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Abstract

Background: The mental health of university students is a widely recognized global concern. The transition to university life marks a crucial developmental phase characterized by individuation, the establishment of new social connections, and increased autonomy and responsibility. This period aligns with continued, rapid brain development at a time when university students are exposed to multiple risk factors known to affect mental health, including psychosocial stressors, recreational drug use, alcohol binging, and disruptions in sleep patterns. Mental health disorders typically present before or during young adulthood, often going unrecognized for years, resulting in significant delays in receiving treatment. Failing to adequately address mental health issues in a timely fashion can lead to the progression of more complex outcomes, such as school dropout, addiction, and self-harm. Indeed, the international prevalence estimates of mental health disorders reveal higher rates among college students

compared to the general population. For example, a multicenter study involving 13,984 students from eight countries, led by the World Health Organization (WHO), demonstrated that one third met clinical criteria for a psychiatric disorder in the previous year (Auerbach et al., 2018). The most frequently reported were depressive disorders (18.5%) and anxiety disorders (16.7-18.6%), followed by alcohol (6.8%) and other substance use disorders (3.0%). Moreover, approximately 22.6% of university students reported experiencing suicidal thoughts. Tragically, suicide stands as the second leading cause of death within this population (Sivertsen et al., 2019).

The presence of psychiatric disorders is linked to numerous detrimental consequences both in the short and long term. In the short term, individuals may experience a decline in their quality of life, poorer academic performance, increased absenteeism and a higher likelihood of course dropout. In the long term, individuals endure lower quality of life, higher unemployment rates, and socioeconomic impairment (Duffy et al., 2019); (Dyrbye et al., 2012).

Though the alarming data presented above were derived from studies conducted in countries with diverse income levels, to date, there is a disproportionately limited body of evidence addressing the mental health issues of young adults attending universities in low income countries. In Brazil, for example, there are approximately eight million students enrolled in 2714 higher education institutions (INEP, 2021; (Power BI Report, n.d.). The few studies that have been conducted in Brazil have tended to focus on medical students; also unveiling concerns about rates of mental distress in this population (Miguel et al., 2021). For example, approximately 37% were under psychiatric treatment and 4.5% had attempted suicide. The most prevalent diagnoses were depression (39.1%) and anxiety disorders/phobias (33.2%), while severe mental health disorders like psychotic disorders (3.7%) and bipolar disorder (1.9%) were less common (Campos et al., 2017).

Here we aim to address numerous gaps in the current national and international literature. First, we will address the mental health of university-aged students in a low income country, namely Brazil. In addition, given that previous studies have been plagued by selection biases owing to the challenge of engaging otherwise healthy young adults in research surveys, we will utilize an engaging web-based survey to mitigate this possibility. The survey will also address another largely unexplored facet of mental health issues, namely the longitudinal course of mental health and quality of life during college. To this end, we propose to measure the mental health of 8,028 undergraduate students of the UniEduK group. UniEduK is a private university located in two medium-sized cities in the southeast of Brazil (Indaiatuba and Jaguariúna), offering numerous undergraduate courses in technical fields (e.g., administration, accounting, architecture, law, engineering) and health sciences (e.g., medicine, nursing, psychology, biomedicine, veterinary medicine). To achieve this goal, we carefully designed an engaging web-based mental health survey suitable for Brazilian Students considering three main challenges: the large number of individuals we aim to screen (n = 8,028), the relatively low budget and resources available to us, and the expected low response rates for this kind of survey.

Objective: The aim of this paper is to describe the methods used in the design of a web-based mental health survey to be administered in a private Brazilian University.

Methods: 3.1 Overall design

The study will be based on validated self-report questionnaires, structured within an electronic web-based survey. The protocol will be repeated every year, evaluating mental health trajectories over time, and including new incoming students to account for any trends specific to the new cohorts of students. The data will be analyzed cross-sectionally (with descriptive and association analyses between the different constructs measured) and longitudinally (with trajectory analyses at the level of the individual, area of academic concentration, and institution).

3.2 Participants/Recruitment

All undergraduate students from UniEduk (n = 8,028) will be invited to participate annually through an email message briefly explaining the research and encouraging participation via the electronic survey. The only exclusion criteria are related to limitations in accessing or responding to the survey (i.e., no access to electronic devices or internet connection; being illiterate [both are considered to be of negligible occurrence in this specific setting]).

We have devised several strategies aimed at increasing participation. First, we will conduct university wide media campaigns to promote awareness concerning mental health and discuss the importance of the study. Second, professors of all disciplines will be encouraged to remind students to engage in the survey. Third, non-responders and survey non-completers will receive three invitation reminders via email, followed by three reminders via text message (WhatsApp). Importantly, students will be informed that the time spent with the survey will count as an equivalent complementary academic activity. All these steps will be executed automatically and anonymously to ensure students' privacy.

When invited, students are required to read and sign an informed consent twice a year. They will be informed at this time that declining participation will not cause any harm to their academic standing or relationship with the University and that they will not receive any more invitations.

3.3 Instruments and Research Requirements

We selected empirically validated psychometric self-report questionnaires, with a validated Brazilian Portuguese translation, that can be presented electronically. A typical dilemma encountered with a survey of this type, is the tension between having enough items to adequately assess the phenotypes we aimed to measure, and the impact that a time consuming survey can have on the

engagement rate of participants. To address this dilemma, we propose a two-step strategy (Figure 1). In the first step, in addition to collecting sociodemographic and overall lifestyle/quality of life information (SHORT-SMILE) (De Boni et al., 2023), we will screen for an array of mental health conditions using the DSM-5 Cross-Sectional Adult Symptoms Scale DSM-5 Level 1 (DSM-5-TR Online Assessment Measures, n.d.) and a short version of the Adult Self Report Scale for Attention Deficit/Hyperactivity Disorder (ASRS-18) (Kessler et al., 2005) (Table 1). In the second step, participants scoring above an indicated threshold within a specific domain will be administered more detailed psychometric scales. These scales could relate to depression, mania, generalized anxiety, sleeping disorders, borderline personality disorder, obsessive-compulsive disorder, attention-deficit/hyperactivity disorder and/or substance use (Table 2). After administration of relevant scales, the participant will be given the option to respond to a questionnaire about personality traits (i.e, Big Five Inventory (Roiz Junior et al., 2023)). Finally, the total time to complete the questionnaire is estimated to be approximately 20 to 40 minutes, depending on the domains assessed.

3.4 Data Collection Instruments

Data collection will be performed through Research Electronic Data Capture (REDCap), as it is a secure online platform for data management that allows the presentation of generalizable online instruments and the database storage. The platform is designed to support data capture for research studies while protecting participant anonymity (Tamuhla et al., 2022). This platform provides a convenient “Survey Queue” for participants to access the survey questionnaires and a “to-do list” so they can keep track of their progress. This allows for the tracking of initial participation, completeness status, and longitudinal data collection for all participants. The REDCap feature best suited to address automation of the communication process and, furthermore, better data collection is the Automated Invitations. The participants receive an individual link and we are able to choose how many reminders will be sent as well as their periodization.

3.5 Survey Distribution Tools

We will upload student data straight from a file containing the emails of all enrolled students (provided by the university's administration sector), in order to generate a unique individual ID link for each student. This will allow us to track the participants’ survey engagement/completion rate.

3.6 Reports and Alerts

“Reports and alerts” are research tools built into the REDCap platform to keep track of certain events and expected outcomes about the collected data. Our main use of this information will be to keep track of overall completion rates. To this end, we will first establish which information is needed for these reports, and apply the logic criteria that will filter our results. The report then queries all records and returns those that match the criteria.

The same principle will also be applied to suicide risk monitoring (Figure 2), to ensure the security of the participants. This monitoring procedure is based on the answers given by the participants in the Cross-Sectional Adult Level 1 Symptoms and PHQ-9 Scales. Specifically, REDCap is set up such that participants answering in the affirmative to either of two questions directly addressing 1) suicidal ideation or 2) suicide plans, automatically generates an email alert notifying the study team. The study team then immediately notifies a relevant healthcare team associated with our research group. Upon receiving this notification, the health care team will contact the participant to offer them appropriate psychiatric care. If the participant does not answer the first contact, the health care team will call again every day for three days. If the research participant accepts the offered care, they will be evaluated by psychiatry professionals and given necessary referrals. If they do not agree, the study team will register this non-agreement and monitoring by the research team will end.

3.7 Statistics analyses

As we will be assessing students longitudinally (annually) during their university journey, we will be able to apply numerous appropriate methodological designs in the statistical analyses including cross-sectional, accelerated cohorts, and traditional cohorts.

3.7.1 Simple Cross-Sectional Analyses

Descriptive statistics will be performed on the collected variables, with reports divided by categories of interest (e.g., academic courses enrolled, sociodemographic data, etc.). Simple statistical associations will be conducted through comparisons of independent groups using the Student's t-test (for variables with a normal distribution), the Mann-Whitney test (for variables with a non-normal distribution), or ANOVA (depending on the number of groups studied). These analyses will associate quality of life and mental health indices with these categories of interest, as well as with university dropout rates and academic performance. Linear and logistic regressions will be conducted to control for confounding variables such as gender, age, and socioeconomic status. The anticipated analyses include, but are not necessarily limited to, the following: comparing quality of life, personality traits, and the prevalence of psychiatric symptoms among students in various academic courses offered by the university; and exploring associations between socioeconomic status, quality of life, and psychiatric symptoms to identify potential risk and protective factors.

3.7.2 Accelerated Cohort Cross-Sectional Analyses
Taking advantage of the large sample size and the design tracking all enrolled students from the first to the last semester of each course, we can use cross-sectional data to compare data by course and semester (or year) for each student, inferring possible changes in these indices from the beginning to the end of the course. For this purpose, Generalized Estimation Equations (GEE) analyses will be designed, using the independent variable of semester/year as a substitute for time in these analyses, while controlling for confounds such as gender, age, and socioeconomic status.

3.7.3 Longitudinal Analyses/Cohort Analyses
By following students longitudinally during their university journey, we will be able to analyze data using Generalized Estimation Equations; including time as an independent variable will allow for the detection of nonlinear variations in outcomes and, in turn, address the evolution of mental health symptomatology in individuals.

3.8 Ethical aspects
This research was approved by the Research Ethics Committee of the UNIFAJ University Center from UniEduk (no. 6.153.870, 2023), and will be carried out in accordance with the recommendations of Resolution no. 466/2012 of the National Health Council (Conselho Nacional de Saúde, n.d.). Students will be invited to participate and informed about the objectives and methods. They will also be provided with a guarantee of confidentiality and anonymity. The Informed Consent Form (ICF) will be presented to all participants via an online form. Participants will be instructed to read the ICF and express their agreement or otherwise to the question: "Have you understood the guidelines and do you agree to participate freely, knowledgeably and spontaneously in this research?" If they agree, they are asked to enter their full name so that it can be attached to their acceptance to take part in the study. The participant will then be directed to a link to the online survey. If they do not agree, the participant will receive a thank you note and the contact will be closed.

Results: Discussion:
The psychological well-being of young adult college students is gaining significant attention. This is appropriate, as it is one of the major determinants of their overall academic success, personal development, and future prospects. Meanwhile, the existing literature suffers from a dearth of evidence concerning the mental health of university students in low income countries. The present study protocol describes a proposal to systematically and longitudinally survey the mental health of a large population of university students in Brazil. Our plan is based upon methodological decisions that balance quality, precision, scalability, cost, and the likelihood of participant engagement.
Among the challenges encountered during the design of this web-based mental health survey, we have highlighted the need to assess a large number of potential participants (n = 8,028) while aiming for a maximum response rate to increase generalizability. Ethical considerations addressed here are related to the importance of ensuring data privacy and interaction with the local health care services to provide assistance in cases of psychiatric emergency (i.e., risk of suicide). We have also strived for this longitudinal study proposal to be as cost-efficient as possible considering financial constraints.
Our proposed use of an internet portal will improve participant engagement, data integration and reduce longitudinal data collection time and expense (Donohoe et al., 2012)(Callegaro et al., 2015). Indeed, automated data capture minimizes the need for paid researchers to run participants and enter data, while also reducing data entry errors (Alessi & Martin, 2010). Finally, since our survey involves multiple questionnaires, the platform allows for easier and more engaging access for potential participants (Bernard, 2011).

Limitations:
Of course, there are disadvantages associated with online research. For example, open-ended questions cannot be explored with immediate follow-up questions and participants are unable to seek clarification of ambiguous items (Andrews et al., 2003). To address this issue, in the present survey, participants can easily email the project team with any questions they may have.
Selection bias presents another challenge for online research. Internet access is affected by myriad variables including income, geographical location, mental health status and age. (Ball, 2019)(Gulliver et al., 2010). We do not anticipate serious issues with internet accessibility. UniEduk has free internet access for all students. In addition, there were 181.8 million internet users in Brazil at the beginning of 2023, which means 84.3% of the population (Kemp, 2023); and the southeast, where UniEduk is, has an even greater user concentration. Our plan to remind participants via WhatsApp to finish their questions is sound, as WhatsApp is the most used social media by Brazilians, around 169 million (Kemp, 2023). Thus, though we cannot fully account for all these possibilities, the present strategy maximizes accessibility in a way that will mitigate these potential confounds and, consequently, increase response rate.
After identifying participants, the present protocol contains strategies to maximize the probability that participants will continue to engage with and complete the survey. For example, one way to increase engagement is to provide participants with information about the study that a) piques their interest, b) helps them understand the importance of their participation in mental health research, and c) increases their confidence about participating. To this end, the research team will hold meetings with UniEduk course coordinators in order to transmit detailed study information so that it reaches the students. Furthermore, a two-

minute video will be sent to all participants. This video contains information about the research team, the reason for the research and its objectives, details about the questionnaires (application time, confidentiality, freedom to decline) and the opportunity to ask questions via email. Our intention is to demonstrate the importance of participation in promoting mental health among the university population.

The security of collected data is ensured by the REDCap platform, a trusted and secure data collection and storage platform (Patridge & Bardyn, 2018) used throughout the scientific community. The platform allows for the long-term reduction of research costs, the possibility of utilization on many devices, and rapid data entry, review and analysis (Walther et al., 2011).

The data analyses in this project will include cross-sectional, accelerated cohorts, and traditional cohorts. Each analysis aims to summarize the data collected and integrate information about the mental health of this population. The cross-sectional analysis will allow us to understand the Brazilian university population in order to think about intervention strategies. As noted in the Introduction, there is a paucity of data that has been collected from low income countries. Existing studies were carried out mainly with students from specific courses (Pacheco et al., 2017) – national studies covering a range of degrees are rare. This survey is a structured means for assessing this population and their quality of life, given that this period represents a hub that critically impacts their responsibilities, mental health and values (Aceijas et al., 2017). The main intention of the present survey methodology is to inform future preventative measures. It has been well established that preventive actions are feasible, cost effective and efficient in improving overall mental health (Arango et al., 2018). We believe that the results of this survey can guide the design and implementation of preventive programs destined to have a positive impact on the mental health of university students.

Conclusions: College and university students have high rates of mental health issues. We have developed and described a web-based mental health survey that will allow us to evaluate and detect these issues with low cost and reasonable response rate in a University in Brazil. These efforts will allow us, in the near future, to monitor and test the efficiency and impact of mental health preventive programs.

This model could be scaled up across other universities in Brazil to easily assess the mental health status of their students and have a significant impact on the mental health of our communities. Clinical Trial: Study registration: This study was registered in the Open Science Framework (OSF) under the https://doi.org/10.17605/OSF.IO/AM5WS

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Title: Study protocol for a web-based Mental Health Survey in a Brazilian University

ABSTRACT:

Background: Global concern for the mental well-being of university students is appropriately on the rise. Prevalence studies worldwide indicate that rates of mental health disorders among young adults attending university have reached 30%, with a staggering 80% of these individuals not receiving proper treatment ((Auerbach et al., 2018)). This not only adversely affects their academic performance but, more crucially, impairs their overall quality of life. In Brazil, where approximately eight million students are enrolled in universities, there exists a noticeable lack of studies addressing their mental health. In response, we created a web-based mental health survey tailored to the context of Brazilian university students. The primary objective of this paper is to outline the methods employed in designing this web-based mental health survey to provide insights into our approach to understanding and addressing mental health issues among university students in Brazil.

Methods: In this web-based mental health survey, undergraduate students (target n = 8028) from two universities in Brazil (UNIFAJ and UNIMAX) will respond to three self-report screening questionnaires: 1) a measure of lifestyle and quality of life (SHORT-SMILE), 2) a screen for mental health disorders (DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure Adult) and 3) a summarized version of the Adult Self-Report Scale for Attention Deficit/Hyperactivity Disorder. Students that receive high scores for specific constructs (i.e., depression, mania, generalized anxiety, sleeping disorders, borderline personality disorder, obsessive-compulsive disorder, attention-deficit/hyperactivity disorder and substance use disorders) will be administered more extensive standardized symptomatology scales. The three questionnaires and appropriate follow-up scales will be repeated every year within the same population to evaluate students over time. In addition, each year we will include new incoming

students. The data will be analyzed cross-sectionally (with descriptive and association analysis between the different constructs measured) and longitudinally (with trajectory analyses at the level of the individual, area of academic concentration, and institution).

Discussion: This survey design will provide a scalable, low-cost framework for the longitudinal evaluation of mental health conditions among college students in Brazil.

Study registration: This study was registered in the Open Science Framework (OSF) under the https://doi.org/10.17605/OSF.IO/AM5WS

Kew-words: study design; college and university students; mental health screening;

1. Background

The mental health of university students is a widely recognized global concern. The transition to university life marks a crucial developmental phase characterized by individuation, the establishment of new social connections, and increased autonomy and responsibility. This period aligns with continued, rapid brain development at a time when university students are exposed to multiple risk factors known to affect mental health, including psychosocial stressors, recreational drug use, alcohol binging, and disruptions in sleep patterns. Mental health disorders typically present before or during young adulthood, often going unrecognized for years, resulting in significant delays in receiving treatment. Failing to adequately address mental health issues in a timely fashion can lead to the progression of more complex outcomes, such as school dropout, addiction, and self-harm. Indeed, the international prevalence estimates of mental health disorders reveal higher rates among college students compared to the general population. For example, a multicenter study involving 13,984 students from eight countries, led by the World Health Organization (WHO), demonstrated that one third met clinical criteria for a psychiatric disorder in the previous year

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2. Objective

The aim of this paper is to describe the methods used in the design of a web-based mental health survey to be administered in a private Brazilian University.

3. Methods

3.1 Overall design

The study will be based on validated self-report questionnaires, structured within an electronic web-based survey. The protocol will be repeated every year, evaluating mental health trajectories over time, and including new incoming students to account for any trends specific to the new cohorts of students. The data will be analyzed cross-sectionally (with descriptive

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3.3 Instruments and Research Requirements

We selected empirically validated psychometric self-report questionnaires, with a

validated Brazilian Portuguese translation, that can be presented electronically. A typical dilemma encountered with a survey of this type, is the tension between having enough items to adequately assess the phenotypes we aimed to measure, and the impact that a time consuming survey can have on the engagement rate of participants. To address this dilemma, we propose a two-step strategy (Figure 1). In the first step, in addition to collecting sociodemographic and overall lifestyle/quality of life information (SHORT-SMILE) (De Boni et al., 2023), we will screen for an array of mental health conditions using the DSM-5 Cross-Sectional Adult Symptoms Scale DSM-5 Level 1 (*DSM-5-TR Online Assessment Measures*, n.d.) and a short version of the Adult Self Report Scale for Attention Deficit/Hyperactivity Disorder (ASRS-18) (Kessler et al., 2005) (Table 1). In the second step, participants scoring above an indicated threshold within a specific domain will be administered more detailed psychometric scales. These scales could relate to depression, mania, generalized anxiety, sleeping disorders, borderline personality disorder, obsessive-compulsive disorder, attention-deficit/hyperactivity disorder and/or substance use (Table 2). After administration of relevant scales, the participant will be given the option to respond to a questionnaire about personality traits (i.e, Big Five Inventory (Roiz Junior et al., 2023)). Finally, the total time to complete the questionnaire is estimated to be approximately 20 to 40 minutes, depending on the domains assessed.

Figure 1 - Initial data collection scheme

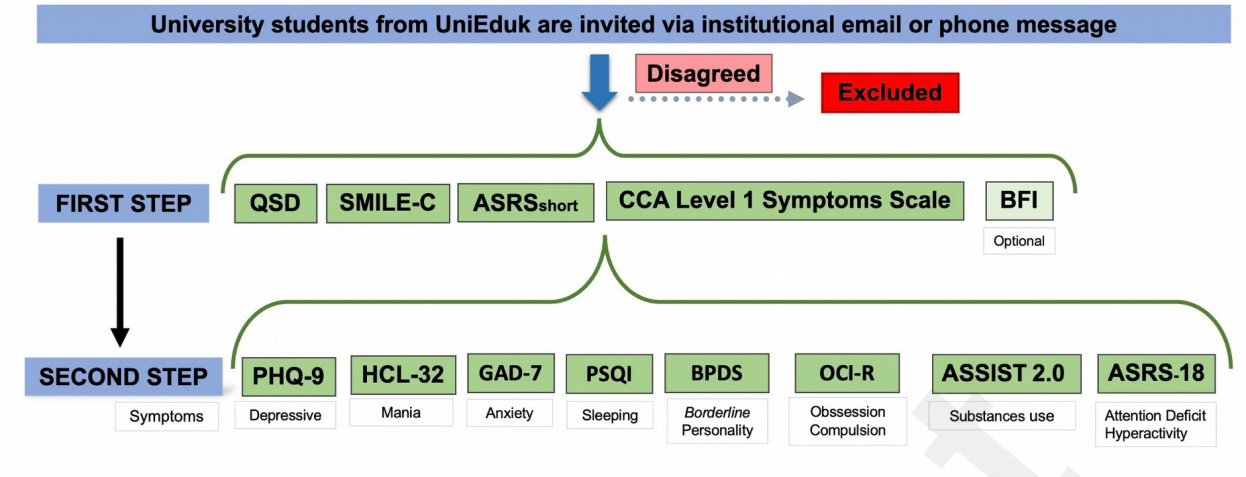


Table 1 - Instruments to be used in Step 1

Instruments	Description
Sociodemographic Questionnaire (QSD)	Questionnaire developed specifically for this study, including age, sexual identity and orientation, income, academic course, professional and career expectations, religiosity, use of social networks, and medical, psychiatric or psychotherapeutic history.
The University Short Multidimensional Inventory Lifestyle Evaluation (SMILE-C)	Multidimensional assessment of lifestyle in seven domains (diet, substance use, physical activity, stress management, social relationship, sleep and screen time), along with an overall lifestyle score. The instrument comprises 24 questions that evaluate the frequency of behaviors considered healthy, with a response scale ranging from 0 to 4, where a higher score corresponds to a healthier lifestyle.
Adult Self Report Scale (ASRS-18)	Assesses symptoms of Attention Deficit/Hyperactivity Disorder (ADHD) in adults, over the past 6 months, via 18

	items divided into 2 domains: A (inattention) and B (hyperactivity-impulsivity). Responses for domain A vary as follows: 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = very often. As a screening measure, all participants will complete only the short version of this scale, which consists of 4 items (4, 5, 6, and 9) from part A and 2 items (1, 5) from part B (hyperactivity). Those who score above 4 points on the short version will receive the complete version. Individuals are considered to have a possible diagnosis if they present at least six symptoms in at least one of the domains, or in both.
Cross-Sectional Adult Level 1 Symptoms Scale (CCA Level 1 Symptoms Scale)	Comprises 23 screening items that assess the frequency and intensity of symptoms across 13 domains of relevant symptomatology to frequent and/or severe psychiatric diagnoses. These domains include: sadness, irritability, mania, anxiety, soma27tic symptoms, suicidal ideation, psychosis, sleep disturbance, memory, repetitive thoughts and behaviors, dissociation, personality functioning and substance use. Each item is rated on a 5-point scale (0 = not at all; 1= very mild or rarely; 2= mild or several days; 3= moderate or more than half the days and 4= severe or nearly every day).

Big Five Inventory (BFI)	The "Big Five" is an established model that analyzes 5 dimensions of personality: Extroversion (tendency towards assertiveness and sociability), Agreeableness (tendency towards reliability and altruism), Conscientiousness (tendency to be careful and diligent), Neuroticism (tendency towards negative emotions and sadness), and Openness (tendency towards creativity and imagination). Likert-type scale with 44 items, where responses range from 1 (totally disagree), 2 (disagree a little), 3 (neither agree nor disagree), 4 (agree a little), to 5 (totally agree).

Table 2 - Instruments to be used in Step 2

Scale	Screening	Description
Depression Patient Health Questionnaire-9 (PHQ-9)	Mild or higher score in domain I	Consists of nine items corresponding to the diagnostic criteria for Depression disorder from the DSM-IV-TR. Symptoms are assessed based on the previous two weeks and the intensity is measured on a Likert

		scale of 0 to 3 points, corresponding to responses of 0 = "not at all," 1 = "several days," 2 = "more than half the days," and 3 = "nearly every day." The tenth question evaluates the impact of these symptoms on daily activities, such as work and study. A score equal to or above 10 indicates a possible depressive episode.
Hypomania Checklist scale (HCL-32)	Mild or higher score in domain III	Designed for screening manic symptoms during periods when participants have experienced excitement, euphoria, or elevated mood. The questionnaire consists of two multiple-choice items and 32 dichotomous response items (yes or no). Each "yes" response is equivalent to one point, and total scores exceeding 18 indicate possible bipolar disorder.
Generalized	Mild or higher	Consists of seven items

Anxiety Disorder Scale-7 (GAD-7)	score in domain IV	corresponding to the diagnostic criteria for Generalized Anxiety Disorder from the DSM-IV-TR. The items assess how much the participant has been bothered by those symptoms in the past 2 weeks. The intensity is measured on a Likert scale of 0 to 3 points, corresponding to responses of 0 = "not at all," 1 = "several days," 2 = "more than half the days," and 3 = "nearly every day." Scores between 10-14 correspond to moderate symptoms, and scores above 15 indicate severe symptoms
Pittsburgh Sleep Questionnaire (PSQI)	Mild or higher score in domain VIII	Assesses the quality of sleep over the past month and provides an index of the severity and nature of sleep problems. The instrument consists of 19 self-administered questions grouped into seven components. It is a Likert-type scale ranging from 0 to 3, corresponding to 0 = never, 1 = less than once a week, 2 = once or twice a week, and

		3 = three or more times a week. A score equal to or greater than 5 is indicative of sleep problems.
Borderline Personality Disorder scale (BPDS)	Very mild or greater score of suicidal ideation (domain VI), or mild or greater score of somatic symptoms (domain V) and/or dissociation (domain XI) and/or personality functioning (domain XII)	Instrument for the evaluation of borderline disorder typical symptoms. It consists of 23 items where individuals reflect on symptoms experienced in the week prior to assessment. This scale employs a Likert-type scale ranging from 0 to 4, with 0 = not at all, 1 = a little, 2 = considerably, 3 = very, and 4 = very strongly. Scores above 16 suggest significant symptoms.
Obsessive thoughts and behavior Obsession and Compulsion Inventory (OCI-R)	Mild or higher score in domain X	Self-administered scale for assessing obsessive-compulsive symptoms. It comprises 18 items that assess the intensity of symptoms using a Likert-type scale ranging from 0 to 4, where 0 = not at all, 1 = a little, 2 =

		moderately, 3 = very, and 4 = extremely. Scores above 18 indicate the possibility of Obsessive-Compulsive Disorder.
Alcohol, Smoking and Substance Involvement Screening Test (ASSIST 2.0)	Very mild or higher score in domain XIII	Consists of eight questions about the use of nine classes of psychoactive substances (tobacco, alcohol, marijuana, cocaine, stimulants, sedatives, inhalants, hallucinogens, and opioids). The questions cover the lifetime frequency of use as well as the prior three months; problems related to use; concern about the use by people close to the user; impairment in the performance of expected tasks; unsuccessful attempts to quit or reduce use; feelings of compulsion; and injectable use. Each response corresponds to a score ranging from 0 to 4, with a total sum ranging from 0 to 20. Scores in

		the range of 0 to 3 are considered indicative of occasional use, scores from 4 to 15 suggest abuse, and scores of ≥ 16 are suggestive of dependence.

3.4 Data Collection Instruments

Data collection will be performed through Research Electronic Data Capture (REDCap), as it is a secure online platform for data management that allows the presentation of generalizable online instruments and the database storage. The platform is designed to support data capture for research studies while protecting participant anonymity (Tamuhla et al., 2022). This platform provides a convenient “Survey Queue” for participants to access the survey questionnaires and a “to-do list” so they can keep track of their progress. This allows for the tracking of initial participation, completeness status, and longitudinal data collection for all participants. The REDCap feature best suited to address automation of the communication process and, furthermore, better data collection is the Automated Invitations. The participants receive an individual link and we are able to choose how many reminders will be sent as well as their periodization.

3.5 Survey Distribution Tools

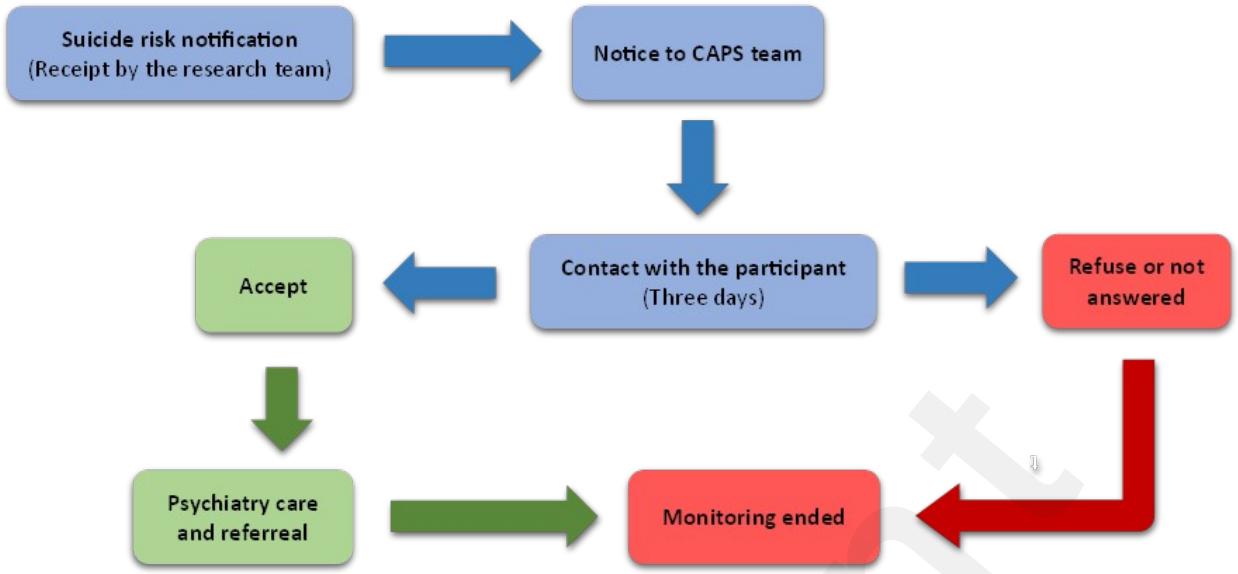
We will upload student data straight from a file containing the emails of all enrolled students (provided by the university's administration sector), in order to generate a unique individual ID link for each student. This will allow us to track the participants’ survey engagement/completion rate.

3.6 Reports and Alerts

"Reports and alerts" are research tools built into the REDCap platform to keep track of certain events and expected outcomes about the collected data. Our main use of this information will be to keep track of overall completion rates. To this end, we will first establish which information is needed for these reports, and apply the logic criteria that will filter our results. The report then queries all records and returns those that match the criteria.

The same principle will also be applied to suicide risk monitoring (Figure 2), to ensure the security of the participants. This monitoring procedure is based on the answers given by the participants in the Cross-Sectional Adult Level 1 Symptoms and PHQ-9 Scales. Specifically, REDCap is set up such that participants answering in the affirmative to either of two questions directly addressing 1) suicidal ideation or 2) suicide plans, automatically generates an email alert notifying the study team. The study team then immediately notifies a relevant healthcare team associated with our research group. Upon receiving this notification, the health care team will contact the participant to offer them appropriate psychiatric care. If the participant does not answer the first contact, the health care team will call again every day for three days. If the research participant accepts the offered care, they will be evaluated by psychiatry professionals and given necessary referrals. If they do not agree, the study team will register this non-agreement and monitoring by the research team will end.

Figure 2 - Suicide risk monitoring



3.7 Statistics analyses

As we will be assessing students longitudinally (annually) during their university journey, we will be able to apply numerous appropriate methodological designs in the statistical analyses including cross-sectional, accelerated cohorts, and traditional cohorts.

3.7.1 Simple Cross-Sectional Analyses

Descriptive statistics will be performed on the collected variables, with reports divided by categories of interest (e.g., academic courses enrolled, sociodemographic data, etc.). Simple statistical associations will be conducted through comparisons of independent groups using the Student's t-test (for variables with a normal distribution), the Mann-Whitney test (for variables with a non-normal distribution), or ANOVA (depending on the number of groups studied). These analyses will associate quality of life and mental health indices with these categories of interest, as well as with university dropout rates and academic performance. Linear and logistic regressions will be conducted to control for confounding variables such as

gender, age, and socioeconomic status. The anticipated analyses include, but are not necessarily limited to, the following: comparing quality of life, personality traits, and the prevalence of psychiatric symptoms among students in various academic courses offered by the university; and exploring associations between socioeconomic status, quality of life, and psychiatric symptoms to identify potential risk and protective factors.

3.7.2 Accelerated Cohort Cross-Sectional Analyses

Taking advantage of the large sample size and the design tracking all enrolled students from the first to the last semester of each course, we can use cross-sectional data to compare data by course and semester (or year) for each student, inferring possible changes in these indices from the beginning to the end of the course. For this purpose, Generalized Estimation Equations (GEE) analyses will be designed, using the independent variable of semester/year as a substitute for time in these analyses, while controlling for confounds such as gender, age, and socioeconomic status.

3.7.3 Longitudinal Analyses/Cohort Analyses

By following students longitudinally during their university journey, we will be able to analyze data using Generalized Estimation Equations; including time as an independent variable will allow for the detection of nonlinear variations in outcomes and, in turn, address the evolution of mental health symptomatology in individuals.

3.8 Ethical aspects

This research was approved by the Research Ethics Committee of the UNIFAJ University Center from UniEduk (no. 6.153.870, 2023), and will be carried out in accordance with the recommendations of Resolution no. 466/2012 of the National Health Council (*Conselho*

Nacional de Saúde, n.d.). Students will be invited to participate and informed about the objectives and methods. They will also be provided with a guarantee of confidentiality and anonymity. The Informed Consent Form (ICF) will be presented to all participants via an online form. Participants will be instructed to read the ICF and express their agreement or otherwise to the question: "Have you understood the guidelines and do you agree to participate freely, knowledgeably and spontaneously in this research?" If they agree, they are asked to enter their full name so that it can be attached to their acceptance to take part in the study. The participant will then be directed to a link to the online survey. If they do not agree, the participant will receive a thank you note and the contact will be closed.

4. Discussion

The psychological well-being of young adult college students is gaining significant attention. This is appropriate, as it is one of the major determinants of their overall academic success, personal development, and future prospects. Meanwhile, the existing literature suffers from a dearth of evidence concerning the mental health of university students in low income countries. The present study protocol describes a proposal to systematically and longitudinally survey the mental health of a large population of university students in Brazil. Our plan is based upon methodological decisions that balance quality, precision, scalability, cost, and the likelihood of participant engagement.

Among the challenges encountered during the design of this web-based mental health survey, we have highlighted the need to assess a large number of potential participants (n = 8,028) while aiming for a maximum response rate to increase generalizability. Ethical considerations addressed here are related to the importance of ensuring data privacy and interaction with the local health care services to provide assistance in cases of psychiatric emergency (i.e., risk of suicide). We have also strived for this longitudinal study proposal to be

as cost-efficient as possible considering financial constraints.

Our proposed use of an internet portal will improve participant engagement, data integration and reduce longitudinal data collection time and expense (Donohoe et al., 2012) (Callegaro et al., 2015). Indeed, automated data capture minimizes the need for paid researchers to run participants and enter data, while also reducing data entry errors (Alessi & Martin, 2010). Finally, since our survey involves multiple questionnaires, the platform allows for easier and more engaging access for potential participants (Bernard, 2011).

5. Limitations

Of course, there are disadvantages associated with online research. For example, open-ended questions cannot be explored with immediate follow-up questions and participants are unable to seek clarification of ambiguous items (Andrews et al., 2003). To address this issue, in the present survey, participants can easily email the project team with any questions they may have.

Selection bias presents another challenge for online research. Internet access is affected by myriad variables including income, geographical location, mental health status and age. (Ball, 2019)(Gulliver et al., 2010). We do not anticipate serious issues with internet accessibility. UniEduk has free internet access for all students. In addition, there were 181.8 million internet users in Brazil at the beginning of 2023, which means 84.3% of the population (Kemp, 2023); and the southeast, where UniEduk is, has an even greater user concentration. Our plan to remind participants via WhatsApp to finish their questions is sound, as WhatsApp is the most used social media by Brazilians, around 169 million (Kemp, 2023). Thus, though we cannot fully account for all these possibilities, the present strategy maximizes accessibility in a way that will mitigate these potential confounds and, consequently, increase response rate.

After identifying participants, the present protocol contains strategies to maximize the

probability that participants will continue to engage with and complete the survey. For example, one way to increase engagement is to provide participants with information about the study that a) piques their interest, b) helps them understand the importance of their participation in mental health research, and c) increases their confidence about participating. To this end, the research team will hold meetings with UniEduk course coordinators in order to transmit detailed study information so that it reaches the students. Furthermore, a two-minute video will be sent to all participants. This video contains information about the research team, the reason for the research and its objectives, details about the questionnaires (application time, confidentiality, freedom to decline) and the opportunity to ask questions via email. Our intention is to demonstrate the importance of participation in promoting mental health among the university population.

The security of collected data is ensured by the REDCap platform, a trusted and secure data collection and storage platform (Patridge & Bardyn, 2018) used throughout the scientific community. The platform allows for the long-term reduction of research costs, the possibility of utilization on many devices, and rapid data entry, review and analysis (Walther et al., 2011).

The data analyses in this project will include cross-sectional, accelerated cohorts, and traditional cohorts. Each analysis aims to summarize the data collected and integrate information about the mental health of this population. The cross-sectional analysis will allow us to understand the Brazilian university population in order to think about intervention strategies. As noted in the Introduction, there is a paucity of data that has been collected from low income countries. Existing studies were carried out mainly with students from specific courses (Pacheco et al., 2017) – national studies covering a range of degrees are rare. This survey is a structured means for assessing this population and their quality of life, given that this period represents a hub that critically impacts their responsibilities, mental health and values (Aceijas et al., 2017). The main intention of the present survey methodology is to inform

future preventative measures. It has been well established that preventive actions are feasible, cost effective and efficient in improving overall mental health (Arango et al., 2018). We believe that the results of this survey can guide the design and implementation of preventive programs destined to have a positive impact on the mental health of university students.

6. CONCLUSION

College and university students have high rates of mental health issues. We have developed and described a web-based mental health survey that will allow us to evaluate and detect these issues with low cost and reasonable response rate in a University in Brazil. These efforts will allow us, in the near future, to monitor and test the efficiency and impact of mental health preventive programs.

This model could be scaled up across other universities in Brazil to easily assess the mental health status of their students and have a significant impact on the mental health of our communities.

CONFLICT OF INTERESTS.

- Funding
- Authors' contributions
- Acknowledgements

7. References

Aceijas, C., Waldhäusl, S., Lambert, N., Cassar, S., & Bello-Corassa, R. (2017). Determinants of health-related lifestyles among university students. *Perspectives in Public Health*, *137*(4), 227–236.

Alessi, E. J., & Martin, J. I. (2010). Conducting an Internet-based Survey: Benefits, Pitfalls, and Lessons Learned. *Social Work Research*, *34*(2), 122–128.

Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic Survey Methodology: A Case Study in Reaching Hard-to-Involve Internet Users. *International Journal of Human–Computer Interaction*, *16*(2), 185–210.

Arango, C., Díaz-Caneja, C. M., McGorry, P. D., Rapoport, J., Sommer, I. E., Vorstman, J. A., McDaid, D., Marín, O., Serrano-Drozdowskyj, E., Freedman, R., & Carpenter, W. (2018). Preventive strategies for mental health. *The Lancet. Psychiatry*, *5*(7), 591–604.

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., WMH-ICS Collaborators. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology*, *127*(7), 623–638.Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., Kessler, R. C., & WHO

Ball, H. L. (2019). Conducting Online Surveys. *Journal of Human Lactation: Official Journal of International Lactation Consultant Association*, *35*(3), 413–417.

Bernard, H. R. (2011). *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. Rowman Altamira.

Callegaro, M., Manfreda, K. L., & Vehovar, V. (2015). *Web Survey Methodology*. SAGE.

Campos, C. R. F., Oliveira, M. L. C., Mello, T. M. V. F. de, & Dantas, C. de R. (2017). Academic performance of students who underwent psychiatric treatment at the students' mental health service of a Brazilian university. *Sao Paulo Medical Journal = Revista Paulista de Medicina*, *135*(1), 23–28.

Conselho Nacional de Saúde. (n.d.). Retrieved November 26, 2023, from https://conselho.saude.gov.br/resolucoes/2012/466_english.pd

De Boni, R. B., Mota, J. C., Schuch, F. B., Pires, D. A., Matias, T. S., Monteiro-Junior, R. S., Deslandes, A. C., Silva, D. R., Moura, H. F., Galvão-Coelho, N., de Jesus-Moraleida, F. R., Kapciznki, F., & Balanzá-Martinez, V. (2023). U-SMILE: a brief version of the Short Multidimensional Inventory on Lifestyle Evaluation. *Trends in Psychiatry and Psychotherapy*. https://doi.org/10.47626/2237-6089-2023-0722

Donohoe, H., Stellefson, M., & Tennant, B. (2012). Advantages and Limitations of the e-Delphi Technique. *American Journal of Health Education / American Alliance for Health, Physical Education, Recreation, and Dance*, *43*(1), 38–46.

DSM-5-TR Online Assessment Measures. (n.d.). Retrieved November 26, 2023, from https://www.psychiatry.org/psychiatrists/practice/dsm/educational-resources/assessment-measures

Duffy, A., Saunders, K. E. A., Malhi, G. S., Patten, S., Cipriani, A., McNevin, S. H., MacDonald, E., & Geddes, J. (2019). Mental health care for university students: a way forward? *The Lancet. Psychiatry*, *6*(11), 885–887.

Dyrbye, L. N., Harper, W., Moutier, C., Durning, S. J., Power, D. V., Massie, F. S., Eacker, A., Thomas, M. R., Satele, D., Sloan, J. A., & Shanafelt, T. D. (2012). A multi-institutional study exploring the impact of positive mental health on medical students' professionalism in an era of high burnout. *Academic Medicine: Journal of the Association of American Medical Colleges*, *87*(8), 1024–1031.

Gulliver, A., Griffiths, K. M., & Christensen, H. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. *BMC Psychiatry*, *10*, 113.

INEP - Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira [Internet]. "Censo da Educação Superior". Accessed December 6, 2023. https://www.gov.br/inep/pt-br/areas-de-atuacao/pesquisas-estatisticas-e-indicadores/censo-da-educacao-superior.

Kemp, S. (2023, February 12). *Digital 2023: Brazil*. DataReportal – Global Digital Insights.

https://datareportal.com/reports/digital-2023-brazil

Kessler, R. C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., Howes, M. J., Jin, R., Secnik, K., Spencer, T., Ustun, T. B., & Walters, E. E. (2005). The World Health Organization Adult ADHD Self-Report Scale (ASRS): a short screening scale for use in the general population. *Psychological Medicine*, *35*(2), 245–256.

Miguel, A. de Q. C., Tempski, P., Kobayasi, R., Mayer, F. B., & Martins, M. A. (2021). Predictive factors of quality of life among medical students: results from a multicentric study. *BMC Psychology*, *9*(1), 36.

Pacheco, J. P., Giacomin, H. T., Tam, W. W., Ribeiro, T. B., Arab, C., Bezerra, I. M., & Pinasco, G. C. (2017). Mental health problems among medical students in Brazil: a systematic review and meta-analysis. *Revista Brasileira de Psiquiatria (Sao Paulo, Brazil : 1999)*, *39*(4), 369–378.

Patridge, E. F., & Bardyn, T. P. (2018). Research Electronic Data Capture (REDCap). *Journal of the Medical Library Association: JMLA*, *106*(1), 142.

Power BI report. (n.d.). Retrieved November 26, 2023, from https://app.powerbi.com/view?r=eyJrIjoiYTdlOGQ3ZTgtMzc1Ny00ZDFkLTk4NjQtZDBkNTUyNjVhNmQ1IiwidCI6IjI2ZjczODk3LWM4YWMtNGIxZS05NzhmLWVhNGMwNzc0MzRiZiJ9

Roiz Junior, P. R. S., da Silveira, D. X., Barbosa, P. C. R., Torres, M. A. D. S., Moreira Junior, E. da C., Areco, K. C. N., de Oliveira, R. T. A., Tazitu, A. G., Fernandes, J. A. B., Fernandes, M. G., & Kasinski, S. K. (2023). Psychometric properties of the Brazilian version of the Big Five Inventory. *Trends in Psychiatry and Psychotherapy*, *45*, e20210458.

Sivertsen, B., Hysing, M., Knapstad, M., Harvey, A. G., Reneflot, A., Lønning, K. J., & O'Connor, R. C. (2019). Suicide attempts and non-suicidal self-harm among university students: prevalence study. *BJPsych Open*, *5*(2), e26.

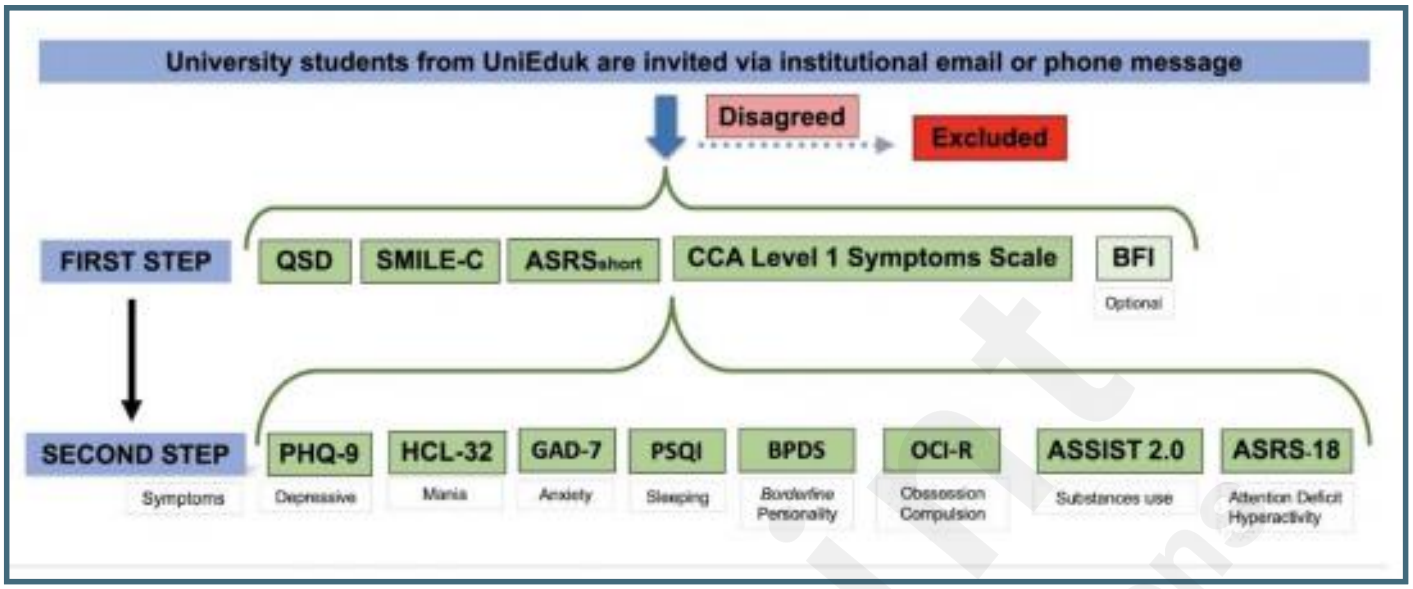
Tamuhla, T., Tiffin, N., & Allie, T. (2022). An e-consent framework for tiered informed consent for human genomic research in the global south, implemented as a REDCap template. *BMC*

Medical Ethics, *23*(1), 119.

Walther, B., Hossin, S., Townend, J., Abernethy, N., Parker, D., & Jeffries, D. (2011). Comparison of electronic data capture (EDC) with the standard data capture method for clinical trial data. *PloS One*, *6*(9), e25348.

Supplementary Files

Untitled.



Figures

Suicide risk monitoring.