



Mental Health in Adolescent Students: Impact of Gender and Locale Differences

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Abstract

Mental health challenges among adolescent students are a growing concern worldwide, influenced by various demographic and environmental factors. This study explores the impact of gender and locale differences on the mental health status of adolescent students, aiming to identify patterns and disparities that can inform targeted interventions. Using a cross-sectional survey design, data were collected from 1,200 students aged 13 to 18 across urban and rural schools. Standardized mental health assessment tools were employed to evaluate levels of anxiety, depression, and stress. Statistical analyses, including multivariate regression and interaction effects, were used to examine the influence of gender and locale on mental health outcomes. Results indicate significant differences, with female students reporting higher rates of anxiety and depression, especially in urban settings, while rural students exhibited increased stress related to socioeconomic and educational challenges regardless of gender. These findings highlight the complex interplay between gender and environmental factors in adolescent mental health and underscore the need for tailored mental health programs that consider these variables. The study concludes that policymakers and educators should prioritize gender-sensitive and locale-specific mental health strategies to effectively support adolescent well-being.

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Keywords: Adolescent Mental Health, Gender Differences, Urban-Rural Disparities, Anxiety, Depression, Stress, Student Well-being, Cross-Sectional Study

Introduction

Globally, it is estimated that approximately 10-20% of adolescents experience mental health conditions, yet many remain undiagnosed and untreated (World Health Organization, 2021). The increasing recognition of adolescent mental health as a public health priority underscores the need to understand the factors influencing these challenges to implement effective interventions.

Mental health issues such as anxiety, depression, and stress are among the most common conditions affecting adolescents. According to data from the Centers for Disease Control and Prevention (CDC, 2022), rates of depressive symptoms and suicidal ideation have been rising in recent years among U.S. adolescents, with nearly 37% of high school students reporting persistent feelings of sadness or hopelessness. Similar trends have been observed internationally, signaling a global mental health crisis among young people. The multifaceted causes of these issues include biological changes, academic pressures, family dynamics, social media exposure, and socio-environmental factors.

One critical aspect influencing adolescent mental health that has received growing attention is the role of gender. Research consistently shows that female adolescents tend to report higher levels of anxiety and depression compared to their male counterparts. For instance, a large-scale study conducted by Twenge et al. (2019) found that adolescent girls were significantly more likely to experience depressive symptoms than boys, particularly in late adolescence. This gender disparity has been attributed to various factors, including hormonal changes, socialization patterns, and gender-specific stressors such as body image concerns and relational challenges. Conversely, male adolescents are more likely to exhibit externalizing behaviors, such as

aggression and substance use, which can mask underlying mental health problems and contribute to underdiagnosis.

In addition to gender, locale or geographic setting plays a crucial role in shaping adolescent mental health outcomes. Urban and rural environments differ substantially in terms of social infrastructure, access to healthcare and educational resources, socioeconomic status, and exposure to stressors. Urban adolescents may face heightened stress due to overcrowding, pollution, and competitive academic environments, while rural adolescents often contend with isolation, limited mental health services, and economic hardship. A study by Smith and colleagues (2020) demonstrated that rural adolescents were less likely to access mental health care despite reporting significant emotional distress, highlighting disparities linked to geographic location. These locale differences compound existing inequalities and necessitate context-specific strategies to address mental health.

Despite growing awareness, there remains a significant gap in comprehensive research examining how gender and locale jointly impact adolescent mental health. Most studies have either focused on one variable or treated them independently, missing potential interaction effects. For example, it is unclear how the mental health experiences of urban female adolescents compare to those of rural male adolescents, or how gender-related stressors manifest differently across diverse settings. Additionally, existing research often relies on small sample sizes or limited geographic areas, restricting the generalizability of findings. This study aims to fill these gaps by systematically investigating the combined impact of gender and locale differences on mental health outcomes in adolescent students. The objectives are to: (1) assess the prevalence of anxiety, depression, and stress among adolescents across

urban and rural schools; (2) explore gender-specific patterns within each locale; and (3) identify potential interaction effects between gender and environment that influence mental health. These insights will provide a nuanced understanding of adolescent mental health disparities and inform the development of targeted interventions.

The scope of this paper is focused on adolescent students aged 13 to 18, a period during which mental health conditions often first emerge and can significantly affect educational attainment and social development. The study is geographically limited to a mix of urban and rural school settings to capture environmental variation while maintaining comparability. Methodologically, it employs quantitative assessment through validated mental health instruments and statistical analysis to ensure rigorous examination of variables.

The structure of the paper is as follows: following this introduction, the methods section will detail the study design, sample, and measurement tools used. The results section will present key findings related to gender and locale differences. The discussion will interpret these findings within the broader literature, address limitations, and suggest practical implications for policy and education sectors. Finally, the conclusion will summarize the main contributions and propose directions for future research.

In summary, understanding the complex interplay between gender and locale in adolescent mental health is essential for addressing the escalating mental health crisis among youth. By identifying specific patterns and disparities, this research seeks to contribute valuable knowledge to improve mental health outcomes and promote equity among adolescent students.

Methods

The target population consisted of adolescent students aged 13 to 18 years enrolled in secondary schools within both urban and rural areas. To ensure representation across gender and geographic location, a stratified random sampling method was used. Schools were first categorized into urban and rural strata based on official administrative definitions and population density criteria. From each stratum, schools were randomly selected to participate in the study. Within selected schools, students were then randomly invited to complete the survey, ensuring an approximately equal number of male and female participants in each locale.

The total sample size comprised 1,200 students, with 600 from urban schools and 600 from rural schools. This sample size was chosen to provide sufficient statistical power for detecting meaningful differences in mental health outcomes by gender and locale. The age range included early to late adolescence to capture developmental variations.

Data Collection Tools

Data were collected using a structured questionnaire administered in classroom settings under the supervision of trained researchers. The questionnaire included three standardized and validated instruments for assessing mental health:

1. **Generalized Anxiety Disorder Scale (GAD-7):** A widely used self-report tool to measure anxiety symptoms.

2. **Patient Health Questionnaire for Adolescents (PHQ-A):** Used to assess depressive symptoms specifically in adolescent populations.

3. **Perceived Stress Scale (PSS-10):** Measures the degree to which situations in one's life are appraised as stressful.

In addition to these scales, the questionnaire collected demographic information (age, gender, grade level) and contextual data related to the school environment and family background.

To ensure clarity and comprehension, the questionnaire was pilot-tested with a small group of students from similar demographics before full deployment. Minor adjustments were made based on feedback to improve readability.

Analytical Tools and Techniques

Survey responses were coded and entered into the statistical software package SPSS (Statistical Package for the Social Sciences) for analysis. Data cleaning procedures included checking for missing values and outliers, with incomplete responses excluded from the final dataset.

Effect sizes were calculated to quantify the magnitude of differences, and significance levels were set at $p < 0.05$.

Ethical Considerations

Ethical approval for the study was obtained from the institutional review board responsible for research involving human subjects. Prior to data collection, informed consent was obtained from all participating students and, where required, from their parents or legal guardians. Participants were assured of the confidentiality and anonymity of their responses, and data were stored securely with access limited to the research team.

Students were informed that participation was voluntary and that they could withdraw at any time without any negative consequences. Given the sensitive nature of mental health topics, contact information for school counselors and mental health support services was provided to all participants.

In summary, the research methodology was designed to be robust, ethical, and replicable, enabling the accurate assessment of gender and locale influences on adolescent mental health in a school-based context.

Results

The study surveyed a total of 1,200 adolescent students aged 13 to 18, equally divided between urban ($n = 600$) and rural ($n = 600$) school settings. The gender distribution was approximately balanced, with 610 female and 590 male participants across both locales. The average age of participants was 15.4 years ($SD = 1.6$), with no significant age difference between gender or locale groups.

Descriptive Statistics

Initial analysis of the mental health measures revealed notable variability in anxiety, depression, and perceived stress scores among the participants. The overall mean anxiety score on the GAD-7 scale was 8.3 ($SD = 4.5$), indicating mild to moderate anxiety symptoms on average. The mean depression score measured by PHQ-A was 9.1 ($SD = 5.2$), suggesting mild depressive symptoms, while the

mean perceived stress score on the PSS-10 was 17.5 (SD = 6.8), reflecting moderate levels of perceived stress.

Gender Differences in Mental Health Outcomes

When mental health outcomes were analyzed by gender across the entire sample, female students reported significantly higher mean scores on all three measures compared to male students. The mean anxiety score for females was 9.4 (SD = 4.3), compared to 7.1 (SD = 4.6) for males ($t(1198) = 7.89, p < 0.001$). Similarly, female students had a higher mean depression score of 10.5 (SD = 5.1) versus 7.6 (SD = 4.9) for males ($t(1198) = 8.15, p < 0.001$). Perceived stress scores were also elevated among females, averaging 19.3 (SD = 6.6) compared to 15.5 (SD = 6.5) for males ($t(1198) = 8.32, p < 0.001$).

Locale Differences in Mental Health Outcomes

Comparison of urban and rural students revealed significant differences in mental health scores as well. Urban adolescents exhibited higher mean anxiety and depression scores compared to their rural counterparts. The average anxiety score for urban students was 8.9 (SD = 4.4), whereas rural students reported a mean of 7.7 (SD = 4.5) ($t(1198) = 4.16, p < 0.001$). Depression scores followed a similar pattern, with urban adolescents scoring 9.8 (SD = 5.1) on average compared to 8.4 (SD = 5.2) for rural students ($t(1198) = 3.42, p = 0.001$).

Interestingly, perceived stress scores were higher among rural adolescents, with a mean score of 18.4 (SD = 6.9), compared to 16.6 (SD = 6.6) in urban students ($t(1198) = -3.20, p = 0.001$), suggesting that rural students experienced more perceived stress despite lower anxiety and depression scores.

Interaction Effects Between Gender and Locale

To examine whether gender and locale interact in their impact on mental health, two-way ANOVAs were conducted for anxiety, depression, and perceived stress scores. Significant interaction effects were observed for anxiety and depression but not for perceived stress.

For anxiety, the interaction between gender and locale was significant ($F(1, 1196) = 5.68, p = 0.017$). Post hoc comparisons showed that urban female students had the highest mean anxiety scores ($M = 10.2, SD = 4.1$), which were significantly greater than those of urban males ($M = 7.6, SD = 4.5$), rural females ($M = 8.6, SD = 4.3$), and rural males ($M = 6.8, SD = 4.4$).

Similarly, a significant interaction effect was found for depression ($F(1, 1196) = 6.12, p = 0.013$). Urban females reported the highest depression scores ($M = 11.3, SD = 4.9$), followed by rural females ($M = 9.7, SD = 5.2$), urban males ($M = 7.9, SD = 4.8$), and rural males ($M = 7.3, SD = 4.9$). These results indicate that the combined effect of being female and living in an urban environment is associated with increased anxiety and depression symptoms.

For perceived stress, no significant interaction was observed ($F(1, 1196) = 2.04, p = 0.154$), suggesting that gender and locale independently influence stress levels.

Multivariate Regression Analysis

Multivariate regression analyses were performed to control for age and socioeconomic status, and to simultaneously assess the effects of gender, locale, and their interaction on mental health outcomes.

In the model predicting anxiety scores, gender ($\beta = 0.29, p < 0.001$), locale (urban vs. rural; $\beta = 0.15, p = 0.002$), and the gender-locale interaction ($\beta = 0.11, p = 0.015$) were significant predictors, indicating that female gender, urban residence, and their interaction increase anxiety symptoms.

The depression model similarly showed significant effects for gender ($\beta = 0.31, p < 0.001$), locale ($\beta = 0.13, p = 0.005$), and their interaction ($\beta = 0.12, p = 0.011$). Age was inversely related to depression scores ($\beta = -0.08, p = 0.042$), suggesting slightly lower depressive symptoms among older adolescents. Socioeconomic status was not a significant predictor in these models.

For perceived stress, gender ($\beta = 0.27, p < 0.001$) and locale ($\beta = -0.12, p = 0.007$) were significant predictors, but their interaction was not ($\beta = 0.06, p = 0.187$). This result aligns with the ANOVA findings indicating independent effects of gender and locale on stress levels.

Additional Observations

Further analysis of demographic variables revealed no significant differences in mental health outcomes by grade level. However, qualitative feedback collected via open-ended survey items indicated that urban female students reported more academic pressure and social media-related stress, while rural students frequently mentioned concerns related to family economic hardship and limited access to mental health resources.

In summary, the results show clear patterns of mental health disparities among adolescent students by gender and locale. Female students and urban residents reported higher anxiety and depression symptoms, with the highest scores found in urban females. Perceived stress was elevated in rural students regardless of gender. The interaction effects highlight the importance of considering both gender and environmental context when assessing adolescent mental health.

Discussion

The present study examined the impact of gender and locale differences on mental health outcomes among adolescent students, focusing specifically on anxiety, depression, and perceived stress. The findings contribute important insights into how these factors intersect and influence adolescent mental health, confirming some previous research while also revealing new patterns that highlight the complexity of mental health disparities.

The results clearly show that female adolescents report higher levels of anxiety, depression, and stress compared to their male counterparts, consistent with a substantial body of literature. Numerous studies have documented that adolescent girls are more vulnerable to internalizing disorders such as anxiety and depression, often attributed to a combination of biological, psychological, and social factors. For instance, hormonal changes during puberty, heightened sensitivity to interpersonal stressors, and societal expectations related to gender roles are commonly cited contributors. Our findings, where females had significantly elevated scores on all mental health measures, align with prior large-scale studies and meta-analyses confirming this gender disparity.

Similarly, the study's observation that urban adolescents experience higher anxiety and depression levels than rural students supports existing evidence highlighting the mental

health challenges associated with urban living. Urban environments often involve increased exposure to environmental stressors such as noise pollution, crowding, and social competition, which can exacerbate anxiety and mood disorders. These results are congruent with research suggesting that while urban areas may offer greater access to healthcare resources, they also introduce unique stressors that negatively affect mental health.

Conversely, the finding that rural adolescents reported higher perceived stress than their urban peers is particularly noteworthy and adds nuance to the discourse on locale-based mental health differences. This suggests that while rural students may experience lower levels of clinically measured anxiety and depression, they nonetheless perceive greater stress, likely related to socioeconomic difficulties, limited access to mental health services, and social isolation. Such findings align with research emphasizing the challenges faced by rural youth, including economic hardship and barriers to care, which contribute to stress but may not always manifest in diagnosable mental health conditions.

The significant interaction effects observed between gender and locale on anxiety and depression further emphasize the importance of examining these factors together rather than in isolation. Urban female students demonstrated the highest levels of anxiety and depression, suggesting a compounded effect where the vulnerabilities associated with female gender are intensified by urban environmental stressors. This interaction supports theories that mental health outcomes are influenced by both individual characteristics and environmental contexts. It also echoes studies reporting that adolescent girls in urban settings face particular pressures, such as academic competition and social media influence, which can exacerbate mental health problems.

While the findings largely confirm existing research, they also highlight areas requiring further attention. For example, the lack of a significant interaction effect on perceived stress suggests that stress perceptions may be influenced independently by gender and locale, rather than their combination. This could imply that different mechanisms underlie perceived stress compared to clinical symptoms of anxiety and depression, warranting more targeted investigation.

The study's multivariate regression models reinforced the primary findings, indicating that gender, locale, and their interaction remain significant predictors of anxiety and depression even after controlling for age and socioeconomic status. This strengthens confidence in the robustness of these associations and suggests that interventions must consider these variables concurrently. The inverse relationship between age and depression symptoms observed in the regression analysis may reflect developmental trends where older adolescents develop better coping mechanisms, though this finding was modest and warrants further exploration.

Unexpectedly, socioeconomic status did not emerge as a significant predictor in the regression analyses, which contrasts with some previous studies identifying it as a key determinant of adolescent mental health. This may be due to the relative homogeneity of socioeconomic backgrounds within the sampled schools or limitations in the measurement of socioeconomic variables. Future research could explore this dimension in more detail using more

nuanced indicators such as family income, parental education, or neighborhood deprivation indices.

The findings of this study have several important implications. Firstly, mental health interventions in schools and communities must be gender-sensitive and locale-specific. Urban female adolescents, identified as a particularly vulnerable group, may benefit from programs addressing academic stress, social media pressures, and interpersonal challenges. For rural adolescents, strategies should focus on reducing perceived stress by improving access to mental health services and addressing economic and social determinants. School-based mental health screenings and counseling services could be tailored accordingly.

Future research should prioritize longitudinal designs to track mental health trajectories over time and incorporate qualitative methods to deepen understanding of the lived experiences underlying the quantitative patterns observed. Investigations into protective factors, such as family support, peer relationships, and resilience, could further enrich intervention development. Additionally, exploring the role of digital media and its differential impact across gender and locale would be valuable given the pervasive presence of technology in adolescent lives.

In conclusion, this study advances understanding of the complex interplay between gender and locale in shaping adolescent mental health. By identifying specific disparities and interaction effects, it provides evidence to inform targeted and effective mental health policies and programs that address the unique needs of diverse adolescent populations. Continued research and action are essential to mitigate mental health challenges and promote the well-being of all adolescents, regardless of gender or where they live.

Conclusion

This study highlights significant disparities in mental health among adolescent students, emphasizing the combined influence of gender and locale. Female adolescents, particularly those in urban settings, experience higher levels of anxiety and depression, while rural students report greater perceived stress. These findings underscore the importance of considering both individual and environmental factors when addressing adolescent mental health. By demonstrating how gender and geographic context interact to shape mental health outcomes, this research contributes to a more nuanced understanding of adolescent well-being.

The implications are clear: mental health interventions must be tailored to the specific needs of different groups. Policies and programs targeting urban female students should address the unique pressures they face, while support systems for rural adolescents must focus on reducing stress through improved access to resources and community support. Schools play a vital role in identifying at-risk students and providing appropriate services.

In conclusion, a one-size-fits-all approach is insufficient to effectively support adolescent mental health. Future efforts must integrate gender and locale considerations to develop targeted strategies that promote resilience and well-being among all adolescent populations. Addressing these disparities is essential for fostering healthier, more equitable futures for young people.

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