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Coping Styles and Sources of Stress of Undergraduate Health Science Students: An Integrative Review

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****Undergraduate students at the time of the study**

ABSTRACT

Background and aim: *Tertiary education provides many personal and social benefits. However, students, particularly those from professional and health science disciplines are known to face significantly greater stress throughout their undergraduate degrees. In this integrative review sources of stress for students and the strategies they use to cope with the stress are explored.*

Method: *Various databases were searched using common key phrases such as "stressors among undergraduate health science students" and "coping mechanisms utilised by undergraduate health science students". Thirty-three articles were selected based on predetermined inclusion and exclusion criteria. The content in the articles were analysed to identify themes.*

Results: *Academic stress was the primary source of stress for health science students. Other sources of stress included interpersonal interactions and clinical training. Students primarily used problem-focused strategies to cope with stress. Other strategies included avoidance and the use of social support networks.*

Conclusion: *Health science students experience stress from academic tasks, interpersonal stress and stresses emanating from clinical training. They utilize problem-focused coping strategies, as well as avoidance and seeking social support when faced with stressful situations. Students would benefit from regular screening for stress-related conditions, and interventions to teach them more adaptive ways to deal with stress.*

Keywords: stressors, coping strategies, health science students, workload, student support.

INTRODUCTION

Higher education is essential for both personal success and economic growth. Tertiary education provides social benefits such as the acquisition of advanced knowledge, increased employability and financial stability[1]. However, successful graduation is a prerequisite for these benefits. Challenges to academic success include the complexity, number and timing of assessment tasks, and stress associated with intense studying at a higher education institution

Fears concerning the future, leaving behind friends and family, and having a poor work-life balance all take a toll on the mental health of university students[2]. This was confirmed by Makoni[3], who stated that mental health remains a global concern for university students, as psychological distress impacts negatively on academic performance. Stressful factors experienced by students include rigid course structures, insufficient support systems, inadequate finances and conflicting role demands, due to either childrearing, caring for an elderly family member or part-time employment[2]. Moreover, many students are academically unprepared for higher education, as many are first generation students, who may lack the social capital to succeed[4]. This is reflected in their poor academic performance such as high failure and dropout rates, and lengthy throughput among others[5].

This article is based on a review that was conducted by UKZN undergraduate students for the fulfilment of a bachelor's degree in Occupational Therapy. This review was underpinned by the following questions:

1. *What are the sources of stress among undergraduate health science students?*
2. *What strategies do students use to cope with stress?*

METHOD

An integrative review of the literature was conducted to understand the sources of stress, as well as the coping mechanisms utilised by undergraduate health science students. This method allowed for the inclusion of different types of studies for a holistic understanding of the research phenomenon[6]. This review was granted exemption from ethics, based on the pandemic, by the University of KwaZulu-Natal. The protocol reference number 00005806 was issued in response to the protocol submitted on 31 March 2020.

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Inclusion criteria:

- Articles published between 2000-2020
- Articles on undergraduate health science students.
- All articles were published in English and had to be full text.

Exclusion criteria:

- Articles involving medical students were excluded from the review as they are exposed to different stressors, and the demands and duration of their degree was different to that of other health science disciplines.
- Articles on postgraduate health science students were excluded as they may be exposed to different stressors, and cope differently.

Review process

The review process was done in phases. The following health databases were searched: Microsoft academic, Refseek, Catalogue search, SagePub, SciELO, Semantic Scholar, Science Direct, Google Scholar, Pubmed, Ebscohost and Medline were used. Pubmed and Medline were searched separately. The following descriptors and Boolean phrases were used as key phrases:

- undergraduate health science students,
- undergraduate occupational therapy students,
- coping mechanisms utilised by undergraduate health science students, OR undergraduate occupational therapy students,
- stressors among undergraduate health science students, OR undergraduate occupational therapy students
- AND sources of stress in undergraduate health science students OR undergraduate occupational therapy students.

The initial searches yielded 60 studies, and the title and abstracts were read in July 2020. The final sample consisted of 33 articles that met the inclusion criteria. The information to be extracted from the studies were defined and categorized, and the full-text articles were read. Data analysis entailed creating a table and extracting the information from all articles into sources of stress and coping strategies. Information was further broken down into themes such as *academic, personal, environmental* factors and *other stressors,* as well as *adaptive and maladaptive coping strategies*. Once all the information was extracted, the themes were constituted, reviewed, and refined, and a flow chart created. The review process is illustrated in Figure 1 (below).

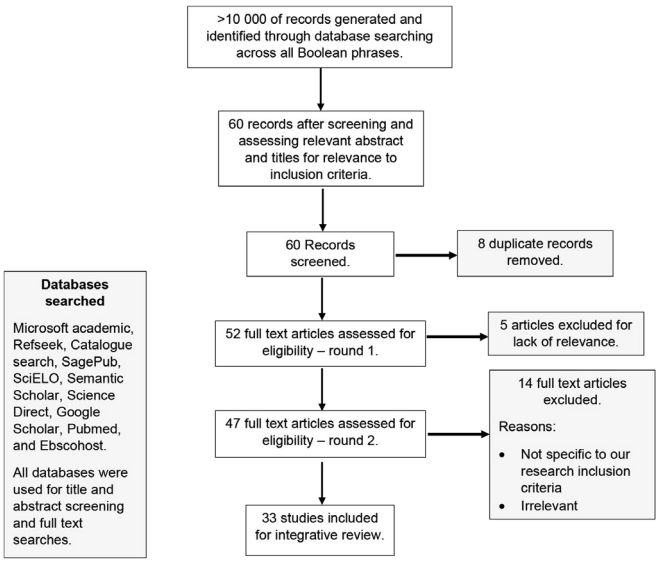


Figure 1: Flow chart showing the research process.

RESULTS

Twenty five of the 33 studies were quantitative, six were qualitative, and two were systemic reviews. The studies were conducted in various countries including South Africa, Nigeria, Saudi Arabia, the United Kingdom, the United States of America, and Australia. The studies were focused on the perspectives of occupational therapy, physiotherapy, dental therapy, speech pathology, pharmacy, and nursing students. The articles included in this review are presented in Table 1 (p31), which are organized according to the numerical order of references.

The findings are presented according to the sources of stress and coping strategies utilized by students.

Sources of stress

Three major sources of stress were identified, which included academic activities, interpersonal/social interactions, and clinical training. Several studies identified academic demands as the most significant source of stress for health science students[7-9]. Students described examinations and a high workload as the major factors contributing to academic stress[10-12]. Interpersonal or social stressors with family and peers were cited in 15 studies[7,11,13-25]. In another study conducted in Saudi Arabia, nursing students identified relationships with hospital staff to be a source of stress[26].

Stress from clinical training was emphasised by 13 out of the 33 studies[7,13,17,18,20,25-32]. Poorly staffed clinical departments, fast-paced wards and initial clinical placements were all factors contributing towards the stress of students[28]. High level patient care was also a prevalent stress factor amongst nursing students[13,17,20]. Other stressors that were reported less frequently included personal issues, financial concerns, environmental factors, psychosocial issues, and lack of students' professional skills. Personal stressors consisted primarily of students being stressed about their personal health-related conditions and illnesses[7].

Financial issues were cited in a study by Gibbons, Dempster and Moutray[28], where students revealed that they had to work part-time during their undergraduate studies to support themselves. Environmental factors cited as stress inducing included noisy living environments[13]. In terms of psychosocial stressors, final year physiotherapy students described the suffering and death of their patients as a traumatic experience[39]. Another study revealed that high parental expectations and decreased time to participate in leisure activities contributed to the students' psychosocial stress[10].

Lack of professional knowledge was reported as a source of stress in six out of the 33 studies[13,17,20,23,25,27]. Students felt that they lacked the necessary skills, and that clinical training was not always sufficient[40]. Other stressors identified in this review were concerns about postgraduate opportunities and career choices[7]. The frequency with which the stressors were identified in the reviewed studies is illustrated in Figure 2.

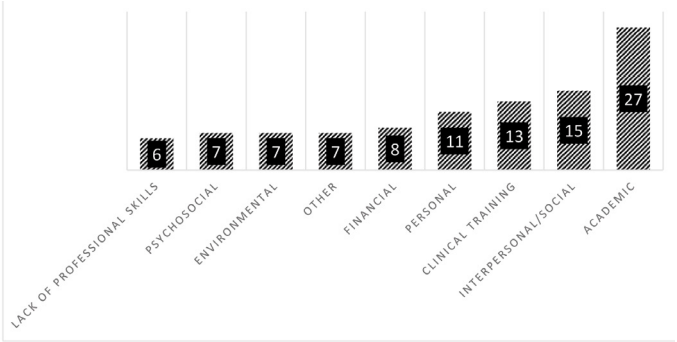


Figure 2: Sources of stress amongst health science students.

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Table I: Description of studies showing title, year, methodology, authors, country and findings of study.

Title of the journal article	Authors	Year	Sample size	Methodology	Findings	Country
Sources of stress in a pharmacy student population[7]	Garber, M., Huston, S., & Breese, C.	2019	721	Quantitative: survey using the Perceived Stress Scale.	Stressors included academic work, pressure to succeed, relationships, postgraduate opportunities, and financial stress.	United States
Perceived stress and sources of stress among physiotherapy students from three countries[8]	Jacobs, T., Gummesson, C., Nordmark, E., Ansary, D., Remedios, L., & Webb, G.	2018	626	Quantitative: cross-sectional study design, using the Perceived Stress Scale (PSS), and the Undergraduate Source of Stress Questionnaire (USOS).	Academic factors were found to be the most significant, and financial stressors were least significant.	Israel, Australia, and Sweden
Sources of stress and psychological morbidity among undergraduate physiotherapy students[9]	Walsh, J., Feeney, C., Hussey, J., & Donnellan, C.	2010	125	Quantitative: survey using the Undergraduate Sources of Stress Questionnaire and the General Health Questionnaire	Students experienced academic and personal stressors. 27% of the students presented with psychological morbidity.	Ireland
A cross-sectional study of stress and its sources among health professional students at Makerere University, Uganda[10]	Amanya, S. B., Nakitende, J., & Ngabirano, T. D.	2017	258	Quantitative: descriptive cross-sectional study design, using the General Health Questionnaire (GHQ-12).	Stressors included the academic curriculum (38%), high parental expectations (26.7%) and financial problems (24.4%).	Uganda
Nature of Stress among Health Science Students in a Malaysian University[11]	Othman, C., Farooqui, M., Yusoff, M., & Adawiyah, R.	2013	248	Quantitative: cross-sectional study, using the Medical Student Stress Questionnaire	Female students (60%) were more stressed compared to male students.	Malaysia
Source of stressors and emotional disturbances among undergraduate science students in Malaysia[12]	Radeef, A.S., Faisal, G.G., Ali, S.M., & Ismail, M.K.	2014	194	Quantitative: Cross sectional, questionnaire-using the Depression Anxiety Stress Scale (DASS-21).	Academic stress was most significant, followed by social /interpersonal stressors.	Malaysia
Assessment of Level and Sources of Stress Among Allied Health Sciences Students of Bayero University Kano: A Comparison Between Clinical and Pre-Clinical Students[13]	Muhammad, D., Ahmad, A., & Usman, J.	2019	230	Quantitative: Using the MSSQ (Medical Student Stressors Questionnaire).	Academic stress was prevalent, with anxiety (84.5%), depression (64.4%), and stress (56.7%) rates recorded.	Nigeria
OT students' experience of stress and coping[14]	Govender, P., Mkhabela, S., Hlongwane, M., Jalim, K., & Jetha, C. G	2015	99	Quantitative: descriptive survey design using a descriptive stress survey and the Ways of Coping Checklist (WCC).	Academic stress was most prevalent, and 7.8% of students were mildly stressed, 49.1% were moderately stressed, 6% were highly stressed, and 0.4% were severely stressed.	South Africa

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Title of the journal article	Authors	Year	Sample size	Methodology	Findings	Country
Resilience in occupational therapy students[15]	De Witt, P.A., Monareng, L., Abraham, A.A.H., Koor, S., & Saber, R.	2019	118	Quantitative: Descriptive, cross-sectional survey design using the Resiliency Scale (RS); the Perceived Stress Visual Analogue Scale (PSS) and the Health Behaviours Questionnaire (HBQ).	Academic stressors were the most prevalent, as well as social and personal stressors	South Africa
Replacing stressful challenges with positive coping strategies: a resilience program for clinical placement learning[16]	Delany, C., Miller, K. J., El-Ansary, D., Remedios, L., Hosseini, A., & McLeod, S.	2015	6	Qualitative: A resilience program was designed consisting of four 90-minute sessions.	Clinical training was stressful, and students used avoidant coping.	Australia
Nursing students' perceived stress, coping strategies, health, and supervisory approaches in clinical practice: A Slovak and Czech perspective[17]	Gurková, E., & Zeleníková, R.	2018	275	Quantitative: cross-sectional, descriptive study using the Perceived Stress Scale and the Coping Behaviour Inventory.	Stressors categorized as clinical, academic and social stressors. Problem focused coping, avoidance, transference and remaining positive were used.	Czech Republic and Slovakia
Stress and coping styles in Japanese Nursing students[18]	Yamashita, K., Saito, M, & Takao T	2012	1324	Quantitative: using the General Health Questionnaire and Brief Coping Orientations to Problems Experienced scales.	Academic stressors, interpersonal relationships, and stress from clinical practice. Strategies included social support (61.7%) and avoidant coping (2.7%).	Japan
Study of stress level in occupational therapy students during their academic curriculum[19]	Kumar, S., & Jejurka, K.	2005	100	Quantitative: study using a 28-item stress questionnaire and Zung's self-rating scale for depression.	First year students experienced greater academic, social and emotional stress.	India
A literature review on stress and coping strategies in Nursing students[20]	Leodoro J	2017	13	Systemic review	Stressors included the care of patients, academics, and negative interactions with staff. Problem solving strategies were used.	Saudi Arabia
Alcohol use by occupational therapy students: An exploratory study[21]	McCombie, RP., Evans, A., & Miller, MJ	2016	81	Quantitative: using the Modified version of the Michigan alcohol screening test, the Stecker Life Stressors Survey	Alcohol use was associated with socialisation. Social support was the primary coping mechanism.	United States
Psychological distress among nursing, physiotherapy and occupational therapy students: A longitudinal and predictive study[22]	Nerdrum, P., & Rustoen, T.	2009	416	Quantitative: using the StudData questionnaire and the General Health Questionnaire	Students experienced academic stress and had interpersonal problems.	Norway
Psychosocial stress factors among mental health nursing students in KSA[23]	Seham, M	2019	10	Qualitative: Interpretive qualitative approach involving semi-structured interviews	Stressors included the academic environment, social distress, financial constraints, and interpersonal relationships.	Saudi Arabia

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Title of the journal article	Authors	Year	Sample size	Methodology	Findings	Country
Experienced stressors and coping strategies among Iranian nursing students[24]	Seyedfatemi, N., Tafreshi, M., & Hagani, H.	2007	440	Quantitative: descriptive cross-sectional study using the Student Stress Survey and the Adolescent Coping Orientation for Problems Experienced Inventory.	Stressors included academic and environmental stress, interpersonal problems, and health concerns.	Iran
Stress and coping strategies among nursing students: an international study[25]	Labrague *et al*	2018	547 (161 Greek students, 153 Filipino students, and 233 Nigerian students)	Quantitative: Using The Perceived Stress Scale (PSS) and the Coping Behaviour Inventory (CBI).	Academic stress was ranked the highest (M=2.46, SD=0.78). Problem focused coping was the most used coping strategy (M=2.68, SD=0.72).	Greece, Philippines and Nigeria
Examining stress perceptions and coping strategies among Saudi Nursing students[26]	Labrague L.J.	2018	11 quantitative studies.	Systemic review	Academic stress was the most significant stressor. Students utilized active and passive coping styles.	Saudi Arabia
Hong Kong baccalaureate nursing students' stress and their coping strategies in clinical practice[27]	Chan, C., So, W., & Fong, D	2009	205	Quantitative: survey using the Perceived stress scale, Physio-Psycho-Social response scale and Coping Behaviour Inventory.	A lack of clinical knowledge, taking care of clients and academic stressors induced stress. Coping strategies included problem solving, transference, avoidance and remaining positive.	Hong Kong
Stress and eustress in nursing students[28]	Gibbons, C., Dempster, M., & Moutray, M.	2008	16	Qualitative: focus group interviews	Students who coped well used support networks and were positive, towards programme issues	United Kingdom
Stress, coping and satisfaction in nursing students[29]	Gibbons, C., Dempster, M., & Moutray, M.	2011	171	Qualitative using The General Health Questionnaire.	Stressors included academic and fieldwork demands. Coping strategies included avoidance and using social support.	United Kingdom
Perceived stressors of oral hygiene students in the dental environment[30]	Gordon, N., Rayner, C., Wilson, V., Crombie, K., Shaikh, A., & Yasin-Harnekar, S	2016	89 (3rd year Bachelor of Oral Health students)	Quantitative: Using the DES questionnaire; and the Maslach Burnout Inventory (MBI).	First and second year students identified theoretical learning as most stressful, whereas the 3rd year group reported clinical training as most stressful.	South Africa
Perceived stress and well-being amongst Dental Hygiene and Dental Therapy Students[31]	Harris, M., Wilson, J., Holmes, S., & Radford, D.	2017	72 dental hygiene and dental therapy students, and 80 final year outreach dental students (as a comparison group)	Quantitative: survey using the Dental Environment Stress questionnaire (DES); Depression Anxiety Stress Scales (DASS21); Scales of Psychological Well-Being (SPWB); Valuing Questionnaire (VQ); and the Adult Hope Scale (AHS).	Stressors included academic work and fieldwork practice.	United Kingdom

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Title of the journal article	Authors	Year	Sample size	Methodology	Findings	Country
Stress sources in nursing practice. Evolution during nursing training[32]	Zupiria Gorostidi, X., Huitzi Egilegor, X., Jose Alberdi Erice, M., Jose Uranga Iturriotz, M., Eizmendi Garate, I., Barandiaran Lasa, M., & Sanz Cascante, X.	2007	69	Quantitative: Using components of the KEZKAK, STAI and demographic questionnaires.	Stressors included academic and social stressors, and the lack of professional knowledge.	Spain
Perceptions of stress, time management and coping strategies of speech pathology students on clinical placement[33]	Lincoln, M., & Adamson, B.	2004	Time1: 62 Time 2: 36 Time 3: 48	Quantitative: Using the Perceived Stress Scale and Australian Time and Organization Management Scale (ATOMS).	Coping strategies included problem focused coping, optimism and using social support.	Australia
Causes of Stress and Coping Strategies Adopted by Undergraduate Health Professions Students in a University in the United Arab Emirates[34]	Gomathi, K., Ahmed, S., & Sreedharan, J.	2013	212	Quantitative: survey using the brief COPE inventory	Stressors included academic and health related stress. Religion and praying were coping strategies.	United Arab Emirates
The role of religiosity, coping strategies, self-efficacy and personality dimensions in the prediction of Iranian undergraduate rehabilitation interns' satisfaction with their clinical experience[35]	Mirsaleh, Y., Rezai, H., Kivi, S., & Ghorbani, R.	2010	318	Quantitative: cross-sectional survey using the Islamic Religiosity Scale, Ways of Coping Questionnaire, General Self-efficacy Scale, NEO Five Factor Inventory, and Satisfaction with Clinical Experiences Questionnaire.	Religiosity, problem-focused coping and general self-efficacy were good predictors of satisfaction with clinical internship in rehabilitation students.	Iran
Nursing students' stress and coping strategies during clinical training in KSA[36]	Waled, A.M., & Badria, M.A.	2019	125	Quantitative: Descriptive cross-sectional study	Stressors included academic stress, a lack of professional knowledge and competitive relationships with peers.	Saudi Arabia
Dealing with stress: Patterns of self-comfort among healthcare students[37]	Vera Dahlqvist, A. S., & Astrid, N.	2018	168	Qualitative: focus group.	Emotion focused styles of coping were used.	Sweden
Predictors of mental distress among undergraduate health science students of Hawassa University, College of Medicine and Health Sciences, Hawassa, SNNPR, Ethiopia: a cross-sectional study[38]	Bedaso, A., Duko, B., & Yeneabat, T.	2020	309	Quantitative: cross-sectional study design	A lack of social support and the excessive use of substances were strong predictors of mental distress.	Ethiopia

Strategies used by students to cope with stress

Students used a variety of strategies to help them cope with stress. Problem-focused coping was identified as one of the most used coping strategies[14,20,25]. Avoidance was another commonly used strategy, which involved students waiting for others to solve their problems, or avoiding teachers, but this approach led to difficulties in clinical training[33]. Other negative coping strategies that were not health promoting was avoidance (17%), transference (11%) and substance use by 2% of the sample.

Students used social support networks as a strategy for coping, as indicated in eight of the 33 studies[14,16,18,21,24,29,33,39]. The frequency with which various coping strategies were used by students in the

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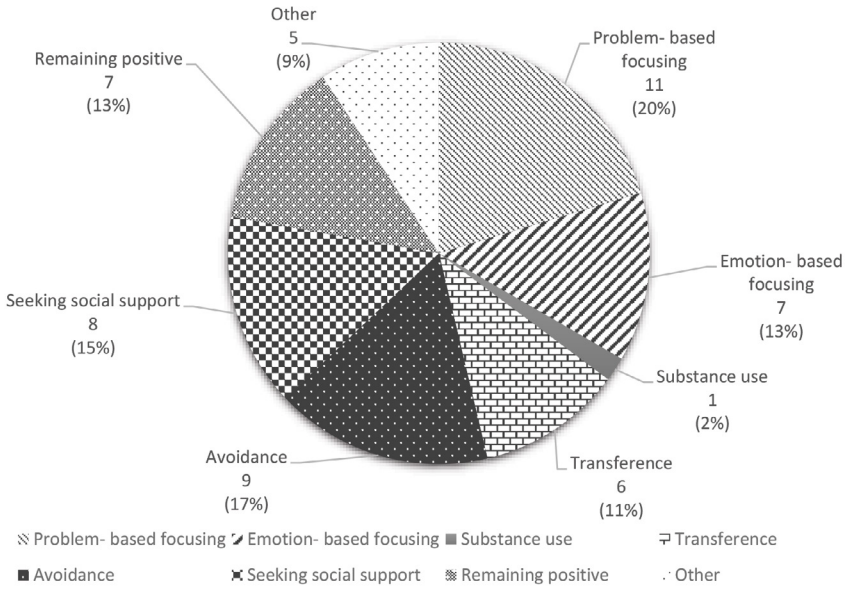


Figure 3: Pie graph showing coping strategies of students.

reviewed studies can be seen in Figure 3.

DISCUSSION

Health science students experience significantly higher levels of stress as compared to students in other disciplines[41]. Academic related stress was most prevalent amongst health science students[7-9] and appeared to increase over the four-year occupational therapy course, with final year students perceiving it to be the greatest source of stress[12]. Examinations and an increased workload were most significant[10-12], which was attributed to students' poor time management[34]. This was reiterated by Mohamadkhani *et al*[42] who stated that efficient time management skills were an important predictor for academic performance, reduced stress levels and increased productivity[42].

Clinical training was also identified as a source of stress[28]; due to understaffed clinical settings, high turnover in wards and problematic clinical placements. Garber *et al*.[7] described fieldwork rotations to be stressful for pharmacy students, who were concerned about their performance in these experiential rotations. Negative relationships with faculty members were identified as one of the key social stressors[7]. A poor relationship with staff can result in decreased academic performance, as students find it difficult to approach lecturers or clinical supervisors. Social stress was cited in Gomathi *et al*.[34], who reported that competitive relationships amongst peers was stressful. These competitive interpersonal relationships have been found to negatively impact on students' available support systems. Family conflicts were also found to compound the stress experienced by students, due to a negative impact on the students' available support networks[21].

Gomathi *et al*.[34], reported that the main psychosocial stressors experienced by students were high parental expectations, lack of adequate leisure time, and anxiety about the future, which centred about future unemployment. Psychosocial stresses of students included difficulties in processing the death or suffering of their patients[39]. Peters *et al*[43], suggested that health providers are constantly exposed to the death and suffering of their clients, which can serve as a subconscious reminder of their own mortality. Students' health-related conditions were also stress inducing[7,13]. Students with chronic illnesses, or those who had surgeries found it difficult to manage these additional stressors[7]. Binge eating disorders and obesity were prevalent in first generation students[44]. These findings were in stark contrast to what has been reported in developing countries, such as South Africa, where many students presented with food insecurity and malnutrition[45]. Dominguez-Whitehead[45] highlighted that South African university students were subjected to food insecurity because of limited funds.

Environmental factors such as noisy environments and the climate within the university and clinical settings were also stress inducing. Servilha and Delatti[46], reported that increased noise levels were a major stressor for undergraduate health science students, which impacted their studies negatively. Financial stress was another source of stress identified within this integrative review. In one of the studies, it was found that students needed to secure part-time employment to alleviate their financial burdens[28]. University students with financial stress were likely to present with decreased academic performance, as they struggled to balance work and completing academic tasks[47]. This continues to be a problem particularly in developing countries, including South Africa, with many students on financial aid. A lack of professional knowledge was the least reported stressor within this integrative review. These students felt that clinical training was inadequate, and that they continued to lack the necessary clinical skills[23].

Coping strategies of health science students

Students used a variety of coping strategies, including problem focused coping and emotion focused coping. It was found that students with high levels of resilience and optimism tended to respond to stress with adaptive coping strategies, such as task-oriented and active coping, whilst those with high levels of pessimism were likely to use maladaptive strategies, such as disengagement, denial, and venting of emotions. Some of the adaptive strategies included remaining positive and using social support. Other negative coping strategies included avoidance, transference, and substance use to cope with stress.

As can be seen in Figure 3, health science students were more likely to utilize problem-focused coping (20%)[14,17,20,24-27,34,35,36,41], in contrast to emotional-focused coping (13%)[14,16,24,34,35,37,39]. Problem focused coping involves taking control of the stressor by either seeking information or assistance in handling the situation, whereas emotional focused coping included avoidance(17%)[17,24,25,27,29,33,34,35,36] and seeking social support[14,16,18,21,24,29,33,35] (15%). Govender *et al*[14] found that only 2% of occupational therapy students at the University of KwaZulu-Natal between the first and fourth year of study used problem-focused coping[13]. This strategy consisted of identifying, planning, analysing potential solutions and taking the necessary actions to solve the problem[48]. Other studies revealed that health science students employed a range of problem-focused coping strategies such as "managing their time, seeking information and sport and recreational activities, or they employ emotion-focused strategies such as tension reduction strategies, such as exercising, balanced diet, getting enough sleep, and engaging in constructive leisure activities"[14].

Adaptive coping strategies

Remaining positive was cited in 11 out of the 33 studies included in this integrative review[14,17,20,24-27,34,35,36,39]. Students were found

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to adopt a positive attitude and mind-set in response to stressful events, confirming the use of hopefulness and optimism as a coping style[36]. A positive mind-set is likely to prevent students from resorting to helpless coping styles. Students were reported to be engaged in problem-focused methods of coping where they actively sought ways to cope with different stressors. Coping approaches included the development of solutions to their problems, and the seeking of assistance from student support services[26]. Another adaptive coping style identified was seeking social support. Support from family and friends is crucial in enabling a student to successfully integrate into university life, and a poor support network is a strong predictor of mental distress[38]. This approach entailed students talking about their problems with family and friends[48]. One study identified 61.7% of nursing students from a cohort of 1324 students who used social support as a means of coping[17].

Emotion-focused coping was cited in seven out of the 33 articles[14,16,24,34,35,37,39], where the individual tried to minimise the stressor, and they felt better, but the problem remained unsolved. Other strategies used by students included remaining positive, transference, and other non-specific methods, such as remaining positive or optimistic,[17,27] and substance use.

Maladaptive coping strategies

Students who engaged in avoidance behaviours often participated in activities such as procrastination, substance use and playing video games. These students were unlikely to identify the positive aspects of a situation[24], which indicated a negative worldview and tendency to utilise avoidant coping styles. McCombie *et al*[21] postulated that some students used substance use as a coping strategy. Problematic family relationships resulted in a lack of social support, resulting in the increased tendency to use substances. With emotion-focused coping, the stressor is not analysed or resolved, but rather indirectly managed, and may include maladaptive coping strategies, such as substance use, avoidance, or transference, self-blame, denial, minimisation, sleeping, eating, wishful thinking and keeping to oneself.

LIMITATIONS

The limitation in this study was that the researchers were undergraduate students and novice researchers. This could have affected the analysis and information extracted during the integrative review. However, having the project supervised by a more experienced researcher mitigated this limitation.

RECOMMENDATIONS

Based on the researchers' analysis, the following recommendations are made:

- Health science and other professional degrees are associated with an increased academic workload, due to the clinical training component. Therefore, there is a need for health science disciplines to review their course structures, and the number and timing of assessments, to reduce the stress on students.
- Interventions to support students should be emphasised for first year orientation programmes. Thereafter student support services could send out electronic stress questionnaires to students, which could be conducted biannually, at the beginning and end of the academic year, allowing support services to screen for any students who may be struggling, and ensure timely support, nuanced to the students' needs[39]. Students who experienced the death of a patient can be referred to a psychologist or student counsellor to assist them in coping with this loss. Research has shown that students do experience stress because of their patients' suffering and death[49]. Some believe that academic support should be compulsory for health science students, who are often reluctant to attend sessions voluntarily[50]. Moreover, it is recommended that student support services must address the academic and emotional needs of students, and support must be nuanced to the students' needs.
- Workshops aimed at addressing budgeting skills would be useful in assisting students to better manage their finances and reduce financial stress.
- The clinical supervisor-student bond may be strengthened during annual workshops for supervisors to ensure students are well supported during their fieldwork blocks. King, Edlington and Williams[51], suggested that both the student and the clinical supervisor require training to ensure effective clinical supervision.

CONCLUSION

The purpose of this integrative review was to determine the sources of stress for health science students in undergraduate programmes, and strategies that they used to cope with stress as reported in international published peer reviewed articles. The sources of stress included academic demands, social and personal factors, financial worries, and stress as a result of clinical training. Other stress-inducing factors included environmental influences, psychosocial factors, and feelings of inadequacy in relation to professional knowledge. Most students reported the use of problem-focused coping in response to increased stress, while others used maladaptive coping styles, such as substance use and other avoidant behaviours. The multitude of stressors and maladaptive coping necessitates the need for support to be timeously accessed by students. The implementation of online semester check-ins would be beneficial in allowing support services to identify students requiring additional support. Students' mental health are predictors for how well they will cope in tertiary education, and specifically with the demands of the health science programmes. It is imperative they access timely support, nuanced to their academic and personal needs.

AUTHOR CONTRIBUTIONS

Odell Chetty and Robyn Henderson conducted the initial article search, information extraction, data analysis, writing, editing and submission of the article. Thavanesi Gurayah conceptualised and supervised the project and edited the final manuscript.

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