

A Survey of Adolescent Mental Health in Tianjin: Factors and Differences

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Abstract

This study aims to gain insight into the mental health status of secondary school students in Tianjin and its relationship with socio-demographic factors. The multidimensional characteristics of secondary school students' mental health were comprehensively explored through the assessment of six dimensions: interpersonal tension and sensitivity, depression, anxiety, learning stress, maladjustment, and emotional instability. At the same time, the effects of factors such as school type (Focused vs. non-focused secondary schools), grade level, gender, parental education and occupation on students' mental health were examined to reveal the patterns and trends involved. The study used a random sample of four secondary schools in the Binhai New Area of Tianjin China to conduct an online questionnaire survey. The survey was conducted from August to September 2023 and 272 valid questionnaires were collected. The reliability of the questionnaire was 0.956, and the KMO value was 0.949. A 5-point scale was used for each item, and the scores were averaged to arrive at the overall and each aspect of mental health status scores. Data will be analysed using Chi-Square test to test for differences in mental health across socio-demographic variables. The importance of the study is to provide educators, parents and policy makers with an important reference point to better support and promote the development of mental health among secondary school students. An in-depth understanding of the mental health status of secondary school students and the factors influencing it will help develop targeted mental health interventions to enhance the mental health and holistic development of adolescents.

Keyword: Mental Health, China, Adolescent, Depression, Anxiety

Introduction

Historically, health discussions have primarily centered on physical well-being, frequently overlooking mental health as less important. This view has evolved as a growing body of research highlights the importance of mental well-being. The World Health Organization (WHO) has been crucial in changing this outlook by promoting a comprehensive definition of health that includes mental, physical, social, and emotional aspects. This shift is important because mental health problems significantly affect overall health, influencing educational performance, work productivity, and societal contributions (World Health Organization, 2018).

Mental health is particularly significant in schools, where early intervention can lead to long-term improvements. Since the early 20th century, Western countries have gradually included mental health education in their school curricula, backed by government support (Wu, 2015; Ryst, 2021). In China, momentum for this integration built from the late 20th century, with key policy changes in the late 1990s enhancing mental health support in educational settings (Fu et al., 2019). This development acknowledges the crucial role schools play in boosting mental resilience and spotting early signs of mental distress among students.

Currently, adolescents are experiencing increased mental health challenges due to heavy academic demands and fast-paced social changes. In China, this issue is severe, with an estimated 30 million children under 17 struggling with mental disorders. These challenges are intensified by insufficient mental health knowledge and weak intervention strategies (Ma, 2020; National Mental Health Development Report, 2017-2018). In response, China has widened its mental health education policies, including compulsory depression screenings and stronger educational support for mental health. These steps highlight the urgent need for ongoing and knowledgeable mental health strategies in schools to ensure that young people are prepared to handle their mental health effectively. This context sets the stage for examining the psychological health of secondary school students in Tianjin and exploring whether there are significant differences in mental health across various demographic groups such as school type, grade level, gender, and parental education and occupation.

The motivation for this study stems from the growing prominence of mental health problems among adolescents. With increasing social competition and academic pressure, these issues have gradually attracted the attention of all sectors of society. Understanding the mental health status of secondary school students and the factors that influence it can aid in early identification and intervention, potentially reducing the occurrence and progression of psychological problems. Despite the urgency of this issue, there are still few studies that systematically and comprehensively assess the mental health status of secondary school students in Tianjin and analyze its relationship with socio-demographic factors. This study aims to fill this gap and provide more comprehensive and specific data support. By revealing the current mental health status of secondary school students and its influencing factors, this research seeks to offer a scientific basis for relevant policy formulation and intervention measures.

This study aims to investigate the mental health status of students in secondary schools in Tianjin, including assessing factors such as stress, anxiety, depression and overall well-being. The contributions of this study are significant. It provides a systematic and comprehensive understanding of the mental health status of secondary school students by assessing six dimensions: interpersonal tension, sensitivity, depression, anxiety, academic stress, maladjustment, and emotional instability. This detailed assessment offers robust data support for further research and intervention. Additionally, the study thoroughly analyzes the impact of socio-demographic factors such as school type, grade, gender, parental education, and occupation on the mental health of secondary school students, uncovering patterns and trends in mental health disparities. Based on the findings, this study offers a foundation for developing targeted mental health interventions aimed at promoting the overall healthy development of adolescents.

Literature Review

Family Factors Influencing Adolescent Mental Health

The family plays a pivotal role in shaping an adolescent's emotional and psychological development, influencing their mental health profoundly. The concept of the family environment has broadened over the years to encompass both material and emotional support, which are essential for nurturing resilience and sociability in teenagers. A supportive family environment promotes healthy psychological qualities, while a negative environment can contribute to distress and mental disorders. Both the physical conditions at home and the emotional climate are crucial, as they collectively impact the mental health of adolescents (Yang et al (2022); However, the relationship between family income and youth mental and behavioral health is complex, with risks present in both poverty and affluence (Coley et al., 2018). Researchers highlight that a nurturing family environment significantly enhances adolescent well-being (Avedissian& Alayan, 2021).

Furthermore, the structure of the family also significantly affects adolescents' mental health. Changes in family policies in China, such as the introduction of the two-child and three-child policies, have shifted family dynamics, altering the support systems available to adolescents. Stable family structures, where support is consistent, are linked with fewer psychological issues in adolescents. In contrast, unstable or single-parent families may lack adequate support, leading to increased mental health challenges (Desforges & Abouchaar, 2003; Doucet et al., 2015). The presence of multiple children can also change the dynamics within the family, influencing the distribution of attention and resources, which can affect the psychological development of each child (Yan, 2023; Fletcher, 2019).

The educational level and psychological disposition of parents are also critical factors that significantly affect adolescent mental health. Parents who are well-educated and psychologically stable tend to set realistic yet high expectations and provide substantial emotional and intellectual support. This positive involvement can enhance their children's mental health and educational outcomes (Dubow et al.,2009; Huesmann, 2009). Conversely, parents with lower educational levels and poorer mental health may set lower expectations and provide less support, which can negatively impact adolescents' emotional and academic development. The style of parenting adopted, whether authoritative, neglectful, or authoritarian, also critically shapes adolescent behavior and mental health outcomes. Authoritative parenting, characterized by supportive and constructive feedback, fosters autonomy and resilience in adolescents. In contrast, but overly strict or indifferent parenting styles can lead to increased anxiety and depression among young people (Wang, 2021; Yaffe, 2021; Lu, 2020; Yaffe, 2017). Wang and others found that a care-autonomy parenting style, characterized by high levels of care and autonomy, decreased the risk of depression and anxiety in children, while an indifference parenting style, characterized by low levels of care and autonomy, increased the risk of depression. Yaffe further emphasized the role of non-authoritative parenting styles, such as overprotective, authoritarian, and neglectful styles, in contributing to anxiety disorders in children and adolescents. Lu and Yaffe both highlighted the positive relationship between parental strictness and anxiety in adolescents, with Lu specifically noting the moderating effect of parental marital quality. Yaffe also found that a lack of autonomy granting by parents and authoritarian parenting were associated with high anxiety levels in children. These findings underscore the importance of a balanced and supportive parenting style in promoting the mental well-being of young people.

School Factors Influencing Adolescent Mental Health

The school environment plays a crucial role in shaping the mental health of adolescents by influencing their emotional, social, and academic development through multiple facets.

Teacher-Student Relationships play a foundational role in the academic and emotional well-being of students. Teachers who create a supportive and encouraging atmosphere can significantly boost students' self-esteem and reduce anxiety, which positively impacts their mental health (Wang & Eccles, 2012). Effective communication and a genuine interest in students' welfare have been shown to improve engagement and reduce stress (Kaur et al., 2019; Sabrifha & Darmawati, 2022; Gubbels & Kappe 2019).

On the other hand, teachers who are indifferent or overly critical can contribute to feelings of inadequacy and anxiety among students, potentially leading to long-term mental health issues (Ali, 2019).

Transitioning from the classroom to broader peer interactions, these play a critical role in adolescents' social experiences and significantly impact their mental health. Positive peer relationships that offer emotional support and validation can greatly enhance feelings of belonging and self-worth. Conversely, negative interactions such as bullying and exclusion are strongly linked to the development of psychological issues like depression and anxiety. Schools that promote inclusive environments and actively address bullying can mitigate these adverse effects and foster a healthier social atmosphere for all students (Boyd & Lawes, 2018; Jike, 2023; Hart Barnett et al., 2019).

Beyond interpersonal relations, the physical and philosophical environment of the school also plays a significant role. Schools that maintain a clean, safe, and inviting physical space help to reduce stress and anxiety among students (Geist, 2019; Witherup & Verrecchia, 2020). Furthermore, educational philosophies that emphasize holistic development—incorporating social, emotional, and academic growth—create a more supportive environment that nurtures mental well-being. The inclusion of mental health education in the curriculum and the availability of counselors and support programs are crucial for addressing and preventing mental health issues (Warford, 2019; Wiedermann et al., 2023).

Lastly, the impact of school policies and daily practices cannot be understated. Practices such as excessive homework, high-stakes testing, and competitive academic environments can significantly increase stress and anxiety among students. On the contrary, schools that implement balanced educational practices, providing sufficient downtime and prioritizing learning over performance, contribute significantly to reducing stress and promoting better mental health outcomes. Including extracurricular activities and allowing time for leisure are also important, as these provide students with opportunities to pursue interests outside the academic sphere, further contributing to their emotional and psychological well-being (Rawal, 2020; Roopesh, 2018).

Interrelation of Family and School Factors

The relationship between family and school environments significantly impacts adolescent mental health, with these two crucial spheres of a young person's life deeply interconnected. The family environment sets foundational attitudes and behaviors that adolescents carry into the school setting. Adolescents from supportive family backgrounds often perform better

academically and engage more fully, possessing higher self-esteem and better stress management skills nurtured at home (Motamedi, 2020). Conversely, those from troubled homes might struggle with academic and social challenges due to higher stress levels and a lack of emotional support, which can hinder their learning and concentration.

School experiences also influence the family dynamic, affecting family relationships and parenting styles. Parents may adjust their parenting based on feedback from teachers or changes in their child's behavior due to school experiences. Positive school experiences, such as recognition of academic or extracurricular achievements, can lead to a more harmonious family environment, enhancing parents' pride and satisfaction in their children's accomplishments. In contrast, academic or behavioral problems can strain parent-child relationships, especially if parents are overly punitive or misunderstand the underlying issues (Wang & Eccles, 2012).

The interaction between family and school factors can either buffer against or exacerbate mental health issues. A strong, positive relationship with teachers can mitigate the negative effects of a difficult home life. Teachers play a crucial role in fostering supportive relationships with their students, which can promote resilience and positive outcomes (Carroll, 2019). This is particularly important in adolescence, a period of increased mental health risks (Giorgi, 2019). Similarly, a stable and supportive family environment can help adolescents manage school stress, peer pressure, and academic expectations, fostering a sense of security and self-worth that supports academic and social success.

The broader community and educational policies also play critical roles in shaping the interplay between family and school factors. Policies promoting parental involvement in schools and community support structures can enhance the synergistic effects of positive family and school environments. Community programs that support parental education and involvement in school activities strengthen the linkages between home and school, creating a cohesive support network for adolescents (Manan, 2023). In understanding and enhancing these interactions, stakeholders can better support adolescents in navigating their developmental challenges and achieving positive mental health outcomes.

Methodology

This study systematically assessed the mental health status of secondary school students in Tianjin, focusing on interpersonal tension, sensitivity, depression, anxiety, academic stress, maladjustment, and emotional instability. We analysed the impact of socio-demographic factors (e.g. school type, grade, gender, parental education and occupation) on students' mental health. We conducted an online questionnaire survey in four secondary schools in Tianjin Binhai New Area from August to September 2023 using random sampling method and collected 272 valid responses. The reliability of the questionnaire was 0.956 and the KMO value was 0.949.

Ethical Considerations

The ethical implications of this study were carefully considered. The study was granted ethical approval by the Research Ethics Committee of Universiti Teknologi MARA (REC/07/2023(PG/MR/255), ensuring that all ethical guidelines were adhered to during the conduct of the research. The privacy and confidentiality of the participants were paramount,

and strict measures were taken to ensure that their personal information remained anonymous and secure.

Research Procedure

An online questionnaire survey was conducted in four secondary schools located in the Binhai New Area of Tianjin. The questionnaire was designed to capture relevant information about the participants' psychological health status, socio-demographic characteristics, and any other pertinent details.

The questionnaires were distributed electronically to ensure ease of access and participation among the students. The data collected through the questionnaires were then collated, analysed, and interpreted to draw meaningful conclusions about the psychological health of the student population. The use of statistical analysis and other research methods helped to provide a comprehensive understanding of the data and identify any patterns or trends that may exist.

Tools

Instrumentation

This questionnaire was conducted in Chinese because the respondents were Chinese, the questionnaire consisted of 46 questions divided into 7 categories, the first being demographics (10 items), and the second being scale questions about mental health based on the Mental Health Scale for Secondary School Students Wang et al (1997) with a total of 36 questions divided into 6 subscales: Interpersonal Tension and Sensitivity (6 items), Depression (6 items), Anxiety (6 items), Stress on Learning (6 items), maladaptation (6 items), and emotional instability (6 items). Each of the 36 items was rated on a 5-point scale and the scores were averaged in order to assess overall and specific aspects of mental health. The study aimed to provide empirical evidence for targeted mental health interventions by identifying patterns and trends in mental health disparities among secondary school students.

Data Collection & Analysis

The data from Questionnaire Star (Google form) was then transferred to SPSS and analysed using IBM SPSS version 26. Firstly, the description of the mental health level of the adolescents in terms of the use of mean and standard deviation, descriptive statistics to describe the demographic details as well as the analysis of Interpersonal Tension and Sensitivity, Depression, Anxiety, Learning Stress, Maladaptation, Emotional instability 6 responses. The Chi-Square test was used to determine the adolescents' responses to the six dimensions of Interpersonal Tension and Sensitivity, Depression, Anxiety, Learning Stress, Maladaptation, and Emotional instability. responses in terms of demographics (School, Grade, Gender, Household Economic situation, Father/Mother Highest Educational, Father's/Mother's work, Growing process, Only Child) differences. The level of statistical significance was set at $p \leq .05$.

Results

A total of 296 students participated in the survey, of which 272 questionnaires were valid. This number of valid questionnaires exceeded the minimum requirement of 260 questionnaires for a sample survey with a total population of 800. The male respondents numbered 143 (52.6%), slightly higher than the female respondents at 129 (47.4%). The highest number of students came from the first secondary school ($n=86$; 31.6%), while the

lowest number came from the third secondary school (n=42; 15.4%). There were significantly more high school students (n=230; 84.6%) than middle school students (n=42; 15.4%). In terms of family economic status, respondents had the highest percentage at the medium level (n=178; 65.4%) and the lowest at the higher level (n=1; 0.37%). The highest proportion of fathers' (n=107; 39.3%) and mothers' (n=88; 32.4%) education levels were in lower secondary school, with the lowest proportion of illiterate fathers (n=2; 0.74%) and mothers (n=11; 4.04%). Regarding parental occupation, the highest proportion of workers was found among both fathers (n=100; 36.8%) and mothers (n=67; 24.6%), exceeding 20%; the lowest percentage of unemployed was among fathers (n=11; 4.04%) and mothers (n=29; 10.66%). Concerning upbringing, the highest percentage of students were raised by both parents (n=234; 86.03%), while the lowest percentage were raised by remarried parents (n=4; 1.47%). In terms of being an only child, the percentage of non-only children (n=181; 66.54%) was slightly higher than that of only children (n=91; 33.46%).

Table 1
Respondents' Summary

Demographic	Description	N	(%)
School	I school	86	31.6
	II school	73	26.8
	IV school	71	26.1
	III school	42	15.4
Grade	High school	230	84.6
	Junior high school	42	15.4
Gender	Male	143	52.6
	Female	129	47.4
Household Economic situation	2	178	65.4
	3	52	19.1
	1	42	15.4
Father Highest Educational	2	107	39.3
	3	81	29.8
	1	53	19.5
	4	31	11.4
Mother Highest Educational Level	2	88	32.4
	3	82	30.1
	1	76	27.9
	4	26	9.6
Father's work	2	100	36.8
	3	78	28.7
	1	49	18.0
	4	34	12.5
	5	11	4.0
Mother's work	3	82	30.1
	2	67	24.6
	1	55	20.2
	4	39	14.3
Growing process	5	29	10.7
	1	234	86.0

	2	20	7.4
	4	7	2.6
	5	7	2.6
	3	4	1.5
Only Child	No	181	66.5
	Yes	91	33.5

Mental health level of secondary school students

When analysing the distribution of individual mental health levels, we find that the majority of young people are classified in the category of varying degrees of unhealthy mental states. Although the percentages of "fairly severe" and "extremely severe" are relatively low, at 5.5 % and 0 % respectively, their presence is worrying. Even more worrying is the much higher proportion of people at "mild" and "moderate" levels of mental health, at 82 % of the population. This suggests that nearly 80 % of young people are experiencing some form of unhealthy mental state, highlighting the urgent need for intervention and support. More worryingly, however, the data shows that a staggering 82 % of young people are in the "mild" and "moderate" mental health categories. This means that nearly 80 % of young people are experiencing some form of mental ill-health, and this prevalence undoubtedly highlights the urgent need for immediate intervention and support. We cannot ignore this large group, whose mental health is not only related to their own well-being and growth, but also to the harmony and stability of their families and schools.

Table 2

Mental Health Distribution

Mental Health Level	Good	Mild	Moderate	Fairly Severe	Extremely Severe
Average Score	<2.00	2-2.99	3-3.99	4-4.99	5
Number of Individuals	34 (12.5%)	120 (44.1%)	103 (37.9%)	15 (5.5%)	0 (0%)

The association between demographic characteristics and MH1-MH6

In summary, the Chi-Square test provided insights into the performance of the six variables of interpersonal tension and sensitivity, depression, anxiety, academic stress, emotional instability, and parenting styles and styles across the different grouping factors.

Table 3

The association between demographic characteristics and MH1-MH6

Demographic	Description	N(%)	Chi-Square (Sig)					
			MH1	MH2	MH3	MH4	MH5	MH6
School	I school	86(31.6)						
	II school	73(26.8)	F=1.412	F=0.479	F=0.518	F=1.744	F=0.585	F=0.582
	IV school	71(26.1)	P=0.240	P=0.697	P=0.670	P=0.158	P=0.625	P=0.627
Grade	III school	42(15.4)						
	High school	230(84.6)	F=6.407	F=2.207	F=4.883	F=0.927	F=1.109	F=1.79
Gender	Junior high school	42(15.4)	P=0.012**	P=0.139	P=0.028**	P=0.336	P=0.293	P=0.182
	Male	143(52.6)	F=0.332	F=0.019	F=1.661	F=0.529	F=0.002	F=0.000
Household Economic situation	Female	129(47.4)	P=0.565	P=0.891	P=0.199	P=0.468	P=0.9699	P=0.990
	2	178(65.4)						
Father Highest Educational	3	52(19.1)	F=2.087	F=1.213	F=3.289	F=2.063	F=0.797	F=2.283
	1	42(15.4)	P=0.126	P=0.299	P=0.039**	P=0.129	P=0.452	P=0.104
Mother Highest Educational Level	2	107(39.3)						
	3	81(29.8)	F=1.622	F=1.245	F=0.711	F=0.641	F=0.928	F=0.723
Father's work	1	53(19.5)	P=0.185	P=0.294	P=0.546	P=0.589	P=0.427	P=0.539
	4	31(11.4)						
Mother's work	2	88(32.4)						
	3	82(30.1)	F=0.139	F=0.356	F=0.113	F=0.22	F=0.353	F=0.626
Growing process	1	76(27.9)	P=0.937	P=0.785	P=0.952	P=0.883	P=0.787	P=0.599
	4	26(9.6)						
Only Child	2	100(36.8)						
	3	78(28.7)	F=1.102	F=1.077	F=1.392	F=1.892	F=0.276	F=1.692
Mother's work	1	49(18.0)	P=0.356	P=0.368	P=0.237	P=0.112	P=0.893	P=0.152
	4	34(12.5)						
Growing process	5	11(4.0)						
	3	82(30.1)						
Only Child	2	67(24.6)	F=1.248	F=0.921	F=0.989	F=1.839	F=0.927	F=0.755
	1	55(20.2)	P=0.291	P=0.452	P=0.414	P=0.122	P=0.449	P=0.555
Growing process	4	39(14.3)						
	5	29(10.7)						
Only Child	1	234(86.0)						
	2	20(7.4)	F=0.574	F=0.827	F=0.517	F=0.668	F=1.244	F=0.375
Only Child	4	7(2.6)	P=0.682	P=0.509	P=0.723	P=0.615	P=0.292	P=0.827
	5	7(2.6)						
Only Child	3	4(1.5)						
	No	181(66.5)	F=1.039	F=0.098	F=0.131	F=0.246	F=1.031	F=0.002
Only Child	Yes	91(33.5)	P=0.309	P=0.755	P=0.718	P=0.620	P=0.311	P=0.967

MH1=Interpersonal Tension and Sensitivity; MH2=Depression; MH3=Anxiety; MH4=Learning Stress ;MH5=Maladaptation; MH6=Emotional instability.

Household Economic situation : 1= high-income families (85835.8 RMB)/upper middle-income households (44948.9 RMB); 2= middle-income households (29,053.3 RMB); 3= lower middle-income households (18445.5 RMB)/low-income households (8332.8 RMB).

Father Highest Educational/Mother Highest Educational Level : 1=Illiterate/Primary school; 2=Junior high school ; 3=High school/Technical school/Vocational school ; 4=College or above.

Father's work / Mother's work : 1=Farmer ; 2=Worker ; 3=Temporary worker (part-time)/Self-employed; 4=Doctor or cadre, teacher; 5=Unemployed/Jobless.

1=Raised by both parents ;2=Raised by a single parent ;3=Raised by remarried parents ;4=Foster care ;5=Other .

The results showed that these variables did not exhibit statistically significant differences across the multiple grouping factors mentioned above. This finding meant that we could not simply reject the original hypothesis, nor did we need to conduct further subsequent multiple comparison analyses. However, the situation changed significantly when we turned our attention to two specific variables, MH1 and MH3. For these two variables, the differences between grade levels were particularly pronounced, with p-values below the 0.05 level of significance, meeting the criteria for statistical significance. This finding forced us to revisit and reject our initial hypothesis in favour of subsequent multiple comparisons to reveal further details of the differences.

Post hoc multiple comparisons using LSD (Least Significant Difference method) allowed us to be more specific about the source of these differences. The results showed that high school students performed significantly better than middle school students on the MH1 and MH3 variables. This finding provides important clues about possible differences in certain psychological or behavioural characteristics among students of different ages, and helps us to gain a more comprehensive understanding of the characteristics and patterns of adolescent psychological development.

In addition, for the MH3 variable, we also found significant differences in their family economic status. Their significance p-value is also less than 0.05, reaching the level of statistical significance. This implies that family economic status has a significant effect on the performance of MH3, which requires us to further explore the reasons and mechanisms involved.

Through post-hoc multiple comparisons with the LSD method, we further found that lower-middle-income and low-income families instead outperformed middle-income families, which in turn outperformed high-income and upper-middle-income families. MH3 performance aspects. This finding overturns the conventional wisdom that "the better the family's financial status, the better the child's performance" and reminds us to re-examine the mechanisms by which family financial status affects a child's psychological or behavioural characteristics. Child Behavioural Characteristics.

Table 4

Association between demographic characteristics and MH1-MH6 (LSD comparison)

variable name	variable value	N(%)	SD	F	P	LSD comparison
Grade	MH1	High school	230(84.6)	0.82	F=6.407 P=0.012**	High school>Junior high school
		Junior high school	42(15.4)	0.6		
	MH3	High school	230(84.6)	0.94	F=4.883 P=0.028**	High school>Junior high school
		Junior high school	42(15.4)	0.77		
Household Economic situation	MH3	1	42(15.4)	0.82	F=3.289 P=0.039**	3>2>1
		2	178(65.4)	0.93		
		3	52(19.1)	0.93		

lower middle-income households /low-income households >middle-income households>high-income families /upper middle-income households

Putting these results together, we can draw this conclusion.

- There are no significant differences between the six variables MH1-MH6 on eight dimensions: school, gender, father's highest level of education, mother's highest level of education, father's occupation, mother's occupation, upbringing, and being an only child. In the variable grade level MH1 interpersonal tension and sensitivity and MH3 anxiety on the performance of a significant difference, high school is greater than middle school, high school students perform better.

There was a significant difference in performance on MH3 anxiety in the variable family economic status, with low-income and middle-income families performing better than high-income families.

First of all, for MH1 and MH3 there is a significant difference between different grades, we can think about the stage changes in the process of adolescent psychological development. As they grow older, high school students may develop more maturity in cognitive abilities, emotional regulation, and social interactions, and therefore perform better on these variables. In addition, factors such as the school's educational environment, curriculum, and teachers' teaching styles may also have an impact on adolescents' psychological development, which in turn leads to differences in variables such as MH1 and MH3.

Second, regarding the significant effect of family economic status on MH3 performance, we can explain it from several perspectives. On the one hand, family economic status may directly affect children's physical living environment and learning resources, which in turn affects their psychological development. For example, children from low-income families may face more life stress and uncertainty, which may lead them to exhibit certain psychological characteristics that are different from those of children from other families. On the other hand, the economic status of a family may also indirectly affect parenting style and family atmosphere, which in turn may have long-term effects on children's psychological development.

It is worth noting that although we found no significant differences between MH1-MH6 in terms of school, gender, and parental education, this does not mean that these factors do not have an impact on adolescent psychological development. The possible reason for this is that these variables we examined may only be some of the many factors that influence adolescent psychological development, and other factors not included in the study may be equally

important. Therefore, future research could further expand the range of variables to gain a more comprehensive understanding of the factors that influence adolescent psychological development.

Finally, we also need to note that although Chi-Square test provides us with statistical information about the differences in the variables, it does not directly explain the reasons and mechanisms behind these differences. Therefore, in future studies, we can combine more theoretical and empirical research methods, such as questionnaires, interviews, and observations, in order to explore the internal mechanisms and influencing factors of adolescents' psychological development in greater depth.

Discussions

In summary, by analyzing the Chi-Square test of variables MH1-MH6 under different grouping factors, we identified several significant differences and conducted detailed post hoc multiple comparisons. These results provide valuable reference information to enhance our understanding of students' performance in various areas. However, it is important to note that these differences may be influenced by various factors, including school, gender, and family economic status. Therefore, a comprehensive analysis considering these factors is necessary to arrive at more accurate and comprehensive conclusions.

These findings offer valuable insights into students' performance in different areas, taking into account various factors such as school, gender, and family economic status. However, it's important to note that other factors may also influence these results, and a comprehensive analysis is needed to draw accurate conclusions.

Anxiety is a particularly pertinent issue in today's society, where students are constantly confronted with expectations and demands (Bhat, 2019; Pesko, 2020). Whether stemming from academic pressures, fears of social exclusion, or uncertainties about the future, anxiety can manifest in various forms and degrees, impacting students' overall well-being (Jones, 2018). It is crucial to identify signs of anxiety and provide support and resources to help students manage this prevalent mental health challenge.

Furthermore, academic pressure significantly contributes to the unhealthy psychological state of many adolescents (Jain, 2017). The competitive nature of education systems and the expectations placed on students to excel academically can result in feelings of inadequacy, stress, and burnout (Nagle, 2018). Establishing an environment that promotes a healthy balance between academic pursuits and personal development is essential (Bartlett, 2021). This allows students to pursue their interests and hobbies while achieving academic success.

Moreover, emotional imbalances can also profoundly affect the psychological health of adolescents. Emotional dysregulation may lead to behaviors such as mood swings, irritability, and difficulty in regulating emotions. These behaviors can result in conflicts with peers, family members, and teachers, further deteriorating the mental state of these students. Providing support and guidance to help students develop healthy coping mechanisms and emotional regulation skills is crucial.

In conclusion, the psychological well-being of secondary school students in Tianjin is a multifaceted issue requiring a holistic approach to understanding and intervention. The distribution of individuals across different psychological health levels underscores the

urgency of addressing these challenges, particularly focusing on anxiety, academic pressure, and emotional imbalances. Through the provision of support, resources, and a nurturing environment, these students can overcome their mental health barriers and achieve their full potential.

First, we can focus on the interactive relationship between adolescent psychological development and family environment. As an important place for adolescents to grow up, the family's atmosphere, upbringing style and the interaction pattern among family members will have a profound impact on adolescents' psychological development (Cheng, 2021; Ali, 2020). Therefore, we can explore how family factors affect the psychological characteristics of adolescents and how this effect varies across different family backgrounds and economic conditions through a more detailed research design.

Secondly, as another important environment for adolescents to grow up, the educational environment, curriculum, teacher-student relationship, and so on, are also important factors affecting adolescents' psychological development (Zaatari, 2018; Wang, 2022). We can study how schools can promote the psychological development of adolescents through optimising the educational environment and providing diversified educational resources, as well as alleviating the negative impact of factors such as academic pressure and interpersonal relationships on the psychological health of adolescents.

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