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Medically unexplained symptoms and mental well-being: a comparative study between university students and members of the general population

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Abstract

Research has consistently established an association between medically unexplained symptoms (MUS) and mental health concerns, such as anxiety and depression. Due to the ongoing student mental health crisis, the current study predicted MUS would be highly prevalent for this population; an issue which has not yet been explored. It aimed to establish differential prevalence rates of MUS between students and non-students, and to further explore the relationship between MUS and mental health. It was predicted that mental health concerns and MUS would correlate with each other, and that both would occur more in student participants. To test this, the Depression Anxiety Stress Scales short form and General Health Questionnaire – 30 were completed online by 68 university students and 63 non-students. Correlational analyses, t-tests, and a one-factor ANOVA revealed significant positive correlations between both questionnaires, and on average, student participants scored higher on both questionnaires, supporting the current predictions. A small sample of the participants completed 1-1 interviews over Zoom to discuss experiences and perceptions of mental health and MUS. Deductive thematic analysis identified themes both in support of and contradicting current quantitative findings. Findings were interpreted as mental health issues and MUS being overall more prevalent for students, however also being varied within groups and dependent on individuals. Furthermore, the results helped provide the basis for future research on the potential impact MUS are having within the student population. Therefore, future studies of larger and more representative samples would be beneficial in addressing the discussed limitations of the current study highlighted in this paper.

Keywords: medically unexplained symptoms (MUS), anxiety, depression, mental health, students.

Introduction

Medically Unexplained Symptoms

Medically unexplained symptoms (MUS) refer to physical symptoms that do not have an identified physiological cause, and therefore does not describe one specific disorder, but clinical predicaments where the cause of symptoms is unidentifiable (Hartman et al., 2013). MUS are also referred to as somatic symptoms, somatic disorder, functional symptoms, and functional illness in existing literature.

'Functional' is used due to symptoms being those of function, rather than of anatomical structure, and 'somatic' refers to a relation to the body (Sharpe, 2000). The common feature of these diagnoses and descriptions of symptoms is significant distress and impairment, and for the purposes of this paper, 'MUS' will be used when referring to unexplained symptoms. Certain clusters of MUS also present as specific syndromes, including those of chronic fatigue syndrome (CFS), irritable bowel syndrome (IBS), fibromyalgia (FM), and functional neurological symptoms (FNS) (Nimnuan et al., 2001). With regards to symptoms, no significant differences between the subcategories of MUS have been identified and tend to be highly intercorrelated (Grover et al., 2014), thus many researchers have concluded on the general latent trait of MUS (Witthoft et al., 2013). Although unexplained, these symptoms are real and can cause significant distress and impairment, with syndromes such as CFS and ME potentially leaving patients bed-bound and extremely isolated (Munson, 2000). As well as the physical symptoms themselves, the lack of explanation can cause further distress. Medical uncertainty is associated with higher levels of conflict between patients and doctors, which has been found to further isolate patients (Lian & Robson, 2017). A thematic analysis of written texts from 256 patients with long term unexplained fatigue showed themes of a lack of medical knowledge, not being understood, being disbelieved, being dismissed, and fighting the system (Lian & Robson, 2017). As identified by Rosendale et al. (2013), experiences of uncertainty such as these can increase pre-existing psychological distress and further intensify sensitivity to pain, thus worsening symptoms.

Prevalence

Not only are MUS potentially disabling, but they are also highly prevalent within the general population (Rady et al., 2021), with presentations of MUS making up 15-30% of primary care patients (Kirmayer et al., 2004). Prevalence differs between age groups, and a systematic literature review from 1966-2011 suggested an age-related decline in the prevalence of MUS, with rates being lowest in older age groups (>65) (Hilderink et al., 2012). Epidemiological studies have also consistently demonstrated lower prevalence rates in later life compared to younger age groups (Regier et al., 1984), as well as MUS being more common among those from lower socioeconomic status (SES), and of female gender (Kroenke & Price, 1993; Steinbrecher et al., 2011). However, it is difficult to determine whether prevalence is in fact higher within these populations, or whether they are diagnosed at a higher rate due to potential. A vignetter-based study showed that GPs tend to be gender-biased in assessments, with female patients experiencing back pain being more likely to be assigned an MUS syndrome compared to an otherwise identical male patient (Clareus & Renstoem, 2019). However, literature is consistent in reporting females being most at risk, across different healthcare settings and populations (Nimnuan et al., 2001).

Biopsychosocial Approach

Although unexplained, potential risk factors for these symptoms have been identified, and existing literature appears to have reached a consensus on biopsychosocial risk

factors, which include gender and SES (Kroenke & Price, 1993). To identify risk factors, a large cohort study randomly sampled 1443 residents who had completed a somatic symptom, health status, and risk factors questionnaire and 741 who had completed them again 1 year later (Creed et al., 2012). Logistic regression identified coexisting medical illnesses, childhood abuse, low SES, and anxiety and depression as risk factors, thus supporting a biopsychosocial approach to MUS. This has also been found to be the case for specific cluster symptom syndromes. In a cross-sectional study exploring the association between bullying victimisation in childhood and fibromyalgia in adulthood, those reporting fibromyalgia in adulthood also reported more childhood bullying (Varinen et al., 2019). This association was also statistically significantly highest in females. Although this was a relatively large sample study (n = 11,924), it is important to note that data relied on self-reports and therefore may not reflect accurate prevalence rates or associations due to possible biases, misunderstandings, or inaccurate childhood memories. The findings do, however, support consistent findings of adverse life events being associated with MUS. Alongside childhood bullying and psychological abuse, recent threatening experiences, other somatic symptoms, and depression and anxiety have been found to be associated with MUS and CFS specifically (McBeth et al., 2015).

MUS and Mental Health

Common mental disorders (CMDs) such as anxiety and depression have been repeatedly found to correlate with the presence of MUS. MUS are the predominant reason why patients with depression and/or anxiety initially present within primary care, and the amount of symptoms is a powerful marker of psychological morbidity, with more MUS positively correlating with more mental health concerns (Kroenke et al., 1994; Kroenke, 2003). Within primary care, 33% of patients with 4-5 MUS have been found to have an anxiety and/or depressive disorder, and this rises to 50% of those with 6-8 MUS, and when there are > 9 symptoms, it rises to 80% (Kroenke et al., 1997; Kisely et al., 1998). Most patients presenting with MUS, however, have a small number of symptoms, so up to two-thirds do not have an anxiety or depressive disorder (Creed, 2009). When specific syndromes have been explored, similar associations with mental health issues have been found, such as the probability of suffering from depression being significantly greater for those with FM compared to those without FM (Palomo-López et al., 2019). Poor mental health may be a result of bodily issues in general, and not specifically of MUS, and this was tested in 4181 participants with either explained or unexplained pain (Beesdo et al., 2010). All forms of pain were found to be associated with decreased life quality and disability, however MUS showed strong and consistent associations with specific anxiety and depressive disorders, and explained pain did not. It was also comorbid anxiety and depression that accounted for a substantial degree of disability and greater impairment in functioning. This confirms a symptomatic relationship between unexplained pain, depression, and anxiety. Although there is a well-established association between MUS and CMDs, causal inferences cannot be made due to findings being correlational. Therefore, it is unknown as to whether mental health concerns can lead to MUS, co-occur with MUS, or be a result of MUS. It has been suggested that excessive and sustained stress may reduce mental health and thus cause bodily symptoms (Patacchiolo et al., 2001). However, the effect of anxiety has been shown to be more so than stress or depression on MUS (Mostafaei et al., 2019). There have also been findings of an earlier incidence of anxiety disorders compared to depressive disorders associated with MUS, and in most cases, depressive disorders occur secondary to pain, with anxiety occurring equally

frequently prior to and after MUS (Beesdo et al., 2010). Although these findings resulted from a cross-sectional study, and thus conclusions on causality cannot be made, explorations into the temporal order of onset supported the assumptions of anxiety beginning prior to the onset of MUS more so than depression. Strong associations between MUS and anxiety have also been found across the life span. In a review of the association of paediatric MUS with anxiety and depressive symptoms and disorders across the life span in community-based and clinical samples of children and adolescents, the likelihood of anxiety and depression increased with the number of reported MUS, and symptoms were found to be consistently associated cross-sectionally with anxiety and depression (Gerralda, 2004). The presence of > 1 MUS in early life was associated with increased likelihood of multiple MUS, and anxiety and depression later in life. Anxiety and depression in childhood were also associated with subsequent multiple MUS later in life. Large, population based longitudinal studies of MUS, anxiety and depression would be needed in order to establish the temporal relationship between mental health and MUS.

University Students

Regardless of the uncertain temporal relationship, the comorbidity of MUS and poor mental health can have devastating consequences, and suicide rates among MUS patients in the UK is 6 times greater than that of the general population (Robert et al., 2016). This highlights the potential severity of MUS and what a serious problem it is for society. A population that would appear to be at particular risk of experiencing MUS is university students, due to young age and the increasing student mental health crisis (Storie et al., 2010). 83% of undergraduate students fall within the 16-24 age group (ONS, 2018), which is not only a risk factor for MUS, but the peak age group at risk for mental health issues, with 75% of mental health problems being established by the age of 25 (Kessler et al., 2005). Today's students are more likely to experience mental illness than previous years, and in 2016, the proportion of UK first year university students who disclosed a mental health condition was 5 times the proportion as it was in 2007 (Thorley, 2017). It could be argued that this reflects an increase in disclosure of issues rather than an increase in mental health problems, however student suicide rates increased by 52% between 2001 and 2016 (Gunnell et al., 2020). As 90% of suicides and suicide attempted are associated with a psychiatric disorder, this suggests that the increased suicide rate indicates an increased prevalence of mental health issues (Nett, 2014).

With increased rates of mental health issues, and the established association of CMDs and MUS, it is plausible to expect high rates of MUS within the student population. There are many potential reasons for the increase in mental health concerns in the student population, including the increased pressures faced by students today. Compared to past generations, students now face much larger debts, with the 2018 repayment cohort having an average loan more than three times greater than the 2008 cohort (Gov.uk, 2018), and financial stress has a well-established negative impact on mental health (Cook et al., 2004). Widened participation in higher education may have added to this risk, due to more students now being from socially disadvantaged background and of lower SES, as this is associated with a substantially higher risk of CMDs (Royal College of Psychiatrists, 2011). It has also led to more females now attending university, who have been found to be at higher risk for both mental health problems and MUS (Adults Psychiatric Morbidity Survey, 2014). Not only do these factors mean students are facing a mental health crisis, it puts them in the high risk groups (young age, female,

low SES) for experiencing MUS, and poor mental health alone may increase this risk. Worryingly, MUS research has not yet focussed on this population and so prevalence rates and potential consequences for university students has not been identified. This means that a population potentially highly vulnerable to MUS are not currently being provided with appropriate support or advice due to there being a lack of data to justify the provision of it. This is particularly worrying considering the potential devastating consequences of MUS when comorbid with mental health issues.

Current Study

The current study therefore aims to explore the prevalence of MUS in the student population compared to the general population, and to establish the relationship of this to mental wellbeing. In line with previous findings, current researchers hypothesise that: 1) mental health concerns and MUS will correlate with each other, and 2) mental health concerns and MUS will occur more in the student population. These will be tested in a two-phase sequential mixed methods design with stage one using questionnaires and stage two conducting interviews to gain a comprehensive understanding of the experience of MUS and its relationship to mental health. Based on previous qualitative research (Lian & Robson, 2017), for part 2 of the study further hypotheses include: 3) there will be stigma experienced for both MUS and mental health issues, and 4) there will be a lack of understanding of MUS. Qualitative data is also expected to provide further confirmation for hypotheses 1 and 2.

Method

Participants

One hundred thirty-one participants were recruited (university students $n = 68$, non-university students $n = 63$, $SD 2.5$). A two-sample t-test power calculation demonstrated this achieved the power of 0.8 at a significance level of 0.05 ($d = 0.5$). University students (4 males, 64 females, $Mage = 23.44$, $SD 30$, age range 19 - 48) were recruited through the Sona participation Pool ($n = 46$) to receive course credits, and through personal social media accounts ($n = 22$), with no reward incentive. Non-university students (18 males, 43 females, 2 other, $Mage = 42.19$, $SD 16.9$, age range 19-86) were recruited through personal social media accounts with no reward incentive. All student participants were University of Plymouth students studying either psychology ($n = 59$), environmental science ($n = 2$), midwifery ($n = 1$), geography ($n = 1$), human biosciences ($n = 1$), publishing ($n = 1$), occupational therapy ($n = 1$), 3D design ($n = 1$), or chemistry ($n = 1$). The only exclusion criteria for participation was < 18 years of age. Two participants from each group (student and non-student) participated in the second part of the study. These were randomly chosen from the participants who consented to being contacted regarding this, by using an online random number generator. All participants in this stage were female and varied in age (non-students aged 31 and 54, students aged 43 and 48). Both student participants were studying psychology at the University of Plymouth.

Materials

An information brief (see Appendix A) was created to inform participants why the research was being conducted, what the study involved, that participation was voluntary, and data could be withdrawn at any point. It also included contact details of the lead researcher. A consent form was created (see Appendix B) to gain informed consent for participation following the presentation of the information brief. The Depression Anxiety Stress Scales short form (DASS-21) (Lovibond & Lovibond,

1995) was used to measure levels of mental wellbeing in all participants. This is a commonly used scale for detection of mental health problems and has been shown to be reliable and valid among non-clinical and clinical samples (Henry & Crawford, 2005; Brown et al., 1997). It has strong concurrent validity with further measures of depression, anxiety, and stress, including the Beck Depression Inventory (Antony et al., 1998). The scale consists of 21 Likert scale questions with subscales for depression, anxiety, and stress. The participants indicated their level of agreement with statements on a 4-point scale ranging from “Did not apply to me at all” to “Applied to me very much or most of the time”, regarding experiences over the past week. An example item is “I found it difficult to work up the initiative to do things”. For the full questionnaire, see appendix C.

To measure general symptoms in all participants, the General Symptom Questionnaire – 30 (GSQ-30) (Hyland et al., 2018; Fallon et al., 2019) was used. This questionnaire has been shown to be a valid and reliable assessment of symptom burden, with excellent internal consistency (Fallon et al., 2019). It is significantly associated with other related measures such as brief scales of depression and anxiety, and the total score correlates strongly with functional impairment. The questionnaire includes 30 Likert scale questions and participants indicated how much each symptom bothered them during the past two weeks on a 5-point scale ranging from “Not at all” to “Very much”. “Joint pain or swelling” is an example item. For the full questionnaire, see appendix D. The DASS-21 scoring guidelines were followed so that scores could be categorised by severity and category (see Appendix G).

The study was conducted using Qualtrics (2022), and participants completed the study using personal lap-tops, computers, and smart-phones. Facebook and Instagram (Meta, 2022) personal accounts were used to advertise the study and to recruit participants. Psychology students at the University of Plymouth accessed the study through Sona Participation Pool (Sona Systems, 2022) and this was used to award participation points to these participants. Following completion of the study, participants viewed a debrief (see Appendix E), which re-stated the purpose and aims of the study, relevant contact information, and the option to consent to being contacted for part two of the study. It described what part two of the study would involve. Ten interview questions (see Appendix F) were created for qualitative data collection. Questions were designed to explore participants’ understanding and perception of MUS, mental health concerns, and the relationship between these factors. They were also designed to gain an understanding of participants’ personal experiences of each of these factors. Interviews were conducted over Zoom (Zoom Video Communications Inc., 2022) and transcribed with the aid of Otter (Otter.ai, 2022), an online transcription service. An online random number generator used to select participants. For statistical analyses of the quantitative data, RStudio (RStudio Team, 2021) was used with the following packages: Tidyverse (Wickham et al., 2019), qualtrics (Ginn et al., 2021), BayesFactor (Morey et al., 2021), ggpubr (Kassambara, 2020), broom (Robinson et al., 2021), AICcmmodavg (Mazerolle, 2020).

Design and Procedure

This study followed a two-phase sequential mixed methods design, beginning with quantitative data collection and analysis, followed by qualitative data collection and analysis. This research design was chosen so that statistical results could be compared with participants’ personal views and experiences for a more comprehensive exploration of the MUS – mental health relationship. Participants

completed the study on their own computer, lap-top, or smart-phone by following an online link to the study on Qualtrics (2022). The information brief was presented first, followed by the consent form. Once this had been agreed to and completed, demographic information was collected, including student status. The study was a correlational design in which participants were one of two population groups: university students or non-university students.

All participants viewed the same material and completed the same questionnaires in the within-subjects experimental design. The first questionnaire was the DASS-21 (Lovibond & Lovibond, 1995), followed by the GSQ-30 (Fallon et al., 2019). The debrief was then presented and participants either left an email address and agreed to be contacted regarding part two of the study or disagreed to this. Student participants ($n = 2$) and non-student participants ($n = 2$) were randomly selected to be contacted regarding part two of the study. An email was sent to them detailing what would be involved and included potential timeslots, to which they could choose to sign up to. Following confirmation of the date and time that the interview would take place, an appropriate Zoom (2022) meeting link was sent to them. Four one-to-one semi-structured interviews were conducted using a guide of ten questions. All interviews were recorded within Zoom (2022) and transcribed using the Otter (Otter.ai, 2022) website.

Data Analysis

Quantitative Analyses

All analyses of quantitative data were done on RStudio (RStudio Team, 2021). First, student data was separated from non-student data so that the correlation between mental wellbeing and other symptoms in this population could be established. A correlational analysis of DASS-21 and GSQ-30 scores was run for this data set in order to test this. To test whether poor mental wellbeing and medically unexplained symptoms were of higher prevalence in the student participants, a series of two-sample t-tests were run. The first t-test compared DASS21 scores between participant groups, and the second compared GSQ-30 scores between the two groups. A further t-test comparing scores of both questionnaires between students of different subjects had been planned in order to test whether degree subject may influence symptom presence, however due to there being such small numbers of students from other degree subjects ($n = 9$), these tests were not run to avoid findings of significantly low ecological validity. DASS-21 scores were broken down into mild, moderate, severe, and extremely severe categories so that previous correlations could be further understood by observing the effect of different severities of mental health symptoms on GSQ-30 scores. The cut-offs used for each severity was as indicated in the DASS-21 scoring guidelines (see Appendix G).

A one-factor ANOVA was conducted on this data to test the amount of variation between groups, followed by a series of two-sample t-tests to identify where these variations existed. A further correlational analysis was conducted on the dataset as a whole between the DASS-21 and GSQ-30 scores to see if, as literature suggests, mental health and physical symptoms were positively correlated.

Qualitative Analyses

A deductive thematic analysis of all interview transcriptions was conducted. This approach was chosen due to existing literature leading to clear hypotheses being tested, and so only data relevant to these, whether confirmatory or contradictory to

hypotheses, were coded and analysed. Prior to analysis, themes expected to be reflected in transcriptions, in relation to the four hypotheses, were: Mental health concerns, Presence of physical symptoms, Mental and physical health relationship, MUS understanding, Stigma, and University pressures. Transcriptions were analysed with these themes in mind and all relative extracts were colour-coded to themes (see Appendix H). During this process, unexpected themes that were relevant and identified were added to this phase. All themes were then reviewed and where appropriate, were split into sub-themes. A process of reviewing, excluding, adding, and editing themes and subthemes was repeated until they accurately represented the data regarding all hypotheses. All coded data was emailed to the project supervisor prior to submission.

Results

Quantitative results

The R-script for statistical analysis and all raw data was provided to the project supervisor.

Mental health concerns and MUS correlation

In the student data, there was a significant positive correlation, $r(66) = .85$, $BF = 3.67$, $p < .01$, between DASS-21 and GSQ-30 scores, as shown in figure 1.

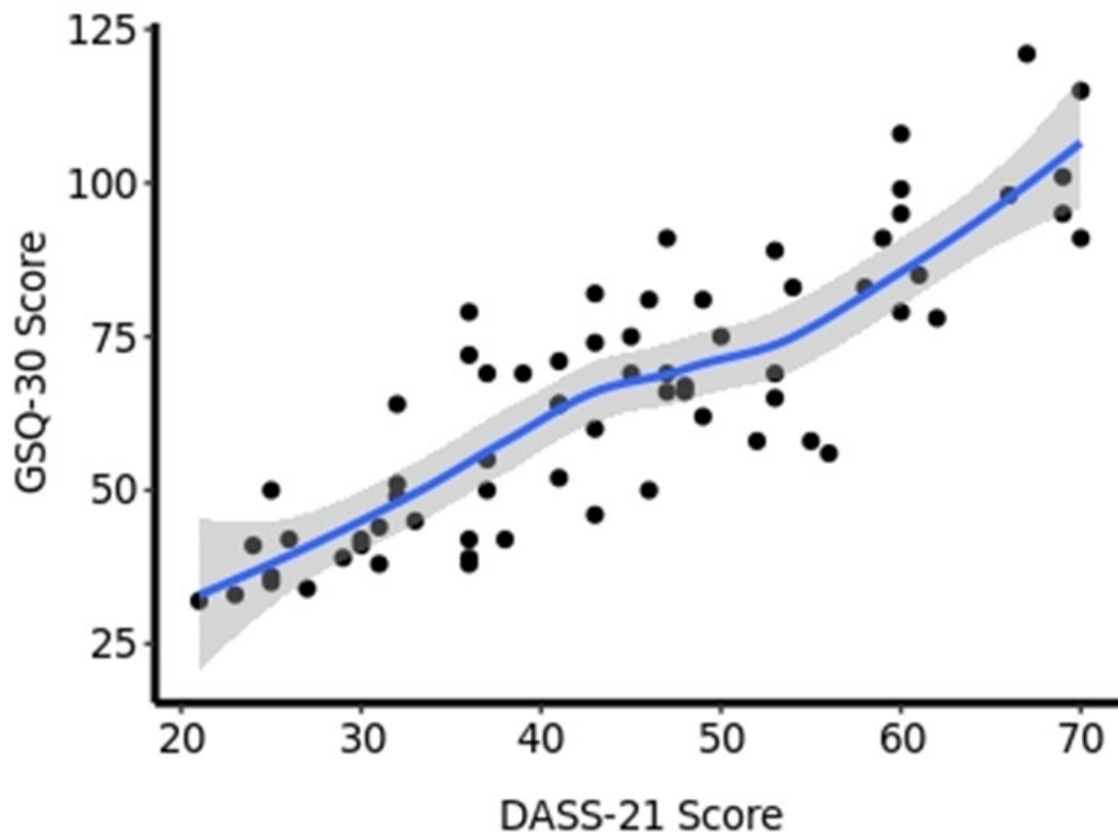
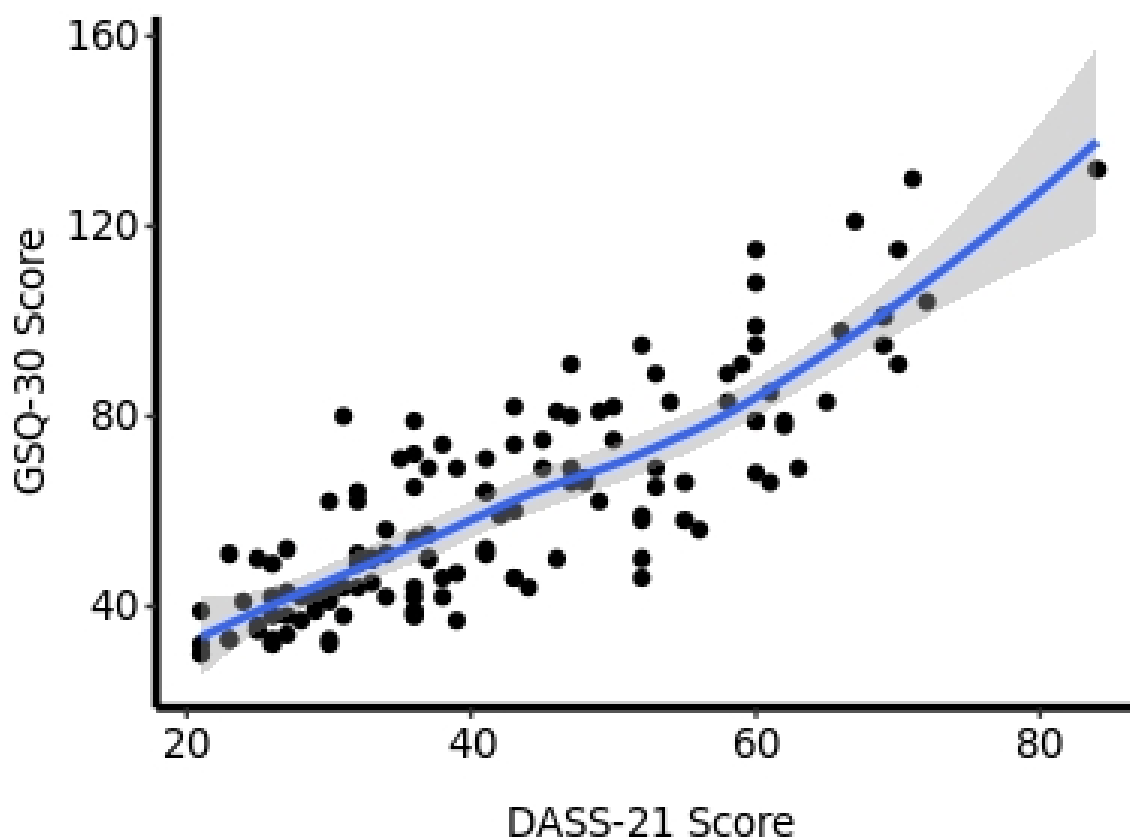


Figure 1: Density Plot depicting correlational analysis of DASS-21 and GSQ-30 scores of student participants.

A statistically significant positive correlation was also found when student and non-student data was combined, $r(128) = .84$, $BF = 3.57$, $p < .01$; thus scores of both



questionnaires were significantly correlated in the overall participant group. This is illustrated in figure 2.

Figure 2: Density plot depicting correlational analysis of DASS-21 and GSQ-30 scores of all participants.

Student DASS-21 scores were categorised into mild (16-20), moderate (21- 30), severe (31-40), and extremely severe (> 40) score categories. No scores fell within the mild category, so the effect of moderate, severe, and extremely severe DASS-21 scores on GSQ-30 scores was tested. A one-factor ANOVA on this data suggested significant variance between categories, $F(1, 65) = 67.2$, $p < .05$. Table 1 presents the mean GSQ-30 scores for each severity category of DASS-21 scores. This shows that the more severe the DASS-21 score, the higher the mean GSQ-30 score was.

A series of two sample T-tests were run to identify which severities of DASS21 scores the significant variation was between. Data was filtered into three separate data sets: 1) moderate and severe scores, 2) moderate and extremely severe scores, and 3) severe and extremely severe scores. A two-sample t test was run on each of these data sets to test the correlation between DASS-21 severity and GSQ-30 scores. The t-tests showed there was a significant difference in GSQ-30 scores between all DASS-21 severities: moderate and severe $t(23.08) = -3.80$, $p < 0.01$; and severe and extremely severe $t(39.77) = -6.02$, $p < 0.01$.

Table 1: GSQ-30 mean scores per DASS-21 score category. This table depicts the mean GSQ-30 scores for each category of DASS-21 scores.

DASS-21 Score Category	Mean GSQ-30 Score
Moderate	38.3
Severe	52.9
Extremely Severe	77.6

Prevalence of MUS and mental health concerns between participant groups

The two sample t-test comparing DASS-21 scores between student and nonstudent participants showed an insignificant difference between scores $t(123.07) = 1.84, p = 0.07$. The mean DASS-21 score for students was 44.32, and the mean DASS-21 score for non-students was 39.81. The subsequent two sample t-test compared GSQ-30 scores between participant groups and this showed a significant difference between groups, $t(124.71) = 2.15, p = 0.03$. For students, the mean GSQ-30 score was 65.5, and it was 56.9 for nonstudents. This is illustrated in figure 3. There was a small effect size ($d = 0.38$) for this data.

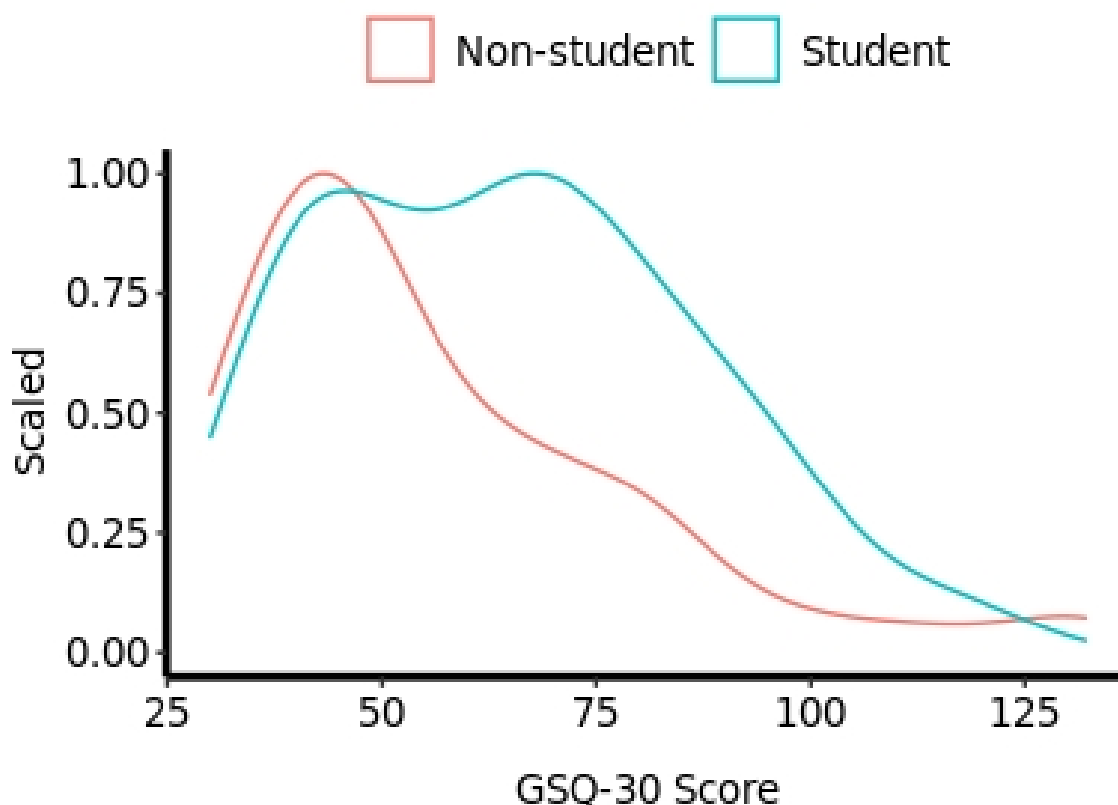


Figure 3: Scaled density plot depicting significant difference between students and non-students on GSQ-30 scores.

Depression, Anxiety, and Stress

Following the DASS-21 scoring guidelines, DASS-21 scores were filtered into depression scores, anxiety scores, and stress scores. The correlation to GSQ-30 scores of each DASS-21 score category was calculated. Student data was analysed first and there were significant correlations between each mental health category score and GSQ-30 score: depression, $r(66) = 0.72$, $p < .01$; anxiety, $r(66) = 0.79$, $p < 0.01$; stress, $r(66) = 0.77$, $p < 0.01$. For this participant group, the strongest correlation with GSQ-30 scores was DASS-21 anxiety scores. This correlation is illustrated in figure 4.

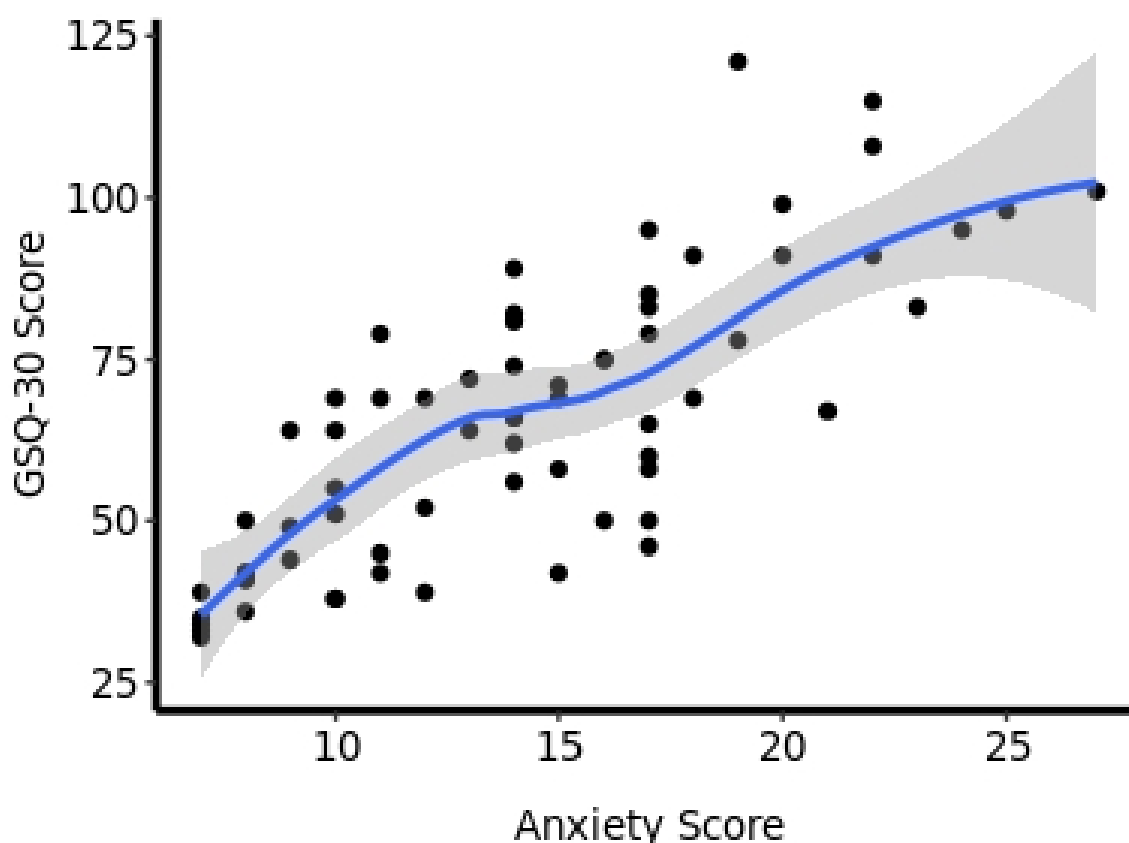


Figure 4: Density plot depicting the correlation of DASS-21 anxiety scores and GSQ-30 scores of student participants.

These correlational analyses were then repeated on the combined student and non-student data set. Once again there was a significant correlation between each mental health category score and GSQ-30 score: depression, $r(128) = 0.69$, $p < 0.01$; anxiety, $r(128) = 0.83$, $p < 0.01$; and stress, $r(128) = 0.75$, $p < 0.01$. As with the student data, anxiety scores had the strongest correlation with GSQ-30 scores out of each DASS-21 mental health category. This correlation is illustrated in figure 5.

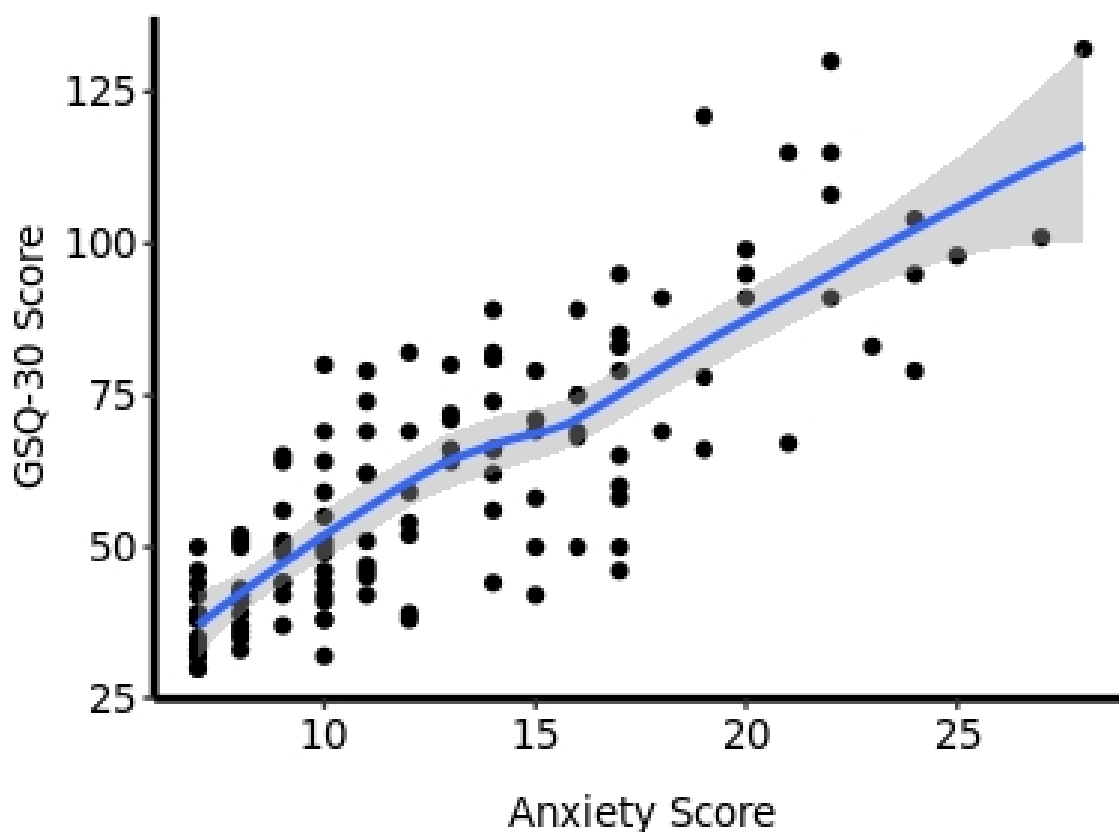


Figure 5: Density plot depicting the correlation of DASS-21 anxiety scores and GSQ-30 scores of all participants.

Qualitative results

Themes

Six main themes were identified from deductive thematic analysis of all interview transcripts:

1. Mental health concerns
2. Presence of physical symptoms
3. Mental and physical health relationship
4. Lack of MUS understanding
5. Stigma
6. Support

These are detailed in table 2 and described following the table.

Table 2: Thematic table depicting and describing themes and sub-themes identified from deductive thematic analysis of interview transcript.

Theme	Description
<u>Mental Health Concerns</u>	Experience and understanding of mental health and mental health issues
<i>Sub-themes</i>	
<i>Presence of Mental Health Concerns</i>	Mentions of mental health issues being present or not present
<i>Awareness of Mental Health Concerns</i>	Showing an awareness of what mental health is and how people can struggle with it
<i>Triggers</i>	Scenarios and situations that trigger mental health issues
<i>Fluctuating</i>	The ever-changing nature of mental health and the unpredictability of experiences.
<i>Improvement at University</i>	The positive effect of university on mental health
<u>Presence of Physical Symptoms</u>	Past and current experiences of physical symptoms, and the impact they have
<u>Mental and Physical Health Relationship</u>	Perspectives on the relationship between physical and mental health
<i>Sub-themes</i>	
<i>Direct Link</i>	Viewing physical and mental health as being directly linked of each other.
<i>Uncertainty</i>	The uncertainty of the physical health – mental health relationships and causations.
<u>Lack of MUS Understanding</u>	General and professional misunderstanding and lack of awareness of MUS.
<u>Stigma</u>	Perspectives on and the effects of stigma regarding mental and physical health symptoms
<i>Sub-themes</i>	
<i>Open dialogue</i>	Ability and possibilities to openly discuss health-related issues and concerns
<i>Masking</i>	Feeling the need to hide health struggles and act as if one is okay
<i>Unable to discuss</i>	The real or perceived barrier to discussing health-related issues and concerns
<u>Support</u>	Techniques, experiences of and perspectives of mental health support and support for MUS
<i>Sub-themes</i>	
<i>Self-help</i>	Having ways to self-manage mental and/or physical health symptoms and concerns
<i>Access to MH support</i>	Experiences and perceptions of accessing MH support
<i>Pharmacological Support</i>	The use of prescribed medication to help manage mental health and/or physical health symptoms
<i>Negative experience</i>	Prior negative experience of accessing and/or receiving support for mental and/or physical health

Theme one: Mental health concerns

Theme one reflects participants' experience, or lack of experience, of mental health issues and/or acknowledging and understanding what mental health issues can involve and the potential impact of them. This represents extracts such as, "My mental health is quite good actually." This theme was split into 5 sub-themes due to the varied nature of extracts relating to mental health concerns, and these are detailed below.

1) Presence of mental health concerns

All participants discussed whether or not they have experienced mental health concerns. Example extracts within this sub-theme include: "I've lived with depression and anxiety for so long. I've got no idea what it feels like to not live with that.", And "I don't really suffer from mental health". There was an even split between participant groups, with one student and one nonstudent disclosing experience of mental health issues, and one student and one nonstudent not having this experience.

2) Awareness of mental health concerns

This sub-theme reflects participants' awareness of what mental health issues are and how they may impact people, regardless of the participants' own experiences. This was equally represented in both student and non-student participants, with example extracts including: "I know people that are so depressed, that they can't get themselves to get out of bed." And "Everyone's impacted differently."

3) Triggers

Data labelled as 'triggers' is that of scenarios and situations identified as triggering mental health struggles. Extracts within this sub-theme include: "Not being in control of a situation" And "Any kind of social occasion really that involves more than one person." Identified triggers were individual for each participant, however they all had the common theme of triggering feelings of either: "Stress" Or "Panic" Or "Huge anxiety" The two participants who did not identify experiencing mental health concerns were also able to identify scenarios that triggered stress.

4) Fluctuating

The ever-changing nature of mental health and mental health concerns are reflected within this sub-theme, and this was something identified by both students and non-students. Example extracts include: "It varies so much... some days you feel as though you've been dealing with it longer than you have, or in other days, you feel as though you're absolutely fine." And "I either have like a really good week or a really bad week." This data reflects the experience of one student and one non-student participant.

5) Improvement at University

Improvement of mental health concerns at university came up multiple times from student participants. Example extracts include: "It's really helped me to figure out a lot of things about myself that I really hadn't had any clue about before to be honest, so it's been tough, but it's definitely been worth it." And "Within our department, we've had lots of support... they've been fantastic." There was overall agreement that university has been a positive influence on mental wellbeing.

Theme two: Presence of physical symptoms

This theme reflects the acknowledgement of personal physical symptoms, and an understanding of others' physical symptoms. The presence of physical symptoms was referred to by both students and non-students, with both student participants having experience of symptoms and one non-student participant experiencing them. IBS was the most frequent cluster of symptoms referred to, and example extracts include: "For years, I'd have like, really bad IBS. Like really bad stomach cramps... I would literally just freeze at work." And "My mum really suffers with IBS... she suffered for about 10 years."

Theme three: Mental and physical health relationship

Data within this theme presents participants' perspectives on the relationship between physical and mental health, and it includes extracts such as: "Both with my panic attacks and my IBS, if I was in a smaller space with lots of people...those symptoms would always come up." Data within this theme was split into two sub-themes for a more accurate representation, and these are detailed below.

1) Direct Link

This sub-theme reflects an assumption of physical and mental health being directly linked to each other, and this was the case for both students and non-students. Examples from this sub-theme include: "I think they are quite related... I can get like, gut issues with anxiety. So, if I get anxious about something, yeah, I get rumbly guts." And "IBS, and stress and depression...it is so linked, like when she's stressed, it just all flares up. It's so related."

2) Uncertainty

Data identified as 'uncertainty' represents the uncertainty surrounding the relationship between physical and mental health, especially regarding temporal and causal relationships. Example extracts include: "I used to have IBS, and that seems to have cleared, so I don't know if that was partly stress-induced, or I don't know." And "I didn't actually know why it happened at the time, but looking back, I think I was mentally quite unsettled...so I think looking back it was related."

Theme 4: Lack of MUS understanding.

Prior to the study, all participants lacked an understanding of MUS and this is reflected within this sub-theme, alongside experience of professional misunderstanding. Extracts include: "They basically just made her feel like she was making it up... if it can't be diagnosed, they almost make you feel like you're making it up." And "I'd actually never heard of the term. No, nothing, absolutely nothing I'm afraid."

Theme 5: Stigma

Perspectives on past and current stigma regarding both mental and physical health symptoms, as well as the effects of this stigma, is reflected within this theme, and an example extract is: "I've had nothing but really positive responses from people I've spoken to." There are three subsequent sub-themes so that the main components from the data are represented, and these are detailed below.

1) Open dialogue

Both groups of participants discussed the ability of being able to open up and discuss health concerns, along with the possibilities in which to do this. This was in reference to both the workplace and university, and the following extracts portray this: "There's a very open dialogue, if you have any problems whatsoever, then you can talk to anybody in the organisation about it." And "I actually think it's quite open now... people are sort of opening up about mental health and talking about it. It's not really stigmatised like it used to be."

2) Masking

Masking refers to experiencing the real or perceived need to hide something, and this sub-theme reflects participants' experiences of having to act as if they are ok

when they were not. Relevant extracts include: “You don’t want to be somebody that’s seen as quite a negative, pessimistic person. So, I think we do try to say we’re ok... you wouldn’t want to say no actually I’m really struggling.” And “There’s definitely like a stigma...people...they feel like they have to put on a face, like a front or something.” This sub-theme reflects data only from non-student participants.

3) Unable to discuss

Data reflecting this theme was only from non-student participants. It reflects the real or perceived barrier to discussing health-related issues and concerns, whether mental or physical, including extracts such as: “When I worked in hotels, you didn’t necessarily feel like you could probably talk about it.” And “I felt a lot more comfortable definitely discussing physical, but like with mental, I think I would definitely struggle a lot more with that.”

Theme 6: Support

Techniques, experiences, and perspectives of mental health support and support for mental health and/or MUS are represented within this theme, such as: “I did visit the health centre, and everybody was very nice.” Due to the varied nature of this data, it has been split into four sub-themes as detailed below.

1) Self-help

Non-students discussed having ways to self-manage mental and/or physical health symptoms and concerns, and these are represented here. This was not reflected by student participants. Examples from the data include: “If I’m feeling a bit low, you know, I exercise a lot... I just kind of force myself to get up and get on with it.” And “I have like kind of like things in place that actually stop it from physically or mentally happening now.”

2) Access to mental health support

This sub-theme reflects participants’ experience of accessing mental health support. Both students and non-students reported positive experiences and opportunities for accessing appropriate support. Examples include: “We can get some free counselling sessions through work, which is really good.” And “I think they’ve got pretty good provision really, for things like that. You can talk to any of the tutors, or you can go to the wellbeing centre.”

3) Pharmacological support

The use of prescribed medication to help manage mental health and/or physical health symptoms was discussed by both students and non-students, with extracts such as: “He prescribed this like an antacid drug, which really helped.” And “If I didn’t have my medication, I would have, I used to have quite bad anxiety attacks... it’s made everything a lot easier to talk about.”

4) Negative experience

One participant from each group discussed negative experiences of accessing and/or receiving support for mental and/or physical health symptoms. This reflected both their own experience and that of relatives. The sub-theme includes the following extracts: “She went to the doctor... they basically just made her feel like she was making it up., so in the end, she just didn’t go.” And “I had a not 100% positive

experience with the NHS, so I personally wouldn't go back to them... in terms of professional help, I'd be quite cautious."

Conclusions

Quantitative analyses demonstrated a statistically significant correlation between DASS-21 and GSQ-30 scores, with a higher number of mental health symptoms correlating with more physical symptoms. This supports the hypothesis that mental health concerns and MUS would correlate with each other. This was also the case for the student participants alone, which allowed a previously unestablished link between student mental health and MUS to be identified. The finding that there were significant differences in GSQ-30 scores between severity categories of DASS21 scores further demonstrated how interconnected mental and physical symptoms were within this sample. By testing the separate effects of depression, anxiety, and stress on GSQ-30 scores, a more comprehensive understanding of the overall correlation was achieved, as GSQ-30 scores were significantly correlated to all three components, however, were most strongly correlated to anxiety.

This was mirrored in the qualitative finding that anxiety was most referred to in relation to physical symptoms, and participants' perspectives on this relationship allowed an insight into temporal and potentially causal components. Interestingly, physical symptoms were not described as leading to mental health concerns, however anxiety was identified as leading to IBS and other MUS. The sub-theme of direct link within theme three provided further support for hypothesis one, with all participants acknowledging mental and physical health being directly related to each other. Although this was the case, hindsight appeared to enable this, with participants of both groups describing not acknowledging the relationship at the time of symptoms, but able to when looking back.

In contrast to supporting the first hypothesis, qualitative analysis resulted in findings that contradicted hypothesis two (mental health concerns and MUS would occur more in the student population). Theme one explored this hypothesis and the sub-theme of presence of mental health concerns reflected the varied nature of responses, showing that these concerns were present for one student and one nonstudent. The sub-theme of fluctuating demonstrated how fluid mental health can be, regardless of student status, and data went on to suggest an improvement in mental health as a result of being at university. Similarly, experience of MUS was disclosed by participants of both groups, suggesting that student status did not impact the presence of MUS. In contrast, quantitative analyses revealed that student participants on average scored significantly higher on the GSQ-30 than non-students, suggesting a higher prevalence of physical symptoms in this population. Students, overall, also scored higher in the DASS-21, however this difference, was statistically insignificant. Interestingly, no scores fell within the mild category of mental health concerns, regardless of student status. These findings demonstrate the individualistic nature of health, whether mental or physical, and how it can vary not only between groups, but within groups as well.

Having a qualitative aspect to the study allowed for a more comprehensive exploration of issues referred to in existing literature, including stigma and lack of understanding. Theme five directly reflected perspectives of stigma, however, this did not support the hypothesis that there would be stigma experienced for both MUS and mental health issues. Data demonstrated a perception of reduced stigma, and all participants reported being able to open up and discuss any health concerns at

both work and university. Non-students, however, also discussed the experience of having to mask mental health struggles in order to not be perceived as negative. This appeared to be work-place dependent, suggesting that a supportive workplace reduced the need to hide struggles. This was only in relation to mental health issues; all participants discussed being comfortable in disclosing physical health symptoms. A lack of understanding surrounding MUS was clearly reflected in theme four, directly supporting hypothesis four. No interview participants had heard of 'MUS' prior to the study, and data represented professional misunderstanding of symptoms. The sub-theme of negative experience provides indirect support for the hypothesis by portraying how patients were made to feel like they were making symptoms up by professionals, demonstrating a professional misunderstanding and judgement.

A lack of professional knowledge of MUS is in-line with previous findings, such as patients with unexplained fatigue describing being dismissed and questioned in Lian and Robson's (2017) thematic analysis of written texts. This is mirrored by one participant in the current study describing her mother being made to feel like she had made her symptoms up by a medical professional. Further to this, the consistent finding that MUS are the predominant reason as to why those with anxiety initially present in primary care (Kroenke et al., 1994) was also mirrored in the current study, with participants describing a lack of knowledge and acceptance that physical symptoms they had sought help for were due to anxiety until looking back at experiences. Adding to previous findings, this study established a higher prevalence of MUS in a student sample compared to a non-student sample, with a strong correlation to mental health symptoms.

The strong correlations found between both questionnaires supports reports of MUS being related to mental health (Patacchiolo et al., 2001), although as with past studies, these were correlational findings, thus a causal relationship could not be determined. Data did, however, suggest that anxiety occurred prior to physical symptoms which reflects previous findings of anxiety having an earlier onset to subsequent MUS (Beesdo et al., 2010). The higher rates of mental health concerns in the student group supported past findings that students have higher rates of poor mental health than the general population (Royal College of Psychiatrists, 2011; Storie et al., 2010), however this finding was not statistically significant in the current study. An increase in student stress highlighted in existing literature (Thorely, 2017) was not reflected in this study, and it instead suggests university positively impacts mental health. However, the finding that GSQ-30 scores were significantly higher in student participants supported the prediction that MUS would be more prevalent for students.

Future Work

This finding provides reason for further research into student prevalence of MUS due to the potential consequences of symptoms, such as extreme isolation (Munson, 2000; Rosendale et al., 2013). If a larger and more varied sample were to support MUS being more prevalent for students, this would be a cause for concern and would warrant further measures of support to be put in place within universities. Universities currently offer mental health support for students, however this study suggests MUS, as compared to mental health issues, are more significantly increased in this population. Due to the clear link between mental health and MUS, there is potential to enrich existing mental health support with symptom-focussed support to improve overall student health.

It is important to note that due to time constraints, there was a small sample size ($n = 4$) for the second part of the study, so it was not possible to accurately conclude on the differential experiences between participant groups. Although randomly selected, all interviewees were female and above 30 years old, and existing literature suggests a higher rate of both mental health concerns and MUS being associated with female gender and younger age, so findings may have differed within a more varied sample. Further to this, gender and age were not considered in quantitative analyses, and demographic information such as SES not gathered. All of these factors have been shown to impact both MUS and mental health, so a breakdown of these within the analyses may have provided alternative explanations for findings of higher questionnaire scores from the student participants. Due to all measures being of self-report, findings were open to demand characteristics from participants, and many factors such as embarrassment or biases may have prevented accurate responses. However, when investigating mental health, it is reliant on participants' reports of their mental health, so this is a persistent downfall of research of this nature.

Future studies of larger and more representative samples would be beneficial in addressing the discussed limitations of the current study. It would be interesting for degree subjects to be taken into account in analyses to test whether this impacts the presence of both mental health issues and MUS, as if it did have an impact, students who are potentially more vulnerable to these issues may be easier to identify so that appropriate support could be available and effectively promoted. Findings that MUS are most strongly correlated to anxiety could be further explored by an ANOVA testing the variation between GSQ-30 scores in relation to each mental health aspect. This would allow the individual impact of depression, anxiety, and stress on physical health to be established. It is also important to note that GSQ30 items do not specifically refer to MUS, and diagnosed conditions were not controlled for in this study. Hence GSQ-30 scores cannot reliably be assumed to present that of only MUS. Nevertheless, the study showed strong correlations between mental and physical health, however it would be beneficial for future studies to utilise measures specifically relating to MUS, or for medical explanations to be controlled for.

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