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A Cross-Cultural Comparative Analysis of Educational Methodologies and Their Effects on Depression Levels and Sleep Quality in High School Students

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Abstract: This paper undertakes a comparative analysis of educational methodologies in Eastern Asian and Western cultures, focusing on Chinese public high schools and international schools. Chinese pedagogy traditionally underscores foundational education with rote learning and memorization but lacks flexibility. In contrast, the Western educational paradigm prioritizes imagination, observation, and analytical skills, albeit with perceived inadequacies in academic proficiency. The primary objective is to compare depression levels and sleep quality among high school students from diverse domestic and international educational frameworks while evaluating the philosophies of various high schools globally. The study employs a quantitative approach to detect relation between variables. The sample comprises 398 participants from 74 high schools in China, America, the United Kingdom, Singapore, the Philippines, and Canada, obtained through snowball sampling. The research aims to provide insights into the relationship between students' mental status and school types, exploring gender differences through cross-tabulations of the Zung Self-Depression Scale(SDS), Pittsburgh Sleep Quality Index (PSQI), and depression levels. The findings reveal significant disparities in depression levels and sleep quality between students from international schools and Chinese public high schools. Notably, the former group reported higher depression levels and poorer sleep quality. Moreover, non-binary students demonstrated the highest depression levels and the poorest sleep quality among the surveyed groups. These observations highlight the urgency of addressing adolescent mental health and emphasize the necessity for a comprehensive educational approach that considers students' cognitive and personality development, fostering a more inclusive and equitable school and social environment for minority groups.

Keywords: cross-cultural comparative analysis, educational methodologies, mental health among adolescents, sleep quality, Chinese and international school systems

1. Introduction

Depression has become a prevalent concern among adolescents worldwide. While the World Health Organization (WHO) has reported an estimated 5% of adults suffering from depression globally, it is evident that depression also affects a significant number of adolescents [1]. Despite its prevalence, research on depression and other mental illnesses in adolescents has not received adequate attention.

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Sleeping problems are also prevalent among adolescents, as highlighted by a Taiwanese study revealing a relatively high proportion of sleeping issues among high school students [2]. Existing studies have emphasized cultural differences, indicating that Asian students may be more likely to suffer from depression comparing to their Western counterparts [3-6]. Additionally, gender and racial differences have been shown to play influential roles in determining individuals' mental well-being [7].

Nevertheless, while numerous studies have explored various aspects, such as family environments, gender, age, racial-ethnic diversity, year groups, and peer pressure, fewer investigations have examined the impact of institutional culture on students' psychological health and sleeping quality [7-9]. Specifically, the relationship between school type and adolescents' depression and sleeping quality remains relatively unexplored. For instance, students in public schools in China face immense academic pressure and fierce competition in high school entrance and college enrollment examinations, compounded by the anxiety from extremely high expectations of their parents. Consequently, they have little time for exploration of personal interests and extra-curriculum activities, but more time under factory-style training, doing excessive papers and exams, and must prioritize scores and engage in after-school academic classes. On the other hand, students attending international schools also endure tremendous pressure and anxiety during university applications, while peer and parental pressures remain significant. Although some people may assume that international school students have more leisure time, they are still compelled to select their future majors early to participate in various activities, competitions, and scientific research relevant to their intended fields, enhancing their credentials for future success [10]. The present study plan to investigate the influence of different education systems on students' mental well-being and sleeping quality. The hypothesis is that students in public schools in China tend to experience more depressed moods and are more likely to sleep worse comparing with their peers in international schools. The study undertakes school type and gender comparisons to gain a comprehensive understanding of the interplay between education systems and students' mental and physical conditions, while also exploring the role of sex differences. Moreover, the assessment of depression and sleeping quality is conducted through multidimensional scales to achieve a more comprehensive understanding of depressive disorders and sleeping problems among adolescents. By identifying correlations and potential predictors, the study aims to shed light on the impact of school types on the psychological well-being and sleeping quality of adolescents, offering valuable insights for better development of educational institutions and educational philosophy and a more comprehensive understanding of students' mental health.

2. Method

2.1. Subjects

The participants were recruited from a diverse selection of 42 international schools from China (including Hong Kong), America, the United Kingdom, Canada, Singapore, and the Philippines, as well as 32 public schools in China, utilizing a snowball sampling approach, mainly focusing on Chinese students and students who are Chinese origins. In addition, through the author's friends and family network, the author was able to conduct the surveys in 74 high schools involved in this study. The research involved a total of 398 high school students, encompassing three distinct year groups: Year 11, Year 12, and Year 13. Among the participants, there were 316 students from Year 11, 46 students from Year 12, and 36 students from Year 13. The gender distribution comprised 138 male students, 248 female students, and 11 non-binary students. The age range of the adolescent sample (n=398) spanned from 15 to 19 years old. The inclusion criteria of this research were: (1) high school students, (2) willing to respond to all questions in the questionnaires, and (3) approved of the

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utilization of personal information.

Informed consent was obtained from both the parents of participants under 18 years old and the participants themselves before filling out the questionnaires. The distribution of the questionnaires took place online through social media platforms (i.e., Wechat) and emails. All participants completed the questionnaires during nighttime hours (i.e., after 8 p.m.) and the data were collected using Microsoft Forms. The average completion time for the questionnaires was approximately 6 minutes. The valid response collected through the research was 398 out of 400 participants after data cleaning, of which two responses were filtered due to invalid personal information.

2.2. Instruments

Questionnaires comprising three sections: basic information, the Zung Self-Rating Depression Scale (SDS), and the Pittsburgh Sleep Quality Index (PSQI) were designed for the research. The section on basic information included age, year group (i.e., Y11, Y12, or Y13), gender (i.e., Male, Female, or Non-Binary), school, and the time they started to fill in the questionnaire. The second and third sections of self-administered questionnaires consisted of the English-Chinese bilingual version of the SDS and PSQI, with a total of 35 questions. Specifically, this included 5 questions pertaining to participants' personal information, 20 questions for the SDS, 9 questions for the PSQI, and an additional inquiry concerning participants' negative emotions, status, behaviors, feelings, or any other experiences encountered, in addition to the questions from SDS and PSQI.

2.3. The Zung Self-Rating Depression Scale (SDS)

SDS is a concise, self-administered survey, designed to quantify the extent of depression in individuals. It comprises 20 items that rate four key aspects of depression Each question is rated on a scale of 1-4 (a little of the time, some of the time, a good part of the time, most of the time). The second, fifth, sixth, eleventh, twelfth, fourteenth, sixteenth, seventeenth, eighteenth, and twentieth questions are reverse scored (i.e., the scale goes from 4 down to 1). Raw scores fall within the range of 20-80, and these raw scores can be transformed into an SDS Index score by multiplying the raw score by 1.25. In the global scoring formula of SDS, scores from 25-49 fall within the normal range, 50-59 indicate mild depression, 60-69 represent moderate or marked depression, while scores of 70 and above (i.e., to 100) indicate severe depression. This study utilizes the Chinese scoring formula of SDS, in which scores from 25-52 fall within the normal range, 53-62 indicate mild depression, 63-72 represent moderate or marked depression, while scores of 72 and above (i.e., to 100) indicate severe depression. Previous studies have indicated that the SDS is a valid, reliable, and sensitive measure of clinical severity in depressed patients during treatment, which could be able to discriminate between individuals with depression and those without it, and supported its continued use as a research instrument [11,12].

Mean and standard deviation calculations were performed, and categorical data were transformed into numerical forms as required for analysis purposes.

For the SDS, questions were recoded as “SDS1” to “SDS20” for analysis. To account for reverse scoring in the SDS (i.e., the second, fifth, sixth, eleventh, twelfth, fourteenth, sixteenth, seventeenth, eighteenth, and twentieth questions), a rearrangement of response options was conducted. The option “most of the time” was adjusted as the first option, while “a little of the time” was placed as the last option. Consequently, the scoring ranged from 1 to 4, with higher scores indicating greater depressive symptoms. The author also aims to compare the depression levels with school types and genders according to the scoring formula of the Chinese versions of SDS. Thereby, the normal range was recoded as “1”, mild depression was recoded as “2”, moderate depression was recoded as “3”, and severe depression was recoded as “4”.

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2.4. Pittsburgh Sleep Quality Index (PSQI)

PSQI is a comprehensive 19-item self-report questionnaire that evaluates sleep quality over a 1-month time span. It is the most widely used sleep health assessment tool found to be the most rigorously validated tool to diagnose sleeping problems worldwide (Manzar et. al., 2018). It comprises 19 items that are grouped into seven component scores that ultimately generate one global score. The total PSQI score ranges from 0 to 21. Each item is assigned a weighted value from 0 to 3, with 0 indicating no difficulty and 3 indicating severe difficulty. The global score is computed by summing up the each component scores where lower scores indicate healthier sleep quality. A cutoff score of 5 is employed to differentiate poor sleepers from good sleepers [2].

Similarly, mean and standard deviation calculations were performed, and categorical data were transformed into numerical forms as required for analysis purposes.

PSQI, questions were re-encoded as "PSQI1" to "PSQI9." In the case of Question 5, which consists of seven sub-questions, they were re-encoded as "PSQI5.1" to "PSQI5.8," representing the various aspects of sleep disturbances. Throughout the research, the main focus was on the last question of the PSQI, which require individuals to rate their overall quality of sleep during the past few month. In the PSQI, the four response options for the overall self-rated sleep quality were recoded as "Good" and "Bad." Specifically, "Very good" and "Fairly good" were categorized as "Good," while "Very bad" and "Fairly bad" were classified as "Bad." Furthermore, "Good" was coded as 0, and "Bad" was coded as 1.

2.5. School Type

To facilitate further analysis, the 74 schools reported by the participants were classified as either "public schools"(n=32) or "international schools"(n=42). This categorization allowed for additional encoding and analysis of the data, in which "public school" was re-encoded as 0, and "international school" as 1. Cross-tabulation between school type and scores on SDS as well as self-rating of sleeping quality of PSQI was designed to compare and calculate the differences between public schools and international schools.

2.6. Gender

Genders were categorized as "Female", "Male" and "Non-Binary" to respect diverse sex. Cross-tabulation between gender and scores on SDS as well as self-rating of sleeping quality of PSQI was used to compare and discover gender differences in depressed mood or depressive symptoms and sleeping quality.

3. Results and Findings

Table 1: Overview of variables.

	Mean/Percentage	Standard Deviation
Gender		
Male	34.93%	
Female	62.31%	
Non-binary	2.76%	
Year Group		
Y11	79.40%	

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Table 1: (continued).

Y12	11.55%	
Y13	9.05%	
School Type		
Public School	69.85%	
International School	30.15%	
Scores of the Zung Self-Rating Depression Scale Raw Scores SDS Index	 44.38 55.47	 9.08 11.35
Self-Rating of Bad Sleeping Quality	31.41%	
N	398	

3.1. Demographics Variables of the Participants

Table 1 provides an overview of the participants' basic information. A total of 398 valid questionnaires were collected and categorized into five sections based on gender (Male, Female, or Non-Binary), year group (Y11, Y12, or Y13), school type (International School or Public School in China), scores on the SDS, and self-ratings of bad sleeping quality. The participant distribution was as follows: Male (n=138; 34.93%), Female (n=248; 62.31%), and Non-Binary (n=11; 2.76%); Year 11 (n=316; 79.40%), Year 12 (n=46; 11.55%), and Year 13 (n=36; 9.05%); International School students (n=120; 30.15%), and students from Public Schools in China (n=278; 69.85%). Participants' age ranged from 15 to 19 years, with an average one-year difference between each grade.

3.2. The Severity of Depressed Mood and Sleeping Problems

The mean SDS index score on the SDS for the 398 participants was 55.47 (SD =11.35) out of 100, indicating mild depression of depressed level for the majority of participants (Table 1 and Table 2). Regarding self-rated sleeping quality, 31.41% (n=398) described their sleeping quality as "bad," while the majority rated it as either "very good" or "fairly good" (Table 1).

Table 2: Raw Scores and SDS Index(i.e., raw scores times 1.25) of participants of SDS.

Variable	Obs	Mean	SD	Min	Max
Raw Scores	398	44.38	9.08	23	74
SDS Index	398	55.47	11.35	28.75	92.5

When comparing scores between students attending public high schools in China and those in international schools, the mean score on the SDS was 54.12 (SD = 11.22) for public school students and 58.60 (SD = 11.08) for international school students. Both scores fell within the mildly depressed level, but the slightly higher mean score among international school students suggests a higher likelihood of experiencing depressed mood or depressive symptoms compared to public high school students in China (Table 4). Overall, 49.28% of students from public high schools in China fall within the normal range of depression, while 50.72% students reported different depressed

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levels due to their scores which were greater than or equal to 53; 30.00% of students who are studying at international school scored less than 53, indicating a normal range of depression; while 70.00% students experienced different level of depressed mood or depressive symptoms related to their scores(i.e., ≥53) (Table 3).

Table 3: Cross-tabulation of school type and depression.

Depression(1=Yes)	School Type (1=international school)	
	0	1
0	49.28%	30.00%
1	50.72%	70.00%
N	398	

In terms of self-rated sleeping quality on the PSQI, 72.30% of students from public high schools in China reported “good” sleeping quality, while 27.70% rated their sleeping quality as “bad.” Among students from international schools, 60.00% rated their sleeping quality as “good,” while 40.00% indicated “bad” sleeping quality. These findings suggest that international high school students experience poorer sleep quality compared to their counterparts in public high schools in China, as a greater proportion of international school participants selected “very bad” or “fairly bad” when rating their sleeping quality (Table 4).

Table 4: Cross-tabulation of school type (i.e., public school and international school), SDS and Self-Rating of Bad Sleeping Quality from PSQI.

	Public School	International School
Self—Rating Depression Scale		
Mean	54.12	58.60
SD	11.22	11.08
Min.	28.75	32.5
Max.	92.5	88.75
Self-Rating Bad Sleeping Quality		
Good	72.30%	60.00%
Bad	27.70%	40.00%
N	398	

The findings in Table 5 revealed that a total of 43.47% of the students exhibited depression scores within the normal range (scoring below 53), while 31.66% fell into the category of mild depression, 16.58% experienced moderate depression, and 8.29% reported severe depression.

Upon conducting a cross-tabulation of depression levels and school types, it became apparent that a higher proportion of students from international schools exhibited different levels of depression compared to their counterparts from public high schools in China. Specifically, 49.28% of students from public schools fell within the normal range of depression, whereas only 30.00% of their peers from international schools fell within the same category. Additionally, 29.86% of public school students were classified as experiencing mild depression, whereas 35.83% of students from international schools showed mild depression symptoms. As for moderate depression, 14.03% of public-school students were reported to have it, in contrast to 22.50% of their counterparts from international schools. Lastly, severe depression was reported in 6.83% of participants from public high schools in China and 11.67% of participants from international schools (Table 5).

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Table 5: Cross-tabulation of depressed levels, school type, and overall situations of all participants.

Depression Levels		School Type(1=international School)	Total
	0	1	
1	49.28%	30.00%	43.47%
2	29.86%	35.83%	31.66%
3	14.03%	22.50%	16.58%
4	6.83%	11.67%	8.29%
N			398

In summary, the results indicate that students attending international schools demonstrated a higher prevalence of depression and exhibited more significant levels of depressive symptoms compared to students from public high schools in China.

3.3. Gender Differences in Depressive Mood and Sleeping Quality

This study revealed gender differences in both the scores of the SDS and the overall sleeping quality measured by the PSQI. Female students exhibited a mean score of 56.47 (SD = 11.55) on the SDS, while male students had a mean score of 52.97 (SD =10.49), and non-binary students had the highest mean score of 64.77(SD = 9.79), indicating the highest levels of depressive mood among non-binary students. Specifically, female students scored higher on the SDS compared to male students in the binary gender category (Table 6). Overall, 39.55% female students fall within the normal range of depression, and 60.48% students do experience depressed mood or depressive symptoms due to their scores which are greater than or equal to 53; 53.96% male students fall within the normal range of depressed level, while 46.04% students scored greater than or equal to 53, indicating a mild, moderate or severe depression; all binary-students are reported as depressed, meaning 100.00% non-binary students scored above or equal to 53. Regarding self-rated sleeping quality on the PSQI, 67.34% of female students reported “good” sleeping quality, while 32.66% rated their sleeping quality as “bad.” Among male students, 72.66% reported “good” sleeping quality, while 27.34% indicated “bad” sleeping quality. For non-binary students, 45.45% reported “good” sleeping quality, while 54.55% rated their sleeping quality as “bad.” These results indicate that non-binary students exhibited the poorest sleeping quality, with a higher proportion choosing “very bad” or “fairly bad” when rating their overall sleeping quality. Additionally, female students demonstrated worse sleeping quality compared to male students in the binary gender category (Table 7).

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Table 6: Cross-tabulation of gender (i.e., female, male, and non-binary), SDS and Self-Rating of bad sleeping quality from PSQI.

	Female	Male	Non-Binary
Self—Rating Depression Scale			
Mean	56.47	52.97	64.77
SD	11.55	10.49	9.79
Min.	28.75	28.75	56.25
Max.	88.75	78.75	92.5
Self-Rating of Bad Sleeping Quality			
Good	67.34%	72.66%	45.45%
Bad	32.66%	27.34%	54.55%
N	398		

Table 7: cross-tabulation of gender and depression.

Depression(1=Yes)	Gender of participants		
	Female	Male	Non-Binary
0	39.52%	53.96%	0.00%
1	60.48%	46.04%	100.00%
N	398		

The analysis of depression levels in relation to participants' gender revealed that 39.52% of female students, 53.96% of male students, and 0.00% of non-binary students were categorized within the normal range of depression; conversely, mild depression was observed in 32.66% of female students, 28.78% of male students, and 45.45% of non-binary students. As for moderate depression, it was identified in 18.55% of female students, 10.79% of male students, and 45.45% of non-binary students. Lastly, severe depression was reported in 9.27% of female students, 6.47% of male students, and 9.09% of non-binary students (Table 8).

Table 8: Cross-tabulation of depression levels and gender of participants.

Depression Levels		Gender of Participants	
	Female	Male	Non-Binary
1	39.52%	53.96%	0.00%
2	32.66%	28.78%	45.45%
3	18.55%	10.79%	45.45%
4	9.27%	6.47%	9.09%
N			398

In short, the data indicates that non-binary students exhibited the highest levels of depression and were the most affected compared to their binary gender counterparts. Moreover, within the binary gender category, female participants displayed a higher prevalence of depression and demonstrated more pronounced levels of depressive symptoms in comparison to male participants.

4. Discussions

The impact of education systems on adolescents' depressed mood or depressive symptoms and sleeping quality was found in this study, and students from international high schools are more depressed and have poorer sleeping quality than students from public high schools in China, which

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is completely the opposite with the author's hypothesis. Gender differences were also found, in which non-binary students demonstrated the highest depressed proportion and the poorest sleeping quality, and female students generated higher depressed levels and poorer sleeping quality compared to male students in the binary gender category.

Public high schools in China predominantly adhere to a traditional Asian pedagogical model, placing significant emphasis on rote memorization and standardized testing as measures of scholastic accomplishment. The philosophy tends to center on academic competition, with the end goal often being high exam scores to secure placements in premier universities. Although this educational system has yielded impressive academic outcomes, the potential detriments cannot be dismissed. An excessive focus on examinations, scores, and academic accolades can result in a constricted curriculum that may stymie the development of creativity, critical thinking, and emotional growth. Furthermore, the immense academic pressure has been linked with deleterious effects on students' mental health, inducing high levels of stress and potential mental disorders.

In pursuit of a more balanced and holistic educational milieu, Chinese public high schools might consider the incorporation of student-centric learning methodologies. These strategies prioritize customized learning experiences, fostering active engagement, collaborative work, and critical reasoning skills. The integration of project-based learning and experiential activities allows students to hone practical skills and apply theoretical knowledge to authentic, real-world situations.

International high schools across the globe tend to espouse a more diverse and globalized pedagogical approach, proffering multilingual programs and fostering exposure to international viewpoints. Their educational philosophy typically prioritizes a well-rounded education, encapsulating not only scholastic prowess but also the cultivation of critical thinking, creativity, and intercultural comprehension. These institutions often employ student-centric and project-based learning strategies to stimulate active participation and collaborative problem resolution. The environment is generally designed to be supportive and inclusive, encouraging cultural amalgamation and cultivating a sense of belonging among students from varied backgrounds.

International schools, despite their advantages, may have drawbacks contributing to students' mental stress. Dependence on technology for academics can lead to addictive behaviors, reduced interpersonal communication, and decreased concentration. A strong focus on multilingual education might cause imbalances in language proficiency or complicate cultural identity for some students. Challenges tied to cultural adaptation may arise within international schools. Additionally, pressures related to university applications, including involvement in competitions, extracurricular activities, projects, and research, may increase feelings of depression and other mental health issues among students.

To enhance the educational experiences of students in international schools, a balance must be struck between interpersonal interactions and mindful technology use. Integrating students' native culture and language within a multilingual framework helps preserve their unique identities while fostering global awareness. Providing support and cultural programs can ease the transition into international schooling and assist with cultural adaptation. Comprehensive guidance on applications, along with opportunities to explore various activities and competitions, can help students discover genuine interests and develop their skills and competencies.

In conclusion, regardless of their educational systems, schools should continually endeavor to refine their educational philosophies and methodologies. These should align more effectively with students' cognitive and personality development, with a significant emphasis placed on addressing and improving students' mental health.

According to the World Health Organization (WHO), around 10% to 20% of adolescents worldwide experience mental illness, with depression being the most common mental health disorder; some Chinese studies even showed that the prevalence of depressive symptoms among

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secondary school students was 64.8% [9]. During this critical stage of development, teenagers often face various challenges and stress, including academic pressures, social stress, and identity exploration. The indifferences and ignorance from surroundings and even the whole society may lead to a downward spiral of isolation, self-destructive behaviors, and even suicidal thoughts in adolescents. Therefore, it is essential for parents, family members, and educators to pay attention and recognize the early warning signs of depression, offer a supportive and non-judgmental environment, and provide students with professional help from therapists or counselors if it's necessary. By proactively addressing adolescents' depression, society could help adolescents navigate through their challenges and foster a brighter and healthier future for these young individuals.

At the same time, schools and society need to concern about the equality and mental health of minorities. For instance, non-binary and LGBTQ+ students face enormous challenges and discrimination nowadays, often experiencing marginalization and misunderstanding with a higher prevalence rate of mental illness. Students from minorities, including non-binary and LGBTQ+ individuals, face a higher risk of bullying and violence. Schools should cultivate a safe and inclusive environment by implementing anti-discrimination policies, educating about gender diversity and different sexualities, and promoting gender equality. Tailored mental health resources must address the unique concerns of minority students, recognizing societal stigma and offering culturally sensitive support. Through championing diversity and striving for inclusivity, schools can ensure that minority individuals are valued and supported in both academic and emotional well-being.

The study enhances understanding of adolescents' depression and sleep issues but has several limitations. The sample size is relatively small and mostly from Hohhot, Inner Mongolia, yet it also includes diverse subjects from various countries. The participant selection, done through non-probability snowball sampling, may not be entirely representative, although efforts were made to optimize cost-effectiveness and time efficiency. The majority of participants were students from Chinese public schools, with less representation of male and non-binary students, potentially influencing results. Nonetheless, out of 400 participants, 398 provided valid responses, and the gender differences were consistent with other studies. While the study covered a broad range of schools in China and globally, future research could focus on specific regions or comparisons between two countries, with attention to equal representation, stringent sample selection, and careful choice of assessment scales.

5. Conclusions

The principal finding of this study underscores the correlation between educational systems and the nocturnal depressive moods, along with sleep quality, of senior high school adolescents. The investigation revealed a relatively higher incidence of depressive symptoms and sleep disturbances among senior high school students attending international schools. Moreover, a distinct association with gender factors was discernible, where non-binary students registered the lowest scores on mental and emotional health indicators and reported the poorest sleep quality. These trends could possibly be attributed to societal stressors and cognitive factors.

Contrarily, students attending public high schools in China did not demonstrate significantly lower instances of sleep problems and exhibited better overall psychological well-being. Despite the limitations of the present study, considering the paucity of research exploring the impact of different school types on adolescent mental health, the author posits that the findings hold considerable significance. They present invaluable insights for future researchers aiming to delve deeper into the influence of educational systems and school types from varied regions and countries on adolescent depression symptoms and sleep quality.

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These findings could subsequently instigate the development of improved educational methodologies and philosophies that better align with students' cognitive development and mental health needs. This study serves as a stepping-stone towards constructing a more comprehensive and considerate educational environment for adolescents across the globe.

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