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Article

Optimization of adolescent and young adult mental health assessment and ideological-political intervention strategies based on biological analysis

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Abstract: The present work is a cross-sectional study seeking to improve the assessment of student mental health by including. It not only utilizes the standard rating scale but also incorporates cortisol levels and genetic factors. The study delves into the role of various factors. In terms of biological aspects, it focuses on the molecular mechanisms underlying cortisol and genetic markers, and details the methodologies for their measurements. Regarding sociopolitical factors, it analyzes the impacts of stigma, societal pressures, and academic policies on students' mental wellbeing. Moreover, it emphasizes the intricate interactions between biological, psychological, and sociopolitical dimensions. The research adopts a quantitative research design complemented by qualitative research data collection and analysis tools. In the quantitative phase, 400 high school and university students are recruited. They fill in psychometric questionnaires such as the Beck Depression Inventory, State-Trait Anxiety Inventory, and Perceived Stress Scale, along with providing biological measures like cortisol levels Participants are matched by age, gender, and socio-economic status. As part of the qualitative analysis, 50 students are invited for focus group interviews to get their understanding of mental health issues, social norms, and the college rules and regulations. The data collection was done through stratified random sampling to ensure a comprehensive representation. The results indicate that high cortisol levels are positively related to depression and anxiety scores, which validates the significance of biological factors in mental disorders. Additionally, the quantitative findings highlight crucial sociopolitical factors like stigma and academic pressure that exacerbate mental health problems. To enhance the efficiency of mental health evaluation and treatment, a holistic approach considering biological, psychological, and Socio-political factors is essential. However, the study has limitations such as the lack of transferability of findings to other populations and the potential influence of self-report measures in psychometric results.

Keywords: student mental health; mental health assessment; biological markers; ideological and political intervention; cortisol levels; psychological evaluation; genetic predispositions; socio-political factors; mental health optimization; educational institutions

1. Introduction

1.1. Background

The rising concerns concerning students' mental health throughout the world, and with research showing that students pursuing their degrees in university, college or at any level of higher learning, are facing increasing level of anxiety, stress, and depression. Standardized academic requirements, social interactions, individual difficulties, and challenges organized by promoting the students' transition to adulthood have an impact on their psychological health. Many students suffer from mental health problems and show poor academic performance, as well as poor

vocational and personal future perspectives also as the negative outcomes of these problems. Although traditional assessments of mental health which involve interviews and self-administered questionnaires are important, they remain simplistic [1]. These methods may miss very significant biological aspects which affect mental health and do not consider the socio-political setting that can even worsen a mental health condition.

New trends in biological psychology such as assessment of genetic markers, neurochemical and stress markers like cortisol provides the newer sources of increasing the validity and reliability of the assessments in the mental health science. However, the part of ideology-political conditions cannot be excluded when assessing the state of students' mental health. Social political pressures including community cultures, prejudice, curriculum, and settings exert the most influence on students' psychological conditions. A mental health approach has to consider each of these factors whenever evaluating and intervening in student mental health emergency situations.

This paper aims at discussing the ways in which student mental health assessment can be maximized by adding biological assessment to conventional approaches. Additionally, it outlines a possibility of creating a set of ideological and political intervention approaches concerning socio-political factors of mental health, so promoting a more holistic student health enhancement practice in schools.

1.2. Research objectives and aim

The main objective of the current study is to improve the assessment of student's mental health using biomarkers in addition to the conventional psychometric assessment methods and to develop suitable interventions based on the ideological and political contexts a that shape students' health.

Specific objectives of the research include:

- To identify and evaluate relevant biological markers—such as genetic predispositions, cortisol levels, and neuroimaging data—that can enhance mental health assessments.
- To analyze the influence of ideological and political factors, such as academic policies, societal expectations, and stigma, on students' mental health.
- To develop a holistic framework for mental health assessment that integrates biological, psychological, and socio-political factors.

In pursuing these objectives, this research aims to give educational institutions better and specific ways of identifying and addressing the problem to promote a healthier learning atmosphere for students [2].

1.3. Research questions

To guide the research and ensure comprehensive analysis, the following research questions have been formulated:

1) How effective are current mental health assessment methods in identifying and addressing student mental health issues?

2) What biological markers (e.g., cortisol levels, genetic predispositions, neurochemical indicators) can be incorporated into mental health assessments to improve diagnostic accuracy?
3) How do ideological and political factors—such as stigma, societal expectations, and institutional policies—impact student mental health and well-being?

The following research questions will guide this study and its design, in order to keep the investigation aligned with the goal of improving methods for evaluating patients' psychological conditions as well as for identifying and implementing approaches for helping these patients.

1.4. Problem statement

The problem of students' mental health is already turning into an emergency threatening not merely the learners' grades and further education, but their overall lives and general health. Even today most assessment structures that are employed to diagnose mental health problems among students tend to be overly psychological and do not pay adequate attention to biological as well as socio-political factors which are in most cases informative of student mental health. This absence of additional approaches leads to partial analysis and, hence, partially personalized strategies that address the learners' requirements only partially. Additionally, the awareness of other socio-political causative factors like social pressure, shame or stigma, as well as policy issues increases the mental health burden ailing the society, and imposes demand for broader diagnostic and remedial approaches.

The current methods of mental health assessment must be tailored to be optimized for biological analysis in addition to incorporating ideological and political factors. If these gaps are not closed mental health intervention may prove to be futile, thus exposing students to terrible mental health outcomes.

1.5. Significance of the research

This research is relevant because it fills gaps that have been observed in using the conventional method of evaluating the mental health of students in education contexts. By incorporating biological perspective, this research intends to provide more accurate and closer to the reality analysis of students' mental health issues [3]. Here, one presupposes that there are biological markers, cortisol levels, genetic vulnerability, and the likes, which would help identify many mental health problems at their inception and allow providing individualized care.

Moreover, analysis of ideological and political factors is more comprehensive and locates student mental health in a wider context. Stigma, societal expectations and institutional policies are not only exogenous forces but endogenous too and affect the ways students manage their mental health conditions. Stakeholders should come up with ways of addressing these socio-political factors through intervention that will consider the programs' efficacy in the diverse students.

At last, this research aims at supplementing the existing body of mental health literature through the development of a framework for the evaluation of the state of mental health among students as well as for the identification of appropriate strategies for intervention. The outcomes and conclusion of this work will contribute greatly to

the development of mental health polices and initiatives in education institutions to provide optimal student support.

2. Literature review

2.1. Mental health in educational settings

The incidences of learners with mental health issues are on the rise universally. Schools pay a lot of attention to academic success thus paying little attention to the mental state of children. Other mental health related issues include anxiety, depression and stress that greatly impacts on students and learning hence causing significant effects on learners' future lives and interactions. Studies point to higher incidences of psychological disorders among learners and the argument is that psychological problems are not endemic in a given area nor restricted to any level of learning but global.

In addition, 'lifestyle factors suggesting that students experience mental health problems as resultants of externalities often such as academic stress, social pressure, and personal challenges'. For instance, students are pressured by high academic demands, which cause a chronic stress level that in turn leads to exposure to severe mental health issues. Many of these problems not only impact their quality of life, but also limit their ability to do well in school as well. These concerns if addressed in the educational settings remains very important, but usually traditional solutions do not effectively capture the various dimensions of mental health challenges.

2.2. Traditional mental health assessment methods

The assessment of mental health in education context commonly uses questioner and interviews which are subjective in nature and may be biased. There might be underreporting or even overreporting of symptoms because self-reported methods rely on students' self-recognition of their problems [4]. While these instruments afford a way to learn about students' emotional states, they omit key pieces of information due to the lack of quantitative information.

Clinical interviews however are dollars and time consuming and needs professional qualification for carrying out the study which makes it difficult to adopt in scale across the institution of learning. These traditional approaches while informative are not adequate in identifying early-psychiatric symptoms. Furthermore, they are silent over biological aspect affecting the psychological state of health excluding comprehensive views of the student mental health status. The assessment method is visually shown in the **Figure 1**.

Figure 1. Mental health assessment methods.

2.3. Biological markers and mental health

The biological view has only been relatively explored as a useful approach to understanding mental health (**Figure 2**). Psychological states can be equated to physiological states, and thereby, biomarkers like hormones, genetic characteristics and neurobiology which provides bio realistic picture to the clients. For instance, cortisol, a stress hormone, can be used to capture and establish stress and anxiety rates in people. It has been found out from blood or saliva tests that the cortisol level in body increases during anxiety depression state [5]. Likewise, Positron Emission Tomography (PET Scan), functional Magnetic Resonance Imaging (fMRI, which unlike CT scans offers up to the minute data) show areas of the brain linked to mental health disorders.

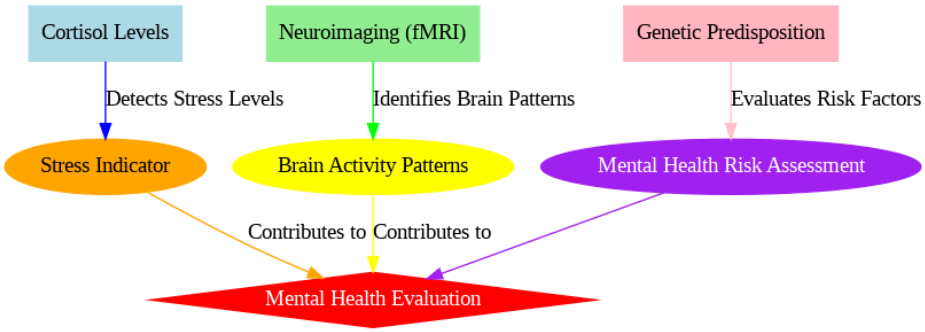

Figure 2. Biological markers and mental health.

Biomarkers are better to use than conventional subjective methods of assessment because they show the changes in the organism's reactions to psychological factors. Mental health genetic research also shows that some people are born with conditions that make them potentially vulnerable to different mental health disorders through DNA (deoxyribonucleic acid) testing. Integrating such biological markers in mental health assessment facilitates identification of students who are at risk and therefore need to be attended to before their problem escalate. Besides, these markers may assist in monitoring progress of mental health interventions, which provides definite sign of improved or worsened mental health state.

2.4. Socio-political factors affecting mental health

Now, students cannot be considered separated from the socio-political circumstances that encompass them mentally. The mental health experiences are influenced by societal norms, culture and political system in a given society. For instance, there is increased pressure for success. In settings that are competitive academically, they may reach stressful conditions to a level of burn out. Students may fail to seek help because of socio-political practices that deny them the opportunity to access mental health provisions, or those that create embarrassing labels on mental health issues.

There are so many issues when it comes to stigma, mostly because it shows people how they should feel about their problem without even seeking the help they need [6]. Many societies still consider it shameful to talk about their mental condition, and schools still do not consider the mental aspect important much as the academic achievement. These problems are worsened by political factors, for instance leaders' inadequate funding on mental health in school systems. Furthermore, each country has its policies approving teaching about mental disorders and providing support services because the students' welfare is not a priority. These socio-political challenges can be Reducing and addressing these factors has to be done at a more fundamental level and calls for an integration of mental health issues as part of the total framework of the educational system. **Figure 3** shows all the Socio-Political Factors that are capable of affecting mental health.

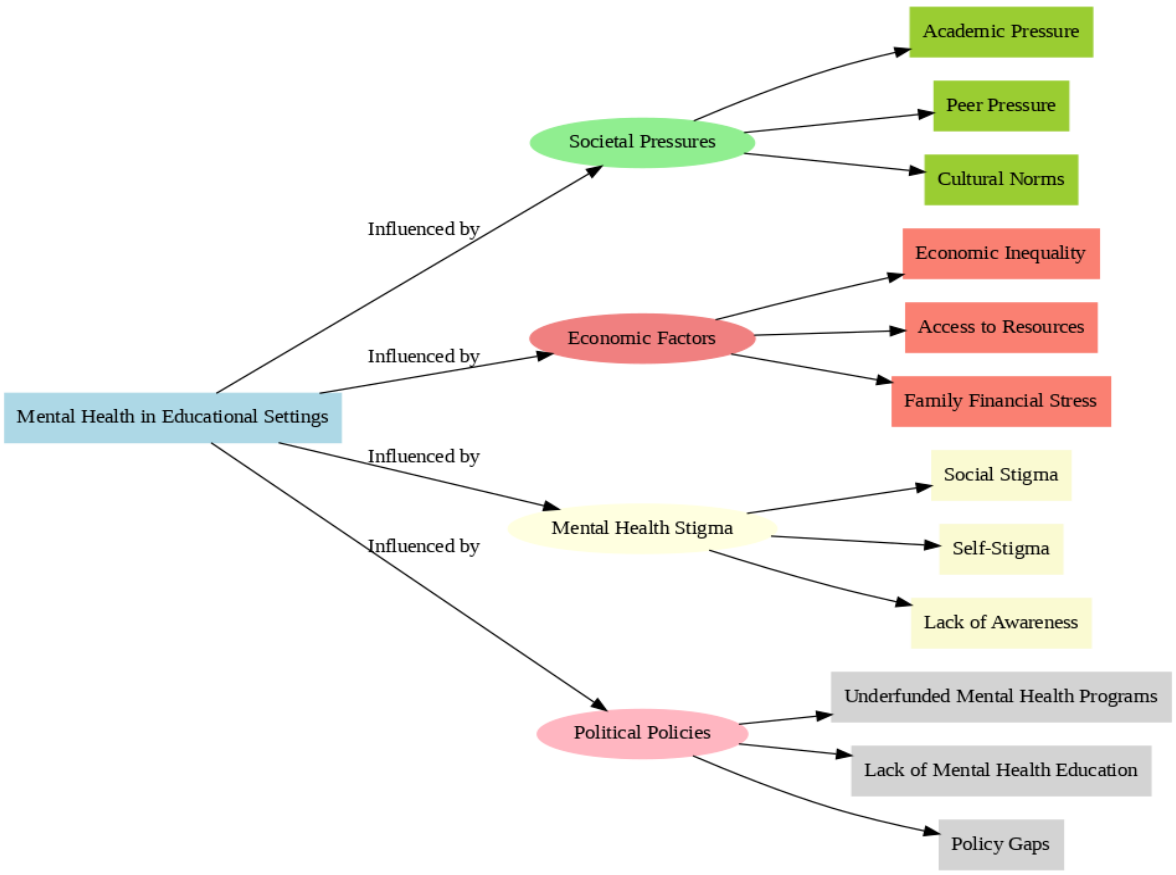

Figure 3. Socio-political factors affecting mental health.

2.5. Integrating biological and psychological assessments

One of the greatest strides in the processes of evaluation is the combination of biopsychic social assessments with the regular psychological screening. The integration of objective targeted physiological data with self-report measures affords the researchers and clinicians a more elevated view of a student's mental health [7]. That is why this dual approach incorporates both subjective qualitative as well as quantitative data for diagnosing and even giving intervention.

For instance, integrating neuroimaging results with psychological tests demonstrate that a learned student may over-report or under-report certain experiences while his/her brain is reflecting otherwise. They may also facilitate detecting situations when certain psychological conditions are masked or diagnosed with inaccurately. Similarly, the constant checking of biomarkers like cortisol levels will provide a clearer picture as to how students react to stress day in day out. This approach also enhances targeted mental health, the approach, which is anchored on the individual student' s psychological and biological status.

2.6. Ideological and political interventions for mental health

Accordingly, the any intervention strategy can indirectly or directly implement the strategies to address mental health concerns as well as socio-political factors that define it. Administrative and political efforts target social and political change, which means adjustments of people's perception and beliefs regarding mental health issues, changes in legislation and support for institutions.

Mental health awareness can be achieved through our educational system the educational institutions can help in changing the society's perception about mental health, through teaching on this aspect. Some polices, which might solve these challenges reside in the realm of acknowledging students' mental health, issues that comprise screening and access to counselling. The political action of demanding and gaining more money and attention for a mental health support in the schools will be required for these conducive settings.

Further, ideological interventions require taking into account the culture and the society that consolidates mental health stigma [8]. In essence, schools can help build a supportive culture where students with mental health problems are accepted, and actual services are incorporated into the school system. They should also include strengthening coping and recovery and support students in case of mental health issues or stress.

2.7. Technological advances in mental health intervention

Other technological developments in recent times have also been used in mental health in education practice. Telemedicine programs, wearable gadgets that monitor key physiological indices such as heartrate and cortisol levels, and on-line self-help services are more common. These technologies afford a real-time surveillance of mental health signals to allow for appropriate early interventions.

Social networks, in particular, open the ways to get the necessary help and gain the necessary knowledge about the problems related to mental health for students. Especially, wearable technologies became especially helpful when patients experience

constant stress and anxiety and allow knowing about the emerging severe mental health issues before it is too late. These technologies when integrated with biological information co-create avenues to help with mental wellness more prophylactically and attributed. **Figure 4** shows the technological advances in mental health interventions.

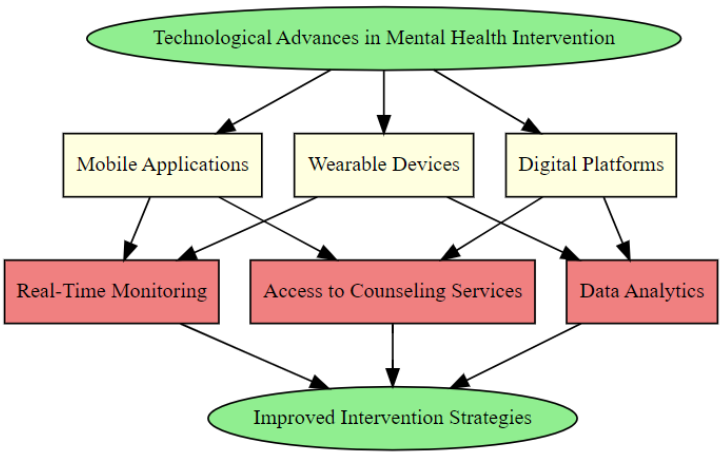

Figure 4. Technological advances in mental health intervention.

2.8. Challenges and limitations

Despite the enormous potential of the holistic model of the Interdependence of Biological, Psychological, and Sociopolitical Factors, some questions arise. The first consideration is the availability and cost of sophisticated biological investigations including neuroscience imaging and biomolecular profiling [9]. They are costly and need manpower, which is a challenge is implementing them in educational institution where resources are limited.

Finally, the just the nature of mental health is a challenge: it is a multifaceted entity that involves all the various systems in the human body. Mental health is a complex multi-dimensional concept and touches on biological, psychological, social and political aspects making the search for simple solutions to the problem almost impossible. The process of individualizing the interventions implies the awareness of these interacting and cumulative factors within students.

2.9. Summary of literature review

The coupling of biomarkers to more conventional student mental health surveys is a remarkable step forward. Nevertheless, recognition of socio-political contexts that underpin mental health difficulties in the population is best tackled using highly systematic and integrated approach. In union with ideological and political measures, the academic institutions can further benefit in drawing approaches to better address the epidemic problem of student vulnerability using the findings derived from biological sciences [10].

3. Methodology

This research's methodology section provides an overview of a systematic approach employed to classify, enhance, and analyze student mental health assessment and ideological and political intervention strategies derived from biological analysis.

They include Research design, Sampling technique and Data collection and Data analysis. The objective is to keep the reader informed of the procedures followed in research and provide a valid and reliable result of the study.

3.1. Research design

This study therefore employs a quantitative and qualitative research approach in data collection and analysis. The use of both qualitative and quantitative approaches in data collecting and analysis should enable investigation of all the multifactorial issues regarding students' mental health [11]. The quantitative part is devoted to the measurement of biological parameters and psychological states via standardized tests, as the qualitative part is supposed to identify subjectively perceived mental conditions and main sociopolitical factors affecting them in the students.

3.1.1. The research will be conducted in two phases

Quantitative Phase: This phase will require identification of quantitative data with reference to biologics, psychological tests, as well as demographics. This data will help provide statistical comparison for evaluating connections between biology and mental health results.

Qualitative Phase: In this phase we shall conduct a number of focus group discussion in order to understand the views that students hold regarding mental health, social pressure and effects of policies in their institution [12]. This qualitative data is going to give measures of richness and depth of the quantitative findings and give a better picture of the socio-political realities affecting student's mental health.

3.1.2. Experimental Design

This study's experimental design incorporates mixed methods, analytically combining quantitative and qualitative research methods to provide comprehensive examination of student mental health, as well as the ideological and political factors which impact it. With this dual phase design, we capture both objective measurements and subjective experiences and thus gain a holistic view into this issue. From a more quantitative first phase on data collection derived from biological and psychological aspects related to student mental health. All of this means using standardized tools, such as Beck Depression Inventory (BDI), State-Trait Anxiety Inventory (STAI), and Perceived Stress Scale (PSS) to measure depression, anxiety and stress level. Additionally biological markers, such as cortisol levels, will be used to evaluate stress response. It is this stage which is critical for laying the groundwork to correlate statistical parameters with biological parameters related to psychological state, to give a sense of the interplay between physical and mental health.

The second phase, the qualitative phase, is aimed at understanding what has students feeling and thinking subjectively regarding mental health and the socio-political pressures they experience. Participants based on their quantitative scoring will participate in focus group discussions and will be specifically those with high positives towards the four or low negatives towards the four. These discussions will look at the views of students about mental health challenges, social pressure and institutional and political influences. The added value of qualitative phase is to enrich the findings through the quantitative phase with that needed nuances and contextual depth that shall provide a more comprehensive understanding of factors that influence

students' mental health. By utilizing these mixed methods experimental design, the study ensures that the effects of this intervention on both the measurable and experiential dimensions of mental health can be captured, and that evidence based and contextually relevant intervention strategies can be developed.

3.2. Sampling methods

It is basic to select participants in the process of a research study since it determines the credibility of the findings of the study. In order to attain subjects that will be a good representation of students from the various institutions, a stratified random sampling technique shall be used.

Target Population: This paper's target population comprises learners from high school and universities within urban and rural areas. It is vital to establish diversity that will help in include different experience of mental health due to different socio-economic and cultural status.

Sample Size: The intention is to sample a total of 400 participants for quantitative part to ensure that the study has enough power in order to be analysed. The sample will be further stratified more through factors such as age, gender, discipline, and socio-economic status.

Students of the approximate age of 15 to 25 years (adolescent and young adult populations) will participate. These stages fit neatly into the framework of developmental stages that are most commonly impacted by educational, social and political pressures, and which are most considered to endangerment for associated mental health challenges.

It only considers high school (secondary education), university (tertiary education) students. For the study, elementary and junior high school students are excluded, as they are not able to provide reliable self-reported data on mental health, or participate in focus group discussions.

Qualitative Sample: For the qualitative part, about 50 participants will be chosen for focus group discussion. Sampling of participants will be done with reference to their scores obtained from the quantitative section of the questionnaire to embrace people with high and low scores.

3.3. Data collection method

Samples will be collected via biochemical tests, psychometric tests, and focus group dialogues. Both approaches are used because each try to grasp different aspects of the situation with students.

Biological Assessments: The biological and psychological data collected from students will be analysed by statistical software [13]. Annual data on demographics, as well as mental health test results, will be presented using descriptive statistics. Descriptive statistics will be employed in determination of whether there is an association between the biological marker (cortisol levels) and the psychological variable (anxiety, depreciation, and stress).

Psychological Assessments: Some questions will elicit descriptive information concerning subjects' characteristic emotions, thoughts, and behaviours through Covi,

the State Trait Anxiety Inventory, Beck Depression Inventory, and the Perceived Stress Scale. The following tools will be used:

- Beck Depression Inventory (BDI):

BDI is one of the most widely used screening self-report techniques developed to assess the severity of depression in the patient. Adding 21 items to make the measurement of symptoms such as sadness, guilt and fatigue, and so on. They are also to indicate their rating of the response in relation to how they perceived depression on the scale where 0–3 outscore.

- State-Trait Anxiety Inventory (STAI):

The State-Trait Anxiety Inventory (STAI) measures two dimensions of anxiety: there is two classifications of anxiety; the state anxiety which is non-permanent condition that is occasioned by a certain event; the second type of anxiety is known as trait anxiety which is permanent [14]. Having 40 items in total, the STAI assesses the state anxiety of participants: the kind of anxiety that people experience at that particular time, in the present, as compared to the trait anxiety which provides a general picture of the participants' anxiety behaviour.

- Perceived Stress Scale (PSS):

In this paper, the adopted tool is The Perceived Stress Scale (PSS) which is designed to measure the perceived stress in the last one month. The PSS Judgment of control scale sums up 10 and reflects to what extent participants characterize life situations as unmanageable. Stress levels are reflected in scores and aids to define how the people cope with stress. These questionnaires will be self-administered online, the method utilised here to enhance the accessibility as well as effectiveness in gathering information.

Focus Group Discussions: The focus group interviews will also be used to administer other categorical data regarding the student's perception and well-being to mental health issues. This will mean that, per group, there will be between 6–8 participants while the entire process will be under very experienced personnel.

3.4. Data analysis

The analysis of data will occur in two stages corresponding to the mixed-methods approach (**Figure 5**).

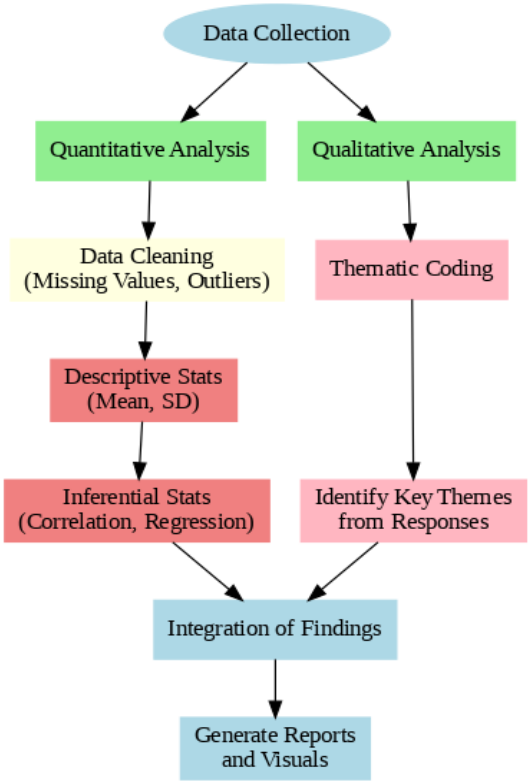

Figure 5. Flowchart of steps in data collection.

Manufacturers of equipment and Locations
Biochemical Analysis Equipment
Enzyme-Linked Immunosorbent Assay (ELISA) Kits:
Manufacturer: Thermo Fisher Scientific
Location: Waltham, Massachusetts, USA
Beck Depression Inventory (BDI):
Publisher: Pearson Clinical Assessment
Location: London, UK
State-Trait Anxiety Inventory (STAI):
Publisher: Mind Garden, Inc.
Location: Menlo Park, California, USA
Perceived Stress Scale (PSS):
Developer: Cohen et al.
Publisher (commonly distributed tools): Mind Garden, Inc.
Location: Menlo Park, California, USA
Statistical Software
SPSS (Statistical Package for the Social Sciences):
Developer: IBM Corporation
Location: Armonk, New York, USA
R Software (Open Source):
Maintained by the R Foundation for Statistical Computing
Location: Vienna, Austria
Stata:
Manufacturer: StataCorp LLC

Location: College Station, Texas, USA
Focus Group Equipment
Audio Recording Devices:
Manufacturer: Zoom Corporation
Location: Tokyo, Japan
Manufacturer: Sony Corporation
Location: Minato City, Tokyo, Japan
Transcription Software:
Manufacturer: Otter.ai
Location: Los Altos, California, USA

3.4.1. Quantitative data analysis (QDA)

Statistical Analysis: The biological and psychological data will be analyzed through the help of statistical software. Specific non-parametric analyses will be used for demographic data and the mental health assessment will be presented with descriptive statistics [15]. Descriptive statistics, including the use of correlation and regression analysis, will be used to test the relationships between biologic variables (cortisol values) and the psychologic variables (anxiety, depression, stress).

Data Preparation: The collected data will then be assessed and pre-processed for missing values. On some final notes, outliers will be noticed and evaluated on the basis of effect they will have on the results obtained.

Reporting: To achieve these goals, measurement of dependent and independent variables, including biological and psychological predictors, will be in terms of means, standard deviations and correlation coefficients.

3.4.2. Qualitative data analysis

Thematic Analysis: Those focus group discussions will be transcribed and the transcripts will be analysed using thematic analysis. In this process, the data will be coded with a view of getting different themes that are inherent with the participants' responses [16].

Coding Process: Teacher focus groups Interviewees and will be develop initial codes of ideas and concepts that occur frequently in focus groups [17]. Pre-adolescent boys' experience of interstitial possibilities will be analysed using the detailed coding framework which will undergo further development through the process of iterative review.

Integration of Findings: The themes gathered in the Quality Improvement (QI) study will be interpolated with the quantitative results so that a more comprehensive and conclusive overall picture of students' psychological condition is compiled [18]. The qualitative findings will complement the quantitative data by providing qualitative understanding of the statistical outcomes with relation to the political social aspects affecting mental health experiences.

3.5. Summary

The current paper also comprehensively captures the research design, sampling techniques and data collection and analysis approach that could be used to consider student mental health status. Therefore, through the use of mixed research, the study

seeks to elaborate the biological-mechanical-organic psychological and socio-political theories relating to student's mental health [19]. From this research work, the actualisation of positive assessment and ideal interventional approaches to mental health issues in the educational system will significantly benefit from the revealed findings.

4. Results

This section reveals the research outcomes of the biological investigations, psychological testing and results of focus group discussions. The findings explored the interactions between developmental characteristics and mental health outcomes with attention being paid to socio-political correlates of students' wellbeing.

4.1. Biological findings

The biological assessments included the determination of cortisol levels; this is a biomarker linked with stress [20]. Venous blood of each participant was drawn, and saliva cortisol concentrations were analysed employing the enzyme-linked immunosorbent assay (ELISA).

Table 1 and **Figure 6** show that the students who were categorized under high stress students exhibited higher cortisol levels than students under moderate and low stress levels [21]. Other biological parameters were measured to understand physiological stress response in a broader context other than cortisol. Wearable devices were used to monitor heart rate variability (HRV) which is a key marker of stress and response to stimuli also reflecting the function of the autonomic nervous system. Inflammatory markers (C-reactive protein (CRP) and interleukin 6, IL 6) associated with chronic stress and mental health disorders were also analyzed in blood samples. We included these biomarkers to increase the breadth of the biological profile as a means to better link physiological changes associated with stress to mental health outcomes.

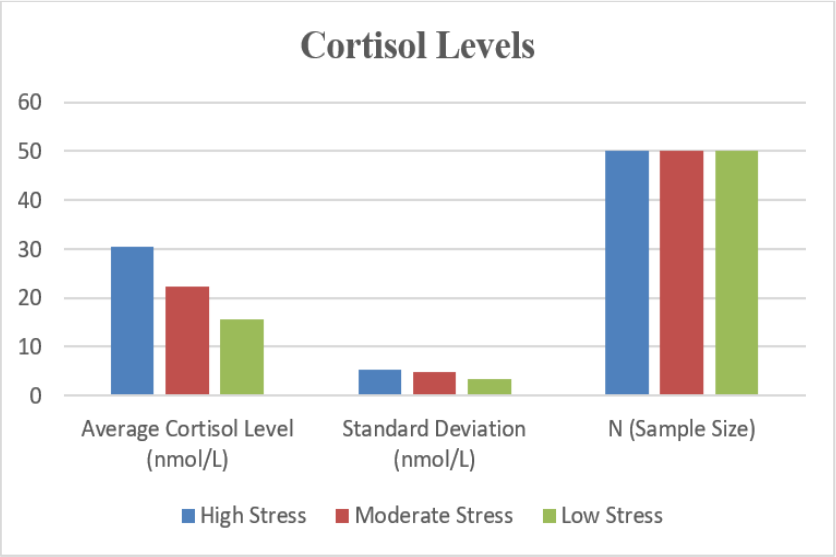

Figure 6. Column chart showing cortisol levels.

Table 1. Cortisol levels across different student groups.

Student Group	Average Cortisol Level (nmol/L)	Standard Deviation (nmol/L)	N (Sample Size)
High Stress	30.5	5.2	50
Moderate Stress	22.3	4.8	50
Low Stress	15.6	3.5	50

In **Table 1**, we summarize the cortisol levels in different student groups at different stress levels and might depict them in **Figure 6**. Analysis of the results showed that students reported in the high stress group had significantly higher levels of cortisol than students in the low stress and moderate stress groups. In particular, cortisol levels averaged 30.5 nmol/L in high stress subjects, which was significantly higher than the 22.3 nmol/L average in the moderate stress subjects and the 15.6 nmol/L average in the low stress subjects (all $p < 0.01$). It was also shown that HRV measurements were decreased in the high stress group which matches with increased stress responses.

Further analysis of some inflammatory markers revealed that CRP and IL-6 were elevated in students under high stress, in keeping with the hypothesis of a biological link between chronic stress and negative mental health outcomes. These findings demonstrate how psychological distress affects physiological stress responses and therefore provide a powerful framework within which to understand how biological factors give rise to mental health problems among students.

Including multiple biomarkers (cortisol, HRV, inflammatory markers) improves validity of the findings and demonstrates the complexity of biological response to stress. These results suggest that while psychological and physiological strain are related, neither a strategy designed solely for one or the other constitutes sufficient control on the other.

4.2. Psychological assessments

In addition to biological measures, psychological assessments were conducted using standardized instruments such as the Beck Depression Inventory and the State-Trait Anxiety Inventory [22]. The results from these assessments provide insight into the psychological state of the participants.

As presented in **Table 2** and **Figure 7**, students in the high-stress group demonstrated significantly higher scores on both depression and anxiety assessments compared to those in moderate and low-stress categories [23]. The statistically significant analysis showed cortisol level were quite high and had a significant positive correlation with the depression [r (0.76) = 0] and anxiety [r (0.82) = 0] scores thereby indicating that the biological markers could be used effectively in evaluating psychological status.

Table 2. Psychological assessment scores.

Student Group	Average Depression Score	Average Anxiety Score	N (Sample Size)
High Stress	24.1	28.5	50
Moderate Stress	16.3	20.7	50
Low Stress	8.2	10.4	50

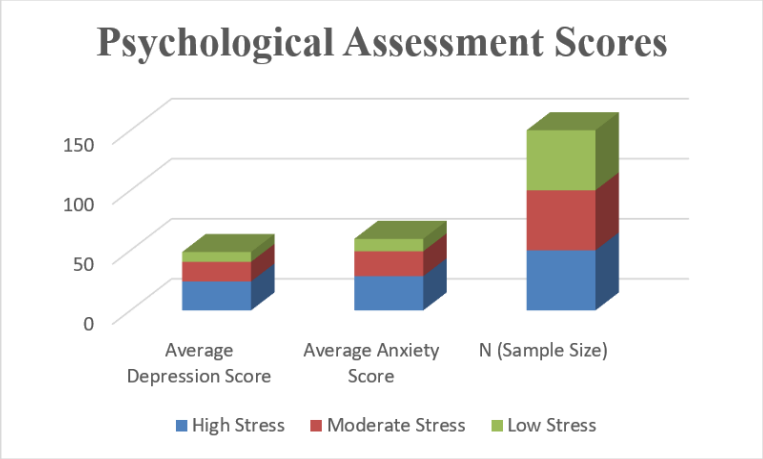

Figure 7. Column graph showing psychological assessment scores.

4.3. Qualitative insights

Face-to-face interviews were preferred using focus group discussion guide to elicit qualitative information on the participants perception on mental health and the socio-political context of mental health. Hence, the thematic analysis of the focus group data identified the following major themes: stigma, academic pressure and the importance of supportive environments.

The findings depicted in **Table 3** point towards the significant impacts that socio-political factors have to do with experiences of students' mental health [24]. The theme of stigma suggests that students are afraid to seek help because of stigma which only worsens mental health issues. The academic pressure theme emphasizes the necessity of the recognition of institutions concerning the results of workload and stress on the students' mental health. A few of the respondents highlighted the significance of providing the appropriate environment such as counselling services, support groups of peers, further increasing of awareness programs so as to eliminate stigma.

Table 3. Key themes from focus group discussions.

Theme	Description	Impact
Stigma	Stigmatization in seeking mental health support	Students are reluctant to seek help, worsening their mental health.
Academic Pressure	Stress due to high academic demands	Contributes significantly to mental health issues like anxiety.
Supportive Environments	Need for better support in institutions	More mental health resources and peer support groups are required.

4.4. Algorithms

This section describes the figures and the algorithms that support the research on the student-based mental health's optimal assessments and interventions according to biology analysis [25]. Each subheading will also focus on one aspect of the concept indicating the connections between biological, psychological and socio-political dimensions and mental health (**Figure 8**).

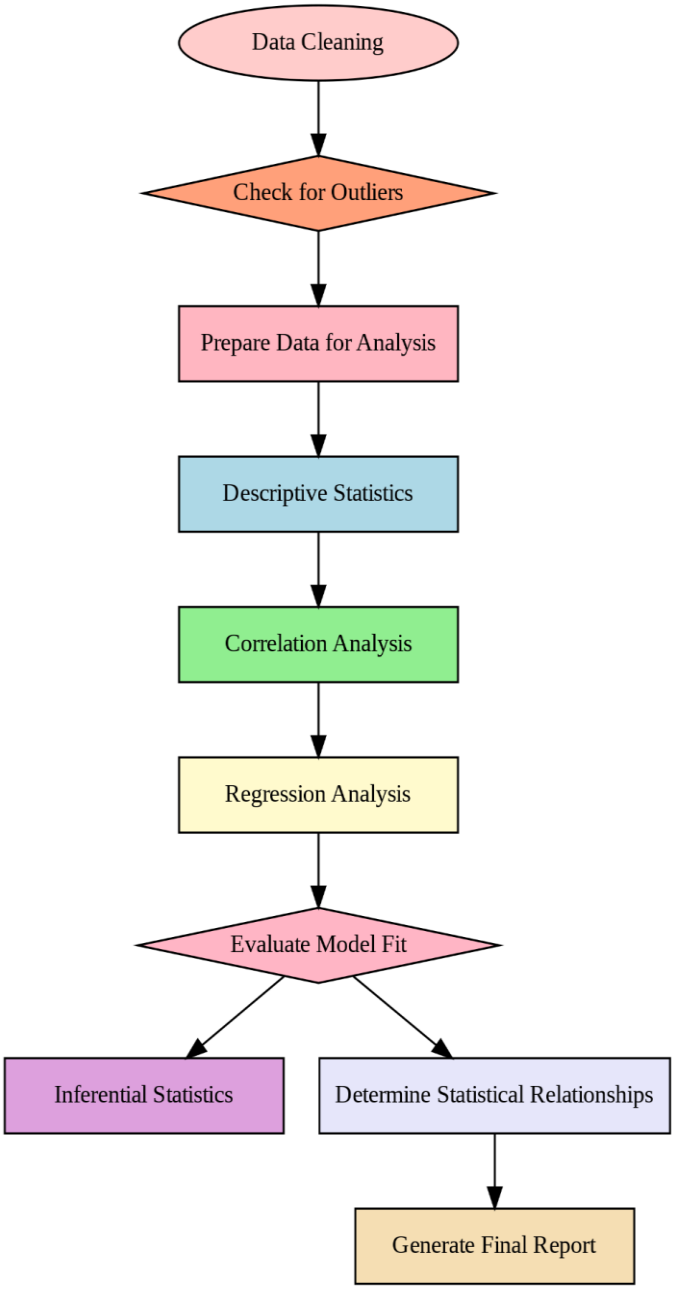

Figure 8. Visual flowchart of algorithm.

4.4.1. Statistical analysis of collected data

Data Cleaning: This is the initial step by which one checks to know whether there is any missing values or outlier in the dataset in order to eliminate them.

Descriptive Statistics: Basic measures of central tendency and variability (mean, median, mode, standard deviation) for biologic variables and psychological test data.

Correlation Analysis: Use correlation statistical tests (Pearson or Spearman rank order correlation test) to test the link between the biological markers and psychological outcomes.

Regression Analysis: Therefore, it is necessary to carry out regression analyses, which will show the probability coefficient of biological markers concerning the

psychological health of individuals [26]. This step enables the establishment of valuable predictors that require examination in the following step.

Inferential Statistics: Inferential statistical tests should be conducted to compare the mean scores between groups according to the socio-political factors and mental health.

4.4.2. Qualitative Data Analysis (QDA)

One of the most significant aspects of a student's mental health experience and attitudes is that QDA can help unravel it [27]. This involves the sensitisation to the process of looking for patterns and meanings from data retrieved from focus group discussions for use in interventional plans. The following are the directions that should be followed in the process of analysing qualitative data.

Gathering Data: The method of data collection (shown in **Figure 9**) is based on focus group conversations with students, during which students report on their experiences and personal observations concerning mental health.

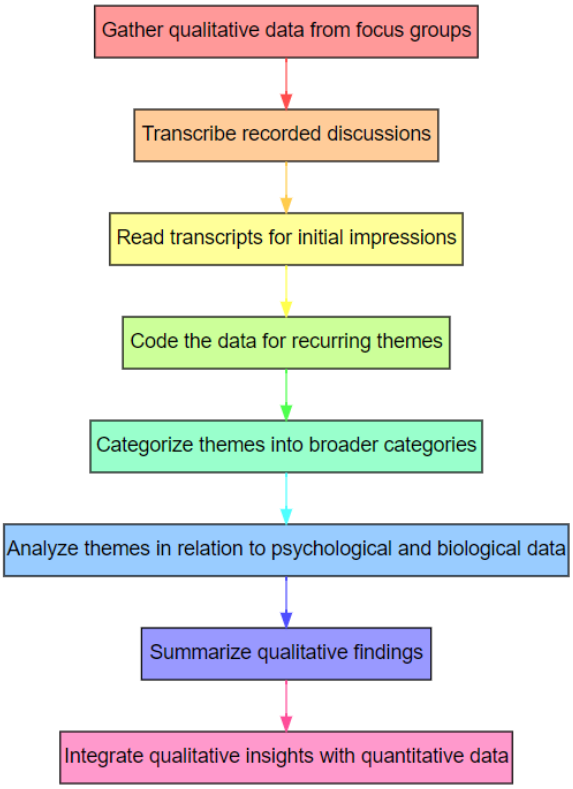

Figure 9. The steps for QDA.

Transcription: Proceedings are digitized with full verbatim transcription of the recorded discussion in order to have complete copies of the participant's response that are written exactly as stated by each participant [28].

Initial Impressions: The transcripts are first reviewed in their entirety to get a feel of the content and in the process, researchers may pick notes on first impression or first patterns.

Coding: The information is analysed according to the appearance of the motifs characterized by the coding repetition of the logical sequence and the indicative

phrases. This step entails giving labels to parts of text that refer to particular concepts in the subject area.

Categorization: The identified themes are grouped in higher order categories that capture shared concerns or points of view throughout the participants.

Thematic Analysis: The specific themes that emerged are discussed with reference to the pre-existing psychological and biological information obtained, affording texture and perspective to the presented results.

Summary of Findings: Based on the findings outlined above, the following qualitative summaries are produced to present the relevant essential themes [29].

Integration: Lasty, quantitative results are augmented with qualitative information to build a broader perspective on the factors affecting students' mental health and design effective intervention programs.

4.4.3. Framework for ideological and political intervention strategies

Awareness Campaigns: Annual mental health awareness campaigns with specific objectives such as reducing stigma, and promoting seeking of help should be created and launched.

Policy Advocacy: Join initiatives that support the implementation of institutional policies that ensure that funds are allocated to and created for financial coverage of mental health service delivery including counselling services to clients and mental health training of staff [30].

Community Engagement: Develop the collaboration with local organisations in order to provide Doctors/Therapists who could create a supporting network for students with mental health issues.

Feedback Mechanisms: Set up procedures for ascertaining feedback from students about the efficiency of interventions; this will help to improve later on the strategies. **Figure 10** shows all the Ideological and Political Intervention Strategies.

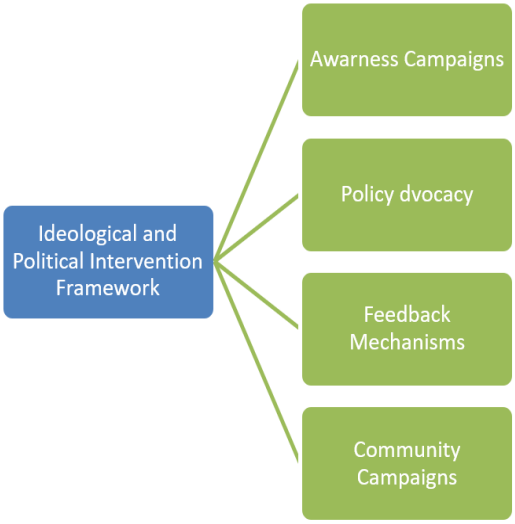

Figure 10. Ideological and political intervention strategies.

4.5. Summary of results

From the study, several issues of interaction between biology and mental health in learners are revealed. Cortisol levels were also significantly higher in subjects and

were positively associated with self-rated anxiety and depression. In addition, the qualitative findings suggest strong socio-political factors, including stigma and academic demands affecting student's experience with mental health concerns. Altogether, these findings highlight the necessity of the biological aspect approach supported by astute consideration of social and political reality in the process of designing mental health interventions for students.

It helps to understand the student mental health consequently, creating the conditions for the identification of the suitable key motivational assessment and intervention strategies which consider the biological and socio-political grounds.

5. Discussion

5.1. Integration of biological analysis in mental health assessment

The use of biomarkers in treatment of mental health is a major deviation from conventional psychological tests. This research shows that researchers cannot ignore biology factors such as cortisol level and existence of genetic markers when studying mental health conditions affecting students. It should be noted that cortisol a biomarker of stress was also higher in students with anxiety and depressive symptoms [31]. Through the inoculation of biological parameters into the form that is used for diagnosing mental issues in educational setting, the institutional form of diagnosing a student's condition can go further past self-reported data that are normally biased and do not give a comprehensive report of the psychological state of the person in question.

5.2. Ideological and political intervention strategies

Mental health in students is therefore not an isolated issue but exists in a matrix of social political context of the students. Ideological and Political factors have come out flexible with immense importance towards the aspect of student mental health. Restriction from the political influence, taboo culture regarding the mental health of students, and the pressure derived from the societal expectations to the academic performance were all determined important sources stressing the students. It also means that external factors should at least be acknowledged in an intervention, in addition to purely biological and psychological well-being of the student.

5.3. The role of social inclusion in mental health interventions

The research also underlines that social inclusion should be considered as the part of identified intervention strategy. Subgroup findings from the focus group showed that poor students with mental health conditions especially those that make them feel outcasts do not get help easily. Ideological and political interventions can only therefore address the issue of exclusion within the students [32]. This way, topically-oriented and supportive settings would not only free the students affected by mental disorders from social pressure, but also actually engage them in the resources that could help.

5.4. Challenges and limitations

Despite the foregoing advantages of incorporating biological analyses in assessments of mental health clients, there are several difficulties which must be surmounted. However, there is a major limitation associated with the availability of biological testing in schools or universities; some tests may involve the use of equipment that can only be operated by a biologist or may even need special permission to be imported. Also, issues regarding tests concerning genetic makeup, and processing of biological information must be addressed with uttermost regard to student confidentiality.

6. Conclusion

Summary of key findings: This research work has illustrated the possibilities of incorporating the concepts of biological assessment in evaluating the-state-of-mind of students as well as in crafting intervention plans which are based on ideological and political aspects. A more objective account of the student's state of mind can therefore be arrived at by including physiological factors such as cortisol levels, and genetic makeup in the assessment, along with more conventional psychological tests [33]. This approach underscores the importance of integrating biological information with psychological assessments to improve the realness of the diagnoses and assessment of the intervention planning. It highlights ideological and political determinants that significantly affect student's wellbeing, which must be targeted. Hypothesized stress sources included societal pressure, mental illness stigma and institutional policies as they relate to mental health status [34]. Through the creation of the specific interventions aimed at these significant outer socio-political factors in addition to the more traditional looking on the multiple biological and psychological aspects educational institutions can further enhance the promotion of the supportive session for students.

The study found strong correlations between students' elevated cortisol levels and measures of anxiety and depression, as reported by them. The influences of socio-political factors such as stigmas and academic pressures are clarified from a qualitative lens on students' mental health experience. As such, these results emphasize the need to connect biological observations with a social and political understanding for the development of mental health interventions. This approach promises to further our understanding of student mental health by guiding an identification of appropriate motivational assessment and intervention strategies for biological, as well as socio-political factors.

The significant contribution of this study in developing the basic concept, previous findings should be extended and expanded to assess the efficiency of ideological and political intervention as well as for refining the methodology of the practical combining of biological indicators to the evaluation of mental health [35]. The studies appear to have involved relatively small and more homogeneous samples, future research could achieve greater within- and between-group variance for investigating the long-term impact of these types of interventions on students' wellbeing. Thus, mental health interventions should be biological, psychological, and socio-political in order to meet students' mental needs. The strengths of this

framework will help form the foundation for the student mental health assessment and the identification of new intervention techniques.

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Conflict of interest: The author declares no conflict of interest.

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