

Research

The incidence of anxiety among paramedic students

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Abstract

Introduction

Summative assessments are an established form of assessing student performance, knowledge and ability against learning outcomes. The impact of anxiety on paramedic student success is not well understood but may adversely affect student outcomes. The aim of this study was to explore the origins and incidence of anxiety among paramedic students.

Methods

Distance and campus-based students from all three years of the Bachelor of Health Science (Paramedic) program at Whitireia New Zealand were approached to participate in this study. A mixed method data collection was used. Participants completed an online survey including the Westside Test Anxiety Scale (WTAS), program-specific questions and free response section to garner qualitative data. Quantitative data was analysed using descriptive statistics and t-tests, qualitative data was the subject of thematic analysis.

Results

One hundred and seventeen paramedic students participated in the study. Participants with previous tertiary education to diploma level had significantly higher WTAS scores than those with prior degree qualification (36.72 ± 5.92 vs. 31.42 ± 7.58 , $p=0.02$). Students undertaking full-time work with part-time study had significantly higher WTAS scores than those enrolled in full-time study with part-time work (36.71 ± 7.0 vs. 32.09 ± 7.25 , $p=0.027$). Qualitative analysis identified three themes: stressors, obstacles to learning and negative experiences.

Conclusion

High levels of anxiety were identified across the student body. There were significant differences in anxiety based on previous educational achievement and between full-time and part-time students. This demonstrates that different course delivery methods and student backgrounds may impact on paramedic student anxiety.

Keywords:

anxiety; paramedic; assessment; stress

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Introduction

Summative assessments are an established form of assessing student performance, knowledge and ability against the learning outcomes of a course. These assessments can be in the form of written or oral examinations and simulated practical scenarios (1). However, the importance of achieving a good grade can manifest into unwanted stress and anxiety (2). Test anxiety can be defined as a characteristic that causes an individual to view an upcoming assessment as a threat, which can result in debilitating psychological, physical and behavioural symptoms (3). It can present with emotional and physiological symptoms including nervousness, shortness of breath, palpitations and feeling of inadequacy (2). Previous poor assessment performance can contribute to test anxiety through conditioning or fear learning (4), while students may bring the burden of poor learning experiences to new learning environments and, if educators do not employ strategies that allow the student to engage and learn, they may not acquire the tools necessary to prepare for assessments (5).

Cognitive interference theory suggests that when an anxious individual is faced with an assessment, their anxiety consumes a great deal of cognitive power, providing less available working memory for task completion (6). Debilitating anxiety was found to decrease cognitive reflection among mathematics students when processing mathematical problems (7), while paramedic clinical performance and the ability to recall information was impaired by acute stress (8). Australian paramedic students reported less anxiety and felt more comfortable in their performance when the tutor was not physically present (9). Similarly, by increasing paramedic students' familiarity with the assessment process, anxiety was diminished and confidence and communication improved (10). By developing good orientation to simulation and creating a safe environment, anxiety associated with simulated assessment can be reduced (6).

Anxiety is the most common form of mental disorder in Australia and New Zealand (11) and is defined as 'an anticipation of future threat' (12). Anxiety can manifest in response to any external threat or challenge, transitory and specific to a situation, or longer term as a reaction to many stimuli (4). Paramedicine can place high demands on the cognitive abilities of the paramedic due to its focus on high-acuity practice and the uncontrolled environment in which much of the practice takes place. In recent years there has been a growing awareness of mental health issues affecting paramedics (13). The prevalence of post-traumatic stress disorder and depression among paramedics have been the topic of various studies (14), but anxiety appears to have attracted less interest.

The environment in which paramedics practice can be both

traumatic and stressful, and being aware of these demands may lead to increased anxiety among paramedic students (15). In addition to the demands of scholarship, students can also be facing personal issues including family, financial and workplace problems which cumulatively can bring intolerable pressure on the student (16). Coexisting issues can consume working memory and lead to cognitive impairment, making the prospect of a summative assessment daunting (17). Therefore, this study was designed to explore the prevalence and causes of anxiety among a population of paramedic students. By establishing the incidence and origins of anxiety across all three years of a paramedic degree program, any findings could inform future curriculum development to promote student mental wellbeing in the face of paramedic practice.

Ethics approval

The project gained approval from the Whitireia and WelTec Ethics and Research Committee (RP129-2016).

Methods

The study was designed using a mixed-method approach to explore the incidence of anxiety among a student paramedic population and to understand the impact of anxiety on the student experience.

Participants

Two hundred and forty-five campus and distance students are enrolled in all three years of the Bachelor of Health Science (Paramedic) program at Whitireia New Zealand. All 197 students enrolled in clinical courses were invited to participate in the study. Students who were only enrolled in non-clinical courses were excluded, as they were not on campus during the recruitment period. For the sample size, a 90% confidence level and 5% margin of error was used giving a sample size of 114 students. This number was deemed representative of the Whitireia student paramedic population (18).

Procedure

The study was presented to the student population by members of the health faculty. Students were given a handout which outlined the aims of the research and advice on how to access the survey. The voluntary nature of the study and the right to withdraw at any time was made clear to the students. Consent was by tick box attached to an online consent form, which when ticked made the questionnaire available. The online survey was open for 6 weeks. Availability of the survey was also publicised by a student intranet announcement and reminders were posted during that period to encourage participation. After closure the data was downloaded into an Excel™ spreadsheet. Quantitative data were uploaded in SPSS™ for analysis and qualitative data was interpreted using thematic analysis.

Questionnaire

The survey was comprised of three sections. Section one requested demographic, occupational and educational information. Section two employed the Westside Test Anxiety Scale (WTAS) (19), a validated tool for measuring test anxiety using a Likert scale response format (20). The third section was split in two parts with program specific questions, which were moderated by the paramedic faculty and piloted within the School of Health. The first part contained five statements, using a five-point Likert scale response format (one = never, five = always), designed to explore students' perceptions of anxiety when in class. The second part contained six free-response qualitative questions, designed to explore features of the courses that increased anxiety. The questionnaire was moderated and piloted before dissemination. The questionnaire design was intentionally brief to encourage participation.

Data analysis

The questionnaire was presented using the QuestionPro™ platform. On completion the raw data was transformed into an Excel™ spreadsheet and the quantitative data was uploaded into SPSS™ Version 25. The data was analysed using independent t-tests and descriptive statistics. Statistical significance was set at $p < 0.05$. The study was performed as an independent-subjects design using two-tailed tests. Data is expressed as mean \pm standard deviation.

Qualitative questions were coded using thematic analysis. This analysis was guided by the principles employed by the Auckland University School of Psychology (21). All responses in the dataset were coded, which involved extracting data that showed common features and collating. Main themes were identified by the repetitive nature and common threads in the responses (22). Analysis of the data around these themes was conducted in an inductive manner, where the coding and theme development was directed by the data. This was extrapolated and written up into a narrative reflecting each theme.

Results

Participants

One hundred and seventeen paramedic students completed the online questionnaire, representing 59.4% of the sample population. Eighty-two female, 43 male and one gender diverse student consented to participate in the study. The majority of respondents identified as New Zealand European (81%) or Maori (8%), and were aged between 20 and 29 years (50%). Sixty-six percent had prior experience of tertiary education (Figure 1).

Work/study balance

Data was collected to identify differences between different workload groups (Figure 2). The two largest groups were full-time campus students who have part-time employment and full-time workers employed on shift and undertaking part-time study. Data also identified emergency medical technicians working on rural stations with low workload who have undertaken full-time study.

Westside Test Anxiety Scale

The mean WTAS score was $33.76 (\pm 7.23)$, with 70% of participants reporting WTAS scores greater than 30, indicating moderate to extremely high test anxiety. There was an overall significant difference in WTAS scores when comparing employment and study status ($p = 0.028$). The WTAS scores of participants with previous tertiary education to diploma level were significantly higher than those of students with prior degree qualification (36.72 ± 5.92 vs. 31.42 ± 7.58 , $p = 0.02$). Students with full-time work and part-time study had higher levels of anxiety than full-time students with part-time work (36.71 ± 7.0 vs. 32.09 ± 7.25 , $p = 0.027$). There was no significant difference between the three gender groups.

Program specific questions

When facing an upcoming summative assessment, 87% of participants reported becoming anxious, and 67% reported

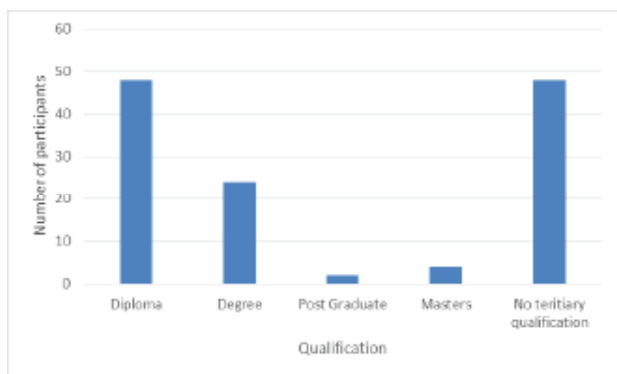


Figure 1. Highest previous tertiary qualification

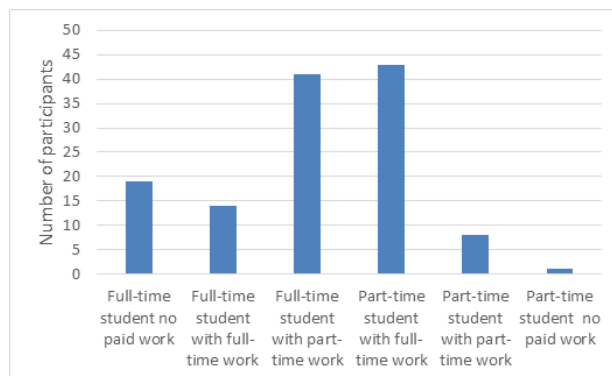


Figure 2. Work/study balance of participants

disappointment at the outcome of a previous summative assessment. However, 82% indicated that summative assessments aided learning. Analysis of program-specific questions with a five-point Likert scale response format showed that 41% of participants always worried about the prospect of failing an assessment and having to tell friend/family/colleagues. Forty-seven percent always worried about the financial implications of being required to repeat a course, while 41% always worried that doing poorly in an assessment would affect the tutors' view of them.

Qualitative themes

Thematic analysis of the qualitative questions in the survey has revealed three broad themes. These can be defined as:

- Stressors
- Obstacles to learning
- Negative experiences.

The sub-themes associated with each main theme are shown in Table 1.

Table 1. The themes and subthemes identified using thematic analysis of the qualitative free-response data

Stressors	Obstacles to learning	Negative experiences
Physical impacts of stress	Simulation	Feedback from tutors
Scholarship	Clinical placement	Feedback from mentors
Being observed by others	Distance learning	Comments from others

Stressors

Many themes were common across all groups, including increasing anxiety as the time for the assessment comes closer, concerns about time management and whether there has been adequate preparation for the assessment. Some reported the physical impact of stress. Scholarship featured as an issue, with all groups commenting on the difficulty of developing a good standard of academic writing and performance.

Obstacles to learning

Dissatisfaction with learning through the use of simulation was highlighted as an issue by many participants, and therefore the prospect of participation in practicums was seen as a source of anxiety. The limitations this places on the fidelity of the scenario was the theme of many comments, with some highlighting the 'disconnect' between simulation and practise, increasing anxiety around clinical placements and working in the field. Year two and three students reported dissatisfaction with clinical placements for reasons including lack of exposure and poor support. Campus-based students reported

dissatisfaction and increased anxiety concerning distance and flexible learning. Isolation, support and comprehension were associated with increased anxiety among distance learners.

Negative experiences

Negative comments and comparisons from others had an impact on student confidence. These comments were from tutors, fellow students, supervising paramedics or family and friends. Even when students recognise the feedback is intended to be constructive, it can be viewed negatively.

Discussion

Student discussion

The prevalence and high level of anxiety reported by paramedic students supports previous research among other disciplines. The WTAS scores revealed a high level of test anxiety, while participants' perceptions of how peers, tutors and family and friends viewed them were mostly negative. Thematic analysis revealed concerns with scholarship and simulation, the physical effects of stress and how negative experience impact on confidence. A relationship was identified between level of previous qualification and anxiety. Students with a previous degree qualification demonstrated significantly lower levels of anxiety, which may reflect greater academic experience and exposure to assessments. A study of pharmacy students found that academic ability has an inverse relationship to test anxiety (17). LeBlanc et al found that the stress of performing in a high-acuity simulation had a negative effect on clinical performance (8). While the intent of this study was not to explore the possibility of anxiety impacting on clinical decision-making ability in practice, it does suggest the anxiety caused by undertaking a summative assessment may contribute to poor performance.

The effects of anxiety on cognitive functioning has been explored using several models. These include deficit theory (7) and cognitive interference theory (23), which suggests that anxiety can consume enough working memory to inhibit the recollection of knowledge or task performance. This model is broadly supported through the integrated model of anxiety and perceptual-motor performance (24), which proposes that attention drawn to task-irrelevant stimuli by anxiety, results in less processing power available for motor skill dexterity. This would suggest that not only can recall of knowledge be affected by anxiety, but motor skills can be impaired in simulation assessments, where the student is expected to demonstrate practical skills. The deficit theory supports the model of cognitive interference where the effect of anxiety on recall can cause an immediate performance decrement (7). This may also lead to a selection strategy where students may choose simpler problem-solving strategies, which may have a negative impact on their ability to manage a high working-memory load.

Students who worked full-time and undertook part-time study had significantly higher WTAS scores than full-time students with part-time work. This may reflect the pressure of undertaking tertiary study while working full-time. The financial implications of further study, inextricably linked with the pressures of work while studying, were also highlighted as a source of anxiety. Being less assured of an adequate income and the prospect of a sizeable student debt has been shown to contribute to anxiety (25). Similarly, distance students and flexible learners, many of whom chose this academic pathway in order to maintain some level of employment, reported anxiety associated with isolation, support and comprehension. While flexible learning opportunities enable greater engagement with often geographically disparate populations, dissatisfaction has been noted with a number of online learning environments (26). These findings are in accordance with others who identified that distance learning can increase isolation from peers, and that a lack of personal interaction with tutors can increase anxiety (27).

Physical manifestations of stress such as nausea, insomnia, mood alterations and the inability to relax were reported. Ali et al found a high level of physical symptoms of anxiety in medical students including headaches, muscle tension and anorexia (28). Scholarship featured as an issue, with all groups commenting on the difficulty of developing a good standard of academic writing and performance. In practical sessions where skills such as resuscitation and intravenous cannulation are taught, being observed by other students or tutors contributed to anxiety. Increased mental workload has been shown to inhibit task performance (29) and similarly, observation has been associated with increased anxiety and decreased performance during simulation (6). Students reported less anxiety and were more efficient at completing tasks when there was no tutor observing the simulation (9). Nevertheless, paramedics frequently operate under observation in the field. Further research is required to understand the dynamics that differentiate between anxieties provoked by real-world distraction and observed simulation assessment.

With practical skills, scenario-based simulation is widely used in paramedic training. Simulation and high fidelity scenarios were associated with increased anxiety among many paramedic students. Simulation reduces risk of patient harm and is an important tool for teaching skills in settings that will not be encountered regularly when the student is undertaking a clinical placement (30). However, to be an effective tool, simulation needs to create an environment that is realistic as possible, albeit within the confines of an artificial setting (31). Clinical placements were also associated with high levels of anxiety, with the disparity between simulation and practice often reported as a source of stress. In an Australian study, Boyle et al found the majority of students were not made welcome when commencing their placement and received negative comments from supervising paramedics (32). Students on placement are vulnerable to negative comments, intimidation and bullying (33), which may be associated with increased anxiety (34).

Limitations

Any research conducted on the basis of one survey will have the risk of bias, as participants may hold strong opinions on the subject matter. If they are aware of anxiety issues in their own life they may be more disposed to participate. While the WTAS reported a high level of anxiety among respondents a shortcoming was that this only surveyed negative or debilitating anxiety. More useful data may have been collected by surveying facilitating and debilitating anxiety. As paramedics are expected to make sound clinical decisions in trying circumstances, this will be a feature of future research. Cross-sectional analyses and self-reporting measures have fundamental flaws and as a result, future research could employ longitudinal studies. Collaborative research between industry and educational providers may be the best method to determine the validity of current assessment methods and explore other assessment modalities.

Conclusion

This study has identified a high level of test anxiety among student paramedics. These findings are concordant with other studies of test anxiety and demonstrates that anxiety can impact negatively on paramedic student success. Developing methodologies for effective delivery of education that builds resilience and prepares students for paramedic practice must be the focus of future research. The paramedic profession can involve difficult and demanding practice, in dangerous and traumatic circumstances. These can take an emotional toll on the individual. Mitigation of features that impact on student anxiety will play a part in building resilient practitioners for future paramedic success.

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Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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