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Authors	McCarthy, Bridie;Trace, Anna;O'Donovan, Moira;Brady-Nevin, Caroline;Murphy, Margaret M.;O'Shea, Maria;O'Regan, Patricia
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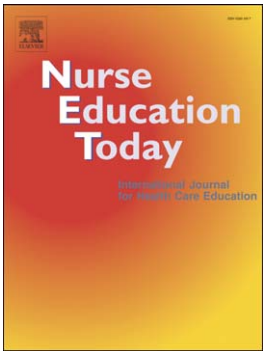

Nursing and midwifery students' stress and coping during their undergraduate education programmes: An Integrative review

Bridie McCarthy, Anna Trace, Moira O'Donovan, Caroline Brady-Nevin, Margaret Murphy, Maria O'Shea, Patricia O'Regan

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Title Page

Nursing and midwifery students' stress and coping during their undergraduate education programmes: An Integrative review

Bridie McCarthy, PhD, MSc, RNT, RGN
Lecturer in General Nursing,
School of Nursing & Midwifery,
University College Cork.
Email: bridie.mccarthy@ucc.ie Tel:0035321 4901497

Anna Trace, BA, MSc Counselling Psychology
Lecturer in Psychology,
School of Applied Psychology,
University College Cork.
Email: a.trace@ucc.ie Tel: 00353214904503

Moira O'Donovan, MSc, RNT, BSc, RPN
Lecturer in Mental Health Nursing,
School of Nursing & Midwifery,
University College Cork.
Email: m. o'donovan@ucc.ie Tel 00353214901481

Caroline Brady-Nevin, MSc, RNT, RGN
Lecturer in General Nursing,
School of Nursing & Midwifery,
University College Cork.
Email: c.bradynevin@ucc.ie Tel: 00353214901480

Margaret Murphy, MSc, BSc, RM, RGN.
Lecturer in Midwifery,
School of Nursing & Midwifery,
University College Cork.
Email: mgt.murphy@ucc.ie Tel: 00353214901644

Maria O'Shea, MSc, RNT, RCN, RGN.
Lecturer in General/Children's' Nursing,
School of Nursing & Midwifery,
University College Cork.
Email: maria.oshea@ucc.ie Tel: 00353214901484

Patricia O'Regan, PhD, MSc, RNT, RGN.
Lecturer in General Nursing,
School of Nursing & Midwifery,
University College Cork.
Email: p.oregan@ucc.ie Tel: 00353214901491

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Abstract

Objectives: The aim of this review is to examine the literature related to the sources of stress, coping mechanisms and interventions to support undergraduate nursing and midwifery students to cope with stress during their undergraduate education.

Design: Integrative literature review

Data sources: The databases CINAHL, PubMed and PsycINFO were searched for articles published between 2010 and 2016. Search terms in various combinations were used for example; student nurse, student midwife, undergraduate, stress, coping and interventions.

Review methods: An integrative review based on Whittemore and Knafl's approach was used to conduct the review.

Results: The search generated 25 articles that met the inclusion criteria. The key sources of stress emanated from clinical, academic and financial issues but predominantly from the clinical environment. Students used a variety of coping strategies, both adaptive and maladaptive. These appear to be influenced by their past and present circumstances such as, their needs, what was at stake and their options for coping. Interventions for student nurses/midwives to cope with stress were varied and in the early stages of development. Mindfulness showed some promising positive results. Interventions focussed on the individual level excluding the wider social context or organisation level.

Conclusions: Stress is pervasive in all aspects of undergraduate nursing and midwifery education. Nursing and midwifery educators need to be aware of this impact and provide appropriate support to students in both the clinical and academic environments. Further research is needed to capture the experience of stress from the students' perspective as well as the barriers and facilitators to supporting students from the preceptors'/mentors' perspectives. Finally, more intervention studies are needed to identify and compare what interventions are effective in supporting students to cope with stress during their undergraduate education.

Keywords:

Coping, coping interventions, stress, student midwife, student nurse, undergraduate.

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Nursing and midwifery students' stress and coping during their undergraduate education programmes: An Integrative review

Introduction

The literature on stress and coping in undergraduate nursing and midwifery education is vast, stems back over many decades and continues to grow. This is perhaps due to the complex nature of nursing and midwifery as professions, the ongoing changes in the healthcare system and the challenges for students to achieve competencies to meet their profession's clinical and academic requirements. Due to this volume of literature the need for a review is justified on the basis of potential reconceptualization of the expanding and diverse knowledge base of the topic as it continues to grow. The aim of this review therefore, is to examine the literature related to the sources of stress, coping mechanisms and stress management interventions to support nursing and midwifery students during their undergraduate education.

Background

Stress, meaning hardship or adversity, is pervasive and can impact on one's everyday life both personally and professionally. Although stress can be difficult to define, there are at least three main definitions found in the literature. The first definition focuses on stress as a response to toxic or aversive stimuli whereby the body may go through three distinct phases: alarm, resistance and exhaustion (Seyle, 1956). The second definition suggests that stress emanates from a stimulus or pressure from an external source. An external stimulus might include, major life events (Holmes and Rahe, 1967) or hassles which are defined as "irritating, frustrating, distressing demands that to some degree characterise everyday transactions with the environment" (Kanner et al. 1981). The third definition, implies that stress is a dynamic process, incorporating both internal and external factors and the interactions between them (Lazarus and Folkman, 1984, 1987). This definition places importance on cognitive factors such as the person's thoughts, attitudes and beliefs toward the stressor. If one evaluates a stressor as harmful or as a threat, rather than benign or a challenge then

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the person may become distressed (primary appraisal). If one evaluates a stressor as harmful and/or a threat to self, then the next appraisal one makes is whether they have the coping skills to deal with it (secondary appraisal).

Stress can be viewed either as neutral, good (known as “eustress”) or bad (known as “distress”). In terms of distress, there are two types: acute (short-term) and chronic (long-term), which is often seen as the most detrimental for health. Although stress can have some positive effects on individuals there is much evidence to suggest that stress can have a profound cognitive, emotional, physiological and/or behavioural impact on nursing/midwifery students. Cognitive impact includes; ineffective coping, fear, anxiety, worry and feeling overwhelmed (Jimenez et al. 2010, Khajehei et al. 2011, Goff, 2011, Chernomas and Shapiro, 2013). Emotional impact includes, irritability and exhaustion, feeling depressed, decrease in self-confidence, poor concentration, loss of focus and motivation (Goff, 2011, Khajehei et al. 2011, Chernomas and Shapiro, 2013). Physiological impact includes; palpitations, nausea and vomiting (Jimenez et al. 2010, Khajehei et al. 2011, Chernomas and Shapiro, 2013,) crying, irritability and exhaustion (Goff, 2011), dizziness, perspiring and stammering (Khajehei et al. 2011). The most common behavioural changes reported included, limited time to engage in leisure activities and maintain a work life balance (Chernomas and Shapiro, 2013).

Sources of stress and predictors of stress are frequently used interchangeably in the literature. Stuart (2013) proposes that predictors of stress are risk factors, which predispose the person to stress. These may be biological, psychological and sociocultural in nature for example, gender, personality traits, cognitive styles and strength of attachments (Stuart, 2013), and categorised generally as intrinsic (those that occur within the person), or extrinsic predictors (those external to the individual).

Some of the intrinsic predictors of stress in students have been identified as; self-control and self-efficacy, coping styles, personality factors and mental health issues. Students with low levels of self-

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esteem or lower confidence were found to have higher levels of stress (Chan et al. 2011, Chernomas and Shapiro, 2013, Wolf et al. 2015). Chen and Hung (2014) also found that students who had a personality type inclusive of traits of introversion, lower confidence, tendency to self-blame, inadequate decision making abilities, poor self-control and poor social bahaviours, to be more prone to stress. Both Chernomas and Shapiro (2013) and Wolf et al. 2015) found that students who experienced higher levels of stress, anxiety and depression prior to the commencement of the programme experienced greater levels of stress during the programme than those students with lower baseline levels. In contrast Gibbons et al. (2011) found that students with high levels of dispositional control, self-efficacy and support were less stressed.

The clinical environment is reported as the main extrinsic predictor of stress for students (Gibbons et al. 2011, Suresh et al. 2012, Chernomas and Shapiro, 2013, Chen and Hung, 2014, Wolf et al. 2015). In some studies, year of programme has also been identified as an extrinsic factor that may predict stress (Chan et al. 2011, Wolf et al. 2015).

Generally coping is acknowledged as the act of dealing with emotions or behaviours with the intention of reducing the physical or psychological effects of excess stress (Largo-Wright et al. 2005). Lazarus and Folkman (1984) define coping as the "constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p.141). They identified two types of coping; problem-focused and emotion focused. Problem-focused coping aims to reduce stressful demands or expand resources to deal with it; whereas, emotion focused coping aims to regulate a person's emotional response to the situation. Segerstrom and O'Connor (2012) argue that what is most important is not trying to change the circumstances (problem-focused) or emotional response (emotion-focused coping) per se, but, whether the individual is using an approach strategy (actively trying to change problems through effort or acceptance or reappraisal) as this may have a better psychological and physical health outcome than avoidance strategies (e.g. disengaging or distraction).

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Some of the more common coping strategies identified by students include; family, social and spiritual support, exercising, problem solving, transference, avoidance, denial as well as smoking, drugs and alcohol (Seyedfatemi et al. 2007, Chan et al. 2009, Murdock et al. 2010, Shaban et al. 2012, Reeve et al. 2013, Al-Zayyat and Al-Gamal, 2014a, Bam et al. 2014, Yesil et al. 2015, Wolf et al. 2015, Zhao et al. 2015)

Method

Problem identification

Due to the expanding and diverse volume of research on stress in undergraduate nursing/midwifery students, we identified a need for a more in-depth understanding of the key stressors, coping mechanisms and stress management interventions to inform nursing and midwifery educators of how best to prepare students for the challenges and complexities of contemporary nursing/midwifery practice. The aim of this integrative review therefore was to examine the literature related to the sources of stress, coping mechanisms and interventions to support undergraduate nursing and midwifery students cope with stress during their undergraduate education programmes. More specifically the authors were keen to explore the following:

1. What are the main sources of stress for student nurses/midwives during their undergraduate education programmes?
2. How do students cope with stressful events during their education programmes?
3. What stress management interventions have been conducted to help students cope with stress during their education programmes?

The integrative review method proposed by Whittemore and Knafl (2005) was chosen to enhance the rigour of this review. This is a modified version of Cooper's (1998) five-stage framework; problem identification, literature search, data evaluation (quality appraisal), data analysis and presentation of findings (Cooper, 1998). The modified version as proposed by Whittemore and Knafl (2005) incorporates a systematic process with the intent to summarise and synthesise findings from

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empirical research with diverse methodologies. This was particularly important in the current review as it was anticipated that both experimental and non-experimental studies would provide greater knowledge and understanding of stress and coping in undergraduate nursing/midwifery students during their education programmes.

Literature search

The initial literature search was conducted in December 2015 and updated in October 2016 using the following computerised databases CINAHL, PubMed and PsycINFO. Search terms in various combinations were used for example 'student nurse', 'student midwife', 'undergraduate', 'stress', coping' and 'interventions'. Peer reviewed articles published in English were included. Grey literature (e.g. conference proceedings) was not searched. Due to the large volume of research conducted in this area, the search was restricted to articles published within the past seven years. Articles were assessed for inclusion based on the following criteria (a) English language; (b) published between January 2010 and October 2016 and (c) that focussed on stress, coping, stress management or coping intervention for undergraduate nursing and midwifery students.

Search outcome

The initial search conducted by two authors, MM and CBN together, generated 918 hits. Titles and abstracts were assessed and reviewed by the two authors using the following inclusion criteria: articles needed to address stress, coping, and interventions used to assist students to manage/cope with stress in undergraduate nursing or midwifery education. Abstracts focussing on stress or coping in graduates, registered nurses or patients/clients, editorial pieces or commentaries were excluded. A total of 862 articles were subsequently removed, with 56 retained for further screening. Full articles from the retained abstracts were retrieved. Each author was assigned eight articles for review and the findings inputted on an individual data extraction table. All individual extraction tables were then uploaded onto one main table and screened against the inclusion and exclusion criteria with all authors present. Articles focusing on depression, anxiety, resilience, reflection,

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emotional intelligence, self-concept, self-esteem, burnout, spiritual health, health promotion, psychological health and professional identity only were eliminated. Unpublished theses were also eliminated. This screening left 25 articles that met the inclusion criteria (Figure 1).

Quality appraisal

According to Whittemore and Knafl (2005) critical appraisal of the literature is not a requirement when undertaking an integrative review however, quality scores may be used to support interpretation. Two reviewers (BMcC, AT), together, assessed the methodologically quality of the 25 publications using a critical appraisal tool devised by Bowling (2002). This

resulted in all 25 articles being of sufficient quality for inclusion in this review (Table 1). The appraisal tool encompasses six quality domains concerning methodological structure and reports these on a three-point scale 'yes', 'poor', and 'not reported' to illustrate the quality of the selected articles. This appraisal tool was chosen as it is particularly suited when systematically and simultaneously appraising the quality of both quantitative and qualitative methodologies (Bowling, 2002).

To facilitate analysis, two tables were created to extract and code the key findings from the 25 primary studies (Tables 2, 3). This approach facilitated the ability to systematically compare specific findings, patterns, sample characteristics and relationships (Whittemore and Knafl, 2005). The next step of data analysis involved data comparison to identify patterns, themes or relationships. Following data reduction and drawing on Graneheim and Lundman's (2004) principles of inductive content analysis initially, the data were categorised into meaning units referred to as codes. Secondly, the content was abstracted and categorised into subcategories that then generated the main categories. These helped to answer the "What" questions. Finally, the categories were subsumed into themes in order to answer the "How" questions (Graneheim and Lundman, 2004).

Results

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Twenty-five studies were critically analysed and synthesised to address the three questions regarding: sources of stress, coping mechanisms and stress management interventions. Studies were conducted in very diverse contexts and in thirteen different countries but predominantly in the United States (n=6) and Taiwan (n=4), (Tables 2, 3). A summary of the sources of stress (clinical, academic and financial), will first be presented. This will be followed by a review of the coping mechanisms and finally, a summary of the stress management interventions.

Sources of stress

Sixteen of the twenty-five studies focussed on stressors and of these twelve were quantitative, two were qualitative and two were mixed methods studies. Stressors stemmed from both the clinical and academic environments as well as financial sources. Stress from the clinical environment appeared more prominent than that associated with academic and financial sources. Clinical stress was associated with caring for patients/clients and relationships with clinical colleagues.

Clinical stress*: Confidence when caring for patients/clients*

A number of studies report that caring for patients/clients is one of the main sources of stress for students in clinical practice (Edwards et al. 2010, Chen and Hung, 2014). In one study nursing care practices and pre-natal care were identified as the main sources of stress for both junior and senior midwifery students (Khajehei et al. 2011). Generally, students identify with the responsibilities inherent in caring for patients/clients when they enter the clinical arena thus, fear of making a mistake or causing harm to patients are frequently reported (Edwards et al. 2010, Chernomas and Shapiro, 2013, Bagcivan et al. 2015). Cilingir et al. (2011) explored nursing (n=345) and midwifery (n=129) students' stressors and identified that midwifery students perceived higher levels of stress with fear of failure and making mistakes than general nursing students. These stressors (fear of failure and making mistakes), can be

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further compounded by students' own awareness of their limited nursing/midwifery knowledge, especially when questioned by nurses/physicians/patients or families (Jimenez et al. 2010, Chen and Hung, 2014). Limited knowledge was viewed as stressful by students as it can encompass a lack of familiarity with medical language and clinical procedures (Edwards et al. 2010, Shaban et al. 2012, Zhao et al. 2015). Other sources of stress reported by students included fear of contracting a disease from patients, witnessing and/or being confronted with difficult and existential life experiences such as pain, suffering, death/dying and/or, acute anxiety. Students report that these stressors impact on their confidence to care for patients/clients in healthcare settings (Edwards et al. 2010, Jimenez et al. 2010).

Relationships with clinical colleagues and clinical educators

Difficult relationships between students and their clinical colleagues and clinical educators were found to be widely reported by nursing and midwifery students in many studies (Cilinigir et al. 2011, Suresh et al. 2012, Reeve et al. 2013, Bam et al. 2014, Al-Zayyat and Al-Gamal 2014a, Wolf et al, 2015, Galvin et al. 2015, Bagcivan et al. 2015). Some of these difficulties included feeling unsupported, ignored, unwanted, feeling rejected by staff nurses who they perceived as not wanting to work with them and/or disappearing, feeling exploited, used as a helping hand, 'waiting to be criticised' having to back down and/or having to prove oneself in clinical practice, as well as experiencing intimidation and reluctance from medical staff to teach them. Relationships in some instances were further compounded by the lack of emotional support during acute events such as emergency situations or death of a patient.

Whilst students generally have a desire to be understood and to feel valued by their clinical colleagues during clinical placements, many studies highlight a lack of understanding and empathy shown toward students (Cilingir et al. 2011, Suresh et al. 2012, Al-Zayyat and Al-Gamal, 2014a, Graham et al. 2016). In order to maintain good relationships with clinical colleagues some midwifery students reported undertaking clinical duties to satisfy their

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mentors/preceptors rather than gaining personal satisfaction from clinical experience (Khajehei et al. 2011).

***Academic stress**: academic environment, examinations and assignments*

The academic stressors reported by students were mainly associated with the academic environment, examinations and assignments (Edwards et al. 2010, Shaban et al. 2012, Reeve et al. 2013; Al-Zayyat and Al-Gamal 2014a, Zhao et al. 2015, Bagcivan et al. 2015). Stressors associated with the academic environment included; crowded classrooms, boring lectures, intensive theoretical hours, receiving many different lectures on the same day and being questioned by educators during lecturing (Cilingir et al. 2011, Bagcivan et al. 2015).

The number of examinations and assignments required to be completed were also identified as stressors by students and for all years of study programmes (Shaban et al. 2012, Reeve et al. 2013, Al-Zayyat and Al-Gamal, 2014a). Meeting assignment deadlines and submitting assignments when due were perceived as stressful (Shaban et al. 2012). Preparation for and sitting exams, coupled with the worry of obtaining poor grades and/or not passing exams, were also reported as stressful (Shaban et al. 2012). Stress from academic assignments and workloads ranked as third in the six main stressors identified by psychiatric/mental health students (Al-Zayyat and Al-Gamal 2014a). In one study, midwifery students were reported to have experienced more academic stress than nursing students (Cilingir et al. 2011)

Financial stress

Financial stressors were most poignant in students born outside of their country of study and included; living with limited finances when not eligible for grants, scholarships and loans, wanting to work but not allowed, high tuition fees and high cost of maintaining contact with family for those living outside their home state (Junious et al. 2010). For other students' financial stress included having to do paid work to meet financial demands (Galvin et al. 2015). Financial difficulties were

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identified as a major source of stress in Jamaican students (Graham et al. 2016) however, no detail is given as to the type of difficulties being experienced.

Coping mechanisms

Eleven of the studies reviewed focused on coping and of these eight were quantitative, two were mixed methods and one was qualitative. Students used a variety of coping strategies both adaptive and maladaptive. These appear to be influenced by their past and present circumstances such as, their needs, what was at stake and their options for coping. Overall, students coping mechanisms involved individual coping behaviours and those coping behaviours involving self in the context of other individuals.

Individual coping behaviours

The most common individual coping behaviours reported by students included problem solving (Shaban et al. 2012, Al-Zayyat and Al-Gamal, 2014a), staying optimistic (Bam et al. 2014) and transference (Zhao et al. 2015). Other individual behaviours included engaging in exercise, listening to music (Murdock et al. 2010, Graham et al. 2016), positive thinking (Wolf et al. 2015) and religious coping (Bam et al. 2014, Graham et al. 2016). Studies also reported that some students engage in negative coping strategies such as ignoring stress, avoiding others, blaming others, avoiding school, unhealthy eating or use alcohol (Reeve et al. 2013, Graham et al. 2016). Interestingly, Shaban et al. (2012) found that avoidance coping was used more by those who had a strong interest in nursing and suggested that this may be related to the personality (trait and/or state) of the student, the environment they grew up in and/or, the mismatch between their expectations and the reality of the nursing role.

Coping behaviours involving self in the context of others

In the context of self with others, seeking social support from family and friends as well as socialising with friends were the most common coping behaviours used by students (Murdock et al. 2010,

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Reeve et al. 2013, Bam et al. 2014, Yesil et al. 2015, Wolf et al. 2015, Graham et al. 2016). Another coping behaviour included developing cordial relationships with clinical colleagues during clinical practice (Bam et al. 2014).

Interventions to cope with stress

Seven of the reviewed studies addressed interventions to cope with stress for undergraduate nursing/midwifery students with some positive findings. Four of these studies were quasi-experimental, one was a randomised controlled trial, one was mixed methods and one was a qualitative descriptive study. Six of the studies used a control group (Table 3). Of note is that the majority of studies focussed on the use of different coping interventions and were conducted over different periods of time, ranging from four weeks (Li et al. 2011, Kim et al. 2015), to sixteen weeks (Hsieh, 2011).

Two studies examined the effects of a Mindfulness Based Stress Reduction Programme (Song and Lindquist, 2015, van der Riet et al. 2015), delivered over a seven-week and eight-week period respectively. Findings in both studies showed a reduction in stress. Other positive impacts included; improved sleep, better concentration, enhanced clarity of thought and a reduction in negative cognition. Hsieh (2011) designed a health promotion programme with a focus on reducing stress through regular exercise and discussion groups (as a form of peer support), over a 16-week period and found levels of stress to be significantly decreased in the experimental group. Hsiao et al. (2012) explored the use of a spiritual learning programme on fifth year nursing students' perceived physical health and clinical practice stress over a twelve-week period and found it to have significant short-term effects but not long-term effects on spiritual health particularly in the experimental group. Findings in Jameson's (2014) study on the use of a hardiness education programme delivered over a seven-week period highlighted a significant reduction in perceived stress in the experimental group.

In contrast, findings from a peer mentoring coping intervention (Li et al. 2011), and a Rational Emotive Behaviour therapy intervention (Kim et al. 2015), both conducted over a four-week period,

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showed no significant differences in the stress scores between the two groups (experimental and control).

Discussion

This review synthesised and evaluated studies that investigated the sources of stress, coping mechanisms and interventions to support undergraduate nursing and midwifery students to cope with stress during their undergraduate education. The evidence from this review indicates that the main sources of stress for students emanate from both the clinical and academic environments.

Key clinical stressors include; confidence when caring for patients/clients and difficult relationships with clinical colleagues and educators (Edwards et al. 2010, Cilingir et al. 2011, Chernomas and Shapiro, 2013, Al-Zayyat and Al-Gamal, 2014a, Bagcivan et al. 2015, Wolf et al. 2015, Galvin et al. 2015).

In relation to caring for patients/clients, most people would agree that nursing work is a very stressful occupation. The literature is replete with descriptions about the emotional burden in dealing with patient illness, suffering, pain, trauma, recovery, death and dying on a daily basis all of which impact on a nurse's emotional well-being (Buchan, 2006, Aiken *et al.* 2008, Coetzee and Klopper, 2010). In addition, it is also recognised that many nurses worldwide work in difficult and demanding circumstances, which include heavy and intense workloads, staff shortages, inadequate management support, poor working conditions, limited resources to work effectively and unstable work environments (Buchan, 2006, Institute of Medicine, 2011, Khamisa et al. 2016, Abhicharttibutra et al. 2017). Given this evidence then it is understandable why student nurses and midwives exposed to such complex clinical environments may well experience and/or absorb many of these stressors, when caring for patients/clients. However, these students are still very dependent on registered nurses and midwives to mentor and support them in dealing with or through their fears and anxieties.

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What was very poignant in thirteen of the sixteen studies in this review however, was the stress that stemmed from difficult relationships with clinical colleagues and clinical educators. Some of these stressors included a lack of support, empathy and understanding, feelings of being ignored, unwanted, rejected, exploited and intimidated by clinical colleagues. Respect and communication with and between nursing and midwifery staff, clinical educators and students in clinical settings is continually being reported in the nursing literature as an on-going problem (Rowe and Sherlock, 2005, Thomas et al. 2012, McKenna and Boyle, 2016, Tee et al. 2016, Anderson and Morgan, 2017). Though not new these findings provide strong evidence of ongoing negative and unsupportive relationships between students and clinical colleagues during clinical placements. Negative encounters between students and clinical staff are more recently being referred to in the nursing literature as "incivility" and this is associated with being a major source of stress for nursing/midwifery students (Clark and Springer, 2007, Clark, 2008, Del Prato et al. 2011, Marchiondo et al. 2010). A continuation of a culture where nurses continue to "eat their young" (Anderson and Morgan, 2017), is reflected throughout the findings. Destructive communication patterns and intergenerational hostility has a long history in the nursing/midwifery profession and continues to be part of the socialisation process in nursing and midwifery (Anderson and Morgan, 2017).

The academic stressors identified in this review included: crowded classrooms, boring lectures, intensive theoretical hours and being questioned by educators during lecturing as well as undertaking exams, amount of exams and assignments and fear/anxiety about poor grades (Edwards et al. 2010, Shaban et al. 2012, Reeve et al. 2013; Al-Zayyat and Al-Gamal, 2014a, Zhao et al. 2015, Bagcivan et al. 2015). The increase in academic stress is a growing concern in many college students generally, and in some instances linked with suicidal ideation and a decrease in mental well-being (Banerjee and Chatterjee, 2016). The change in young college students now referred to as the Millennials, bring a new dimension to learning that must be considered. According to Pardue and Morgan (2008), Millennials are technologically competent, optimistic, assertive, cooperative team players and gravitate toward group activities. However, when measured against traditional students,

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Millennials appear less mature, many express doubt surrounding their own academic abilities and readiness for college, some do not like to read or write and many have difficulty communication through traditional channels (Pardue and Morgan, 2008).

The findings on the sources of stress identified in this review are similar to those found in previous reviews in the nursing literature (Thomas et al. 2012, Alzayyat and Al-Gamal, 2014b, Labrague et al. 2016) and medical literature (Benbassat et al. 2011, Jain and Bansal, 2012), indicating that nursing, midwifery, dental and medical students share similar clinical and academic stressors globally.

In relation to how students cope with stressful events, the evidence is inconclusive. Findings in this review indicated that students use both adaptive and maladaptive coping strategies depending on their circumstances (past and present), current needs, what is at stake and their options for coping. Lazarus and Folkman (1984) view coping as a "process", determined by cognitive appraisal and that it is context dependent. Hence how students cope will depend on the type of stressors and the situation (Parkes, 1986, Folkman and Lazarus, 1988). Problem solving, staying optimistic and transference were the most frequent individual coping behaviours used (Shaban et al. 2012, Al-Zayyat and Al-Gamal, 2014a, Bam et al. 2014, Zhao et al. 2015), but exercise, listening to music, positive thinking and religious coping were also strategies used for coping (Murdock et al. 2010, Bam et al. 2014, Wolf et al. 2015, Graham et al. 2016). According to Folkman and Lazarus (1988), problem solving is one of the more effective ways to deal with stress as it focuses on behaviours to manage or alter the problem through problem-solving activities and seeking information. Problem solving has also identified as the most common approach used by undergraduate students in a review conducted by Labrague et al. (2016).

In the context of self with others, seeking social support from family and friends, socialising with friends and seeking out cordial relationships with clinical colleagues during clinical practice were the most common coping behaviours used by students (Murdock et al. 2010, Reeve et al. 2013, Bam et al. 2014, Yesil et al. 2015, Wolf et al. 2015, Graham et al. 2016). Social support is known to act as a

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buffer for stress by either; preventing a situation being appraised as stressful, providing a solution to a stressful problem, minimising its perceived importance or, facilitating a healthy behaviour response (Cohen and Wills, 1985).

What is clearly evident in this review is, that despite studies being conducted in different countries and with diverse cultures, the sources of stress and coping mechanisms are similar for students. This reflects the global nature of stress amongst students that is not unique to any particular country. It also highlights the prevalence of a culture where destructive relationships continue to be a significant source of stress for students in the clinical environment. Codes of professional nursing/midwifery practice stipulate that nurses and midwives must support students' learning to help them develop their professional competence and confidence (Nursing and Midwifery Council (NMC), Australia 2008, Nursing and Midwifery Board of Ireland 2014, NMC, UK, 2015). However, the reasons why such negative relationships perpetuate in nursing and midwifery and what condones this practice that it is "ok to eat our young" need further exploration.

In this review evidence suggests that to date there is no clearly identified stress management intervention to help students cope with stress during their undergraduate education programmes. Studies conducted are; limited, focused on different interventions (mindful awareness, building hardiness, spiritual development, individualised clinical support, changing belief systems and exercise), and conducted over different periods of time (4-16 weeks). Those conducted over a longer period of time (between 7 - 16 weeks) did report some short-term positive findings (Hsieh, 2011, Hsiao et al. 2012, Jameson, 2014, Song and Lindquist, 2015, van der Riet et al. 2015) whereas, those conducted over a 4-week period (Li et al. 2011, Kim et al. 2015), showed no significant effects. All seven studies had similar aims to explore the effects of interventions on reducing the intensity of stressors (Lazarus and Folkman, 1984). Only two studies described their theoretical frameworks that guided their study, Hsiao et al. (2012) drew on Lazarus and Folkman's theory and Jameson (2014) drew on Roy's Adaptation and Hardiness models to guide her study. Finally, all seven interventions

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focused on the individual level excluding the wider social context or organisational level. It is suggested that stress intervention measures are more effective when the focus is on the both the individual and the organisation (McVicar 2003).

The variety of research methods and the different measures used to achieve specific outcomes made comparing the results of studies in this review complex. The majority of studies were descriptive, cross-sectional, used convenience samples and were conducted in one institution. Whilst some studies focussed on one year of an undergraduate programme for example year two (Shaban et al. 2012, Chen and Hung, 2014, Graham et al. 2016), most studies used a sample of students from different years of the programme but did not report the findings separately. Hence it was difficult to decipher which students and what year of a programme students found most stressful or coped better. The cross-sectional nature of data collection using different years of a programme limits the ability to compare findings across the different years.

The instruments used in these studies varied in the number of items, content and structure. The majority of studies measuring perceived stress used a self-report questionnaire (Murdock et al. 2010, Cilingir et al. 2011, Khajehei et al. 2011, Bagcivan et al. 2015, Graham et al. 2016), in which students respond by giving a subjective measurement to their stress and/or coping levels. These carry the risk that students respond in a socially desirable manner. The most frequently used scale was the Perceived Stress Scale by Sheu et al. (1997). This 29-item scale, developed in Chinese language with Taiwanese nursing students, was devised to measure the types of events perceived as stressful during clinical placement and the degree of stress that these events cause. Shaban et al. (2012) do not appear to have validated this scale for use with a Jordanian cohort of nursing students, whereas Jimenez et al. (2010) and Al-Zayyat and Al-Gamal (2014a), did validate it for use with Spanish and Jordanian students respectively. Bam et al. (2014), and Jameson (2014) used a validated 10-item Perceived Stress Scale (Cohen et al. 1983), designed to measure nonspecific stress in the general

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population and not explicitly for nurses. Wolf et al. (2015) used The Perceived Stress Questionnaire devised by Levenstein et al. (1993), validated for use with a population experiencing psychosomatic symptoms but did not report on its validity and reliability. Six studies designed ad hoc instruments to measure stress. Five of these measured both clinical and academic stressors and one study (Khajehei et al. 2011) measured clinical stress only. When researchers develop their own questionnaires adequate detail should be provided regarding the development and piloting of the questionnaire and its validity and reliability (Rattray and Jones, 2007). Of the six studies that developed questionnaires five undertook pilot studies, Murdock et al. (2010) did not report on a pilot study.

Four of the eight studies investigating coping strategies used the Coping Behaviour Inventory (CBI) by Sheu et al. (2002), an instrument designed specifically for assessing coping in student nurses. In one study conducted in Jamaica, Graham et al. (2016) developed a 30-item instrument specifically for student nurses, with only one item on coping. The remaining studies used either; Folkman and Lazarus' (1988), Ways of Coping Questionnaire (Yesil et al. 2015), Carver's (1997) Brief Cope Scale (Bam et al. 2014) or Amirkhan's (1990) Coping Strategy (Kim et al. 2015). These three scales are widely used and have significant generalisability across populations (Desmond et al. 2006, Kato, 2015). The variety of instruments used, some of high quality, had different numbers of items to measure coping.

The scarcity of qualitative studies makes it difficult to decipher what students classify as causing stress or being more stressful from their clinical colleagues and/or educators. Patton (2002) argues that qualitative approaches are important in healthcare research in order to gain insight into participants' feelings, experiences and meanings and to explore more fully why healthcare professionals behave the way they do. Understanding more on how nursing and midwifery students experience, react to, think about and, cope with stressful events generally will provide a foundation for prevention intervention educational programmes.

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In the stress management studies reviewed very little detail is given on the content of the interventions limiting the opportunity for critiquing the intervention used. What was clearly evident in this review however, is that in spite of so many studies conducted on the sources of stress and all reporting similar findings yet so few studies have been conducted on stress management or coping interventions for undergraduate students. Evidence suggests that the Asian countries such as Taiwan and Korea are leading the way with stress management interventions with four of the studies conducted in these countries.

Conclusion

This integrative review aimed to critically examine the evidence regarding the sources of stress, coping mechanisms and stress management interventions to help students during their undergraduate nursing and midwifery programmes. The review highlights the clinical and academic stressors experienced by undergraduate nursing and midwifery students during their undergraduate education and the internal/external resources they draw on to cope with such stressors. It also highlights the lack of stress management or coping interventions available to help students cope with stressful events. Academic and clinical educators need to be cognisant of the sources of stress for students during their clinical placements and the profound consequences such negative experiences may have on students mentally, physically, psychologically and socially. Educators must also be aware of the impact such stress may have on student performance, fitness to practice, patient safety and patient outcomes. The risk of an increase in student attrition as well as the possibility of a continuation of such negative and disparaging clinical experiences for students must be carefully monitored.

Nursing and midwifery educators are well placed to educate and support students to become knowledgeable about stress and strategies to cope with stressors and/or stressful events. Furthermore, they are also ideally placed to support students and clinical educators with implementing such supportive strategies that help to improve relationships between clinical

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educators and students. Finally, these educators must incorporate new learning strategies in the undergraduate curriculum to facilitate the learning needs of millennial students.

In light of these findings, nurse researchers should conduct methodological studies with the purpose of establishing and refining a standardised instrument for assessing stress and coping in undergraduate students. Furthermore, researchers should aim to recruit large representative samples of nursing and midwifery students from a number of institutions and in specific years of a programme as well as at specific times e.g. not prior to exams when stress levels may be higher.

More qualitative studies are needed to capture the experience of stress from the students' perspective. There is also a need for more qualitative studies to explore the perspectives of preceptors/mentors with a particular focus on the barriers and facilitators to supporting students in clinical practice. Perhaps it is only when preceptors/mentors are formally recognised and supported for undertaking preceptor/mentor roles that change may come about.

Finally, more intervention studies on stress management/coping strategies aimed at moderating, minimising or elimination some stressors are also needed with a proviso of being monitored over a longer period of time to assess sustainability of effects. Such interventions should have a sound theoretical basis and be conducted at individual and organisational levels or the interface of both.

Conflict of interest

None

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References

Abhicharttibutra, K., Kunaviktikul, W., Turale, S., Wichaikhum, O., Srisuphan, W., 2017. Analysis of a government policy to address nursing shortage and nursing education quality. International Nursing Review 64 (1), 22-32.

Aiken, L., Clarke, S., Sloane, D., Lake, E., Cheney, T., 2008. Effects of hospital care environment on patient mortality and nurse outcomes. The Journal of Nursing Administration 38 (5), 223-229.

Al-Zayyat, A., Al-Gamal, E., 2014a. Perceived stress and coping strategies among Jordanian nursing students during clinical practice in psychiatric/mental health courses. International Journal of Mental Health Nursing 23 (4), 326–335.

Al-Zayyat, A., Al-Gamal, E., 2014b. A review of the literature regarding stress among nursing students during their clinical education. International Nursing Review 61 (3), 406-415.

Amirkhan, J., 1990. A factor analytically derived measure of coping: The Coping Strategy Indicator. Journal of Personality and Social Psychology 59 (5), 1066.

Anderson, L., Morgan, M., 2017. An examination of nurses' intergenerational communicative experiences in the workplace: Do nurses eat their young? Communication Quarterly 65 (4), 377-401.

Bagcivan, G., Cinar, F.I., Tosun, N., Korkmaz, R., 2015. Determination of nursing students' expectations for faculty members and the perceived stressors during their education. Contemporary Nurse 50 (1), 58-71.

Bam, V., Oppong, G., Ibitoye, M., 2014. Stress and coping mechanisms of nursing students during clinical practice in Ghana. Journal of Science and Technology 34 (2), 50-59.

Banerjee, N., Chatterjee, I., 2016. Academic stress, suicidal ideation and mental well-being among 1st semester and 3rd semester medical, engineering and general stream students. Researchers World 7 (3), 73-80.

Benbassat, J., Baumal, R., Chan, S., Nirel, N., 2011. Sources of distress during medical training and clinical practice: suggestions for reducing their impact. Medical Teacher 33 (6), 486-490.

ACCEPTED MANUSCRIPT

Bowling, A., 2002. Research Methods in Health: Investigating Health and Health Services, 2nd ed. Open University Press, Buckingham, p.120-121.

Buchan, J., 2006. The impact of global nursing migration on health services delivery. Policy Politics and Nursing Practice Supplement 7 (3), 16S-25S.

Carver, C., 1997. You want to measure coping but your protocol is too long: Consider the brief cope. International Journal of Behavioral Medicine 4 (1), 92-100.

Chan, C., So, W., Fong, D., 2009. Hong Kong baccalaureate nursing students' stress and their coping strategies in clinical practice. Journal of Professional Nursing 25 (5), 307-313.

Chan, M.F., Creedy, D.K., Chua, T.L., Lim, C.C., 2011. Exploring the psychological health related profile of nursing students in Singapore: a cluster analysis. Journal of Clinical Nursing 20 (23-24), 3553-3560.

Chen, Y., Hung, C., 2014. Predictors of Taiwanese baccalaureate nursing students' physio –psycho-social responses during clinical practicum. Nurse Education Today 34 (1), 73-77.

Chernomas, W., Shapiro, C., 2013. Stress, depression, and anxiety among undergraduate nursing students. International Journal of Nurse Education Scholarship 7 (10), doi: 10.1515/ijnes-2012-0032.

Cilingir, D., Gursoy, A., Hintistan, S., Ozturk, H., 2011. Nursing and midwifery college students' expectations of their educators and perceived stressors during their education: A pilot study in Turkey. International Journal of Nursing Practice 17 (5), 486-494.

Clark, C., Springer, P., 2007. Thought on incivility: student and faculty perceptions of uncivil behavior in nursing education. Nursing Education Perspectives 28 (2), 93–97.

Clark, C., 2008. Student voices on faculty incivility in nursing education: a conceptual model. Nursing Education Perspectives 29 (5), 284–289.

Coetzee, S., Klopper, H., 2010. Compassion fatigue within nursing practice: A concept analysis. Nursing and Health Sciences 12 (2), 235-243.

Cohen, S., Kamarck, T., Mermelstein, R., 1983. A global measure of perceived stress. Journal

ACCEPTED MANUSCRIPT

of Health and Social Behavior 24 (4), 385–396.

Cohen, W., Wills, T., 1985. Social support and the buffering hypothesis. Psychological Bulletin 98 (2), 310–357.

Cooper, H., 1998. Synthesizing Research: A Guide for Literature Reviews*, 3rd ed. Sage Publications, Thousand Oaks, CA.*

Del Prato, D., Bankert, E., Grust, P., Joseph, J., 2011. Transforming nursing education: a review of stressors and strategies that support students' professional socialization. Advances in Medical Education and Practice 6 (2), 2 109-116.

Desmond, D., Shevlin, M., MacLachlan, M., 2006. Dimensional analysis of the coping strategy indicator in a sample of elderly veterans with acquired limb amputations. Personality and Individual Differences 40 (2), 249-259.

Edwards, E., Burnard, P., Bennet, K., Hebden, U., 2010. A longitudinal study of stress and self-esteem in student nurses. Nurse Education Today 30 (1), 78-84.

Folkman, S., Lazarus R., 1988. Coping as a mediator of emotion. Journal of Personality and Social Psychology 54 (3), 466-475.

Galvin, J., Suominen, E., Morgan, C., O'Connell, E., Smith, A., 2015. Mental health nursing students' experiences of stress during training: a thematic analysis of qualitative interviews. Journal of Psychiatric and Mental Health Nursing 22 (10), 773-783.

Gibbons, C., Dempster, M., Moutray, M., 2011. Stress, coping and satisfaction in nursing students. Journal of Advanced Nursing 67 (3), 621–632.

Goff, A., 2011. Stressors, academic performance, and learned resourcefulness in baccalaureate nursing students. International Journal of Nursing Education Scholarship 8 (1),

doi: 10.2202/1548-923X.2114.

Graham, M., Lindo, J., Bryan, E., Steve Weaver, S., 2016. Factors associated

with stress among second year student nurses during clinical training in Jamaica. Journal of Professional Nursing 32 (5), 383–391.

ACCEPTED MANUSCRIPT

Graneheim, U., Lundman, B., 2004. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. Nurse Education Today 24 (2), 105-112.

Holmes, T., Rahe, R., 1967. The social readjustment rating scale. Journal of Psychosomatic Research 11 (2), 213-218.

Hsiao, Y., Chiang, H., Lee, H., Chen, S., 2012. The effects of a spiritual learning program on improving spiritual health and clinical practice stress among nursing students. Journal of Nursing Research 20 (4), 281-290.

Hsieh, P., 2011. A school-based health promotion program for stressed nursing students in Taiwan. Journal of Nursing Research 19 (3), 230-237.

Institute of Medicine 2011. The Future of Nursing: Leading Change. Advancing Health. The National Academies Press, Washington, DC.

Jain, A., Bansal, R., 2012. Stress among medical and dental students: A global issue. Journal of Dental and Medical Sciences 1 (5), 05-07.

Jameson, P., 2014. The effects of a hardiness educational intervention on hardiness and perceived stress of junior baccalaureate nursing students. Nurse Education Today 34 (4), 603-607.

Jimenez, C., Navia-Osorio, P., Diaz, C., 2010. Stress and health in novice and experienced nursing students. Journal of Advanced Nursing 66 (2), 442-455.

Junious, D., Malecha, A., Tart, K., Young, A., 2010. Stress and perceived faculty support among foreign-born baccalaureate nursing students. Journal of Nursing Education 49 (5), 261-270.

Kanner, A., Coyne, J., Schaefer, C., Lazarus, R., 1981. Comparison of two modes of stress measurement: daily hassles and uplifts versus major life events. Journal of Behavioral Medicine 4 (1), 1-39.

Kato, T., 2015. Frequently used coping scales: A meta-analysis. Stress and Health 31(4), 315-323.

Khajehei, M., Ziyadlou, S., Hadzic, M., Kashefi, F., 2011. The genesis and consequences of stress among midwifery students. British Journal of Midwifery 19 (6), 379-385.

ACCEPTED MANUSCRIPT

Khamisa, N., Peltzer, K., Ilic, D. and Oldenburg, B., 2016. Work related stress, burnout, job satisfaction and general health of nurses: A follow-up study. International Journal of Nursing Practice 22 (6), 538-545.

Kim, M., Kim, J., Kim, E., 2015. Effects of rational emotive behavior therapy for senior nursing students on coping strategies and self-efficacy. Nurse Education Today 35 (3), 456-460.

Labrague, L., McEnroe-Petitte, D., Gloe, D., Thomas, L., Papathanasiou, I., Tsaras, K., 2016. A literature review on stress and coping strategies in nursing students. Journal of Mental Health 1-10. http://www.tandfonline.com/doi/abs/10.1080/09638237.2016.1244721

Largo-Wright, E., Peterson, P., Chen, W., 2005. Perceived problem solving stress and health among college students. American Journal of Health Behavior 29 (4), 360-370.

Lazarus, R., Folkman, S., 1984. Stress, Appraisal, and Coping. Springer, New York.

Lazarus, R., Folkman, S., 1987. Transactional theory and research on emotions and coping. European Journal of Personality 1 (3), 141-169.

Levenstein, S., Prantera, C., Varvo, V., Scribano, M., Berto, E., Luzi, C., Andreoli, A., 1993. Development of the Perceived Stress Questionnaire: A new tool for psychosomatic research. Journal of Psychosomatic Research 37(1), 19-32.

Li, H., Wang, L., Lin, Y., Lee, I., 2011. The effect of a peer-mentoring strategy on student nurse stress reduction in clinical practice. International Nursing Review 58 (2), 203-210.

Marchiondo, K., Marchiondo, L., Lasiter, S., 2010. Faculty incivility: effects on program satisfaction. Journal of Nurse Education 49 (11), 608–614.

McKenna, L., Boyle, M., 2016. Midwifery student exposure to workplace violence in clinical settings: An exploratory study. Nurse Education in Practice 17 (1), 123-127.

McVicar, A. 2003. Workplace stress in nursing: A literature review. Journal of Advanced Nursing 44 (6) 633-642.

ACCEPTED MANUSCRIPT

Murdock, C., Naber, J., Perlow, M., 2010. Stress level and stress management skills of admitted baccalaureate nursing students. Kentucky Nurse 58 (2), 8.

Nursing & Midwifery Council (NMC), (2008) Code of Professional Conduct for Nurses in Australia. NMC, Australia.

Nursing & Midwifery Board of Ireland (NMBI), (2014) Code of Professional Conduct and Ethics for Registered Nurses and Registered Midwives. NMBI, Dublin.

Nursing & Midwifery Council (2015) Code of Professional Conduct, NMC, London.

Pardue, K., Morgan, P., 2008. Millennials considered: A new generation, new approaches, and implications for nursing education. Nursing Education Perspectives 29 (2), 74-79.

Parkes, K., 1986. Coping in stressful episodes: the role of individual differences, environmental factors, and situational characteristics. Journal of Personality and Social Psychology 51 (6), 1277-1292.

Patton, M., 2002. Qualitative Evaluation Methods. Sage Publications, CA.

Rattray, J., Jones, M., 2007. Essential elements of questionnaire design and development. Journal of Clinical Nursing 16 (2), 234-243.

Reeve, K., Shumaker, C., Yearwood, E., 2013. Perceived stress and social support in undergraduate nursing students' educational experiences. Nurse Education Today 33 (4), 419-424.

Rowe, M., Sherlock, H., 2005. Stress and verbal abuse in nursing: do burned out nurses eat their young? Journal of Nursing Management 13 (3), 242-248.

Segerstrom, S., O'Connor, D., 2012. Stress, health and illness: Four challenges for the future. Psychology and Health 27 (2), 128-140.

Seyedfatemi, N., Tafreshi, M., Hagani, H., 2007. Experienced stressors and coping strategies among Iranian nursing students. BMC Nursing **6 (**11), **DOI:** 10.1186/1472-6955-6-11.

ACCEPTED MANUSCRIPT

Seyle, H., 1956. What is stress? Metabolism 5 (5), 525-530.

Shaban, I., Khater, W., Akhu-Zaheya, L., 2012. Undergraduate nursing students' stress sources and coping behaviours during their initial period of clinical training: A Jordanian perspective. Nurse Education in Practice 12 (4), 204-209.

Sheu, S., Lin, H., Hwang, S., Yu, B., Hu, W., Ro, M., 1997. The development of a Perceived Stress Scales for nursing students. Nursing Studies 5 (8), 341-51.

Sheu, S., Lin, H., Hwang, S., 2002. Perceived stress and physio-psycho-social status of nursing students during their initial period of clinical practice: the effect of coping behaviors. International Journal of Nursing Studies 39 (2), 165-175.

Song, Y., Lindquist, R., 2015. Effects of mindfulness-based stress reduction on depression, anxiety, stress and mindfulness in Korean nursing students. Nurse Education Today 35 (1), 86-90.

Stuart, G., 2013. Principles and Practice of Psychiatric Nursing. Elsevier Health Sciences, St Louis, p. 44-56.

Suresh, P., Matthews, A., Coyne, I., 2012. Stress and stressors in the clinical environment: a comparative study of fourth-year student nurses and newly qualified general nurses in Ireland. Journal of Clinical Nursing 22 (5-6), 770-779.

Tee, S., Özçetin, Y., Russell-Westhead, M., 2016. Workplace violence experienced by nursing students: A UK survey. Nurse Education Today 41 (1), 30-35.

Thomas, J., Jack, B., Jinks, A. 2012. Resilience to care: A systematic review and meta-synthesis of the qualitative literature concerning the experiences of student nurses in adult hospital settings in the UK. Nurse Education Today 32 (6), 657-664.

van der Riet, P., Rossiter, R., Kirby, D., Dluzewska, T., Harmon, C., 2015. Piloting a stress management and mindfulness program for undergraduate nursing students: Student feedback and lessons learned. Nurse Education Today 35 (1), 44-49.

Whittemore, R., Knafl, K., 2005. The integrative review: updated methodology. Journal of Advanced Nursing 52 (5), 546-553.

ACCEPTED MANUSCRIPT

Wolf, L., Stidham, A., Ross, R., 2015. Predictors of stress and coping strategies of US accelerated vs. generic baccalaureate nursing students: an embedded mixed methods study.

Nurse Education Today 35 (1), 201-205.

Yeşil, P., Öztunç, G., Eskimez, Z., 2015. Personal characteristics and styles of coping with stress of nursing students of a university in Turkey. Journal of Nursing Education and Practice 5 (5), 73-81.

Zhao, F., Lei, X., He, W., Gu, Y., Li, D., 2015. The study of perceived stress, coping strategy and self-efficacy of Chinese undergraduate nursing students in clinical practice. International Journal of Nursing Practice 21 (4), 401-409.

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Figure 1. Study identification, screening, and selection flowchart

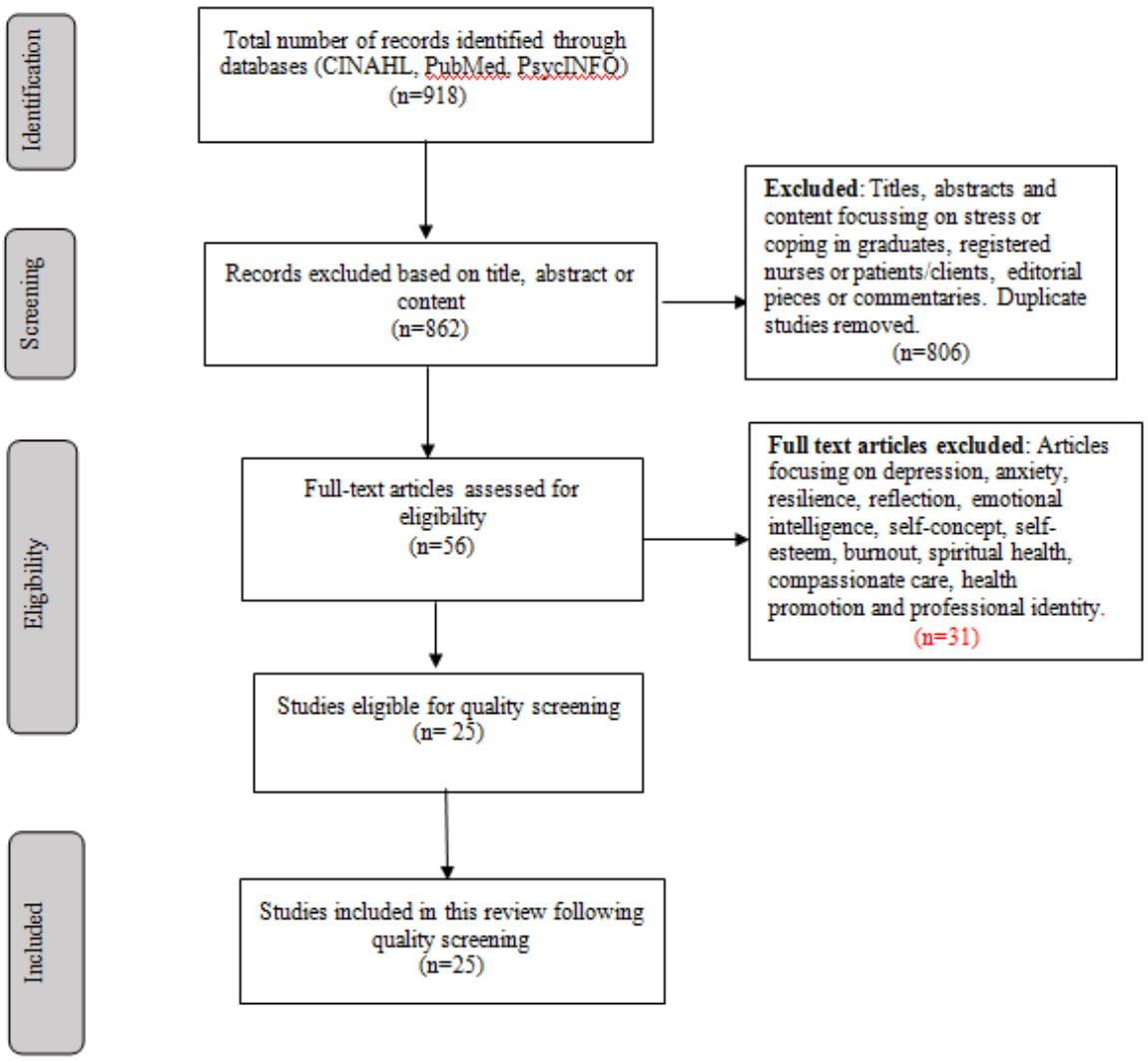

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Table 1. Quality appraisal of studies reviewed

Author(s)	Aims, objectives clearly described	Study design adequately described	Research methods appropriate	Adequate description sample, Inclusion, Exclusion, Criteria	Ethical consideration presented	Results clear, adequately reported	Results related to study question & literature	Limitations presented	Implications discussed
Al-Zayyat & Al-Gamal 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bagcivan et al., 2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bam et al., 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chen et al., 2014	Yes	Yes	Yes	Yes	Poor	Yes	Yes	Poor	Yes
Cilingir et al., 2011	Yes	Poor	Poor	Yes	Yes	Yes	Yes	Yes	Yes
Edwards et al., 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Poor
Galvin et al., 2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Graham et al., 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hsiao et al., 2012	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hsieh et al., 2011	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jameson 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Junious et al., 2010	Yes	Yes	Yes	Yes	Poor	Yes	Yes	Yes	Yes
Jimenez et al., 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kim et al., 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Khajehei et al., 2011	Poor	Poor	Yes	Poor	Poor	Yes	Yes	Poor	Yes
Li et al., 2011	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Murdock et al., 2010	Yes	Poor	Yes	Poor	Yes	Yes	Yes	Poor	Yes
Reeve et al., 2013	Yes	Yes	Yes	Yes	Not reported	Yes	Yes	Not reported	Yes
Shaban et al., 2012	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Song & Lindquist 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Suresh et al., 2012	Yes	Yes	Yes	Poor	Yes	Yes	Yes	Yes	Yes
Van der Riet 2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not reported
Wolf et al., 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yesil et al., 2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zhao et al., 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Table 2. Studies examining the sources of stress and coping strategies/behaviours of undergraduate nursing/midwifery students

Author(s) year, Country	Sample and setting	Design	Instrument(s)	Q1: Stressors (Sources/activities)	Q2: Coping strategies/behaviours
Al-Zayyat & Al-Gamal, 2014. Jordan	Nursing students n=65 5 universities Registered in 2nd semester 2012/2013	Descriptive, longitudinal Pre/post clinical	Perceived Stress Scale (Sheu et al., 1997). Coping Behavior Inventory (Sheu et al., 2002)	Pre-clinical: taking care of patients, stress related to teachers/nursing staff and assignments/workloads showed highest mean scores. Post-clinical: taking care of patients, assignments/workloads and stress related to teachers/nursing staff showed highest mean scores.	Pre-clinical: most utilized included problem solving, avoidance, staying optimistic and transference Post-clinical: most utilized included problem solving, staying optimistic, avoidance and transference.
Bagcivan et al., 2015. Turkey	Nursing students n=260 1 nursing school Year 2 (n=105) Year 3 (n=106) Year 4 (n=49)	Descriptive cross-sectional	Researcher designed questionnaire	Clinical: in rank order, negative behaviours of nurses/doctors/patients, fear of failure or making a mistake and seeing a dying patient. Academic: intensive theoretical lessons, crowded classes and monotonous/ boring lessons.	Not reported
Bam et al., 2014. Ghana /Africa	Nursing students n=89 1 nursing school 2nd, 3rd and 4th year	Quantitative descriptive	Perceived Stress Scale (Cohen, 1994). Brief Cope Scale (Carver, 1997)	Clinical: clinical nurses' instruction differed from what was taught in classroom (86.6%), feeling ignored by clinical nurses (85.4%), standing during clinical practice (79.8%), intimidation from healthcare staff (76.4%), medical staff unwilling to teach (75.3%) and being shouted at by health professionals (73%).	Support from family (97.8%), establishing cordial relationships with clinical nurses during clinical practice (76%), praying to God that clinical difficulties will end (77.5%) and looking forward to practicing as a professional nurse (72%).
Chen & Hung, 2014. Taiwan	Nursing students n=101 1 University Year 2	Descriptive cross-sectional	Perceived Stress Scale (Sheu et al. 1997) Coping Behaviour Inventory (Sheu et al., 2001)	Clinical: taking care of patients, instructors and nursing staff, lack of professional knowledge and skills. Academic: assignments and workload	Most frequently used: Problem solving, staying optimistic, transference and avoidance.
Cilingir et al., 2011. Turkey	Nursing students n= 345 Midwifery n= 129 1 university Year 1 (23.2%) Year 2 (22.4%) Year 3 (26.6%) Year 4 (27 .8%)	Descriptive cross-sectional	Researcher designed questionnaire	Clinical: lecturer's questions about patients (32.9% midwifery, 21.3% nursing), fear of failure/making mistakes (24.1% midwifery, 12.8% nursing), pressure of lecture at clinic (13.2% nursing, 13.1% midwifery), negative behaviours of nurses/physicians /patients (13.1% midwifery, 8.5% nursing,). Academic: questions from lectures (33.7% midwifery, 20.5% nursing), many topics same day (23% nursing, 20.7% midwifery), fear of not understanding topic/not passing exam (25.9% midwifery, 16.6% nursing).	Not reported
Edwards et al., 2010. UK	Nursing students n=169 1 university,	Descriptive Longitudinal	Stress in Nurse Education Questionnaire (Rhead 1995)	In rank order 7/32 items appeared to cause most concern in Time 1, 2, 3, and 4. Clinical: fear of making a mistake in caring for a patient, watching a patient suffer. Academic: revising/sitting examinations, not knowing how deep to study a subject, pressure to meet assessment deadlines, having to pass assessments before next stage of course and study after a day's work.	Not reported

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Galvin et al., 2015. UK	Nursing students n=12 1 university Year 1 (n=2) Year 2 (n=4) Year 3 (n=6)	Qualitative descriptive	Semi-structured interviews.	Clinical: Emotional impact of work, lack of support/supervision, feeling vulnerable around some patients and no support, not being debriefed as to what to do should incidents arise between patients, negative attitudes and lack of respect. Academic: assignment deadlines	Developing resilience or use of alcohol as a form of release
Graham et al., 2016. Jamaica	Nursing students n=106 2 nursing schools Year 2	Descriptive cross-sectional	Researcher designed questionnaire	Clinical: Relationships with staff and preceptors, not being assisted with procedures or treated with respect, not orientated to ward and didn't feel part of the team. Fear of harming patients, dealing with ill/dying patients, feeling inferior, overwhelmed, hopeless and angry. Academic: Classroom lecturers during clinical rotations Financial difficulties	Relaxation techniques (57.7%), recreation 50.9%), seeking faculty support (34%), religion (32.1%), socialisation with family/friends (18.9%).
Junious et al., 2010. USA	Nursing students n=10 (Foreign born) 1 university Senior level	Qualitative phenomenology	Focus Group and individual interviews.	Clinical: relationships with clinical staff, too much responsibility, negative attitudes of professionals, language difficulties requiring more time for reading/writing resulting in being tired all the time. Academic: workload, examinations and grades, fear of failing, difficulty of classwork material to be learned. Financial issues due to no tuition assistance and unable to work due to status as an international student	Not reported
Jimenez et al., 2010. Spain	Nursing students n=357 1college Year 1 (n=119) Year 2 (n=119) Year 3 (n=119)	Descriptive cross-sectional	Adapted version of the Perceived Stress Scale (Sheu et al. 2002)	Clinical: seeing pain/suffering of patients/relatives, inability to provide appropriate responses to doctors/teacher's/patients questions, lack of knowledge on how to help patients with biopsychosocial problems. Academic: worry about bad grades, when teachers compare student performance, competition from peers.	Not reported
Khajehei et al., 2011. Iran	Midwifery students n=72 1 university Year 3 (n=36), Year 4 (n= 36)	Descriptive cross-sectional study	Researcher designed questionnaire	Clinical: relationships with preceptors/mentors (juniors 72.2%, seniors 50%), ward climate and clinical staff (juniors 66.7%, seniors 52.8%), intrapersonal factors (juniors 30.6%, seniors 19.4%), nursing care practices (juniors 40.74%, seniors 15.55%), fear of malpractice and making mistakes (juniors 77.77, seniors 63.88).	Not reported
Murdock et al., 2010. USA	Nursing students (n=95) 1 university No details given	Descriptive survey	Researcher designed questionnaire	Not reported	Exercise (33.7%), socialising (19%), listening to music (12.6%), eating (11.6), meditation/deep breathing (7.3%), smoking (2.1%), alcohol (1.1%) or other (12.6%)
Reeve et al., 2013. USA	Nursing students n=107 n=49 traditional n=58 degree. 1 university	Mixed methods	Student Stress Life Inventory (Gadzella 1994). Critical Incident Technique tool	Clinical: Qualitative findings: feelings of rejection from clinical staff/clinical instructors/peers/patients, being yelled at by patients, lack of knowledge, feeling inadequate, fear of making mistakes	Physical activities, using positive statements of persistence, look at stressful event objectively and maintain commitment to nursing, talking to friends, ignoring stress, consuming alcohol.

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Shaban et al., 2012. Jordan	Nursing students n=181 2 universities Year 2	Descriptive cross-sectional	Perceived Stress Scale (Sheu et al. 1997). Coping Behavior Inventory (Sheu et al., (2002)	Clinical: environment, nursing staff and teachers, lack of professional skills and knowledge, pressure from the nature and quality of clinical practice Academic: assignments/workload during clinical placement., worry about grades	Problem solving, staying optimistic, transference and avoidance.
Suresh et al., 2012. Ireland	Nursing students n = 71 n=40 (Year 4) Registered nurses (n=31) 6 hospitals	Descriptive cross-sectional survey	Nursing Stress Scale (Gray-Toft & Anderson 1981)	Clinical: work load, death/dying, uncertainty, inadequate preparation, conflict with physicians, difficult relationships with nurses/preceptors /supervisors. Academic: academic demands during clinical placement.	Not reported
Wolf et al., 2014. USA	Nursing students n=210 Juniors & Seniors in two programmes Generic (n=135) Accelerated (n=75) 6 universities in 4 countries	Mixed methods	Perceived Stress Scale (Levenstein et al., 1993).	Clinical: fear of making a mistake, fear of failing clinical, incompetence, problematic relationships between students and clinical instructors, lack of respect. Academic: timing and number of assignments and examinations, multiple deadlines, fear of failure to graduate, failing course work	Positive thinking, social support from family and friends.
Yesil et al., 2015. Turkey	Nursing students n=467 1 university Year 1 (n=188) Year 2 (n=114) Year 3 (n=102) Year 4 (n=63).	Descriptive cross-sectional	Ways of Coping Questionnaire (Folkman & Lazarus 1980)	Not reported	Self-confident style, optimistic style, helpless style, seeking social support and submissive style.
Zhao et al., 2015. China	Nursing students n= 217 Final college year 3 hospitals	Descriptive cross-sectional	Perceived Stress Scale (Sheu et al., 1997) Coping Behaviour Inventory (Sheu et al., 2002)	Clinical: knowledge and skills, inability to help patients with physio-psychosocial problems, rapid changes in patient's condition discrepancy between theory and practice. Academic: assignments and workload during clinical practice, feeling that performance does not match teacher's expectations, when teachers compare students' performance.	Transference, staying optimistic, problem solving with avoidance

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Table 3. Studies examining the effects of stress management interventions in undergraduate nursing/midwifery students

Author, Year, Country	Purpose	Study design	Sample, size, Intervention, Data collection instrument	Key findings
Hsiao et al., 2012. Taiwan	To examine the effects of a Spiritual Learning Programme on nursing students perceived clinical practice stress	Quasi-experimental	Nursing students, experimental group (n= 40), control group (n=51). Year. 5. 8-week Spiritual Learning Programme Perceived Clinical Stress Scale (Sheu et al., 2002)	Significant reduction in perception of clinical stress in experimental group prior to entering clinical practice. Programme had short term effects only, evident in data collected post clinical
Hsieh et al., 2011. Taiwan	To investigate the effect of a School Based Health Promotion Programme on stressed nursing students	Mixed methods Quasi-experimental	Nursing students, experimental group (n=37), control group (n= 40). Year. 1. 16-week Physiological Stress Management Course with reflective discussions and 30 mins activity x 3 times a week (jogging or exercise in a gym). Researcher designed questionnaire.	Significantly reduced scores in stress levels in experimental group post intervention. Researchers conducting both the physical activities and focus groups, hence students reporting to those providing the programme
Jameson 2014. USA	The effects of a Hardiness Educational Intervention on hardiness and perceived stress of junior nursing students	Quasi-experimental	Nursing students, experimental group (n=18), control group (n=16), Junior level 5-week Hardiness Educational Course Perceived Stress Scale (Cohen et al., 1983)	Intervention had a statistically significant effect on decreasing perceived stress scores in experimental group.
Kim et al., 2015. Korea	To examine the effects of Rational Emotive Behaviour Therapy for senior nursing students on coping strategies	Quasi-experimental	Nursing students, experimental group (n=18), control group (n= 16), Senior level, 4-week Rational Emotive Behaviour Therapy Amirkhan's Coping Strategy Indicator (Shin & Kim 2002)	No significant difference in the stress-coping strategies e.g. seeking social support, problem solving and avoidance between the 2 groups.
Li et al., 2010. Taiwan	The effect of a Peer-mentoring Strategy on student nurse stress reduction in clinical practice.	Quasi-experimental	Nursing students, experimental group (n=17), control group (n = 32), registered nurses, experimental group (n=17), Junior level, Perceived Stress Scale (Sheu et al.,1997)	No statistical difference in stress scores between the two groups
Song & Lindquist 2015. USA	To examine the effects of a Mindfulness Based Stress Reduction course on depression, anxiety, stress and mindfulness in nursing students	Randomised Control Trial	Nursing students, experimental group (n= 21) control group (n= 23), 1st to 4th Grades 8-week Mindfulness Stress Reduction Course, Depression, anxiety and stress scale (Psychology Foundation Australia) Unpublished, MAAS Korean version	Statistically significant difference in stress levels pre and post intervention in the experimental group.
Van der Riet 2015. Australia	To explore the impact of a Mindfulness Program for first year undergraduate nursing and midwifery students	Qualitative descriptive	Nursing students, (n= 10), Year. 1. 7-week Mindfulness Programme. One Focus group Interview	Students reported increased concentration and clarity of thought in conjunction with increased awareness and a reduction in negative thoughts

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Highlights

- Sources of stress derive predominately from both clinical and academic environments
- Main coping strategies include problem solving, staying optimistic, transference.
- Scarcity of studies conducted on stress management interventions to support undergraduate students cope with stressful events.

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