding system of CASP 0-10, a score of 8–10 is considered high quality, 4–7 moderate quality and below 4 poor quality. In terms of quality, the CASP Qualitative studies (n=2) all demonstrated a high quality. Using the same criteria, CASP RCT was deemed high quality (see table 4 and 5).

***<<Please insert table 3, 4 and 5 here>>***

## RESULTS

In total, 12 articles were included in this review. Studies were internationally spread from China (n=2), UK (n=2), Spain (n=3), India (n=1), Turkey (n=1), Australia (n=1), Thailand (n=1), South Africa (n=1). The findings of these studies are based on a total of 3,736 participants. All 12 studies investigated students either from all years or from a single year of undergraduate nursing programmes. Only one of these papers included a mixture of educational levels (Klainin-Yobas *et al.* 2014) such as Nursing Specialty (4 months), Master’s and PhD programmes.

The 12 articles used a range of methodologies including eight cross-sectional studies, one longitudinal study, two qualitative designs and a randomised clinical trial. All quantitative studies used validated scales for data collection. The most popular scales for measuring resilience, well-being and stress were the Connor-Davidson Resilience Scale (CD-RISC), the General Health Questionnaire (GHQ-12) and the Perceived Stress Scale (PSS) respectively. The two qualitative studies used in-depth and semi-structured interviews and focus groups.

Of the 12 papers, only one paper, undertaken in China by Smith and Fang (2017), used a theoretical model, which is Lazarus and Folkman’s (1984) Transactional Model of Stress and Coping to guide collection and analysis.

Whilst the 12 papers in this review provide an insight into the interaction of the three concepts among nursing students, their findings should be read with caution. For example, five papers (Ríos-Risquez *et al*. 2016; Mathad *et al*. 2017; Smith and Yang 2017; Garcia-Izquierdo *et al*. 2018; Rios-Risquez *et al*. 2018) relied on self-reported questionnaires to collect the data which may introduce a response bias. Other studies have adopted a cross-sectional design which ultimately restricts the possibility of establishing causal relationships between variables (Klainin-Yobas *et al*. 2014; Ríos-Risquez *et al*. 2016; Garcia-Izquierdo *et al*. 2018) and cannot provide a deeper understanding of resilience and stress and psychological well-being from a developmental perspective (He *et al*. 2018). In qualitative studies, Janse van Rensburg and colleagues (2012) have reported that their study limitation was with limited focus group interviews because of the availability of students and time constraints. Galvin *et al*. (2015) have pointed out that the limitation of their study is the difficult of generalization.

### Quantitative and Qualitative Study Findings

Among the 12 studies, five papers reported the levels of resilience and stress and psychological health (Janse van Rensburg *et al*. 2012; Galvin *et al*. 2015; Ríos-Risquez *et al*. 2016; Smith and Yang 2017; He *et al*. 2018).

#### The level of resilience, stress, and well-being.

Regarding the level of resilience, two cross-sectional studies have pointed out that the level of resilience was moderate (Ríos-Risquez *et al*. 2016; Smith and Yang 2017). Furthermore, Smith and Yang (2017) in a study of Chinese nursing students (year 1 – year 4) using a cross-sectional survey reported that there were no significant differences in resilience scores among students in four different grades, but that there were significant differences in resilience scores between students who were class leaders or non-class leaders. However, considering that this study was undertaken in China the transferability of the findings is questionable given the different educational systems and cultural context there. Two other studies adopting a qualitative approach found resilience to be low among UK mental health nursing students (Galvin *et al*. 2015) and South African (Janse van Rensburg *et al*. 2012) nursing students. Participants from these two studies reported that they struggled to adjust and cope with stress arising from their nursing programs, and this was particularly felt among third year student (Janse van Rensburg *et al*. 2012; Galvin *et al*. 2015).

Regarding the level of stress, a study undertaken in Spain by Ríos-Risquez *et al*. (2016) reported that taking the cut-off point proposed for the Spanish population by Bresó *et al*. (2006), the prevalence of burnout was 2.65%. However, a study undertaken in Australia by He *et al*. (2018) reported that their participants had higher stress scores compared to the younger groups (nursing or health allied) reported in previous studies. However, such findings should be read with caution as the author, He *et al*. (2018) suggest that participants may have responded in ways that they consider socially desirable rather than reﬂecting their actual situation. In China, Smith and Yang (2017) assessed the level of stress, among Chinese nursing students (year 1-4), and found it was relatively higher compared with western nursing students. They also highlighted a significant difference in stress scores between different years of nursing students, however, no matter whether they are class leaders or not, there is no significant difference in stress scores. Two other studies adopting a qualitative approach found that nursing students experienced stress during their placement study (Janse van Rensburg *et al*. 2012; Galvin *et al*. 2015).

Regarding the level of psychological health, Ríos-Risquez *et al*. (2016) reported that from the 113 nursing students in their study 8.8% could be classiﬁed as vulnerable or at risk of experiencing more negative psychological health in accordance General Health Questionnaire- 12 psychological measurement (Goldberg and Williams 1988). In addition, Smith and Yang (2017) reported that in their study, the senior nursing students (year four) experienced poorest psychological well-being scores than earlier year groups. They also illustrated that the higher and junior grades reported poorer levels of psychological well-being. He *et al*. (2018) have reported that their participants had lower psychological well-being compared to the previous studies.

#### The interaction of resilience, stress, and well-being.

The interaction of resilience, stress and well-being were reported in nine observational studies. In terms of stress and resilience, a study undertaken in Spain by Ríos-Risquez *et al*. (2016) reported a signiﬁcant negative correlation between resilience and both emotional exhaustion and cynicism, while resilience was positively associated with academic efﬁcacy. However, in contrast a study undertaken in Spain by Garcia-Izquierdo *et al*. (2018) highlighted the cynicism has no significant correction with resilience among second year students. In another paper, referring to the similar variables, resilience was weakly and negatively correlated with stress (Smith and Yang 2017).

In terms of the interaction between resilience and well-being, resilience is significantly and positively correlated with well-being (Gibbons *et al*. 2011; He *et al*. 2018; Rios-Risquez *et al*. 2018). In the other words, greater resilience is associated with greater psychological well-being for the student. In Spain Rios-Risquez *et al*. (2018) have found that over the duration of their studies (year 2 and year 4), students’ resilience increased, and their psychological well-being also improved. However, the results stem from one cohort of students and are nationally based therefore generalizability is questionable. In addition, an academic study undertaken in China showed that a positive, coping style had no significant effect on well-being (Luo and Wang 2009), however this study did not report the reliability and validity of the scales, so the results may not be accurate.

In terms of the interaction between stress and well-being, some papers showed that stress had a significant effect on psychological health. In other words, greater level of stress is associated with lower level of well-being. Additionally, some authors, Ríos-Risquez *et al*. (2016), Rios-Risquez *et al*. (2018) have noted that when emotional exhaustion and cynicism were present, the lower the well-being scores recorded. In addition, they also found that there was no relationship between academic efficacy and psychological well-being

Finally, in terms of the interaction between resilience and stress and well-being, some papers have pointed out that, overall, there was a significant relationship between resilience and stress and well-being (Klainin-Yobas *et al*. 2014; Ríos-Risquez *et al*. 2016; Smith and Yang 2017; Garcia-Izquierdo *et al*. 2018). A study by Garcia-Izquierdo *et al*. (2018) has emphasized that nursing students who show lower levels of resilience and higher levels of stress report the worse well-being. Meanwhile, Smith and Yang (2017) have also noted that resilience and stress are moderately and negatively correlated with well-being. However, a random clinical trial undertaken in India by Mathad *et al*. (2017) illustrated that even though there were improvements from yoga in resilience, satisfaction in life and perceived stress, the results were not statistically significant.

#### The predictors of resilience and well-being.

The predictors of resilience and psychological well-being have been mentioned in four papers, but stress was not reported (Rios-Risquez *et al*. 2016; Garcia-Izquierdo *et al*. 2018; He *et al*. 2018; Rios-Risquez *et al*. 2018). One quantitative study by Garcia-Izquierdo *et al*. (2018) used hierarchical multiple regression analysis to test the predictors of resilience. Sex, emotional exhaustion, and academic efficacy was conducted. They concluded that the significant predictors of resilience were emotional exhaustion and academic efficacy (Garcia-Izquierdo *et al.* 2018). However, a study undertaken in Spain by Ríos-Risquez *et al*. (2016) highlighted that academic efﬁcacy was not signiﬁcantly correlated with psychological health. But this finding may have been affected by the low internal consistency obtained in the subscale of academic efﬁcacy and may have contributed to bias in the results of the analysis performed for this variable.

Three papers focused on the predictors of psychological well-being. For example, in an Australian cross-sectional study with a convenience sample of 1760 nursing students, He *et al*. (2018) reported Negative Psychological Well-being (N-PWB), resilience, perceived stress, support from significant others, support from family, mindfulness, and support from friends were predictors. Support from friends was the weakest predictor. For Positive Psychological Well-being (P-PWB), resilience, support from significant others and support from family were predictors. Resilience was the strongest predictor.

In another study, Ríos-Risquez *et al*. (2016) found from the hierarchical multiple regression analysis that emotional exhaustion and resilience were predictors of psychological health. Furthermore, another longitudinal study, Rios-Risquez *et al*. (2018) have indicated that emotional exhaustion at T1 (nursing students in the second academic year) is the only variable that predicts psychological health at T2 (nursing students in the fourth academic year). Resilience of nursing students at T1 was not found to predict psychological health at T2.

## DISCUSSION

Overall the results of this systematic review suggest that stress is a feature of a nursing student’s life, which affects their psychological well-being. As a coping strategy, resilience is reported to be variable, which suggests the need for more attention to be given to student nurses to help develop this skill. Findings suggests that the interaction between resilience and stress and well-being was high while resilience and low stress were found to better predict well-being. Unsurprisingly, all the studies cited recommendations to inform educational policy and practice in relation to resilience, well-being, and stress among undergraduate nursing students.

The results of the current study, which focused on the levels of resilience and stress and well-being, showed levels varied and were influenced by a range of factors. For example, two papers revealed nursing students’ resilience levels as moderate (Ríos-Risquez *et al*. 2016; Smith and Yang 2017), however levels were reported to be influenced by several factors such as class-leaders (Smith and Yang 2017). Other qualitative research by Galvin and colleagues (2015) highlighted the influence of maturity and experience as being an influencing factor to resilience.

Overall stress was reported to be high (Janse van Rensburg *et al*. 2012; Galvin *et al*. 2015; Ríos-Risquez *et al*. 2016; Smith and Yang 2017), a finding consistent with the outcome of previous systematic review studies (Alzayy and Al-Gamal 2014; Tung *et al.* 2018). Smith and Yang (2017) claim that Chinese nursing students experience relatively higher levels of stress compared to western nursing students, however a lack of international comparative research make such claims difficult to verify. Nevertheless, the ramifications of stress on nursing students’ psychological well-being indicated a negative consequence for a certain proportion of nursing students (Ríos-Risquez *et al*. 2016; Smith and Yang 2017).

Analysis of the correlation between the interaction of resilience, stress, and well-being have highlighted variability across the studies. Some research reported that high resilience and low stress will predict better psychological well-being (Klainin-Yobas *et al*. 2014; Ríos-Risquez *et al*. 2016; Smith and Yang 2017; Garcia-Izquierdo *et al.* 2018). However, findings from an RCT (Mathad *et al*. 2017) concluded that the interaction between resilience, satisfaction and perceived stress were not statistically significant.

Analysis of the levels of resilience, stress and psychological well-being by year of study revealed variability. For example, several studies reported that the level of stress, resilience and burnout experienced by student nurses varied across student year group (Alzayy and Al-Gamal 2014; Houpy *et al*. 2017; Smith and Yang 2017). Therefore, the year of study may be a factor future research should consider.

Finally, the results of the systematic review highlighted several recommendations that could be made to inform educational policy and practice in relation to resilience, stress, and well-being. Overall, the effective predictors of resilience in this review were emotional exhaustion and academic efficacy (Garcia-Izquierdo *et al*. 2018). In addition, the effective predictors of Negative Psychological Well-being (N-PWB) were resilience, perceived stress, support from significant others, support from family, mindfulness, and support from friends, while for Positive Psychological Well-being (P-PWB), predictors are resilience, support from significant others and support from family. Quantitative and qualitative results from the current study in relation to predictors may be used to inform the development of educational policy and practice concerning resilience, well-being, and stress among undergraduate nursing students. Overwhelmingly, the studies recommend that greater attention be paid to nursing students and equipping them with resilience coping skills.

### Strengths and Limitations of this Review

Whilst this review adopted a systematic process and incorporated a global perspective on the research being undertaken it has several limitations. First, the review was based on four English language databases and four Chinese language databases and did not include grey literature sources. Second, only English and Chinese language papers were included in the review, limiting the inclusion of other languages. Finally, the search was conducted from 2008 to 2018 and new studies may have been published which are not reflected in the analysis. Therefore, the conclusions should be treated with caution.

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## CONCLUSION

This is the ﬁrst systematic review to synthesize the evidence relating to the interaction of resilience, stress, and well-being in undergraduate nursing students. Previous reviews have generally only focused on one concept (resilience or stress or well-being) to synthesize the evidence whilst others have reported on the predictors or prevalence rates (Aburn *et al.* 2016; Walker *et al*. 2016; Thomas and Revell 2016; Turner and McCarthy 2017; Tung *et al.* 2018). This highlights a gap in the research evidence synthesising the interaction between reliance, stress and psychological well-being.

This review highlights that most research in this area has adopted a cross-sectional design. However, in order to provide a deeper understanding of resilience, stress and psychological well-being, future research should adopt different designs. Furthermore, additional research is required to build on comparing level of resilience, stress and well-being among nursing students in different countries to identify the influencing factors internationally.

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