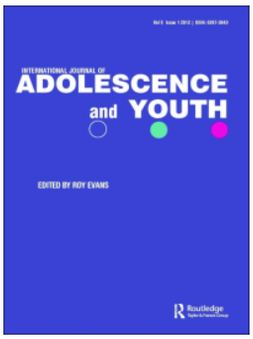

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The impact of stress on students in secondary school and higher education

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ABSTRACT

Students in secondary and tertiary education settings face a wide range of ongoing stressors related to academic demands. Previous research indicates that academic-related stress can reduce academic achievement, decrease motivation and increase the risk of school dropout. The longer-term impacts, which include reduced likelihood of sustainable employment, cost Governments billions of dollars each year. This narrative review presents the most recent research concerning the impact of academic-related stress, including discussion of the impact on students' learning capacity and academic performance, mental health problems, such as depression and anxiety, sleep disturbances and substance use.

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Academic; adolescent health; education; mental health and well-being; stress

Young people report high levels of stress

Students in secondary and tertiary education settings face a wide range of ongoing normative stressors, which can be defined as normal day to day hassles such as ongoing academic demands. Accordingly, secondary/high school (defined here as junior/lower secondary education and senior/upper secondary education)] (UNESCO, 2012) and tertiary (defined here as post-secondary education) (UNESCO, 2012) students commonly self-report experiencing ongoing stress relating to their education, which we refer to as academic-related stress, such as pressure to achieve high marks and concerns about receiving poor grades. For example, the Organisation for Economic Co-operation and Development (OECD) recently conducted a survey involving 72 countries and consisting of 540,000 student respondents aged 15–16 years. On average across OECD countries, 66% of students reported feeling stressed about poor grades and 59% reported that they often worry that taking a test will be difficult. The OECD further found that 55% of students feel very anxious about school testing, even when they are well prepared. As many 37% of students reported feeling very tense when studying, with girls consistently reporting greater anxiety relating to schoolwork compared to boys (OECD, 2017). This data demonstrates that education and academic performance are a significant source of stress to students. The impact of this ongoing academic-related stress to student outcomes and well-being has not been comprehensibly explored. Therefore, the current narrative review explores the impact of academic-related stress on students' academic performance, mental health and well-being.

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Methods

A single author (MP) searched PubMed and Google Scholar for peer-reviewed articles published at any time in English. Search terms included academic, school, university, stress, mental health, depression, anxiety, youth, young people, resilience, stress management, stress education, substance use, sleep, drop-out, physical health with a combination of any and/or all of the preceding terms. A snowball strategy allowed for examination of references in identified articles, and inclusion of additional articles as appropriate. The author reviewed all potential articles for inclusion. Articles from all countries were included in this narrative review, if a school based (secondary [as defined at grade 7 or higher] or university) population was included and the study assessed the impact of stress on student mental health, substance use, sleep, dropout rates, physical activity or academic outcomes. Articles were included regardless of study design.

Academic-related stress and mental health

Previous research indicates that self-reported stress is associated with the presentation of anxious states and lower well-being (Carter, Garber, Ciesla, & Cole, 2006; Kessler, 1997; Robotham & Julian, 2006). The recent above-mentioned OECD survey reports that secondary students who self-report higher levels of academic-related stress also report lower well-being, measured using psychological, social, cognitive and physical components (OECD, 2015). A systematic review of 13 studies showed that in individuals undertaking higher education, self-reported levels of stress are associated with poorer quality of life and well-being (Ribeiro et al., 2017). Ongoing stress also precipitates the development of more serious mental health issues such as anxiety and depression (Kessler, 1997; Moylan, Maes, Wray, & Berk, 2013). The prevalence of anxiety is as high as 35% in tertiary students (Bayram & Bilgel, 2008; Eisenberg, Gollust, Golberstein, & Hefner, 2007; Ozen, Ercan, Irgil, & Sigirli, 2010) and the prevalence of depression is 30% (Ibrahim, Kelly, Adams, & Glazebrook, 2013). The reciprocal relationship between stress and depression and anxiety is well established (Dantzer, 2012; Dantzer, O'Connor, Lawson, & Kelley, 2011; Maes, 2008). Indeed, major stressful life events are one of the best predictors of the onset of depression (Kendler et al., 1995; Kessler, 1997). Accordingly, in young people the first onset of depression is often preceded by major life stressors (Lewinsohn, Allen, Seeley, & Gotlib, 1999).

Aside from impairing overall health and well-being, depression and anxiety symptoms can further adversely affect academic achievement (Bernal-Morales, Rodríguez-Landa, & Pulido-Criollo, 2015). In undergraduate university students from the United States, those with higher self-reported anxiety and depression symptoms were found to achieve poorer grades on examinations (Chapell et al., 2005; Hysenbegasi, Hass, & Rowland, 2005). A longitudinal study of Hawaiian secondary school students showed that self-reported depressive symptoms resulted in subsequent poor academic achievement (Kessler, 2012; McArdle, Hamagami, Chang, & Hishinuma, 2014). This is consistent with the findings of Humensky et al. (2010) who found that self-reported depressive symptoms were associated with concentration difficulties and trouble with completing school tasks, in 83 students from the United States between the ages of 14–21, and at-risk for major depression (Humensky et al., 2010). In a sample of Finnish students aged 13–17, self-reported depression severity was associated with concentration difficulties, and poorer social relationships, self-learning, poorer academic performance, and worse reading and writing outcomes (Fröjd et al., 2008). Therefore, it is not surprising that young people with depression, particularly males, are less likely to undertake higher education, as shown in a 15-year longitudinal study of Swedish adolescents (Jonsson et al., 2010). Importantly, adolescent depression can also result in longer-term poor employment outcomes, as demonstrated by a 25-year longitudinal study of New Zealand children (n = 982). This study found that people who had depression at ages 16–21 had greater rates of welfare dependence and unemployment, demonstrating that the impact of poor mental health in adolescence can have long-lasting impacts

(Fergusson, Boden, & Horwood, 2007). Enhancing support in the education setting may improve the mental health of young people. A national telephone survey of United States households showed that the incidence of depression in college students decreases if students have positive adjustments to academic life as well as adequate social support (Ross & Mirowsky, 2006). Indeed, an Australian randomised control trial reported that a gamified online cognitive behaviour therapy intervention was effective in reducing depressive symptoms in 540 final year secondary students (Perry et al., 2017). This study demonstrates the potential of education settings in mediating the impacts of academic-related stress on young people's mental health.

Academic-related stress and substance use

The health and risk behaviours of young people, including substance use and abuse, are all important determinants of their current and future health and well-being status (Tountas & Dimitrakaki, 2006; World Health Organisation, 2004). Academic-related stress can increase substance use among young people. In a survey study of 128 Grade 11 students attending competitive private schools in the United States, students who reported experiencing high ongoing stress, particularly in relation to academic achievement and the tertiary education admissions process, also reported high rates of drug and alcohol use (Leonard et al., 2015). The authors report that substance use was associated with a greater desire for academic achievement, higher perceived stress, less effective coping strategies, and less closeness with parents (Leonard et al., 2015). In 7th and 8th Grade students from the United States, self-perceived stress has similarly been reported to be related to substance use. In these students, coping strategies that included information gathering, problem solving and having a positive outlook, as well as adult social support and relaxation were inversely related to substance use (Wills, 1986). This study demonstrates the importance of protective social factors in mediating the effects of academic-related stress. In a cross-sectional study of tertiary nursing students from the United States, those with higher self-reported stress had higher incidence of substance use. Students who had higher perceptions of faculty support used fewer stimulants to assist them while studying, further demonstrating the proactive role of social factors (Boulton & O'Connell, 2017). Finally, The Canadian Institute for Health reports that young people aged 12–19 who feel connected to their school report less anxiety and less risky behaviours, such as smoking and drinking alcohol, compared to those who do not feel connected to their schools (Canadian Institute for Health, 2005). Collectively, the above discussed findings indicate that increased stress is associated with substance use among students and that perceived social support, including from within the education environment, may positively mediate this relationship.

Academic-related stress and sleep

Insufficient sleep in adolescents is recognised as a serious health risk by the American Medical Association and the American Academy of Sleep Medicine, who report that many young people do not get enough hours of sleep (Owens, 2014). Stress is a contributing factor to poor sleep in young people (Bernert, Merrill, Braithwaite, Van Orden, & Joiner, 2007; Curcio, Ferrara, & De, 2006). Noland et al., found that 42% of 9–12th Grade students report that stress is an impediment to good sleep, in 384 students surveyed (Noland, Price, Dake, & Telljohann, 2009). Self-perceived stress has been shown to result in poorer sleep in female university students from the United States (Lee, Wuertz, Rogers, & Chen, 2013; Wallace, Boynton, & Lytle, 2017), medical students from Saudi Arabia (Almojali, Almalki, Alothman, Masuadi, & Alaqeel, 2017), university students from Portugal (Amaral et al., 2017) and Pakistani medical school students (Waqas, Khan, Sharif, Khalid, & Ali, 2015), demonstrating the cross cultural impacts of stress on sleep quality and quantity tertiary education students. In a study from the United States, over 90% of 9–12th Grade students reported that they have an inadequate number of hours of sleep on most school nights. These young people report that the impact of the loss of sleep is difficulty paying attention,

lower grades, higher stress, and trouble getting along with other people. Some students reported problematic coping strategies such as taking sleeping pills, smoking cigarettes and drinking alcohol to help them sleep (Noland et al., 2009). Sleep quality and quantity has been shown to be closely related to student learning capability and academic performance (Curcio et al., 2006). Loss of sleep is frequently associated with poor learning (Curcio et al., 2006). Therefore, stress-related disruption to sleep quality and quantity is an important factor contributing to poor learning and well-being among students.

Academic-related stress and physical health

The experience of high levels of academic-related stress increases the risk of young people developing preventable physical health problems later in life. A systematic review of prospective studies found that people who were stressed, such as during examination periods, were less likely to be physically active, the impact of which is associated with a plethora of potentially inter-related poor physical health outcomes (Stults-Kolehmainen & Sinha, 2014). Stress may also lead to the development of non-communicable diseases, including metabolic syndrome, obesity and reduced insulin sensitivity, resulting from unhealthy lifestyle habits and stress system dysregulation (Pervanidou & Chrousos, 2012). Similarly, stress has been shown to be associated with increased appetite (Dallman et al., 1993) and higher body weight (Stephens et al., 1995). Therefore, academic-related stress can contribute to the development of health issues, including chronic non-communicable diseases, due to decreases in physical activity and increases in unhealthy lifestyle habits.

Academic-related stress and achievement

The World Health Organisation (1996) states that students must be healthy and emotionally secure to fully participate in education (World Health Organisation, 1996). Indeed, the above-mentioned OECD survey reports that anxiety about schoolwork, homework and tests has a negative impact on students' academic performance in science, mathematics and reading. The survey highlights that top-performing girls report that the fear of making mistakes often disrupts their test performance (OECD, 2015). Students in the bottom quarter of academic performance report feeling far more stressed compared to those in the top quarter of academic performance. As many as 63% of students in the bottom quarter of science performance report feeling anxious about tests no matter how well prepared they are, while 46% of students in the top quarter report feeling anxious (OECD, 2015). This demonstrates that higher perceived stress levels are associated with poorer academic performance.

Previous research shows that the experience of positive and negative emotions are directly related to levels of student engagement (Reschly, Huebner, Appleton, & Antaramian, 2008). In 293 students in Grades 7–10 from the United States, the frequency of positive emotions during classes was associated with higher student engagement. Conversely, the frequency of negative emotions was associated with lower engagement (Reschly et al., 2008). This finding is important as engagement in learning is necessary for achievement, as illustrated by the findings of a survey conducted by the National Union of Students. This survey reported that the main factors affecting the tertiary studies of Australian university students aged 17–25 was stress (Rickwood, Telford, O'Sullivan, Crisp, & Magyar, 2016). In an observational study of 456 German undergraduate medical students, higher perceived academic-related stress was found to predict poor academic performance (Kotter, Wagner, Bruheim, & Voltmer, 2017). In another study of 121 medical students from Hong Kong, high self-reported stress levels were similarly related to poorer academic performance (Stewart, Lam, Betson, Wong, & Wong, 1999). The above findings demonstrate that the academic-related stress that secondary and tertiary students experience constitutes a major factor affecting their academic achievement. Students with higher perceived stress are likely to have lower academic achievement.

Academic-related stress and dropout

Academic-related stress and burnout includes exhaustion, depersonalization, cynicism and inefficacy or reduced accomplishment (Walburg, 2014). Academic-related stress is strongly related to decreased student academic motivation (Liu, 2015; Liu & Lu, 2011; Shinto, 1998) and academic disengagement (National Centre on Addiction and Substance Abuse at Columbia University (CASA) United States of America, 2003). The relationship between academic-related stress, motivation and dropout does not appear to be culturally specific, with similar findings shown from a number of international studies (Liu, 2015; Liu & Lu, 2011; Shinto, 1998; Walburg, 2014). In 298 Chinese secondary school students, academic-related stress in Grade 10 negatively predicted intrinsic academic motivation and positively predicted lack of motivation in Grade 12. This indicates that decreasing academic-related stress might preserve students' ongoing intrinsic academic motivation (Liu, 2015; Liu & Lu, 2011). Similarly, in 495 Japanese students in junior secondary school, self-reported academic-related stress was found to negatively relate to feelings of self-growth and academic motivation (Shinto, 1998). A recent literature review highlights how stress and burnout can also affect academic achievement by increasing the risk for school dropout (Walburg, 2014). This was particularly true for students who experience more stressful life events of a more severe nature, as well as students who do not seek support from their parents or other family members as well as students from ethnically diverse groups (Hess & Copeland, 2001).

School dropout is associated with a lifelong reduction in earning capacity and secure employment (Lamb & Huo, 2017). Individuals with lower education levels report having poorer mental health and more illness than those with higher levels of education (Turrell, Stanley, de Looper, & Oldenburg, 2006). Early dropout from school has also been reported to contribute to intergenerational issues including unemployment, poverty and less academic achievement (Black, 2007; Lamb & Huo, 2017; Muir, Family, Maguire, Slack-Smith, & Murray, 2003). Academic achievement and completion of secondary school leads to greater employability, less reliance on social welfare support and a higher likelihood of participation in further education (Noble, Wyatt, McGrath, Roffey, & Rowling, 2008). These outcomes in turn increase the likelihood of sustainable employment, adequate income and self-sufficiency (Noble et al., 2008), which can save Governments hundreds of millions of dollars every year (Lamb & Huo, 2017).

Discussion

The current narrative review highlights that students commonly report high levels of academic-related stress, cross-culturally. The academic-related stress experienced by secondary and tertiary students' impacts their mental and physical health and leads to a range of academic problems. Good stress-management skills have the potential to benefit young people in an ongoing manner throughout their lives, given that many long-term health-related behaviours and patterns, both positive and negative, are established during adolescence and early adulthood (Sawyer et al., 2012). Therefore, providing opportunities to improve young people's academic stress-related coping abilities during this highly stressful, crucial period of development is an important target (OECD, 2015).

The OECD highlights that education settings are places where young people develop many of the social and emotional skills needed to become resilient and thrive (OECD, 2015). Therefore, education settings can work to improve student academic related stress through the provision of programmes shown to decrease stress and increase stress management and coping. Discussion regarding the efficacy of particular school based stress management programmes to teach students to cope with stress is beyond the scope of the current review. It worth noting, however, that education-based initiatives that focus on increasing students skills and ability to cope with stress have been previously demonstrated to directly and positively influence educational achievement and decrease health risks (Hanson & Austin, 2002; Perry et al., 2017; Weare & Gray, 2003). For example, a meta-analysis of 19 randomised controlled

trials or quasi-experimental studies found that school programmes targeting stress management or coping skills reduced stress symptoms and improved coping skills among students (Kraag, Zeegers, Kok, Hosman, & Abu-Saad, 2006). Schools provide access to a large number of young people, across a diverse range of backgrounds, during a formative developmental period (Sawyer et al., 2012). As such, even if modestly effective, the population level implementation of stress management and coping skills programmes would help young people to develop healthy coping strategies in order to deal with the inevitable stressors of life. Understanding and addressing the barriers and enablers to implementation of stress management programmes in schools would support the development of effective implementation strategies (Albers & Pattuwage, 2017; Domitrovich et al., 2008), resulting in significant health, economic and social benefits for large numbers of young people, their families and the community.

A strength of the current review is that we have discussed studies from many countries, indicating that the academic-related stress experienced by students in education is cross-cultural and wide spread and is of international concern. We reviewed studies that demonstrated a range of negative effects of academic-related stress, highlighting the potential broad spectrum of benefits that may result from the implementation of stress-management interventions. A limitation of the current study is that we have not delineated between studies that have assessed the impact of academic-related stress during different phases of secondary and tertiary education. It is more than likely that the needs and therefore the most beneficial coping strategies may vary throughout the life span. Therefore, the most appropriate stress-management education approaches may differ between the early high school and tertiary education years.

Conclusion

This narrative review highlights that academic-related stress is a major concern for secondary and tertiary students. The ongoing stress relating to education has demonstrated negative impact on students' learning capacity, academic performance, education and employment attainment, sleep quality and quantity, physical health, mental health and substance use outcomes. Increasing students' stress-management skills and abilities is an important target for change.

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