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ORIGINAL RESEARCH

A Study on the Risk Factors of Abnormal Mental Health Status in General Physical Examination Population

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Purpose: This study aims to investigate the mental health status of the general population and its risk factors.

Patients and Methods: In this cross-sectional study, a total of 10278 individuals aged 12 and above who underwent health examinations were included. Participants completed self-administered questionnaires, the Symptom Checklist-90 (SCL-90), and the Stress Self-Assessment Questionnaire-53 (SSQ-53), to collect general information, mental health status, and stress level information. Metabolism-related hematological examinations were also conducted.

Results: Based on the criterion of having a positive total score on the SCL-90 scale and/or a positive score on any factor of the scale, 3394 positive subjects (33.0%) were detected and classified as the abnormal psychological state group (positive group), while the remaining subjects served as the control group. There are differences between the two groups in terms of age (and age structure) and gender (female). The positive group had significantly higher in the SCL-90 total score and each factor score, as well as the SSQ-53 total score and each dimension score (including the proportion of abnormal scores in each dimension) ($p<0.001$). In the positive group, body mass index (BMI) ($p<0.001$) and triglycerides ($p=0.001$) were significantly higher than those in the control group, while high-density lipoprotein cholesterol ($p<0.024$) was significantly lower. Additionally, the abnormal proportions of BMI ($p<0.001$), white blood cell (WBC) count ($p<0.001$), and fasting plasma glucose levels ($p=0.006$) were significantly higher in the positive group. Logistic regression analysis revealed that adolescents (aged 12–18), females, abnormal BMI (overweight or obesity), and abnormal WBC count were risk factors for positive SCL-90 scores ($P<0.05$).

Conclusion: There is a strong correlation between chronic metabolic diseases, inflammation, and stress-related mental and psychological disorders, necessitating active management of these physical issues. More attention should be paid to the mental health of women and adolescents.

Keywords: mental health, obesity, metabolic abnormalities, inflammation, psychological stress

Introduction

Mental health is an important part of health. With the rapid development of the economy, people's ideas, family structures and lifestyles have undergone tremendous changes. Rapid social changes may lead to widespread psychological stress and tension, as well as a relative increase in the burden of mental disorders. It has become a consensus among medical and social sectors that mental health issues are important public health concerns.[1] A nationally representative cross-sectional epidemiological survey conducted in China in 2019 revealed the prevalence of six major mental disorders (mood disorders, anxiety disorders, alcohol/drug use disorders, schizophrenia and related psychotic disorders, eating disorders, and impulse control disorders) was 9.3%, and the lifetime prevalence was 16.6%.[2] As the whole society gradually pays attention to mental health, industry experts have also proposed the concept of "psychological physical examination" or "mental health physical examination",[1] aiming to

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carry out screening for mental health and psychosomatic diseases, actively pay attention to the mental health status of the general population, and achieve early prevention and intervention.

The comorbidity of stress-related mental illnesses and chronic physical diseases is receiving increasing attention. Chronic diseases, such as obesity, metabolic syndrome, and chronic inflammation, often co-occur with psychological issues.[3] There are complex bidirectional interactions between each other. The increase in psychological stress can lead to changes in people's behavioral habits, such as overeating and decreased physical activity, which in turn can result in issues like obesity and metabolic syndrome. Conversely, obesity and metabolic abnormalities, acting either individually or collectively,[4] can impair personal and social functioning and increase the risk of mental illnesses such as depression and anxiety. In addition, the development of mental illnesses directly related to psychological stress is associated with metabolic and obesity issues, such as stress-related disorders, depressive disorders, and anxiety disorders.[5] Obesity and metabolic syndrome are both associated with chronic and subacute systemic inflammatory states, and an increase in pro-inflammatory cytokines reflects an excess of adipose tissue mass.[6] The association between inflammatory markers and depression has also been reported. Inflammatory response may be a potentially important factor in the pathological process of the disease. Research indicates that inflammation may lead to anxiety symptoms and anhedonia by affecting neural circuits in the brain related to motivation, motor activity, arousal and alarm.[7] Inflammation has been identified as a potential link between depression, obesity, and metabolic syndrome.[4]

Previous studies have also found that these mental and psychological disorders, as well as chronic physical diseases, may occur more frequently in specific populations. For instance, women are twice as likely as men to suffer from depression, post-traumatic stress disorder, generalized anxiety disorder, or panic disorder.[8] They also face a higher risk of developing chronic metabolic diseases.[9] Unfortunately, compared to men, women with obesity or metabolic syndrome are more likely to suffer from depression.[10] Women are also more sensitive to changes in inflammation levels when dealing with stress.[11] Furthermore, the onset of these chronic psychological and physical diseases is gradually shifting towards younger age groups, with children and adolescents becoming a focal point of attention.[12,13]

Therefore, it is necessary to understand the mental health status and related risk factors of psychological problems among the general population of all ages, in order to achieve early prevention and intervention. This article conducted a large-scale cross-sectional study by collecting relevant data from participants who underwent health examinations at a tertiary first-class hospital in Beijing. By collecting general demographic information, assessing mental health status (using the Symptom Checklist-90) and stress levels (using the Stress Self-Assessment Questionnaire-53), and combining with hematological index testing, this study explores the mental health status of the general population and further analyzes psychological, physiological, and other risk factors that may affect the mental health of the population, in order to promote the prevention of mental illnesses and improve the management of mental health in the population.

Materials and Methods

Study Design and Participants

This is a large-scale cross-sectional study aimed at collecting and analyzing the mental health status and related risk factors of the general population participating in physical examinations. Participants were recruited from all individuals who underwent health examinations at the Health Management (Physical Examination) Center of Peking University Third Hospital from January 2019 to December 2023. After preliminary screening, the participants had no clear history of mental illness or use of psychiatric medications, and no clear family history of mental illness. A total of 10278 participants were ultimately included, and they were divided into an abnormal mental health group and a relatively healthy control group based on the results of psychological assessments.

Participant inclusion criteria: (1) Aged 12 and above; (2) Completion of general health examination items; (3) Completion of psychological assessment; (4) Signing of informed consent form (Participants under the age of 18 must have both their own signature and that of their guardian). According to the Declaration of Helsinki, protocols involving human participants are reviewed and approved by the Institutional Ethics Committee of Peking University Third Hospital (Project Number: M2022255). After fully understanding the objectives and methods of the study, all participants signed the informed consent form and agreed to the use of current health survey data, relevant physical examination results, and laboratory results.

Data Collection

General Information

A self-designed questionnaire was used to general information about participants, including age, gender, marital status, and so on.

Hematology Examination

Collect elbow venous blood from participants and centrifuge it at 3000 r/min for 15 minutes at 4°C. The SYSMEX XN-2000 automatic hematology analyzer is used for complete blood count analysis. The Beckman Coulter AU5800 automatic biochemical analyzer is used for blood biochemical analysis. The Siemens Atellica analyzer is used to measure thyroid-related hormones and other tumor markers.

Mental Health Assessment

The Symptom Checklist 90 (SCL-90)

The Symptom Checklist-90 (SCL-90)[14] is the most classic and widely used mental health assessment scale, designed to evaluate the psychosomatic status of participants. The scale comprises 90 self-assessment items, with 10 factors tested: somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobia, paranoid ideation, psychoticism, and additional items (mainly related to sleep and dietary conditions). Each item is graded from 1 to 5, ranging from non-existent to severe, based on the frequency and intensity of symptoms, as well as the impact on the subject being evaluated. The higher the score, the worse the health condition. According to the comparison with the Chinese population health norm, if the total score is ≥160 and/or any factor score is ≥2, the participant's psychological assessment result is considered positive.

The Stress Self-Assessment Questionnaire-53 (SSQ-53)

The Stress Self-Assessment Questionnaire-53 (SSQ-53)[15] is used to assess the level of psychological stress. It is recommended by expert consensus and is widely used among Chinese people.[16] This scale consists of 53 questions, designed to evaluate the stress level experienced by individuals over the past month. It categorizes stress into four factors: physical, emotional, cognitive, and behavioral. There are 10 stress levels, with higher scores indicating higher stress levels. Individuals with a stress level of 7 or above are considered highly stressed and exhibit psychological and physiological symptoms of excessive stress, necessitating stress management.

Statistical Analysis

Data statistical analysis was conducted using SPSS 26.0. Measurement data conforming to a normal distribution were expressed as mean ± standard deviation ($\bar{x}\pm s$), and t-tests were used for inter-group comparisons. Data not conforming to a normal distribution were expressed as M (Q1, Q3), and Mann–Whitney *U*-tests were used for inter-group comparisons. Enumeration data were presented as case count (percentage), and chi-square tests were used for inter-group comparisons. Logistic regression analysis was employed to evaluate the impact of different risk factors on abnormal mental health status. All statistical analyses were considered statistically significant with a two-tailed p-value <0.05.

Results

General Features

Among the 10278 participants, there were 5273 males (51.3%) and 5005 females (48.7%). The average age of the participants was 38.39±10.35 years.

Based on the criteria of SCL-90 total score ≥ 160 and/or any factor ≥ 2 as positive, the group with abnormal mental health status (positive group) comprised 3394 individuals (33.0%), while the relatively healthy group (control group) had 6884 individuals. Significant differences were observed between the two groups in terms of age (and age structure) and gender (Table 1).

Table 1 Comparison of General Demographic Data Between SCL-90 Positive Individuals and Normal Controls

Variables	Positive Group (n=3394)	Control Group (n=6884)	t-value/ x2-Value	P-Value
Age (years)	38.78±10.60	38.20±10.22	2.641	0.008
12-18 years	17(0.4%)	5(0.1%)	21.900	<0.001
19–35 years	1436(42.3%)	3158(45.9%)		
36–59 years	1864(54.9%)	3572(51.9%)		
≥60 years	82(2.4%)	149(2.2%)		
Gender				
Males (%)	1693(49.9%)	3580(52.0%)	4.099	0.043
Females (%)	1701(50.1%)	3304(48.0%)		
Marital status				
Married (%)	2509(75.1%)	5089(75.3%)	0.057	0.812
Unmarried (%)	831(24.9%)	1666(24.7%)		

Comparison of Psychosomatic Symptoms and Psychological Stress Levels

The total score of SCL-90 and the scores of 10 factors in the positive group were significantly higher than those in the normal control group ($p<0.001$). The total score of SSQ-53 and the scores of four stress dimensions (physical, emotional, cognitive and behavioral) in the positive group were significantly higher than those in the control group ($p<0.001$), and the proportion of subjects with excessively high stress (≥7) in the total score and the four stress dimensions was significantly higher than that in the control group ($p<0.001$) (Table 2).

Table 2 Comparison of SCL-90 and SSQ-53 Assessment Results Between SCL-90 Positive Individuals and Normal Controls

Variables	Positive Group (n=3394)	Control Group (n=6884)	t-value/ x2-value	P-value
SCL-90				
Total score*	156.67±36.75	105.90±11.87	78.483	<0.001
The total average score*	1.74±0.41	1.18±0.13	78.482	<0.001
Somatization*	1.65±0.50	1.17±0.20	53.236	<0.001
Obsessive-compulsive*	2.03±0.54	1.31±0.24	74.444	<0.001
Interpersonal sensitivity*	1.83±0.54	1.21±0.22	64.691	<0.001
Depression*	1.81±0.57	1.17±0.18	63.911	<0.001
Anxiety*	1.75±0.52	1.19±0.18	61.599	<0.001
Hostility*	1.78±0.59	1.18±0.21	56.832	<0.001
Phobic anxiety*	1.34±0.41	1.05±0.12	40.414	<0.001
Paranoid ideation*	1.58±0.51	1.10±0.17	52.996	<0.001
Psychoticism*	1.57±0.46	1.11±0.15	57.628	<0.001
Additional items* (eg diet, sleep)	2.05±0.60	1.26±0.26	72.819	<0.001
SSQ-53				
Overall stress*	0.62(0.38,0.94)	0.13(0.06,0.26)	−63.760	<0.001
Physiology*	0.65(0.40,0.95)	0.15(0.05,0.35)	−58.660	<0.001
Mood*	0.61(0.28,1.06)	0.06(0.00,0.22)	−58.425	<0.001
Cognition*	1.00(0.50,1.25)	0.25(0.00,0.50)	−54.483	<0.001
Action*	0.45(0.27,0.73)	0.09(0.00,0.18)	−55.508	<0.001
Overall stress level (≥7)*	841(27.0%)	21(0.3%)	1860.443	<0.001
Physiological grade (≥7)*	773(24.8%)	50(0.8%)	1577.338	<0.001
Emotional grade (≥7)*	970(31.1%)	58(0.9%)	2045.112	<0.001
Cognitive grade (≥7)*	758(24.3%)	55(0.8%)	1521.890	<0.001
Action grade (≥7)*	570(18.3%)	28(0.4%)	1168.752	<0.001

Note: *p-value, significant at <0.05.
Abbreviations: SCL-90, the Symptom Checklist-90; SSQ-53, the Stress Self-Assessment Questionnaire-53.

Comparison of Physical Examination Indicators

The BMI (p<0.001) and triglyceride (TG) levels (p=0.001) of the positive group subjects were significantly higher than those of the control group, while the high-density lipoprotein cholesterol (HDL-C) level (p=0.024) was significantly lower than that of the control group. When distinguishing between normal and abnormal ranges for each indicator, the results showed that the positive group had significantly higher proportions of abnormal in BMI (p<0.001), white blood cell (WBC) count (p<0.001), and fasting plasma glucose (FPG) level (p=0.006) compared to the control group (Table 3).

Analysis of Risk Factors for Abnormal Psychological State

In the multivariate logistic regression analysis, SCL-90 positivity was taken as the dependent variable, with TG, HDL-C (as continuous variables), age (with the group aged 60 and above as the control group), gender, abnormal BMI, abnormal WBC, and abnormal FPG (as categorical variables) as independent variables. The results indicated that the teenage group (aged 12–18) (OR=5.351, 95% CI [1.659–17.254], p=0.005), females (OR=1.246 vs male, 95% CI [1.123–1.382],

Table 3 Comparison of Physical Examination Indicators Between SCL-90 Positive and Normal Controls

Variables	Positive Group (n=3394)	Control Group (n=6884)	t-value/Z-value/ x2-value	P-value
BMI (kg/m2)*	24.06±3.81	23.76±3.55	3.788	<0.001
BMI (<24)*	1754(52.1%)	3807(55.8%)	12.468	<0.001
BMI (≥24)*	1613(47.9%)	3016(44.2%)		
SBP (mm hg)	119.43±15.33	119.52±15.02	−0.281	0.779
DBP (mm hg)	73.85±11.11	73.87±10.89	−0.092	0.927
WBC	5.95±1.54	5.91±1.43	1.409	0.159
WBC (3.5–9.5)*	3164(94.7%)	6505(96.2%)	12.268	<0.001
WBC (<3.5 or>9.5)*	176(5.3%)	255(3.8%)		
Erythrocytes	4.82±0.51	4.83±0.50	−0.476	0.634
Hemoglobin	144.90±16.46	145.25±16.53	−1.002	0.317
Platelets	250.39±57.07	250.35±55.33	0.036	0.972
FPG	5.18±1.01	5.16±1.04	0.959	0.338
FPG (<6.11)*	3082(92.0%)	6324(93.5%)	7.691	0.006
FPG (≥6.11)*	268(8.0%)	440(6.5%)		
Glycated hemoglobin	5.63±0.65	5.60±0.65	1.367	0.172
TC	4.89±0.94	4.89±0.92	0.099	0.921
TG*	1.15(0.81,1.70)	1.11(0.79,1.64)	−3.262	0.001
HDL-C*	1.32±0.32	1.33±0.32	−2.265	0.024
LDL-C	2.92±0.76	2.91±0.76	0.261	0.794
UA	341.02±91.51	340.83±91.01	0.099	0.921
Homocysteine	10.6(8.6,13.6)	10.7(8.8,13.6)	−1.644	0.100
Urea	4.76±1.17	4.79±1.16	−1.386	0.166
CR	78.70±13.90	79.25±14.04	−1.862	0.063
AST	20(17,25)	20(17,25)	−0.639	0.523
ALT	18(13,28)	18(12,27)	−0.770	0.441
TSH	1.98(1.42,2.81)	1.99(1.43,2.77)	−0.094	0.925
T4	7.73±1.55	7.70±1.59	0.869	0.385
FT3	3.32±0.43	3.33±0.50	−1.046	0.296
FT4	1.28±0.19	1.28±0.23	0.178	0.859

Notes: *p-value, significant at <0.05.

Abbreviations: BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; WBC, white blood cell; FPG, fasting plasma glucose; TC, total cholesterol; TG, triglycerides; HDL-C, high-density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; UA, uric acid; CR, creatinine; AST, Aspartate transaminase; ALT, alanine aminotransferase; TSH, thyroid stimulating hormone; T4, thyroxin; FT3, free triiodothyronine; FT4, free thyroxine.

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Table 4 Multivariate Analysis of Risk Factors for SCL-90 Positivity

Factors	B	SE	Wald test	P-value	OR	95% CI
Age (12–18)	1.677	0.597	7.883	0.005	5.351	1.659–17.254
Age (19–35)	−0.091	0.146	0.387	0.534	0.913	0.685–1.216
Age (36–59)	−0.033	0.144	0.053	0.817	0.967	0.730–1.282
Gender (female)	0.220	0.053	17.316	0.000	1.246	1.123–1.382
Abnormal BMI	0.121	0.053	5.291	0.021	1.129	1.018–1.251
TG	0.027	0.018	2.205	0.138	1.027	0.991–1.064
HDL-C	−0.155	0.087	3.205	0.073	0.856	0.722–1.015
Abnormal WBC	0.300	0.106	7.994	0.005	1.350	1.096–1.662
Abnormal FPG	0.078	0.089	0.767	0.381	1.081	0.908–1.286

Abbreviations: BMI, body mass index; TG, triglycerides; HDL-C, high-density lipoprotein cholesterol; WBC, white blood cell; FPG, fasting plasma glucose.

p<0.001), abnormal BMI (overweight or obesity) (OR=1.129, 95% CI [1.018–1.251], p=0.021), and abnormal WBC (OR=1.350, 95% CI [1.096–1.662], p=0.005) were independently associated with the risk for SCL-90 positivity. The model demonstrated good fit (Hosmer-Lemeshow test p>0.05) (Table 4).

Discussion

Current research has found that nearly one-third of the general population exhibits abnormal mental health conditions, accompanied by higher levels of psychological stress. Individuals with poor mental health tend to have a higher body mass index (BMI), and a higher proportion of obesity, with certain metabolic indicators indicating a higher risk (such as elevated triglyceride levels, reduced high-density lipoprotein cholesterol levels, and an increased likelihood of elevated fasting blood glucose). Additionally, there is an elevated probability of abnormal inflammatory markers (white blood cell count). Furthermore, overweight and obese, along with abnormal white blood cell count, are independent risk factors for poor mental health, indicating a strong correlation between these chronic physical issues and stress-related mental health disorders. In addition, research has found that women and adolescents are more prone to psychological issues, and their mental health status requires close attention.

Mental health issues are on the rise globally. According to the 2019 Global Burden of Mental Illness report, an estimated 970 million people worldwide are affected by mental health disorders, with anxiety, depression, and other emotional issues accounting for over half of these cases.[17] China's 2019 survey on the prevalence of mental and psychological disorders revealed that the lifetime prevalence of anxiety disorders is 7.6%, followed by mood disorders (7.4%).[2] Mental health issues have become a significant public health concern. The current study, from a broader perspective, screened the proportion of individuals with psychological issues in the general population and found that 33.0% of the subjects exhibited varying degrees of mental and psychological symptoms, further emphasizing the necessity to understand the risk factors behind mental health disorders.

Current research has found that individuals with positive psychological screening results exhibit significantly higher total scores and scores in various symptom dimensions in mental health symptom assessments, indicating that the overall mental health status of the subjects is worse, and they may have varying degrees of psychiatric symptoms, accompanied by higher levels of psychological stress. Individuals with positive psychological screening results have higher body mass index (BMI) and a higher proportion of obesity, and overweight and obesity are independent risk factors for abnormal mental health status. The probability of psychological issues among this population (BMI greater than 24) is 1.129 times higher than that of individuals with a normal BMI. The study also revealed that individuals with abnormal psychological states exhibit higher triglyceride levels and lower high-density lipoprotein cholesterol levels, as well as an increased probability of elevated fasting blood glucose. This is consistent with previous research conclusions. It is currently known that obesity is closely related to metabolic syndrome, and obesity has always been considered a risk factor for chronic metabolic diseases such as hypertension, diabetes, and dyslipidemia.[18] Studies have also shown that obesity and metabolic abnormalities work together to increase an individual's risk of developing depression.[19] In prospective studies,

it has been found that the presence of obesity or metabolic abnormalities may indicate a poorer prognosis for depressive symptoms in individuals.[20] Current research further confirms this conclusion, indicating that obesity associated with metabolic abnormalities not only increases the risk of developing mood disorders but also elevates the risk of experiencing stress-related psychopsychological symptoms across multiple dimensions. Existing research has indicated that there may be a bidirectional relationship between obesity and depression, where a high-fat diet and chronic stress work together to exacerbate metabolic disorders and depressive-like behaviors.[21] Conversely, excessive anxiety, depression, and psychosocial stress may further aggravate the burden of metabolic diseases.[22,23] Recent studies suggest that both depressive disorders and metabolic syndrome are inflammatory diseases, which are associated with chronic, low-grade inflammation. This is manifested by an increase in pro-inflammatory cytokines, changes in the number of white blood cells in the blood, and the aggregation and activation of immune cells in both the periphery and the central nervous system.[21] In both human[24–26] and animal studies,[27,28] it has been found that circulating pro-inflammatory cytokines are elevated in obese individuals, which directly leads to insulin resistance and subsequently triggers metabolic dysfunction. In patients with metabolic syndrome or obesity, there are significant changes in blood leukocyte count, which is correlated with BMI and insulin resistance.[29–31] Chronic stress can also activate the immune system through multiple pathways, promoting the development of depressive-like behaviors. An increase in leukocyte count was observed in the blood of both depressed patients and depressive mouse models.[32,33] The current study further supports the impact of abnormal inflammatory markers (white blood cell count) on mental health status. This study found that individuals with abnormal white blood cell counts (either too high or too low) are 1.35 times more likely to experience psychological issues compared to those with normal counts. Additionally, this study suggests that abnormal white blood cell counts may play a role in individuals with excessive psychological stress, obesity, and metabolic abnormalities. Some studies suggest that inflammation may play a mediating role between emotional symptoms and metabolic syndrome to some extent, as research on the association between metabolic syndrome and depression has found that inflammation is independently associated with emotional scores after controlling for metabolic factors.[34]

Current research has found that women exhibit a higher proportion of abnormal mental health conditions, which are independent risk factors for abnormal psychological conditions. The probability of women experiencing mental health issues is 1.246 times higher than that of men. This is consistent with previous research findings. On the one hand, it is related to women being more prone to emotional disorders and stress-related disorders; on the other hand, studies have found that women have a relatively higher risk of developing other chronic and metabolic diseases, especially during specific life cycles (such as menopause), changes in marital status and socioeconomic status, as well as unhealthy lifestyle habits. These factors increase women's risk of developing obesity, metabolic diseases, and mental health disorders.[35] Unfortunately, psychological stress, mental health issues, and metabolic problems are highly interrelated and mutually influential. Prospective cohort studies have found that women exhibiting emotional issues such as anxiety and depression at baseline have an increased risk of developing metabolic syndrome in the future, while the presence of metabolic problems at baseline can predict an increase of emotional issues in future.[36]

Another high-risk group with mental health issues identified in the current study is adolescents. Compared to the age group over 60, the probability of adolescents experiencing mental health issues is 5.351 times than that of the control group, significantly higher than other age groups. In recent years, the mental health issues of adolescents have garnered increasing attention. On the one hand, the mental and psychological issues of adolescents are gradually becoming more prominent; on the other hand, these issues have a significant impact on individuals, families, and even the whole society. Research indicates that approximately 14% of young people meet the diagnostic criteria for mental disorders.[37] Mental disorders account for nearly half of the global disease burden among young people and have become one of the five common diseases leading to functional impairment or even death among young people.[38] Meanwhile, studies have found that half of adult mental health issues originated before the age of 15, and nearly three-quarters of mental health issues began before the age of 18.[39] In other words, a significant portion of adult mental illnesses may be extensions of adolescent illnesses. Therefore, it is imperative to actively pay attention to adolescent mental health.

This study clarified the current status of mental health among the general population through large-scale mental health screening, and found that poor mental health is accompanied by an increase in subjective psychological stress levels. Special attention should be paid to the psychological status of women and adolescents. The study also identified obesity

and abnormal inflammatory markers as risk factors for poor mental health. This provides further evidence support for the prevention of psychosomatic health in the general population. However, the limitation of this study lies in the limited sample size of the adolescent group, which makes it difficult to convincingly demonstrate mental health issues among adolescents. In the future, it is necessary to further expand the sample size and refine the characteristics of individuals with psychological problems, in order to more deeply explore the key influencing factors of psychological issues within the population. Additionally, this study is a cross-sectional study, which cannot clearly analyze the causal relationship between metabolic diseases, chronic inflammation, and mental health. In the future, we will further establish cohort studies to explore deeper associations between them.

Conclusion

Current research has found that a high proportion of the general population experiences mental health issues, which is associated with higher levels of psychological stress. Individuals with poor mental health status tend to have a higher body mass index (BMI), a higher proportion of obesity, and abnormal metabolic and inflammatory markers. And research has found that abnormal BMI and white blood cell count, female and adolescent populations are risk factors for abnormal mental health status. This indicates a strong correlation between chronic metabolic diseases, inflammation, and mental health. We need to actively pay attention to these physical conditions to better manage mental health issues. Meanwhile, the mental health of women and adolescents may require more attention.

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Disclosure

The authors report no conflicts of interest in this work.

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