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A comparative study of mental health and wellbeing among UK students in professional degree programmes

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A comparative study of mental health and wellbeing among UK students in professional degree programmes

Despite elevated rates of suicide and evidence of poor mental health among medical professionals, there is a paucity of research in the UK into the mental health of students destined for these careers. This study estimated and compared the prevalence of mental ill-health in students studying veterinary medicine, medicine, dentistry and pharmacy in the United Kingdom. A group of law students was also included, who although subject to similar stressors as undergraduates, do not go on to share a heightened risk of suicide as professionals. A total of 1,744 respondents completed a questionnaire with validated measures to assess wellbeing, psychological distress, depression and suicidal ideation and attempts. Results indicated that law students experienced the poorest mental health of the student groups studied. Wellbeing was highest among veterinary and medical students. However, the medical students were the most likely to have previously attempted suicide. These findings highlight the importance of directly comparing student groups, in order to appropriately support students as they progress through training and into the professions.

Keywords: university; students; mental health; wellbeing; healthcare professions

Introduction

Elevated rates of death by suicide have been identified among veterinarians, doctors, pharmacists and dentists (Hawton et al. 2011; Platt, Hawton, Simkin and Mellanby, 2010). Veterinarians may be at particular risk, with the proportional mortality ratio (PMR) for suicide among UK veterinarians estimated to be around twice that of other high-risk medical occupations (Mellanby, 2005; Meltzer et al., 2008) and three to four times that of the general population (Bartram and Baldwin, 2010; Platt et al., 2010). Proposed explanations for this heightened risk among veterinarians include ease of access to lethal drugs and firearms, mental health stigma and occupational stress, with high levels of depression, anxiety, stress and burnout reported (Bartram, Sinclair and Baldwin, 2010; Fritschi, Morrison, Shirangi and Day, 2009; Hawton et al., 2011).

Another widely proposed explanation is that of pre-existing psychiatric morbidity. However, despite a plethora of anecdotal suggestions that veterinary students are particularly vulnerable to mental ill-health, relatively few studies have investigated the mental health of this student population using validated measures. One study that has empirically assessed the mental health of UK veterinary students (Cardwell et al., 2013), reported that study participants experienced significantly poorer wellbeing and higher levels of psychological distress than age-matched general population groups. This concurred with findings of US studies reporting heightened levels of psychological distress and depression among veterinary students in comparison with the general population (Hafen, Reisbig, White and Rush, 2006, 2008; Strand, Zaparanick, and Brace, 2005). Cardwell et al. (2013) also identified that about a quarter of veterinary students indicated that they had previously thought about suicide – a figure that concurs with estimates from the veterinary profession but significantly exceeds estimates from the English general population (16.7%; Nicholson, Jenkins and Meltzer, 2009) (Cardwell et al., 2013).

Similarly, studies in the UK, Europe, US and Canada, have identified poorer mental health among medical, dentistry and pharmacy students in comparison with the general public (Earle and Kelly, 2005; Gallagher et al., 2014; Goebert et al., 2009; Gorter et al., 2008; Guthrie et al., 1995; Humphris et al., 2002; Laurence, Williams and Eiland, 2009). Again, it has been suggested that the type of person who chooses a career in the health professions is more vulnerable to mental illness, owing to particular personality traits and

pre-existing mental ill-health, and that training-related stressors contribute to psychological distress (Dyrbye, Thomas and Shanafelt, 2006; Moffat, McConnachie, Ross and Morrison, 2004). However, research evidence is required to support these arguments. In fact, there is evidence that mental health among higher education students in general is poorer than that of the general public (Ibrahim et al., 2012; Roberts et al., 1999). Therefore, comparing any particular student group with the general population is likely to result in over-estimation of group-specific mental illness. Direct comparisons between student populations are required in order to lend credence to any suggestions that particular student groups experience heightened levels of distress or poor mental health compared with others. Where comparisons have been made, there have been conflicting results in relation to healthcare students. Studies comparing medical students with the general student population have reported lower levels of anxiety (Webb, Ashton, Kelly and Kamali, 1998) and similar (Quince, Wood, Parker and Benson, 2012) or lower (Honney, Buszewicz, Coppola and Griffin, 2010; Dahlin, Nilsson, Stotzer and Runeson, 2011; Ibrahim et al. 2012) levels of depression among the medical students.

Challenges to making comparisons among student groups include different entry grade requirements, varying workloads, academic demands, emotional demands and levels of responsibility. Therefore it is important to select well-matched comparison groups who are subject to similar demands. An American study, which compared similar groups by assessing psychological distress among medical, dentistry, pharmacy and nursing students reported that a significantly larger proportion of pharmacy students were in the clinical range for distress, as assessed by the Brief Symptom Inventory (BSI), with distress levels reportedly similar to those in psychiatric patients (Henning, Ey and Shaw, 1998). To date there are no published studies using validated tools to compare veterinary student mental health directly with other similar student populations. Therefore it is not clear whether the heightened risk of suicide observed in the veterinary profession in comparison with other healthcare professions is mirrored by an increased risk of poor mental health in veterinary students compared with other healthcare students. The aim of this study was to estimate and compare the prevalence of mental ill-health and wellbeing in UK students studying veterinary medicine, medicine, pharmacy and dentistry. As it is also not clear whether the mental health of healthcare students differs significantly from other student groups with equivalent entry requirements and academic demands, a secondary aim was to compare these groups with law students, who although arguably

subject to similar stressors of long working hours, heavy workloads and undertaking a career focused degree, do not go on to share a heightened risk of suicide in the profession. The primary hypothesis was that mental health and wellbeing would vary significantly across the different student populations. Based upon previous research and the increased risk for suicide in the profession, it was further hypothesised that veterinary students would experience poorer mental health and wellbeing than the other student groups.

Methods

Participants

Undergraduate students studying veterinary medicine, medicine, pharmacy, dentistry and law at seven English universities were invited to participate. Each year of study was included, allowing for cross-sectional comparison. Institutions with entry requirements of at least AAA at A-Level for these programmes were invited to participate. Participants were recruited during two different time periods: March to August 2013 and October to December 2013. In the first wave of recruitment all institutions were located in London. This was intended to reduce extraneous variables related to the pressures of living in a large city. However, to increase participant numbers the geographical boundaries of the study were extended and a second wave of recruitment was conducted, including institutions in Oxford and Bristol. The study received ethical approval from all participating institutions (RVC Ethics Code: 2013 0073H). Anonymity was assured and a completed or partially completed questionnaire was regarded as consent to the analysis and reporting of the data. The questionnaire was disseminated via email to each participating department, with the exception of two London medical schools where the protocol was to advertise external studies on the departmental e-bulletin board. An online tool SurveyMonkey® (www.surveymonkey.com) was used to administer the questionnaire.

Measures

The questionnaire incorporated:

- Demographic questions (age, gender, UK citizenship, year of study and previous degrees).

- Assessment of wellbeing using the Warwick-Edinburgh Mental Well-being Scale (Tennant et al., 2007). The scale consists of fourteen positively-phrased 5-point Likert items scored from 1 (none of the time) to 5 (all of the time), giving a minimum score of 14 and a maximum score of 70. A higher score indicates higher levels of wellbeing.
- Assessment of non-psychotic psychological distress using the 12-item General Health Questionnaire (Goldberg and Williams, 1988). This uses 12 four-point Likert items to assess respondents' mental health over the past few weeks in comparison with their usual state. Responses were scored using both the Likert method and bimodal methods described in the GHQ User's Guide (Goldberg and Williams, 1988). For the Likert method, items are scored as 0,1,2,3 and summed to give an overall scale from 0 (least distressed) to 36 (most distressed). To obtain a bimodal score (0-0-1-1), scores of 1 were recoded as 0 and scores of 2 and 3 as 1. Items were then summed, providing a scale of 0 (least distressed) to 12 (most distressed). A score of four or more on the bimodal scale is considered to indicate possible psychiatric disorder (Murphy and Lloyd, 2007).
- Assessment of depression using the 21-item Beck Depression Inventory-II (Beck et al., 1996). Each item includes four statements scored from 0 - 3 and respondents select one statement from each item which best describes the way they have been feeling during the past two weeks. Scores are summed to give a range from 0 – 63, with higher scores indicating greater severity of depression. Scores may also be categorised into the following ranges: 0 – 13: minimal depression, 14 – 19: mild depression, 20 – 28: moderate depression and 29 – 63: severe depression (Beck et al., 1996).
- Assessment of suicidal ideation and suicide attempts using two questions from the Adult Psychiatric Morbidity in England survey (Nicholson et al., 2009). These questions were *'Have you ever thought of taking your life, even if you would not really do it?'* and *'Have you ever made an attempt to take your life, by taking an overdose of tablets or in some other way?'* Response options were 'Yes, most recently in the last 12 months', 'Yes, most recently more than 12 months ago' and 'No'.

Data Analysis

Data were analysed using SPSS Statistics for Windows, version 21.0 (2012, Armonk, NY: IBM Corp). Descriptive statistics characterised participant demographics. Mean values and standard deviations of WEMWBS, GHQ-12 and BDI-II scores are reported. Mean scores on each of these questionnaires were compared by student group using one-way ANOVA followed by Bonferroni post-hoc tests. One-sample *t*-tests were used to compare mean WEMWBS and GHQ-12 scores with published UK general population estimates. In order to make valid comparisons, data were only included if they were published within the last 20 years and involved UK, non-clinical populations. No published data met these criteria for comparisons with the BDI-II scores. Mean WEMWBS scores were compared with published data from the English general population (NatCen, 2010). GHQ-12 scores were compared with published data from the UK general population (Murphy and Lloyd, 2007) and data from students at Newcastle University (Humphrey et al., 1998).

Proportions of students scoring above the threshold for psychiatric disorder on the GHQ-12 bimodal scale across student populations were compared using Chi-square tests. GHQ-12 bimodal scores and proportions reporting suicidal ideation and attempts were further compared with published English general population data (Health and Social Care Information Centre, 2013).

Results

Respondents

In total there were 1,744 respondents. Estimated response rates by population are summarised in Table 1, along with the age, gender and citizenship of participants. Gender and age distributions reflected those of the study populations. Female students formed 80% of the total respondents and the median age was 21. The majority of participants (82%) were UK citizens who did not hold a previous degree.

Wellbeing

WEMWBS scores varied significantly across student populations ($p = 0.03$; Table 2). Law student wellbeing was the poorest, and significantly poorer than that of medical students ($p = 0.03$). Overall, the mean student wellbeing score (46.02) was significantly lower (indicating poorer wellbeing) than that of the English general population ($p < 0.001$), including when compared with approximately age-matched general population groups (16-24 years: mean 50.8, 95% CI 50.2 – 51.4, $p < 0.001$; 25-34 years: mean 50.7, 95% CI 50.2 – 51.2, $p < 0.001$) (NatCen, 2010). Each individual student population also had lower mean wellbeing scores compared with the English general population and age-matched groups (Table 2).

Psychological Distress

GHQ-12 Likert scores differed significantly by student population ($p < 0.001$; Table 3), with law students experiencing significantly higher levels of distress than both veterinary ($p < 0.001$) and medical students ($p = 0.001$). Overall, the mean GHQ-12 Likert score of the professional students (15.22) was significantly higher (indicating higher levels of psychological distress) than that of the UK general population (11.06; Murphy and Lloyd, 2007; $p < 0.001$). Each of the five individual populations also had significantly higher levels of distress than the UK general population.

The mean bimodal GHQ scores of the professional students individually and overall ($m = 4.07$) were significantly higher, indicating higher levels of psychological distress, than that of a random sample of Newcastle university students ($m = 3.05$; $p < 0.001$) (Humphrey et al. 1998).

The proportion of students with bimodal scores of 4 or more, suggesting psychiatric morbidity, significantly by degree course ($p = 0.002$), with the highest proportion being among the law students (56%) (Table 3). Overall, significantly higher proportions of professional students scored above the psychiatric morbidity threshold (46.1%) compared with the English general population (15.09%) ($p < 0.001$), including approximately age-matched general population groups (16-24 years: 15.07%, $p < 0.001$; 25 – 34 years: 13.67%, 95% CI 11.83 – 15.75, $p < 0.001$) (Health and Social Care Information Centre, 2013). This was also the case for each student population considered individually.

Depression

Levels of depression varied significantly between student populations ($p = 0.001$), with law students ($m = 14.07$) scoring significantly higher on the BDI-II, denoting greater severity of depression, than veterinary ($m = 11.49$; $p = 0.005$) and medical students ($m = 11.18$; $p = 0.02$). These data are presented in Table 4.

Suicidal ideation and attempts

The overall prevalence of suicidal ideation among the student populations (39.8%) was significantly greater than that of the English general population prevalence at 16.7% ($p < 0.001$), including when compared with an approximately age-matched sub-set of 16 – 24 year olds (20.6%) ($p < 0.001$) (Nicholson et al. 2009) (Table 5). The prevalence of suicidal ideation among each of the professional groups individually also exceeded that of the general population and age-matched comparisons ($p < 0.001$). The proportion of students who had experienced suicidal ideation differed significantly by student population ($p = 0.003$), with the greatest proportion being among the medical students and the lowest among the dentistry students. There was no significant variation by student population in the proportion of students who had attempted suicide. Only medical students (9.6%) significantly exceeded the 5.6% (95% CI; 5.09 – 6.14) English general population lifetime prevalence of suicide attempts (Nicholson et al. 2009), ($p = 0.01$).

Discussion

Evidence of an increased suicide risk among veterinarians, even when compared with other high-risk health care professions (Bartram and Baldwin, 2010; Mellanby, 2005; Meltzer et al., 2008; Platt et al., 2010), has raised the question of how the mental health of veterinary students compares with other equivalent student groups. Few studies have directly compared the wellbeing of healthcare students within one study. This is the first UK study to compare veterinary students with equivalent groups.

Contrary to our hypothesis, law students, and not veterinary students, experienced the poorest mental health of all student groups in this study. Law students had the lowest levels of wellbeing, with scores significantly lower than the medical students, and had significantly higher mean levels of depression and psychological distress than both veterinary and medical students.

Veterinary students in our study experienced comparatively positive mental health, contrasting with observations in the profession. In particular, this suggests that the increased risk of suicide identified among veterinarians in comparison with other high-risk professions does not reflect poorer mental health in those training to be veterinarians. Caution therefore needs to be exercised in suggesting that veterinary students are in some way pre-disposed to poor mental health. While the heightened suicide risk in the profession is a clear cause for concern, it should not be conflated with an inherently unhealthy student population.

The poor mental health identified among law students corroborates studies from the US and Australia that have identified higher levels of mental health problems in law students than in medical students (Heins et al. 1984, Shanfield and Benjamin, 1985, Leahy et al, 2010). The authors propose that these problems are exacerbated by the law school environment, which is deemed less supportive than its medical counterpart (Shanfield and Benjamin, 1985). It is suggested that the study of law disrupts opportunities to form social networks because of its arguably more isolated and adversarial nature, and a lack of emotionally-supportive relationships is associated with greater distress (Pritchard and McIntosh, 2003). However, these conclusions are drawn from a limited research base, and there are currently no published investigations into the mental health of UK law students with which to compare our findings and so more evidence is needed to support them.

The mental health and wellbeing of each professional student group in this study was significantly poorer than the general population and age-matched norms (Health and Social Care Information Centre, 2013; Murphy and Lloyd, 2007). Around half of all student groups scored above the threshold for psychiatric morbidity on the GHQ-12, a proportion substantially exceeding the general population prevalence (Health and Social Care Information Centre, 2013). This is not unexpected, as previous evidence suggests that those in higher education experience poorer mental health than non-students in general (Ibrahim et al., 2012; Roberts et al., 1999; Royal College of Psychiatrists, 2011). University-related stressors, for example transitions from home, exam stress and financial constraints, are not exclusive to healthcare students, but are shared by the wider student population. The professional students in this study also experienced significantly higher levels of psychological distress, as assessed by the GHQ-12, than a general student population from Newcastle University (Humphrey et al. 1998). Previous research has

already identified factors specific to professional student groups which contribute to poor mental health. These factors include, but are not limited to, the volume of material to learn, work overload, a lack of time for relaxation, transition to the clinical years, the responsibilities of professional practice and dealing with death and suffering (Cohen et al., 2013; Firth-Cozens, 2001; Radcliffe and Lester, 2003; Williams et al., 2005). However, medically-related degree courses also emphasise the importance of team work, which may foster closer supportive relationships and a sense of belongingness (Levett-Jones, Lathlean, McMillan and Higgins, 2007; Treloar et al., 2000). While healthcare students spend large amounts of time together and frequently work collaboratively, this may not be the case in the law degree where the work is arguably more isolated, involving large amounts of solitary reading. The law degree is also by its nature adversarial (Benjamin et al., 1986; Larcombe et al., 2013). Lower feelings of belongingness, being pitted against each other and a difference in law school culture may factor in the heightened levels of mental health problems found among law students compared to healthcare students.

It is possible that the findings reported here are subject to non-response bias, which is a limitation inherent to all voluntary studies. Individuals with experience of mental ill-health could be more inclined to complete the questionnaire because of a personal interest, leading to over-estimation of severity or prevalence of poor mental health at the population level. Conversely, poor mental health could increase reluctance to participate. One possibility is that students may fear recriminations from revealing poor mental health. This could arguably be more pertinent for the healthcare students than the law students, because of fitness to practice concerns (Levine, Breitkopf, Sierles and Camp, 2003). Response rates among the medical students in particular were low. There is a potential for bias if those medical students experiencing poor mental health were disinclined to participate owing to the perceived negative consequences of doing so. In turn, the comparatively positive mental health reported by the medical students in this study could reflect that those who completed the questionnaire felt that they had nothing to fear from participating in mental health research. Despite assurances of confidentiality, previous studies have demonstrated that medical students express concerns about the repercussions of disclosing mental illness (Chew-Graham et al., 2003; Fox et al., 2011; Levine et al., 2003). There was no way in this study of determining whether the mental

health of respondents differed from non-respondents, as the questionnaire was entirely anonymous.

It could also be that medical students down-played their true level of psychological distress owing to a greater understanding on their part of the assessment measures used. An American study that assessed depression at one medical school identified in a follow-up survey that almost 10% admitted giving dishonest responses to the BDI because of concerns about the negative implications of being honest about mental illness (Levine et al., 2003). However, if this were the case it would be expected that underreporting among the medical students in this study would extend to questions about suicide behaviour. One explanation may lie in the different scales used. While the BDI-II, GHQ-12 and WEMWBS are measured on a Likert scale, the suicide questions required dichotomous yes / no answers, as there is no gradient between whether a person has or has not attempted suicide.

The response rates from each of the populations also varied considerably, with large proportions of veterinary medicine students responding and fewer medical students. This is probably owing to the different recruitment methods used. While the veterinary students could be contacted directly via email by the researcher, pharmacy, dentistry and law students were emailed by a third party and the study was only advertised on e-bulletin boards for the medical students as per institution protocols. This could reduce the generalisability of the results for populations with fewer responses. Another factor which could affect the extent to which these results can be generalised is that only one veterinary and one pharmacy school were involved in the study. However, the study does serve as a good foundation for future comparative research.

A further limitation of the measures used is their short-term focus. The BDI-II, WEMWBS and GHQ-12 ask about feelings and thoughts over recent weeks and therefore only capture a snapshot of the participants' mental health and wellbeing and do not measure fluctuations over time. Longitudinal, comparative studies following students from pre-university to the end of their higher education careers are required to assess any impact of training on health.

The prevalence of suicidal ideation among all of the populations was elevated in comparison with the general population. However, the relationship between suicidal

ideation and attempts or completion is complicated. While thoughts about suicide are a significant risk factor for later attempts, the majority of people who experience suicidal ideation do not go on to take their own lives (McAuliffe, Corcoran, Keeley and Perry, 2003; Van Orden et al., 2010; Wilcox et al., 2010). Suicidal ideation as a concept is also nebulous and there is no definitive definition; it can range from passing thoughts to more persistent deliberations. As a result, studies have measured suicidal ideation in different ways, which accounts for the variation in reported prevalence rates. Despite this, when asked the same question “Have you ever thought of taking your life, even if you would not really do it?” suicidal ideation among each of the professional student populations was significantly greater than that of the English general population (Nicholson et al., 2009), including when compared with approximately age-matched 16 – 24 year olds (Nicholson et al., 2009). Another possibility is that the nature of these degree courses prompts reflection about life, death and suicide. Medical students are trained in caring for people at the end of their lives, while veterinary students witness euthanasia. Issues around assisted dying also form a part of many law curricula. A limitation of the suicidal ideation question used here is that it does not distinguish between passing thoughts about death and more serious suicidal thoughts or suicide plans. Students therefore could not express their degree of suicidal intention. Given the link between intensity of suicidal ideation and later suicide attempts (Joiner and Rudd, 2000; Lewinsohn, Rhode and Seely, 1996), future studies should include questions assessing intent and suicide planning.

Although medical students had the highest mean scores for wellbeing, and the lowest for depression and psychological distress, the greatest prevalence of suicidal ideation and attempts was found in this population. This appears contradictory with the fact that psychiatric disorders are among the most prominent risk-factors for suicide (Borges et al., 2010; Kessler, Borges and Walters, 1999). It would therefore be anticipated that the student group with the poorest mental health would report the highest incidence of suicidal behaviour. The Interpersonal Theory of Suicide (IPTS, Joiner, 2005; Van Orden et al., 2010) provides a potential explanation for this by distinguishing between lethal and non-lethal suicidal behaviour on the basis of the “acquired capability” for suicide. According to the IPTS, ‘thwarted belongingness’ and ‘perceived burdensomeness’ produce the desire for suicide, but this is only acted upon in the presence of an acquired capacity for lethal self-harm. It is proposed that painful and provocative life experiences can reduce an individual’s fear of death and physical pain, thus they acquire the ability

for suicide. Evidence shows that previous suicide attempts are the most significant risk-factors for death by suicide (Nock and Kessler, 2006; Goldstein, Black, Nasrallah, and Winokur, 1991). In the context of the IPTS, previous attempts habituate the individual to the prospect of death and pain, rendering a future attempt more likely. Exposure to provocative experiences is also more likely to occur in particular professions, for example medical professions, which could lead to desensitised responses to death and suffering (Joiner, 2005). Joiner (2005) argues that the capacity for suicide does not develop quickly, whereas rapid changes may occur in feelings of belongingness and burdensomeness. Therefore, while medical students do not generally experience poorer mental health, should suicidal desire emerge, the ability potential to enact suicide greatly elevates the risk of lethal attempts. The IPTS also provides a potential explanation for the heightened suicide rate observed among veterinarians. Witte, Correia and Angarano (2013) demonstrated that veterinary students' experiences of performing euthanasia were associated with reduced fear of death; a crucial factor, according to the IPTS, in elevating the risk of lethal suicide attempts (Joiner, 2005). Witte et al. (2013) suggest that the results of their study may explain the contradictory findings that veterinarians have similar levels of mental illness and suicidal ideation to other populations (Meehan and Bradley, 2007; Platt, Hawton, Simkin and Mellanby, 2012), and yet are at a heightened risk for suicide. Veterinarians are not specifically vulnerable to psychological dysfunction, but euthanasia may habituate this population to fear of death and thus the ability to enact suicide is acquired.

Professional students, in particular the veterinary and medical students, are also likely to be aware of the heightened suicide rates in the professions. It has been suggested that exposure to the suicidal behaviour of others results in habituation and may lead to suicide clustering (Haw, Hawton, Niedzwiedz and Platt, 2012). However, suicide transmission represents just one of many factors that influence the decision to attempt suicide and there is limited methodologically sound evidence to adequately assess its risk. Nevertheless, the risk of suicide transmission should be taken into consideration and appropriate support given to those likely to be affected (Stanley, Mallon, Bell, Hilton and Manthorpe, 2007), while avoiding a general pathologising of the student population.

Suicide is the most prominent cause of death for individuals aged between 20 and 34 in the UK (ONS, 2012) and the majority of students fall into this high-risk age bracket. Suicide attempts are also more common among 16 – 24 year olds than older age groups

(Nicholson et al., 2009). Previous studies have reported that the prevalence rates for suicide completion and attempts are similar or lower among students in higher education compared with age-matched general populations (Collins and Paykel, 2000; Hawton et al., 1995; Hawton et al. 2012). This belies the suggestion that the stressors of university pose a greater threat for suicide. It is difficult to establish the overall prevalence of student suicides and attempts, as national statistics do not differentiate student suicides from the general population (Stanley et al., 2007). However in concurrence with previous studies, the prevalence of suicide attempts among the professional students in the current study did not differ significantly from that of roughly-age matched 16 – 24 year olds in the UK general population (Nicholson et al., 2009). Given that previous suicide attempts have been well-established to pose a significant risk for future attempts and completion (Hawton and Fagg, 1988; Forman et al. 2004), it is imperative that universities identify and support students who are vulnerable to suicide.

In conclusion, the poorest mental health of all the student populations surveyed in this study was among law students, a population that may be overlooked with the current research focus on other student populations. Veterinary students reported comparatively positive mental health, contrasting with observations in the profession. This highlights the importance of directly comparing student groups, in order to appropriately support students as they progress through training and into the professions.

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Supplementary tables

Table 1

Estimated response rates, age, gender and citizenship data, by population and overall

| Population | Response Rate | Age | | Gender | | Citizenship | | Previous Degree | |
|----------------------|---------------|-----------|--------|--------------|-------------|---------------|--------------|-----------------|---------------|
| | | Min – Max | Median | Female n (%) | Male n (%) | UK n (%) | Non-UK n (%) | Yes n (%) | No n (%) |
| Veterinary (N = 821) | 68% | 18 – 51 | 22 | 591 (83.6%) | 116 (16.4%) | 617 (86.9%) | 93 (13.1%) | 193 (27.3%) | 515 (72.7%) |
| Medical (N = 267) | 10% | 18 – 29 | 21 | 155 (75%) | 52 (25%) | 186 (89.4%) | 22 (10.6%) | 19 (9.2%) | 187 (90.8%) |
| Pharmacy (N = 174) | 22% | 18 – 40 | 21 | 105 (81.4%) | 24 (18.6%) | 97 (74%) | 34 (26%) | 7 (5.3%) | 125 (94.7%) |
| Dentistry (N = 191) | 17% | 18 – 36 | 21 | 107 (77%) | 32 (23%) | 125 (87.4%) | 18 (12.6%) | 24 (16.9%) | 118 (83.1%) |
| Law (N = 291) | 18% | 18 – 30 | 21 | 157 (74.1%) | 55 (25.9%) | 122 (56.7%) | 93 (43.3%) | 8 (3.7%) | 208 (96.3%) |
| Overall (N = 1744) | | 18 – 51 | 21 | 1,115 (80%) | 279 (20%) | 1,147 (81.5%) | 260 (18.5%) | 251 (17.9%) | 1,153 (82.1%) |

Table 2

Mean and median WEMWBS scores, by population and overall

| Population | Mean Score | SD | Median | Min - Max | p-value* | 95% CI |
|----------------------------|------------|------|--------|-----------|----------|---------------|
| Veterinary (820) | 46.27 | 8.69 | 47.00 | 14 – 70 | < 0.001 | 45.67 – 46.86 |
| Medical (267) | 47.11 | 8.50 | 48.00 | 18 – 70 | < 0.001 | 46.09 – 48.14 |
| Pharmacy (174) | 45.82 | 9.73 | 46.50 | 17 – 70 | < 0.001 | 44.37 – 47.28 |
| Dentistry (191) | 45.41 | 9.68 | 47.00 | 16 – 70 | < 0.001 | 44.03 – 46.80 |
| Law (291) | 44.86 | 9.08 | 45.00 | 16 – 70 | < 0.001 | 43.81 – 45.91 |
| Overall (1,743) | 46.02 | 8.97 | 47.00 | 14 – 70 | < 0.001 | 45.60 – 46.44 |
| English general population | 50.90 | - | - | - | - | 50.70 – 51.10 |

* p-value for comparison with the English general population mean (50.9)

Table 3

Summary statistics for General Health Questionnaire 12 (GHQ-12) scores by population and overall

| Population | (N) | Mean Score | SD | Median Score | Max - Min | p-value | 95% Confidence Interval |
|---|---------|------------|------|-------------------------------|-----------|----------------------|-------------------------|
| <i>Likert scoring:</i> | | | | | | | |
| Veterinary | (784) | 14.77 | 6.34 | 14.00 | 0 – 36 | < 0.001* | 14.32 – 15.21 |
| Medical | (247) | 14.49 | 5.83 | 14.00 | 1 – 35 | < 0.001* | 13.75 – 15.22 |
| Pharmacy | (159) | 15.57 | 6.80 | 14.00 | 0 – 36 | < 0.001* | 14.50 – 16.63 |
| Dentistry | (170) | 15.67 | 6.19 | 14.00 | 4 – 36 | < 0.001* | 14.73 – 16.61 |
| Law | (259) | 16.77 | 7.08 | 16.00 | 0 – 36 | < 0.001* | 15.90 – 17.63 |
| Overall | (1619) | 15.22 | 6.46 | 14.00 | 0 – 36 | < 0.001* | 14.90 – 15.53 |
| UK General Population | (17343) | 11.06 | - | - | - | - | 10.93 – 11.18 |
| <i>Bimodal scoring:</i> | | | | | | | |
| Veterinary | (784) | 3.79 | 3.60 | 3.00 | 0 – 12 | < 0.001 [±] | 3.54 – 4.05 |
| Medical | (247) | 3.76 | 3.42 | 3.00 | 0 – 12 | 0.001 [±] | 3.33 – 4.19 |
| Pharmacy | (159) | 4.21 | 3.81 | 3.00 | 0 – 12 | < 0.001 [±] | 3.62 – 4.81 |
| Dentistry | (170) | 4.35 | 3.47 | 3.00 | 0 – 12 | < 0.001 [±] | 3.82 – 4.87 |
| Law | (259) | 4.92 | 3.92 | 5.00 | 0 – 12 | < 0.001 [±] | 4.44 – 5.40 |
| Overall | (1619) | 4.07 | 3.65 | 3.00 | 0 – 12 | < 0.001 [±] | 3.89 – 4.25 |
| Newcastle University Students | (956) | 3.05 | - | 2.00 | 0 – 12 | - | 2.85 – 3.25 |
| <i>Threshold scoring (≥ 4 on the GHQ-12 indicating potential psychiatric disorder):</i> | | | | | | | |
| | | | | Proportion of scores ≥ 4 | | | p-value [¥] |
| Veterinary | (784) | | | 42.1% (330/784) | | | < 0.001 |
| Medical | (247) | | | 44.5% (110/247) | | | < 0.001 |
| Pharmacy | (159) | | | 49.1% (78/159) | | | < 0.001 |
| Dentistry | (170) | | | 48.8% (83/170) | | | < 0.001 |
| Law | (259) | | | 56.0% (145/259) | | | < 0.001 |
| Overall | (1619) | | | 46.1% (746/1619) | | | < 0.001 |

* p-value for comparison with the English general population mean (11.06) (Murphy & Lloyd, 2007)

[±] p-value for comparisons between each professional student population and Newcastle University students (Humphrey et al. 1998)

[¥] p-value compared with the proportion of the English general population with a score of ≥ 4 (Health and Social Care Information Centre, 2013)

Table 4

Mean and Median Beck Depression Inventory (BDI-II) scores by population and overall

| Population | Mean Score | SD | Median Score | Max - Min | 95% CI |
|------------------|------------|-------|--------------|-----------|---------------|
| Veterinary (774) | 11.49 | 9.86 | 9 | 0 – 55 | 10.80 – 12.19 |
| Medical (230) | 11.18 | 9.33 | 8 | 0 – 42 | 10.00 – 12.37 |
| Pharmacy (155) | 13.94 | 10.91 | 11 | 0 – 45 | 12.21 – 15.67 |
| Dentistry (164) | 12.26 | 9.60 | 10 | 0 – 52 | 10.78 – 13.74 |
| Law (233) | 14.07 | 11.33 | 12 | 0 – 53 | 12.66 – 15.47 |
| Overall (1556) | 12.17 | 10.16 | 10 | 0 – 55 | 11.67 – 12.67 |

Table 5

Numbers and proportions of students who answered ‘yes’ to the questions “*Have you ever thought about taking your life, even if you would not really do it?*” and “*Have you ever made an attempt to take your life, by taking an overdose of tablets or in some other way*”

| <i>“Have you ever thought about taking your life, even if you would not really do it?”</i> | | | | | | | | | |
|---|-------------------------------------|------|-------------|---------------------------------------|------|-------------|---------|------|-------------|
| | most recently in the last 12 months | | | most recently more than 12 months ago | | | Overall | | |
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Veterinary N = 713 | 140 | 19.6 | 16.9 – 22.7 | 140 | 19.6 | 16.9 – 22.7 | 280 | 39.2 | 35.8 – 42.9 |
| Medical N = 208 | 58 | 27.9 | 22.2 – 34.4 | 41 | 19.7 | 14.8 – 25.7 | 99 | 47.6 | 40.9 – 54.4 |
| Pharmacy N = 132 | 15 | 11.4 | 6.9 – 18.0 | 30 | 22.7 | 16.4 – 30.6 | 45 | 34.1 | 32.5 – 50.7 |
| Dentistry N = 144 | 23 | 16.0 | 10.8 – 22.9 | 19 | 13.2 | 8.5 – 19.8 | 42 | 29.2 | 22.3 – 37.1 |
| Law N = 216 | 59 | 27.3 | 21.8 – 33.6 | 37 | 17.1 | 12.7 – 22.8 | 96 | 44.4 | 36.0 – 53.2 |
| Total N = 1413 | 295 | 20.9 | 18.8 – 23.1 | 267 | 18.9 | 16.4 – 21.7 | 562 | 39.8 | 37.2 – 42.4 |
| <i>“Have you ever made an attempt to take your life, by taking an overdose of tablets or in some other way”</i> | | | | | | | | | |
| | most recently in the last 12 months | | | most recently more than 12 months ago | | | Overall | | |
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Veterinary N = 713 | 5 | 0.7 | 0.2 – 1.5 | 40 | 5.6 | 4.3 – 7.2 | 45 | 6.3 | 5.0 – 8.0 |
| Medical N = 208 | 6 | 2.9 | 1.2 – 6.3 | 14 | 6.7 | 4.0 – 11.1 | 20 | 9.6 | 6.2 – 14.4 |
| Pharmacy N = 132 | 2 | 1.5 | 0.07 – 5.7 | 10 | 7.6 | 4.0 – 13.5 | 12 | 9.1 | 5.2 – 15.4 |
| Dentistry N = 144 | 0 | 0 | 0 – 3.12 | 7 | 4.9 | 2.2 – 9.9 | 7 | 4.9 | 2.2 – 9.9 |
| Law N = 216 | 9 | 4.2 | 2.1 – 7.8 | 9 | 4.2 | 2.1 – 7.8 | 18 | 8.4 | 5.3 – 12.9 |
| Total N = 1413 | 22 | 1.6 | 1.0 – 2.4 | 80 | 5.7 | 4.3 – 7.5 | 102 | 7.3 | 6.0 – 8.7 |