Prevalence and risk factors of anxiety and depression in university students in Pakistan: A systematic review and narrative synthesis

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Abstract

Objectives: The objectives of this review were to estimate the prevalence of anxiety and depression in university students in Pakistan, as well as identify potential risk factors.

Methods: A literature search was carried out in March 2020 on thirteen databases: CINAHL, Embase Ovid, MEDLINE EBSCO, MEDLINE Ovid, PsycARTICLES, PsycINFO, Psychology and Behavioral Sciences Collection, PubMed, Web of Science Core Collection, Web of Science MEDLINE, WorldCat, WorldCat Theses and Dissertations, and PakMediNet.com. The eligibility criteria that was followed limited studies to include university students indigenous to Pakistan as the target population, anxiety or depression being measured to establish a prevalence rate, and reporting on the risk factors of anxiety and depression in this population. Out of 944 total search results, 50 studies were included in this review after being screened against the eligibility criteria. Data was extracted from each study using a modified online template.

Results: Prevalence estimates for anxiety and depression were established from 47 studies. The remaining three solely reported risk factors. The studies spanned 1994 to 2020, and the mean prevalence rates for anxiety and depression calculated for this period are 51.7% and 46.8% respectively. The studies took place across three provinces in Pakistan, primarily in metropolitan cities. The majority of the studies were cross-sectional, and the AXIS Critical Appraisal Tool for Cross-Sectional Studies was used for quality assessment. Female students were found to experience symptoms of both anxiety and depression more often than male students.

Limitations: The studies were reviewed by a sole reviewer.

Conclusions: Further research into protective factors and the efficacy of current treatments for anxiety and depression in a similar setting would be beneficial.

Keywords: anxiety, depression, university, students, Pakistan

Rationale

Anxiety and depression affect 264 million and 322 million people worldwide respectively (World Health Organization [WHO], 2017b), contributing to an overall 14% of the global population suffering from mental illnesses with three-quarters of this figure living in low- and middle-income countries (Farooq et al., 2019). Anxiety is a condition that is characterised by constant worrying, concentration issues, and physical symptoms such as trembling, restlessness, tension headaches, and increased heart rate (WHO, 1994). Depression is a condition that manifests through low mood, loss of enjoyment, fatigue, poor concentration, disturbed sleep and appetite, a bleak outlook on life and possibly self-harm (WHO, 1994). Both conditions contribute to years lived with disability (YLDs); the 2017 Global Burden of Disease study showed a 12.8% increase in YLDs between 2007 and 2017 for anxiety disorders, and 14.3% for depressive disorders (Murray, 2018). Both anxiety and depression are severely underdiagnosed and very common in low- and middle-income countries (LMICs) (Farooq et al., 2019).

Pakistan is a LMIC in South Asia with a population of 220 million (The World Bank, 2020). Over 10% of the population are believed to suffer from some form of mental health condition (Nisar et al., 2019), with one of the most prevalent being depression (Javed, 2020). According to a previous review (Mirza & Jenkins, 2004), the mean prevalence of anxiety and depressive disorders in community samples in Pakistan was 33.62%. Despite poor mental health having greater economic consequences than general ill health, it is overlooked due to the absence of appropriate resources, little to low awareness, and lack of interest from policymakers (Malik & Khan, 2016). As of 2017, the Pakistani government spends only 0.40% of its total health budget on mental health, and does not have a plan for child/adolescent mental health (WHO, 2017b). There is limited data available on the overall prevalence of mental disorders in Pakistan, owing to a lack of incentive to conduct epidemiological research (Javed, 2020). A study (Malik & Khan, 2016) on the economic burden of mental illnesses in Pakistan for the year 2006 provided an estimate of USD 4,264.27 million (currently USD 1,475.3 billion) largely contributed to by lost productivity and admission treatment costs. Both major depressive disorder (MDD) and generalised anxiety disorder (GAD) were part of the group of illnesses investigated. Although it is difficult to compare this data with that from higher income countries (HICs), it is clear that the burden is significant especially to a LMIC and can be worsened if mental illnesses are left untreated. Farooq et al. (2019) conducted a study on adults in Karachi, a metropolis and the largest city in Pakistan, which aimed to establish the prevalence of anxiety and depression and a link with multimorbidity. The prevalence of

anxiety and depression was reported to be 27.4%. The co-occurrence of anxiety and depression with chronic diseases such as diabetes, cancer, and heart disease can increase the likelihood of patients developing disabilities, and experiencing financial hardship from the need for various treatments.

The burden can also be attributed to a shortage of appropriately trained personnel and negative attitudes towards mental illnesses (Suhail, 2005; Javed, 2020). Research conducted on the attitudes of university students and teachers towards mental illness indicated statistically significant negative attitudes from the students especially, who perceived people with depression as dangerous (Javed et al., 2006). A more recent paper (Waqas et al., 2014) found that university students trusted a psychiatrist's ability to 'cure' mental illnesses, but did not shy away from the belief that there were supernatural causes to blame for their presence in the first place; it is worth noting that non-medical students believed in the supernatural whereas medical students leaned heavily towards psychopathological causes. This sample was chosen to reflect particularly literate attitudes, and compared to the previous study, did show an improvement. Students who had also been exposed to books and articles about mental health bore more positive attitudes. Another survey revealed that the majority of the sample (94.5%) believed mental health awareness should be a part of the school curriculum (Nisar et al., 2019).

Sixty-four percent of the population is younger than 30, with 29% aged between 15 and 29 (Ahmad, 2018). The most recent data for university enrolment in Pakistan shows a figure of 20,964,647 students in 2018 (UNESCO Institute of Statistics, 2020), which makes up almost 10% of the country's population. Research has shown that, regardless of location, mental health problems in university students are becoming increasingly common and severe, owing to increased responsibilities and sudden independence (Saleem et al., 2013). A systematic review (Ibrahim et al., 2013) on the prevalence of depression in undergraduate students reported a figure of 30.6%, higher than rates found in general young adult populations, and attributed this to increased stress levels stemming from concerns about future employment. A review on Iranian studies of depression prevalence in university students (Sarokhani et al., 2013) reported a 33% prevalence rate, and a review on depression prevalence in medical students reported a figure of 27.2% (Rotenstein et al., 2016). Studies from Bangladesh (Alim et al., 2017; Islam et al., 2020; Mamun et al., 2019) have reported rates of 36.2% (combined rate), 69.5% (depression) and 61% (anxiety), 52.52% (depression) and 58.1% (anxiety) respectively. A systematic review on medical students in India reported 39.2% in depression prevalence (Sarkar et al., 2017). Studying the mental health of university students, especially the factors that increase their vulnerability to poor mental health, could be very beneficial Contributors to mental distress in university students that were identified included academic responsibilities, adjusting to a new environment, being separated from one's family, rebuilding one's social life, financial concerns, and sudden independence (Kumaraswamy, 2013).

Objectives

Aims and research questions

Mirza and Jenkins (2004) investigated the risk factors, prevalence and treatment of anxiety and depressive disorders in adults (aged 18-65) in Pakistan, but did not limit its target population to university students. Rather, the data they collated consisted of studies in primary care settings, and on psychiatric inpatients and outpatients. To the reviewer's knowledge, a systematic review on the prevalence of anxiety and depressive symptoms in university students in Pakistan does not exist. Therefore, this review aims to collate existing evidence on the prevalence rates of anxiety and depressive symptoms in university students in Pakistan, and document risk factors for these symptoms identified in the literature. There are two research questions this review aims to answer.

Research question 1: What are the prevalence rates of anxiety and depression in university students across Pakistan?

Research question 2: What are the risk factors for symptoms of anxiety and depression in university students across Pakistan?

Method

Information sources

    The literature search for this review was conducted in March 2020. The following databases were searched because of their relevance in the fields of psychology and healthcare research: Cumulative Index Nursing and Allied Health Literature (CINAHL), Embase Ovid, MEDLINE EBSCO, MEDLINE Ovid, PsycARTICLES, PsycINFO, Psychology and Behavioral Sciences Collection, PubMed, Web of Science Core Collection, Web of Science MEDLINE, WorldCat, WorldCat Theses and Dissertations, and PakMediNet.com. Both WorldCat databases were searched in an attempt to identify grey literature. PakMediNet.com was searched to identify Pakistan-specific articles that could be potentially relevant. No date or language restrictions were in place when the searches were implemented. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed for this review.

Search

    A search strategy was developed after consultation with a subject librarian. The names of major cities in Pakistan, including the capital Islamabad, were included as search terms in order to ensure potentially relevant titles were not missed. The term "bahria" refers to the name of Bahria University, which has three campuses in Pakistan and was considered to be a pertinent search term to include after a preliminary search yielded results that mentioned its name specifically in article titles. The full combination of search terms is laid out below:

1. exp Students/
2. (universit* adj5 (pupil* or student*)).tw.
3. (college* adj5 (pupil* or student*)).tw.
4. 1 or 2 or 3
5. exp Mental health/
6. (mental health or mental illness*).tw.
7. (anxi* or depress*).tw.
8. (mental disorder* or mental wellbeing).tw.
9. (psych* disorder* or psych* illness*).tw.
10. 5 or 6 or 7 or 8 or 9
11. Pakistan/
12. (pakistan or islamabad or karachi or lahore or peshawar or bahria).tw.
13. 11 or 12
14. 4 and 10 and 13.

The aforementioned terms were searched on all databases except WorldCat, WorldCat Theses and Dissertations, and PakMediNet since they do not have advanced search features similar to the other databases. On both WorldCat databases, the following terms were searched:

- (mental health OR mental illness OR mental disorder OR mental wellbeing OR psych* illness OR psych* disorder) AND
- (university OR universities OR college OR colleges) AND
- (student OR students OR undergraduate OR undergraduates OR postgraduate OR postgraduates) AND
- (Pakistan OR Islamabad OR Lahore OR Karachi OR Peshawar OR Bahria).

PakMediNet.com yielded no results with a variety of search terms in place, therefore only "student anxiety" and "student depression" were searched. All search results were exported to EndNote Web, sorted into groups by database. Duplicates were removed using the appropriate function on EndNote, and the full list of references was scanned afterwards to remove any duplicates that still remained. Once full texts had been screened and deemed eligible for this review, their references were also searched to identify titles that could be relevant.

Study selection

A blind review of the full list of titles exported to EndNote was carried out by hiding the authors' names in order to avoid unintentional bias while screening titles and abstracts. An abstract screening form was designed using Microsoft Word to screen articles, and contained the following questions:

- Does this study look into anxiety and/or depression?
- Are the participants university students?
- Does the study take place in Pakistan?
- If not, are the findings for Pakistani students distinct from those of other countries?
- Does the study report prevalence rates?
- Does the study report risk factors?

Articles were considered relevant at this stage, or did not contain enough information in their abstracts to be written off immediately, were accessed to begin full-text screening against the following eligibility criteria.

Inclusion criteria:

- studies with a population of university students

- studies reporting prevalence rates of anxiety and/or depression
- studies reporting on potential risk factors of anxiety and/or depression in this population
- studies conducted within Pakistan
- studies with a multiple-country dataset that includes distinct data for/from Pakistan.

Exclusion criteria:

- studies that did not report prevalence rates or risk factors for anxiety or depression
- studies with participants not recruited from universities
- studies that investigated Pakistani students in foreign universities
- studies with data from multiple countries, which included Pakistan, but did not distinguish country-specific data
- studies that investigate the prevalence of anxiety and depression before, during, or after a specific situation, for example before an exam.

Studies that investigated Pakistani students in foreign universities were not included because the environment and culture of Pakistan was considered essential to investigating the presence of anxiety and depression in university students who had grown up and lived in that environment. Studies that deliberately collected data before, during, or after a stressful situation were not included because the data was not considered to be generalisable.

Data collection process

A data extraction table was designed based on a comprehensive template from the Wiley Library (Egan et al., 2003). A separate table was created for each study using Microsoft Word, and additional spaces were added to the table to extract the following information that was not a part of the online template:

- age of the participants
- sex of the participants
- students' field of study
- type of analysis
- sampling methods
- how tests were administered
- findings.

This data was entered into distinct tables for each study. The full data extraction form can be found in Appendix 6.

Risk of bias assessment

The study design for the studies included in this review was found to be primarily cross-sectional. The AXIS tool for the critical appraisal of cross-sectional studies, developed by Downes et al. (2016b), was used to assess the risk of bias. The tool consisted of 20 questions, with each section of the studies (introduction, methods, results, discussion) being assessed. There were no numerical values assigned to items as points, rather each question required a 'yes' or 'no' answer, or in the event of inadequate information from the article an appropriate comment. The quality assessment for the studies in this review is presented in Table 1. The full version of the tool can be found in Appendix 5.

The target journal chosen for this review is the International Journal of Psychology, because it publishes articles that investigate the influence of social and cultural contexts on psychological processes, which is a key part of this review. It also publishes articles on psychological thinking from different areas of the world, making a review on mental health in a lower middle-income country like Pakistan relevant to the scope of this journal. A link to the author guidelines can be found in the appendices (Appendix 1).

<center>**Results**</center>

Study selection

        The literature search yielded a total of 944 results from all the databases above. After being exported to EndNote Web, they were screened for duplicates and 435 titles were subsequently removed. 509 titles remained to be screened against the eligibility criteria. Abstracts were accessed and 412 titles were found to be irrelevant at this stage and thus excluded. 105 titles remained and were accessed for full-text screening. The reference lists of these articles were hand-searched to seek out additional relevant titles. Eight relevant titles were found from these references. A total of 55 articles were excluded; 30 articles did not investigate anxiety or depression, 20 did not report prevalence rates or risk factors for either condition, three were carried out specifically before exams, and two did not have university students as participants. Fifty articles were included in this review. The steps taken to select studies are illustrated in the PRISMA flow diagram below (Figure 1).

Study characteristics

        49 of the 50 studies in this review were articles published in journals, and one was a thesis submitted to the University of Bielefeld (Chaudary, 2016). A total of 27 studies investigated both anxiety and depression in university students, 21 investigated only depression, and two investigated only anxiety. Fourteen studies were carried out in Lahore[1], twelve in Karachi, seven in Islamabad and Rawalpindi, two in Peshawar, and the rest in various other cities across the provinces of Khyber Pakhtunkhwa, Punjab, and Sindh (Table 2). Thirty-five studies had a female-majority sample.

        Medical students were the target population in 30 studies. Two studies included medical students in their samples along with nursing and dentistry students. Eight studies recruited students from various other disciplines. The last 10 studies did not specify which discipline they recruited their participants from. Sampling techniques differed, with 23 studies using convenience sampling. Eleven studies used random sampling, six studies used purposive sampling, two studies sampled the total target population, one study used stratified sampling, one study used consecutive non-probability sampling, one study used non-probability purposeful sampling. The remaining five studies did not specify their sampling methods and the information provided in their method sections were insufficient to determine the techniques used.

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[1] Geographical locations explained in Appendix 4.

Figure 1.

PRISMA flowchart of study selection (adapted from Moher et al., 2009).
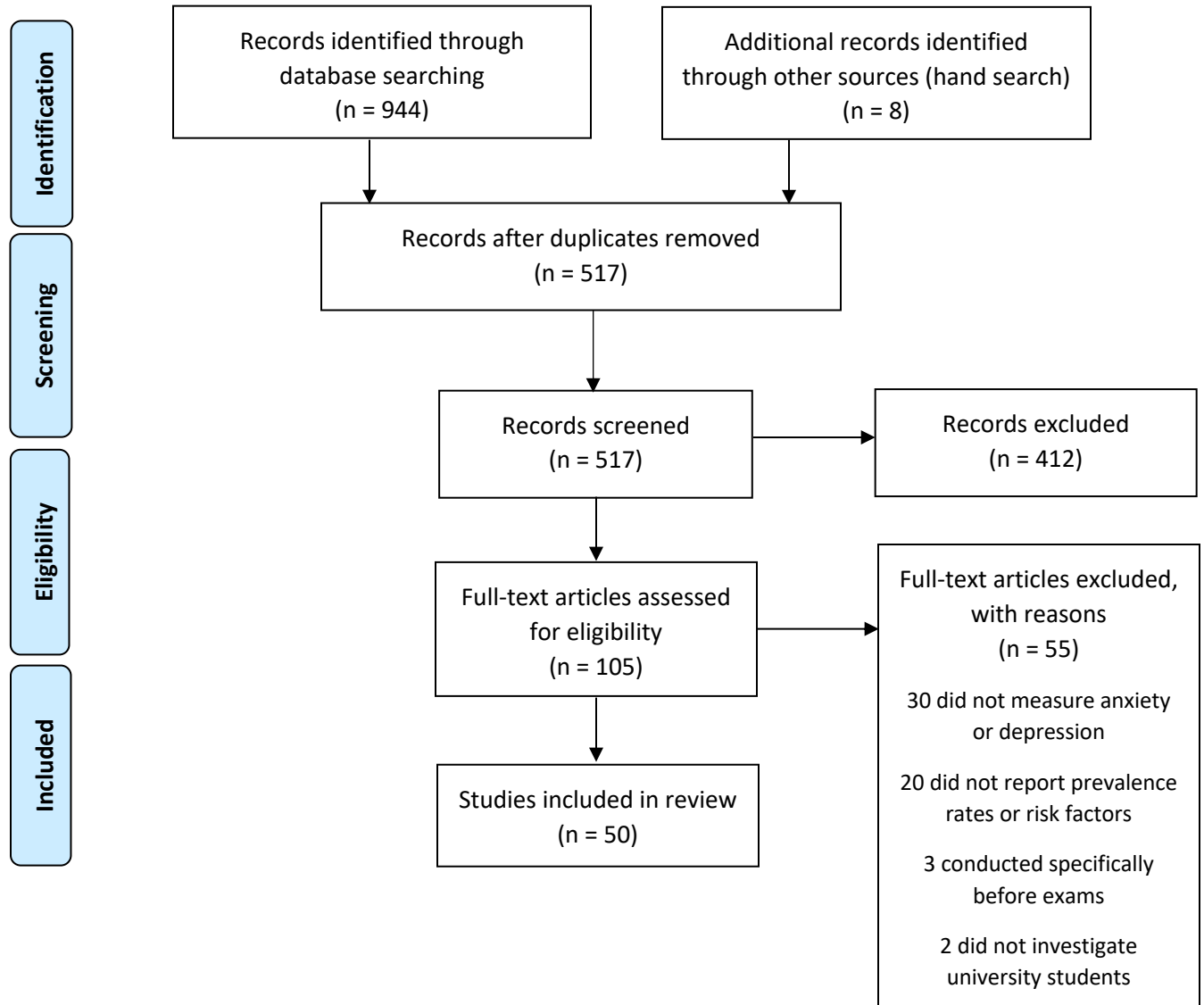
The majority of the studies (n = 39) in this review used a cross-sectional design. One study employed a mixed method design, two were observational, and eight studies did not specify their study designs. The Depression, Anxiety and Stress Scale (DASS) and the Aga Khan University Anxiety and Depression Scale (AKUADS) were the most common measures used, in 13 and 10 studies respectively. The Beck Depression Inventory (BDI, BDI-II) was used in six studies, with one also using the Beck Anxiety Inventory (BAI). The Hospital Anxiety and Depression Scale (HADS) was used in four studies, with one also using the General Health Questionnaire (GHQ). Three studies each used the Patient Health Questionnaire (PHQ-9), and tests developed by the researchers. Two studies used the Center for Epidemiologic Studies Depression Scale (CES-D), and the Zung Self-Rating Depression Scale. One study each used the General Anxiety Disorder-7 (GAD-7), the Kutcher Adolescent Depression Scale (KADS-6), the Mental Health Inventory (MHI), the Moods and Feelings Questionnaire (MFQ), the Quick Inventory of Depressive Symptomatology (QIDS), the Goldberg Depression Test (Gul et al., 2020), and the ICD-10 criteria to screen for generalised anxiety disorder (Zeekash et al., 2018).

Risk of bias assessment

The quality of the studies in this review was assessed using the AXIS tool for the critical appraisal of cross-sectional studies. A notable limit of the tool is that it does not allow the reviewer to grade the studies numerically, thereby making it difficult to ascertain the quality of a study at a glance with the help of a total quality score. However, the comprehensive quality criteria allow the reviewer flexibility and the ability to be subjective during assessment (Downes et al., 2016b).

All the studies stated their aims and objectives clearly, as well as their target populations. The two observational studies also employed appropriate designs for their intended outcomes, as an observational study design is particularly appropriate in epidemiological research (Johnson, 2017). The study that employed a mixed-method quantitative-qualitative design reported prevalence rates of both anxiety and depression through the use of a standardised questionnaire, as well as reasons for academic burden identified through focus group discussions. Out of the 50 studies in this review, only 13 justified their sample sizes. A justified sample size can help to avoid the occurrence of a type I error, where assumptions and conclusions are mistakenly drawn about significant associations that do not exist, and a type II error which can occur if a study's sample is too small and can falsely lead to the assumption of a null hypothesis (Downes et al., 2016a; Nayak, 2010). Justifying sample sizes can bring about a more representative sample in a study, along with the type of sampling method used.

According to the AXIS tool guide (Downes et al., 2016a), the representativeness of a sample can be affected by the type of sampling method used, specifically in the case of convenience sampling. Random sampling is considered to be a more reliable method of gaining a representative sample, although there may be exceptions to this. As seen in Table 1 below, 21 studies have been declared as having representative samples by the reviewer. Two studies justified their sample sizes, which were considered to be representative of the larger population because they also randomly selected their participants (Balouch et al., 2019; Chaudary, 2016). Ten studies with justified sample sizes used a variety of sampling techniques, including convenience, purposive, stratified, consecutive non-probability, and non-probability purposeful which may not be truly representative of the larger population. The last study with a justified sample size did not specify its sampling method (Sohail et al., 2018), or state the number of enrolled students, making it difficult to determine whether its sample was representative. Studies that did not justify their sample sizes but were still considered to have representative samples either recruited the entire student population, the majority of the population, used random selection, and used a rigorous inclusion/exclusion criteria to ensure their participants were from their target population (Zafar et al., 2018). One study (Rab et al., 2008) used random sampling to recruit its participants, but only recruited 20% of its target population without justification. It was unclear in five cases whether the sample was truly representative, if the studies' authors did not specify which sampling method they used or there was no information on the total size of the target population, which would make it clear what proportion of the total was recruited as part of the sample. These instances have been denoted as 'NR' (not recorded) in Table 1.

Twenty-five studies had response rates ranging from 60-90%, while 22 had full response rates (100%). Three had response rates lower than 60% which could cause a non-response bias. Non-responders were not categorised in any of the studies, so it is not clear whether they shared certain characteristics and could have been clustered into groups. If they did have characteristics in common, baseline data could be affected by the absence of data from these groups (Downes et al., 2016a), possibly leading to skewed results that may be accepted as representative of the population. Only one study (Saeed et al., 2017) provided specific information about why participants did not respond.

Generally, the studies used appropriate measures to assess anxiety and depressive symptoms, with the vast majority (n = 47) using established measures. Three studies used measures that were developed by the researchers, two of them based on other published questionnaires (Abbas et al., 2015; Rab et al., 2008). There was insufficient information on the items of the questionnaire of the last study, therefore its validity and reliability are uncertain. One study (Yousaf et al., 2016) used the Kutcher Adolescent

Depression Scale (KADS-6); using such a scale in a sample of university students may not be entirely appropriate given the widely understood definition of the term 'adolescent' as someone who is normally younger than the age of 18. The WHO defines adolescents as people aged between 10 and 19 (WHO, 2014), which overlaps with the typical age of university students during their first two years at university. The study did not specify the mean age or age range of their sample, which makes it difficult to judge whether this measure was entirely appropriate for the target population, considering the other studies used measures that were not specifically targeted at adolescents.

Precision estimates to determine the significance of findings were reported in all but four studies, and eleven studies did not sufficiently describe their methods, especially the statistical analyses. This lack of information makes it difficult to understand how the researchers reached their conclusions, and if needed, poses problems for replicating the studies to ensure their reliability. Additionally, 13 studies did not present their analyses in their results, and six of these studies also did not provide enough information about their methods. Typically, the absence of analyses in a study's results could be a cause for concern, as authors may omit them if they were not what they expected or hoped to get (Downes et al., 2016a).

Nineteen studies did not discuss their limitations, two studies reported sources of funding, and seven studies did not explicitly report ethical approval or consent obtained from participants. Reporting limitations can show that the author has considered what could be done better for future research involving the same variables. One of the two studies that reported a conflict of interest did not discuss its limitations, and its description of its methods was inadequate as well. Funding can unintentionally result in a skewed interpretation of findings in order to favour the source that has funded the study. Three of the seven studies that did not clearly state that they had ethical approval or consent to collect data also did not fully describe their methods.

Results of individual studies
Prevalence rates
Out of the 50 studies in this review, 47 reported prevalence rates. These rates ranged from 0.93% for both conditions (Raza et al., 2018) to 78.6% for anxiety (Khan et al., 2017b), and 100% for depression (Balouch et al., 2019). Six studies reported a combined prevalence rate for both, ranging from 39.6% (Abrar et al., 2014) to approximately 70% (Khan et al., 2006); the mean combined prevalence is 53.2%. Based on the available data, the mean prevalence rates for anxiety and depression are 51.7% and 46.8% respectively. Eleven studies reported higher rates of depression in female students as compared to males, while three studies reported higher anxiety in females, and one study with a combined rate reported that

females were 1.8 times more likely to suffer from both conditions (Abrar et al., 2014). Out of these studies, nine reported a statistically significant difference in the prevalence rates of anxiety and depression between male and female students, where females scored higher on both conditions. In four studies (Ali et al., 2014; Ali et al., 2019; Bukhari et al., 2015; Gani et al., 2018), it was reported that depression was higher and more common in males, with one study reporting the same finding for anxiety (Saeed et al., 2017). Two studies reported a non-significant difference between male and female prevalence rates (Gani et al., 2018; Gul et al., 2020), and another found almost even scores between sexes (Shafiullah et al., 2016).

Differences in prevalence rates also arose between public and private sector universities. Two studies reported higher mean depression scores in public sector universities (Kumar et al., 2019; Zafar et al., 2017), whereas one reported a slightly higher prevalence in private universities (Abbas et al., 2015). Anxiety scores were also reportedly higher in private universities (Kumar et al., 2019). Rates were compared between students who lived at home and those living in hostels; anxiety was found to be marginally lower in students living in hostels, whereas depression was marginally higher in the same group (Liaquat et al., 2017). However, Rab et al. (2008) reported both anxiety and depression as being significantly higher in students who lived in dormitories.

Trends between year of study were also investigated, with one study (Kanwar et al., 2019) claiming no clear pattern. This has been contradicted by seven others (Abbas et al., 2015; Abrar et al., 2014; Alvi et al., 2010; Inam et al., 2003; Jadoon et al. 2010; Khan et al., 2017b; Hassan et al., 2014) that reported high rates in the second year, a sharp decrease in both anxiety and depression during the third year of study, and a slight increase during the fourth year. Rab et al. (2008) reported high anxiety during the fourth and fifth (final) years, and high depression during the first two years. Alternatively, Shafiullah et al. (2016) found the highest depression scores during the final year.

Risk factors, predictors and correlational factors

Several risk factors for anxiety and depression in university students in Pakistan have been identified over the years. The most commonly reported factors include a family history of depression (Ali et al., 2014; Deepak et al., 2017; Hashmi et al., 2014; Khan 2006; Sohail et al., 2018; Zafar 2017), and the recent loss of a relative or close friend (Ali et al., 2014; Khan 2006). Evidence on the role of socioeconomic status in the prevalence of depression was conflicting, being shown as both a risk factor (Azim et al., 2019) and inconsequential with no significant effect (Bukhari et al., 2015). Birth order, number of siblings, level of education, and household monthly income were found to have no correlation with prevalence (Hassan et al., 2018; Inam et al., 2003; Jadoon et al., 2010; Raza et al., 2018), although one study did report that anxiety and birth order were significantly correlated (Alvi et al., 2010). The

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same study reported that both anxiety and depression were significantly associated with age, gender, overburdened test schedules, and dissatisfaction with examinations. Cyber bullying, internet addiction, and insomnia were reported as positive predictors of anxiety and depression as well (Musharraf et al., 2018; Zafar et al., 2018). Evidence indicates that depression and anxiety are strongly associated with each other, meaning similar factors can contribute to the presence of both conditions, for example Bibi et al. (2015) and Zeekash et al. (2018) both report academic responsibilities, and a poor working environment as factors significantly associated with depression and anxiety respectively.

Studies in this setting have also reported strong links between anxiety and irritable bowel syndrome (Afridi et al., 2017), ego defense mechanisms, and being female (Waqas et al., 2015). Other factors linked with depression in this setting include amount of time spent on social networking sites (Balouch et al., 2019), amount of physical activity (Ali et al., 2019; Sohail et al., 2018), substance abuse (Khan et al., 2006), and students' marital status (Zafar et al., 2017) where married students were found to be depressed more often than unmarried ones.

Table 1

Quality assessment of the studies using the AXIS tool (Downes et al., 2016).

Items									Study numbers								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Clear aims	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Appropriate study design	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Justified sample size	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	Yes	No	No	No
Clear target population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Representative sample	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	Yes	No	No	No
Representative selection	No	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	Yes	No	No	No
Non-responders categorised	No	No	No	No	No	No	No	No	No	No	No	N/A	No	No	N/A	N/A	No
Appropriate outcome variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Piloted measure	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Precision estimates	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Methods sufficiently described	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Basic data described	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Non-response bias	No	No	No	No	No	No	Yes	No	N/A	No	N/A	N/A	No	No	N/A	N/A	N/A
Non-responder information	No	No	No	No	No	No	No	No	N/A	No	N/A	N/A	No	No	N/A	N/A	N/A
Internal consistency	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Results for analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes
Discussion justified	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations discussed	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes
Conflict of interest/funding	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No

Items	Study numbers																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Ethic approval/consent	Yes	Yes	NR	Yes	Yes	Yes	Yes	Yes	Yes	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Items	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Clear aims	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Appropriate study design	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Justified sample size	No	No	No	No	No	No	No	No	No	No	No	No	Yes	N/A	Yes	No	No
Clear target population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Representative sample	NR	Yes	No	No	No	No	NR	NR	Yes	No	Yes	Yes	No	Yes	No	No	No
Representative selection	NR	Yes	No	NR	No	No	NR	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No
Non-responders categorised	N/A	No	No	No	No	No	N/A	No	No	N/A	No	No	N/A	No	No	No	N/A
Appropriate outcome variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Piloted measure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Precision estimates	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Methods sufficiently described	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes
Basic data described	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Non-response bias	N/A	N/A	N/A	No	N/A	Yes	N/A	N/A	No	N/A	No	No	N/A	No	No	No	N/A
Non-responder information	N/A	N/A	N/A	No	N/A	No	N/A	N/A	No	N/A	No	No	N/A	No	No	No	N/A
Internal consistency	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Results for all analyses	Yes	No	Yes	No	No	Yes	No	No	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
Discussion justified	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations discussed	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	No	Yes	Yes	Yes	No	No
Conflict of interest/funding	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Ethical approval/consent	Yes	Yes	Yes	NR	Yes	Yes	NR	NR	Yes	Yes	NR	Yes	Yes	Yes	Yes	Yes	Yes

Items	Study numbers															
	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Clear aims	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Appropriate study design	NR	Yes	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Justified sample size	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	No	No	No
Clear target population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Representative sample	Yes	No	No	No	No	No	Yes	NR	No	Yes	No	NR	No	Yes	No	No
Representative selection	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	No	NR	No	No	No	No
Non-responders categorised	No	N/A	N/A	No	No	No	N/A	N/A	N/A	No	No	No	No	No	No	N/A
Appropriate outcome variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NR	Yes	Yes	Yes	Yes
Piloted measure	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Precision estimates	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A
Methods sufficiently described	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Basic data described	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Non-response bias	No	N/A	N/A	No	N/A	Yes	N/A	N/A	N/A	No	No	No	N/A	No	No	N/A
Non-responder information	No	N/A	N/A	No	N/A	Yes	N/A	N/A	N/A	No	No	No	N/A	No	No	N/A
Internal consistency	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Results for all analyses	Yes	Yes	Yes	Yes	Yes	Yes	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion justified	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations discussed	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Conflict of interest/funding	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
Ethical approval/consent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NR	Yes	Yes	Yes	Yes

Note. N/A = not applicable, in studies with a response rate of 100%; NR = not reported.

Table 2

Data extracted from the studies.

SN	Source	Year	Period of study	Location	Sampling method	Sample size	Response rate	Measures	Student disciplines	% female
1	Abbas et al.	2015	2013	Unspecified	Total population	500	86.6%	Developed by researchers	Pharmacy	63.5%
2	Abrar et al.	2014	NR	Islamabad	Convenience	361	89.8%	AKUADS	Medicine	53.7%
3	Afridi et al.	2017	2015-16	Peshawar	Purposive	750	80.5%	GAD-7	Medicine	64.1%
4	Ali et al.	2014	2010	Karachi	Convenience	557	>80%	AKUADS	Engineering	44.5%
5	Ali et al.	2019	NR	Islamabad	Convenience	400	74.5%	MFQ	Unspecified	62%
6	Alvi et al.	2010	2007-08	Wah Cantonment	Convenience	393	71%	BDI-II, BAI	Medicine	72.4%
7	Azad et al.	2017	NR	Islamabad	Convenience	415	36.1%	BDI, BAI	Medicine	76.4%
8	Azim et al.	2019	2016-17	Karachi	Purposive	270	70%	DASS-21	Medicine	53%
9	Balouch et al.	2019	2016-17	Jamshoro	Random	212	100%	PHQ-9	Medicine	45.8%
10	Bibi et al.	2015	2014-15	Mansehra	Convenience	600	72.7%	BDI	Unspecified	45%
11	Bukhari et al.	2015	NR	Karachi	Purposive	331	100%	CES-D	Unspecified	50.2%
12	Bukhari et al.	2017	NR	Islamabad	Purposive	200	100%	DASS-21	Unspecified	50%
13	Buzdar et al.	2015	NR	Southern Punjab	Random	600	83.7%	DASS-21	Social sciences	100%
14	Chaudary	2016	2015	Punjab	Random	1308	91.4%	M-BDI	Social sciences, commerce,	49.8%

SN	Source	Year	Period of study	Location	Sampling method	Sample size	Response rate	Measures	Student disciplines	% female
									management sciences	
15	Deepak et al.	2017	2016	Karachi	Convenience	325	100%	AKUADS	Medicine	71.1%
16	Gani et al.	2018	2014	Islamabad	Convenience	200	100%	BDI	Medicine	50%
17	Ghayas et al.	2014	2012	Karachi	Convenience	408	100%	Zung Self-Rating Depression Scale	Unspecified	60.8%
18	Gitay et al.	2019	NR	Karachi	Unspecified	300	100%	PHQ-9	Health sciences	61.7%
19	Gul et al.	2020	2017-18	Dera Ismail Khan, Faisalabad, Peshawar, Rawalpindi	Random	1159	100%	Goldberg Depression Test	Unspecified	68.3%
20	Hashmi et al.	2014	2012-13	Karachi, Lahore	Convenience	437	100%	AKUADS	Medicine	59%
21	Hassan et al.	2018	NR	Lahore	Convenience	252	75%	AKUADS	Medicine	68%
22	Inam et al.	2003	NR	Karachi	Convenience	189	100%	AKUADS	Medicine	68%
23	Jadoon et al.	2010	2008	Multan	Convenience	815	59.1%	AKUADS	Medicine	46.7%
24	Javed	1994	NR	Unspecified	Unspecified	200	100%	GHQ, HADS	Engineering, unspecified	-
25	Kanwar et al.	2019	NR	Lahore	Convenience	393	76.8%	AKUADS	Medicine	26.7%

SN	Source	Year	Period of study	Location	Sampling method	Sample size	Response rate	Measures	Student disciplines	% female
26	Khan et al.	2006	NR	Karachi	Random	Unspecified	>90%	AKUADS	Medicine	59%
27	Khan et al.	2015	NR	Lahore	Convenience	110	100%	HADS	Medicine	32.7%
28	Khan et al.	2017a	2017	Lahore	Random	100	81%	DASS-21	Medicine	70.4%
29	Khan et al.	2017b	2017	Lahore	Random	650	77.7%	DASS-21	Medicine	64.4%
30	Khan et al.	2019	2015	Karachi	Convenience	150	100%	BDI	Medicine, nursing	52%
31	Kumar et al.	2019	2019	Karachi	Total population	450	69.3%	DASS-21	Medicine	84.6%
32	Liaquat et al.	2017	2013	Karachi	Convenience	250	84.4%	DASS-42	Medicine	62.1%
33	Marwat	2013	2011	Peshawar	Convenience	216	76.8%	Zung Self-Rating Depression Scale	Medicine	NR
34	Musharraf et al.	2018	NR	Islamabad, Rawalpindi	Convenience	508	100%	DASS-21	Unspecified	68.5%
35	Nadeem et al.	2017	NR	Southern Punjab	Random	800	90.3%	DASS-21	Unspecified	NR
36	Perveen et al.	2016	NR	Abbottabad	Stratified	1000	100%	QIDS, CES-D	Medicine	56.9%
37	Rab et al.	2008	2002	Lahore	Random	87	100%	Developed by researchers	Medicine	100%
38	Raza et al.	2018	2016-17	Jhelum	Consecutive non-probability	400	80.5%	DASS-14	Unspecified	62.25%

SN	Source	Year	Period of study	Location	Sampling method	Sample size	Response rate	Measures	Student disciplines	% female
39	Rizvi et al.	2015	NR	Islamabad, Rawalpindi	Purposive	66	100%	DASS-42	Medicine	57.6%
40	Saeed et al.	2017	2015-16	Lahore	Unspecified	753	53.7%	DASS-42	Social sciences, pharmacy, arts, IT	53.6%
41	Shafiullah et al.	2016	NR	Mardan	Random	100	100%	Developed by researchers	Medicine	50%
42	Sohail et al.	2018	2016-17	Lahore	Unspecified	283	100%	AKUADS	Medicine, nursing, dentistry	NR
43	Syed et al.	2018	2016-17	Various cities in Sindh	Non-probability purposeful	267	100%	DASS-42	Physiotherapy	75.3%
44	Waqas et al.	2015	NR	Lahore	Random	500	81.8%	HADS	Medicine	70%
45	Waqas et al.	2018	2014-15	Lahore	Convenience	500	81.8%	HADS	Medicine	61.9%
46	Yousaf et al.	2016	2016	Lahore	Unspecified	142	80.3%	KADS-6	Medicine	49%
47	Zafar et al.	2017	NR	Karachi	Convenience	300	100%	BDI-II	Medicine	72.7%
48	Zafar et al.	2018	2016	Unspecified	Purposive	703	60.3%	MHI	Unspecified	45%
49	Zafar et al.	2020	2015	Lahore	Convenience	763	70%	PHQ-9	Medicine	61.4%
50	Zeekash et al.	2018	NR	Lahore	Convenience	100	100%	ICD-10 criteria	Medicine	65%

Note. SN = study number, NR = not reported. Full names of measures can be found in Appendix 3.

Table 3

Prevalence rates of anxiety and depression.

Source	Year	Prevalence of anxiety	Prevalence of depression	Combined rate	Measure	Scoring
Abbas et al.	2015	-	62.4%	-	Developed by researchers	Unclear
Abrar et al.	2014	-	-	39.6%	AKUADS	Cut-off = >14
Afridi et al.	2017	23.7%	-	-	GAD-7	Cut-off = 10
Ali et al.	2014	-	73.8%	-	AKUADS	Cut-off = >19
Ali et al.	2019	-	42.3%	-	MFQ	Cut-off = >20
Alvi et al.	2010	47.7%	35.1%	-	BDI-II	Cut-off = 14
Azad et al.	2017	18.7%	64%	-	BDI	Cut-off = 14
Azim et al.	2019	72%	71%	-	DASS-21	Cut-off = >4 (anxiety), >5 (depression)
Balouch et al.	2019	-	100%	-	PHQ-9	Cut-off = >5
Bibi et al.	2015	-	10.2%	-	BDI	Cut-off = 14
Bukhari et al.	2015	-	84.9%	-	CES-D	Cut-off = >16
Bukhari et al.	2017	5%	6%	-	DASS-21	Cut-off = >4 (anxiety), >5 (depression)
Buzdar et al.	2015	73.9%	58.8%	-	M-BDI	Cut-off = >35
Chaudary	2016	-	33.1%	-		
Deepak et al.	2017	-	16%	-	AKUADS	Cut-off = >19
Gani et al.	2018	-	66%	-	BDI	Cut-off = >14
Ghayas et al.	2014	-	52.9%	-	Zung Self-Rating Depression Scale	Cut-off = >50

Source	Year	Prevalence of anxiety	Prevalence of depression	Combined rate	Measure	Scoring
Gitay et al.	2019	70%	85%	-	PHQ-9, GAD-7	Cut-off = >5, 10 (GAD)
Gul et al.	2020	-	85%	-	Goldberg depression test	Unclear
Hashmi et al.	2014	-	-	45.5%	AKUADS	Cut-off = >14
Hassan et al.	2018	-	-	60%	AKUADS	Cut-off = >14
Inam et al.	2003	-	-	60%	AKUADS	Cut-off = >14
Jadoon et al.	2010	-	-	43.89%	AKUADS	Cut-off = >14
Javed	1994	35%	30%	-	GHQ, HADS	
Kanwar et al.	2019	-	38.4%	-	AKUADS	Cut-off = >14
Khan et al.	2006	-	-	70%	AKUADS	Cut-off = >14
Khan et al.	2015	32.7%	10.9%	-	HADS	Cut-off = >8
Khan et al.	2017a	-	25%	-	DASS-21	Cut-off = >5
Khan et al.	2017b	78.6%	69.5%	-	DASS-21	Cut-off = >5 (depression), >4 (anxiety)
Khan et al.	2019	-	76%	-	BDI	Cut-off = >14
Kumar et al.	2019	74%	57.6%	-	DASS-21	Cut-off = >5
Liaquat et al.	2017	44.5%	37.9%	-	DASS-42	Cut-off = >8 (anxiety), >10 (depression)
Marwat	2013	-	17.5%	-	Zung Self-Rating Depression Scale	Cut-off = >50
Nadeem et al.	2017	74.9%	58.2%	-	DASS-21	Cut-off = >5
Perveen et al.	2016	-	57.25%	-	QIDS, CES-D	Cut-off = >9, >16
Rab et al.	2008	43.7%	19.5%	-	Developed by researchers	Unclear
Raza et al.	2018	0.93%	0.93%	-	DASS-14	Unclear

Source	Year	Prevalence of anxiety	Prevalence of depression	Combined rate	Measure	Scoring
Rizvi et al.	2015	74.2%	40.9%	-	DASS-42	Cut-off = >8 (anxiety), >10 (depression)
Saeed et al.	2017	58.2%	54.7%	-	DASS-42	Cut-off = >8 (anxiety), >10 (depression)
Shafiullah et al.	2016	-	55%	-	Developed by researchers	Unclear
Sohail et al.	2018	-	22.2%	-	AKUADS	Cut-off = >14
Syed et al.	2018	68.5%	47.9%	-	DASS-42	
Waqas et al.	2015	69.1%	28.9%	-	HADS	Cut-off = >8
Waqas et al.	2018	68.7%	28.9%	-	HADS	Cut-off = >8
Yousaf et al.	2016	-	63%	-	KADS-6	Cut-off = >6
Zafar et al.	2017	-	9%	-	BDI-II	Cut-off = >14
Zafar et al.	2020	-	74.9%	-	PHQ-9	Cut-off = >5

Note. Full names for measures can be found in Appendix 3.

Discussion

Summary of evidence

Perhaps the most consistent finding above has been that female students tend to score higher on anxiety and depression generally. This finding is congruent with global literature, which states that women are twice as likely as men to develop depression at some point in their lives, although irrefutable evidence on the causes has yet to be revealed (Kuehner, 2017). Women are also more likely to be diagnosed with an anxiety disorder, which leads to the very strong possibility of a diagnosis for major depressive disorder (McLean et al., 2011).

A key feature of the study sample in this review is the fact that more than half the studies (n = 26) were carried out in Lahore and Karachi, which are the two biggest, most urban cities in Pakistan. Despite their respective sizes and populations, they alone cannot be considered representative of the country as a whole. It is also worth noting that the majority of the studies in this review were based on a medical student population. During a literature search to identify similar prevalence studies in other areas of the world, it was found that medical students take up a large part of the data pool. It is possible that this field of research is particularly pertinent to medical professionals who may work with the students, and it is easy to recruit them into a study due to the convenience. However, this could present a skewed picture of the true prevalence of anxiety and/or depression amongst university students since the university experience for medical students is bound to be vastly different to that of students from other disciplines. It is understood that medical students are under duress from having to retain large amounts of information constantly, the stress from which could be reflected on their questionnaire scores. In some cases, they might also have been forced into studying medicine, which is sometimes the case in Pakistan especially. Loss of control over one's life choices could lead to a sense of despondency.

One study (Abbas et al., 2015) on pharmacy students reported information on how depression is perceived by the student population, and 63.7% stated that they would be unwilling to live with someone who had depression, 65.1% did not wish to socialise with someone who was depressed. Over half the sample was not willing to work alongside someone who was depressed. This refusal towards treating people who have mental illnesses with compassion is an unfortunate, pervasive reality especially in lower-income countries where mental health literacy is low. As mentioned earlier, studies conducted in Pakistan about attitudes towards mental health offer little hope for changing attitudes. Making this information about the prevalence of anxiety and depression in Pakistan, especially amongst the younger generation, public could help to validate people who have struggled with understanding them. In extreme

cases, many students have been known to turn to suicide, with the true causes unknown and incidents swept under the rug from shame. An analysis on student suicides in Pakistan reported that 25% of students had died by suicide in the year 2017, with cases beginning to rise from 2012 (Shakil, 2019). Anti-stigma campaigns and increased mental health awareness should be a starting point.

As Farooq et al. (2019) established, there is a correlation between anxiety and depression and chronic health conditions. Comorbid mental and physical health issues can result in increased dependency on caretakers, which has a rippling effect where they in turn may eventually need some sort of counselling to alleviate the stress they feel from looking after someone else fulltime. Although the sample in the above study was over the age of 30, undiagnosed and untreated anxiety and depression can cause further problems as time goes on. These issues may even begin during young adulthood, which could lead to loss of productivity. Pakistan's population is currently the youngest it has ever been, with 64% aged under 30 (Ahmad, 2018). The economy depends on an increasingly literate young population; the wellbeing of these students is vital to the wellbeing of society as a whole.

The risk factors identified in the literature can severely affect one's academic performance, motivation, and life satisfaction. The most common factors were a family history of depression, and the loss of a loved one. The latter supports the notion that mental health literacy should be increased; the more people that are aware of the condition, the greater the demand for treatment. Loss of a loved one could be dealt with appropriately through counselling, if it was available. Other factors such as issues with the way classes are conducted should be taken seriously by university authorities, since they are being labelled as stressors of anxiety and depression. Although this review has focused on risk factors, it would be worth exploring protective factors and effective coping strategies as well. Some were noted during the screening of the texts in this review, such as intrinsic religiousness reducing anxiety (Buzdar et al., 2015), being with friends, and praying (Chaudary, 2016; Nadeem et al., 2017). Investigating this aspect of mental health could provide valuable insight on how to tackle emotional issues by tailoring counselling sessions or therapies to the individual student's needs, or actively involving them in the process by leading them to help themselves. Identifying what they do to alleviate these issues could help to make the idea of treatment for psychological issues more palatable.

Limitations

This study has a few limitations. The first would be the fact that there was only one reviewer, and despite said reviewer's best efforts, it is possible that biases could have occurred during study selection or quality assessment. A second reviewer would undoubtedly have lent rigour to the review process. The

scope of the search could have been expanded to include other anxiety disorders, such as posttraumatic stress disorder (PTSD). The province of Khyber Pakhtunkhwa in northwest Pakistan has been affected by conflict, and it could be beneficial to explore the possible prevalence of PTSD or generalised anxiety in that area. Doing so could act as a catalyst to taking mental health more seriously and ensuring that adequate and appropriate treatment is available to those in need. Additionally, the search for this review was conducted five months ago and it is possible that more data could now be available to review.

Conclusions

This review explored data from 1994 until 2020, and the mean prevalence for anxiety and depression respectively was established to be 51.7% and 46.8% over that period of time. The evidence compiled in this review indicates that anxiety and depression are worth exploring not just in university students, but in Pakistan as a whole since local data on the prevalence of mental disorders is scarce. Mirza and Jenkins' (2004) work could be updated, since their current review is already fairly comprehensive. It would help to know, for example, which treatment options for common mental health issues such as anxiety and depression, are currently effective and take advantage of that information to advance practices even further. Further research in this field could only serve to better the lives of others, in the long-term perhaps even improving physical health outcomes.

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Appendix 1

Link to instructions for authors submitting to the International Journal of Psychology. Systematic reviews should follow PRISMA checklist and APA referencing.

https://onlinelibrary.wiley.com/page/journal/1464066x/homepage/forauthors.html

Appendix 2

Research project outline

Student number: 2496765

Supervisor: XXXXXX

<u>Brief intro and summary of literature</u>

It is generally acknowledged that students are more susceptible to poorer mental health than the general population (Saleem, Mahmood, & Naz, 2013). Major psychiatric conditions affecting contemporary youth include depression, anxiety, and stress (Buzdar, Ali, Nadeem, & Nadeem, 2014). Evidence suggests that mental health issues are a significant problem for university students in Pakistan, and studies looking into this have found varying, yet generally high, prevalence rates (Bibi, Blackwell, & Margraf, 2019). Anxiety and depression have been estimated to become the second most common cause of disability worldwide (Rab, Mamdou, & Nasir, 2008); the effects of emotional distress include impaired functioning, particularly in the classroom, and deteriorating performance (Inam, Saqib, & Alam, 2003).

Studies looking into mental health in university students in Pakistan have found that female students are more likely to experience poor mental health and high levels of stress (Khan et al., 2006; Rashid, Khaqan, & Shahid, 2018; Raza, Abbasi, Khurshid, & Ansari, 2018; Gitay et al., 2019); this has been attributed to the possibility that women are more likely to report psychological symptoms and feelings of stress (Inam, Saqib, & Alam, 2003). In addition to this point, most of these studies happen to have a majority of female participants, which would skew results. Being female was identified as a possible risk factor of susceptibility to developing anxiety and depression (Alvi, Assad, Ramzan, & Khan, 2010), as well as substance use, a family history of depression and anxiety, losing a close relative in the past year (Khan et al., 2006; Alvi, Assad, Ramzan, & Khan, 2010). Low levels of peer and familial support were also found to contribute to poor psychological health in university students (Jibeen, 2016). Academic stressors that played a role in poor mental health included incessant evaluations, the volume of material to be learned (Inam, Saqib, & Alam, 2003), and fatigue as a result of this (Khan et al., 2006). Lack of recognition and

support from teaching staff, poor quality feedback, and group activities to facilitate learning were also identified as moderate stress inducers (Rashid, Khaqan, & Shahid, 2018).

Due to the impact of poor mental health during university on cognitive functioning and learning (Khan et al., 2006), collating data from existing research could help to emphasise the need for further investigation in this area by highlighting the ongoing nature of his problem. Current findings could stand to be explored in order to possibly identify stressors early on, as well as particularly vulnerable students; doing so could aid the general understanding of these issues and help with policy making, and designing appropriate interventions and counselling services (Saleem, Mahmood, & Naz, 2013), ultimately leading to a strong need for more widespread promotion of positive mental health (Rashid, Khaqan, & Shahid, 2018).

Aims and research questions

What are the prevalence rates and associated risk factors/stressors of poor mental health in university students in Pakistan?

Proposed methods

Search strategy

Search terms to be used for this review are "mental health" AND "university student*" OR "university" OR "college student*" OR "college" AND "Pakistan". Once this search is complete, the terms "depression" and "anxiety" will be searched separately, combined with the above terms excluding "mental health".

Databases to be used are PubMed, PakMediNet, Journal of the College of Physicians and Surgeons of Pakistan, and the Journal of the Pakistan Medical Association. The last three databases will be used in order to avoid limiting searches by including the term "Pakistan" in the search, because the results from these databases are more likely to have taken place within Pakistan, without mentioning the country's name. The reference lists of relevant studies will also be scanned for additional papers that fall under the inclusion criteria.

There will be no restrictions on the timeframe in which the studies took place, although there will be a language restriction limiting the studies to be included that have been conducted and published in English.

Time constraints due to the deadline to submit the review are likely to act as a hindrance to the reviewer's ability to obtain translations for studies not conducted in English that might otherwise be relevant to the review.

Types of studies included

Inclusion criteria: studies published in English, looking into poor mental health generally specifically in university students in Pakistan, studies looking into depression and anxiety in university students in Pakistan, studies that take place in specific cities and/or provinces within Pakistan.

Exclusion criteria: studies that look into Pakistani university students along with those from another country.

Considerations of potential barriers against success of project

Not being able to find sufficient amount of studies that fit the inclusion criteria, and would therefore be worth reviewing.

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Appendix 3

Full names of measures used to assess prevalence of anxiety and depression.

Abbreviations	Names
AKUADS	Aga Khan University Anxiety and Depression Scale
BAI	Beck Anxiety Inventory
BDI, BDI-II	Beck Depression Inventory
CES-D	Center for Epidemiologic Studies Depression Scale
DASS-14, DASS-21, DASS-42	Depression, Anxiety and Stress Scale
GHQ	General Health Questionnaire
HADS	Hospital Anxiety and Depression Scale
KADS-6	Kutcher Adolescent Depression Scale
M-BDI	Modified Beck Depression Inventory
MHI	Mental Health Inventory
PHQ-9	Patient Health Questionnaire
QIDS	Quick Inventory of Depressive Symptomatology

Appendix 4

Brief background on geographical locations.

Name	Note
Abbottabad	City in the province of Khyber Pakhtunkhwa.
Dera Ismail Khan	City in the province of Khyber Pakhtunkhwa.
Faisalabad	City in the province of Punjab.
Islamabad	Capital of Pakistan.
Jamshoro	City in the province of Sindh.
Jhelum	City in the province of Punjab.
Karachi	Capital city of the province of Sindh, largest city in Pakistan.
Lahore	Capital city of the province of Punjab, second largest city in Pakistan.
Mansehra	City in the province of Khyber Pakhtunkhwa.
Mardan	City in the province of Khyber Pakhtunkhwa.
Multan	City in the province of Punjab.
Peshawar	Capital city of the province of Khyber Pakhtunkhwa.
Rawalpindi	City in the province of Punjab, adjacent to Islamabad.
Wah Cantonment	Military city in the province of Punjab.
Punjab	Most populous province in Pakistan.
Sindh	Second most populous province in Pakistan.

Appendix 5

Appraisal tool for cross-sectional studies (Downes et al., 2016a).

Question		Yes	No	Don't know/comment
Introduction				
1.	Were the aims/objectives of the study clear?			
Methods				
2.	Was the study design appropriate for the stated aim(s)?			
3.	Was the sample size justified?			
4.	Was the target/reference population clearly defined? (Is it clear who the research was about?)			
5.	Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?			
6.	Was the selection process likely to select subjects/participants that were representative of the target/population under investigation?			
7.	Were measures undertaken to address and categorise non-responders?			
8.	Were the risk factor and outcome variables measured appropriate to the aims of the study?			
9.	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?			
10.	Is it clear what was used to determine statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)			
11.	Were the methods (including statistical methods) sufficiently described to enable them to be repeated?			
Results				
12.	Were the basic data adequately described?			

13.	Does the response rate raise concerns about non-response bias?			
14.	If appropriate, was information about non-responders described?			
15.	Were the results internally consistent?			
16.	Were the results presented for all the analyses described in the methods?			
Discussion				
17.	Were the author's discussions and conclusions justified by the results?			
18.	Were the limitations of the study discussed?			
Other				
19.	Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?			
20.	Was ethical approval or consent of participants attained?			

Appendix 6

Data extraction form.

Data to be extracted	Notes
Title of study	
Author	
Year of publication	
Location	
Period of study	
Study objective as stated by authors	
Study design	
Inclusion of sufficient data to assess validity of conclusions?	
Measures used to assess anxiety and/or depression	
Size of achieved sample	
Response rate	
Age of participants	
Sex of participants	
Student discipline	
Urban or rural	
Type of analysis	
Sampling method	
How tests were administered	
Findings	