

Association Between Social Support and Mental Health Status Among College Students: A Nationwide Survey

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Abstract

Background

Social support could improve college students' mental health status. However, mental health varies across different geographic areas, and most of previous studies only included small sample sizes, thus the nationwide survey are warranted. This study sought to estimate the association between social support quality (SSQ) and mental health among Chinese college students using data yielding from a nationwide survey.

Methods

A cross-sectional study with a web-based questionnaire survey was conducted in Wuhan, China, from October 2017 to February 2018. A total of 11093 college students were recruited from 18 colleges or universities through multi-stage random cluster sampling method. The Multidimensional Scale of Perceived Social Support scale and 12-items General Health Questionnaire were used to estimate students' SSQ and mental health status, respectively. Logistic regression analysis was used to identify the association between SSQ and the mental health disorder in college students.

Results

A total of 10,676 (96.24%) college students were included in this study. Of them, 21.4% were identified as having a mental disorder. Students being a female, aged 18-22 years old, whose mother held a college degree and above, and drinking alcohol had more risks of being mental health problems ($P < 0.05$). However, having general or higher family economic levels, working and resting regularly, and sleeping ≥ 7 hours could be preventive factors for mental health problem ($P < 0.05$). Especially, with the improvement of SSQ, there was a decreasing trend in the risk of being mental disorder.

Conclusion

Mental health disorder is an important public health challenge among college students in China. Improving SSQ could be the practical and valuable method to prevent college students' mental problem.

Background

Mental health problem is increasingly recognized as a global public health challenge, and its high prevalence and heavy burden have aroused people's attention. A systematic review based on 174 studies across 63 countries showed that the 12-month common mental disorder prevalence was 17.6% and the lifetime prevalence was 29.2%[1]. With a rapid socio-economic development, China has been confronting an increasing burden from mental health problems. It has been estimated that 4.3 million people were registered as having a severe mental illness[2], which brought substantial burden to individual and the whole society. Mental disorders also had profound negative influences on individual work performance and personal development, especially when the public tended to prejudice against people with mental health problems[3].

Mental health status is considered as the significant predictor of academic performance throughout the entire education period[4]. China has the largest number of college students in the world and the psychological problems of them are particularly prominent health challenges, the prevalences of lifetime, 12-month and 30-day neurotic disorders among Chinese undergraduates were 25.6%, 15.7% and 6.8%, respectively[5]. Another review demonstrated that 16%-30% college students suffered from depression, anxiety, interpersonal relationship problems, or other mental health problems[6]. However, the prevalence of mental health varies across different geographic distributions and socio-economic levels[7, 8].

Social support quality (SSQ) was considered as one of critical influencing factors for mental health status[9]. Although there were some attempts to estimate the relationship between SSQ and mental health status among Chinese college students and provided general knowledge of their relationship, the sample sizes of these studies were small[10, 11], which might limit the representativeness of the findings. In addition, we hypothesized that there would be a significant trend in the improvement of the mental health status among college students with the improvement of SSQ, even though no study has examined this speculation. Given the high prevalence of psychological problems among Chinese college students and its considerable burdens, we conducted this study to analyze the influencing factors of mental health status, and to identify its association with SSQ among college students.

Methods

Sample and data collection

We conducted a large cross-sectional study among 18 colleges/universities in Wuhan, Central China, from October 2017 to February 2018. A multi-stage cluster random sampling method was applied in this survey. Firstly, according to the subject settings, we categorized six groups according to disciplines: Science/Engineering, Medical, Normal, Agronomy, Humanities and others. Secondly, we randomly selected several classes from each grade (from undergraduate to doctoral degree) from each discipline subgroup. Finally, all students in selected classes were recruited in this survey. Included students were asked to fulfill an online questionnaire on their computers or cellphones and ensured no less than 500 questionnaires were received from each college/university. (Firstly, according to the discipline setting, we categorized the included colleges/universities into six groups: Science/Engineering, Medical, Normal, Agronomy, Humanities and others. Secondly, with the approval and help of college/university administrators, we randomly selected 6-18 classes from each college/university (in the proportion of students sizes, one class was randomly selected from each discipline group in undergraduates, masters, and doctoral students, respectively). Then, we encouraged students in selected classes to participate in this survey with the voluntary principle. Finally, all participated students were asked to fulfill an online questionnaire on their computers or cellphones and ensured no less than 500 questionnaires were received

from each college/university.) Ultimately, a total of 11093 questionnaires were collected on a computer terminal. After excluding those questionnaires completed in less than five minutes, 10676 qualified questionnaires were included in further statistical analyses, yielding a 96.24% qualification rate.

This study was approved by the ethics committee of Tongji Medical College institutional review board, Huazhong University of Science and Technology, Wuhan, China. All participants signed informed consent before filling out the questionnaire.

Social support

Multidimensional Scale of Perceived Social Support (MSPSS)[12] consisted of 12 items with response options scoring from 1 (very strongly disagree) to 7 (very strongly agree). It estimated SSQs from three sources: family (including item 3, 4, 8, and 11), friends (including item 6, 7, 9, and 12) and significant others (including item 1, 2, 5, and 10)[13]. All item scores were added up and then divided by 12. The mean scores ranging from 1 to 2.99, 3 to 5 and 5.01 to 7 were classified as low, medium, and high perceived support levels, respectively[12]. MSPSS had a sound factorial validity (with Cronbach's alpha coefficients of 0.953), and internal consistencies for the full scale and subscales were both satisfactory[14]. The Chinese version has been suggested as a reliable tool for assessing SSQ[15].

Mental health status

The 12-items General Health Questionnaire (GHQ-12)[16] was one of the most widely used abridged versions measuring mental health disorder. It included 12 items corresponding to three dimensions: anxiety/depression (including item 1, 2, 7, and 10), social dysfunction (including item 3, 4, 5, 6, 8, and 9) and deficiency of confidence (including item 11 and 12)[17]. There were four answers ranged from "better/healthier than normal" to "much worse/more than usual". The GHQ scoring method (the four options were scored by 0-0-1-1, respectively) was adopted in our study[18]. Higher score corresponded to worse mental health status. A total score of 4 or more was classified as having notable mental problem[19]. GHQ-12 had satisfactory reliability (with Cronbach's alpha coefficients of 0.886) and extensive sensitivity, which had been previously validated.

Demographics

The questionnaire included the following demographic variables: age, gender, ethnicity, religious belief, residence area, single-parent/-child family or not, paternal/maternal education level, family economic status. Lifestyle variables referred to physical exercise, regular work-rest or not, sleep duration, smoking and alcohol drinking status.

Data Analysis

Data analyses were performed using the SPSS software (Version 22 for Windows, SPSS Inc, Chicago, IL, U.S.A.). Descriptive analyses included means (standard deviations [SDs]) for continuous variables and percentages for categorical data. We analyzed the demographic characteristics of the respondents, and compared the differences between SSQs and mental health statuses among various demographics by χ^2 tests. Potential influencing factors of psychological disorder were identified via multi-class logistic regression analysis. Furthermore, we described the correlation between MSPSS and GHQ-12 by matrix analysis and estimated relationships between SSQs and mental problems under different adjustments using trend analysis. Significance level was accepted as $P<0.05$ (two-tailed) for all tests.

Results

Participants in this study had a mean age of 19.66 (SD=2.22), and 56.7% were female. 2,284 (21.4%) students were identified as having a mental disorder. The results of χ^2 tests suggested that SSQ was associated with gender, age, religious belief, residence area, from single-parent or -child family or not, paternal or maternal education level, and family economic status ($P<0.05$). Statistical significantly lower SSQs (score 1-2.9) were reported in males, in students aged 18-22 years old, and those having religious beliefs. Lower SSQs were also found in students living in rural areas, from single-parent family or non-single-child family, whose parents' (both paternal and maternal) education levels were primary or below, and those from families with lower economic statuses ($P<0.05$) (Table 1).

For mental disorder, gender, age, ethnicity, religious belief, residence area, from single-parent or -child family or not, paternal or maternal education levels, and family economic status were considered as potential relevant factors according to the results of χ^2 tests ($P<0.05$). And females, students aged 18-21 years old, minority students, students having religious beliefs, living in rural areas, from single-parent or non-single-child families, whose parents' education levels were primary or below and with lower family economic status were more likely to have mental problems ($P<0.05$).

Regression analysis indicated that gender, age, maternal education level, family economic status, work-rest routine, sleep duration, alcohol drinking and SSQ had potential influences on students' psychological status ($P<0.05$). Of them, female, aged 18-21 years old, maternal education level was college and above, drinking alcohol were independently associated with poorer mental health statuses (odds ratios (ORs) were between 1.245 and 1.362, all $P<0.05$). While middle and higher family economic status, regular work-rest routine, sleep duration ≥ 7 hours, having moderate and high social support quality were more likely to have better mental health conditions (ORs ranged from 0.245 to 0.709, all $P<0.05$) (Table 2).

According to results of regression analysis, SSQ was demonstrated as one of the most significant influencing factors for students' mental health status (moderate vs. low: OR=0.521, 95% CI=0.383-0.708; high vs. low: OR=0.245, 95% CI=0.180-0.333). In order to thoroughly analyze the relationship between

college students' SSQ and psychological problem, we conducted further analyses. The correlation matrix presented in Table 3 revealed that SSQ was negatively associated with mental problem ($r=-0.184$). Among the three social support sources, family provided the strongest effect on mental disorder ($r=-0.182$), then followed by friends ($r=-0.167$) and significant others ($r=-0.157$). Within the MSPSS, the family, friends and significant others subscales were highly correlated with each other (r between 0.586 and 0.717) and with the overall scale (r between 0.787 and 0.835).

In addition, we explored the relationships between SSQ and students' mental disorder under different adjustments. Compared with low SSQ, both moderate and high SSQs reduced the risk of mental disorder (ORs ranged from 0.184 to 0.526, $P<0.05$). In different models of each subscale, there were significant differences in the effects of different SSQs on mental health statuses ($P_{\text{fordifference}}$ all <0.05). Furthermore, in all three models with different adjustments, there were significant positive trends in the associations between both the full scale and subscales of SSQ and mental disorder (P_{fortrend} all <0.001). Especially, in model 3, with the full adjustment, both higher and moderate SSQs had greater negative impacts on mental disorder than low social support (OR=0.249, 95% CI=0.183-0.338; OR=0.526, 95% CI=0.386-0.715, respectively). In subscales, family support had the strongest preventive effect on students' mental disorder (high/moderate SSQ=0.412/0.219), then followed by friends support (0.434/0.234) and significant others supports (0.524/0.285) (Table 4).

Discussion

A total of 10676 college/university students were included in this study and the prevalence of mental disorder was 21.4%. Although this result was lower than the finding (28.0%) from a survey conducted in Finnish university students[20], it was a little higher than results of a cross-national mental health survey (20.3%)[21] and another one (19.0%) from Hungary[22], all above studies were conducted among college students using the GHQ-12. These differences might be attributed to racial, cultural diversities, and socioeconomic disparities[23, 24]. With the increase of SSQ, the risk of being mental disorder among college students showed a significant decreasing trend. It suggested that improving the SSQ could be an effective and practical method to prevent and treat mental disorders of college students.

The high prevalence of psychiatric disorder in college/university might due to the fact that most of the students were just entering adulthood, it was a crucial time for personal identity development. In this period, they were generally sensitive to the shift of surroundings, such as changes in living environment and learning style, crisis of interpersonal relationships, which was easily to cause psychological fluctuations and mental problems[25, 26]. Another possible explanation was that entering college/university followed by a series of unexpected challenges for many students. Apart from considerable pressure related to academic load, they had to bear more adult-like responsibilities, even though they had not yet captured enough cognitive maturity and developed foundational skills required for adulthood[27]. For example, college students might face with stresses from living with housemates with different lifestyles or personalities, graduating and looking for work, and dealing with love affairs. All of these might induce psychological problems, which were harmful to their health, academic performance, and even individual development[28]. Therefore, free psychological counseling centers were suggested to set up in campus, so that more professional resources could be offered to help students prevent and resolve psychological problems[29].

Students' mental disorder was associated with various factors. Similar to previous studies[11], gender was one of important factors influencing college students' mental health in our study, as the female generally lived with more delicate emotions and were prone to have negative views of their health than males, they were more likely to have mental problems. Compared with the older college students, the freshmen, mostly aged 18-21, faced confused lifetime planning, cash-strapped living, and less social experience, which made them anxious and stressful. Mother played a pivotal role in the development of children's mental health[30], but we found mother with college degree or above was a risk factor for students' mental health. Higher academic degree generally corresponded to longer work time and heavier work stress, which deprived the time and energy to accompany with children. In this case, mothers might ignore mental problems in their children and delay their psychological counseling. In addition, students who drank alcohol tended to have decreased sensitivity, intense emotions, and interpersonal conflicts, and eventually increased the risk of bad mood[31, 32]. Nevertheless, the function between alcohol drinking and mental problem could be bi-directional, college students also opted to cope with their depression, stress and other mental illnesses by drinking.

Higher family economic status could protect students from being mental problems, which aligned with previous evidences that poorer family economic status was associated with lower quality of life and less warmth from parents[33]. Coupled with the increasing self-esteem of college students, the gap between subjective demands and objective facts contributed to psychological imbalance and ultimately induced mental problem[34]. Students followed regular work-rest schedule had significant lower risk of mental disorder than those who never/seldom work-rest regularly. This finding was partly supported by a study based on the UK Bio-bank that circadian disruption was reliably associated with various adverse mental health outcomes[35]. However, as its study sample aged 37-73 years old, the result might be not applicable for college students, further prospective studies and random controlled trials were needed to confirm their relationship. Correspondingly, sleep seven hours and longer would decline the risk of mental disorder, which was supported by a recent meta-analysis[36]. Adequate sleep could preserve the homeostasis of affective brain, and optimally prepare next-day emotional functioning, leading to a stable and healthy mental status[37].

Compared with low SSQ, moderate and high SSQs were protective factors for students' mental health. From the correlation coefficient matrix analysis, we found that SSQ and its subscales were negatively correlated with mental disorder, which were in consistent with previous studies[38]. Under different levels of adjustment, medium and high SSQs and their subscales were all negatively associated with mental disorder when compared to low SSQ. Adequate high-quality social supports could give individuals comfortable mental consolation and the sense of security, which benefited college students to keep a healthy psychological status[39]. In general, family was the most important source of social support, followed by friends and significant others. Because of the conservative family values and collectivist nature of Chinese society, family ties were deemed as the most important social relationships[40]. Generally, people affiliated with mental disorder often create the feelings of stigma or shame. In this case, the family should play a key role in guiding family members with psychological problems to receive treatment, and making patients healthy through active interventions[41]. However, several studies listed friends as the most important source of supports, ahead of family and significant others[42]. The reason might be that most college students lived with friends in the campus rather than their family members, friends could timely find psychological change of each other and social supports from friends could offer sufficient mental

assistance. Finally, multinomial logistic regression analyses suggested that SSQ could improve college students' mental health, regardless of from family, friends or significant others. This result informed that university administrators and teachers should strive to improve students' SSQs, especially the supports from family and friends, so as to prevent and treat mental problems in college students better.

Strengths and limitations

There were several strengths in this study. Firstly, we included 10,676 students in this study via the multi-stage random cluster sampling. It was a big sample size among relevant studies, guaranteeing the results were credible to some extent. Secondly, we obtained some important findings. For example, there was a decreasing trend of being mental problem with the improvement of SSQ. This result further supplemented and determined the influencing factor network of college students' mental health, and provided statistical data for international comparisons around this topic.

However, some limitations also should be acknowledged. Firstly, the study was cross-sectional design, the results only suggested the observational correlation rather than the exact causality between SSQ and mental health. Secondly, students' SSQs and mental health statuses were collected through self-reported, which might be a potential source of information bias. However, as the questionnaire was filled out in anonymous forms, obtained data might be objective. Furthermore, previous studies also suggested that there was qualified agreement between online self-reported and measured data [43], indicating the bias derived from this method were permissible. Thirdly, this study was conducted in Wuhan city, which might limit the generality to other regions. However, college students in Wuhan were from across the country, which could make up for the lack of sample representation to some extent.

Conclusion

In conclusion, the SSQ was an critical factors associated with mental health. Compared with low SSQ, moderate and high SSQs significantly prevented mental disorder. Given college students was an important group, their mental health significantly correlated with the quality of social development, our findings might provide valuable and practical clues for the prevention of mental disorder in college students.

Abbreviations

SSQ, social support quality

MSPSS, Multidimensional Scale of Perceived Social Support

GHQ-12, the 12-items General Health Questionnaire

SD, standard deviation

OR, odds ratio

Declarations

Ethics approval and consent to participate

This study was approved by the ethics committee of Tongji Medical College institutional review board, Huazhong University of Science and Technology, Wuhan, China. All participants signed informed consent before filling out the questionnaire.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analysed during this study are included in this manuscript.

Competing interests

The authors declare that they have no competing interests.

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Author contributions

CW designed of the questionnaire, participated in the survey and analyzed the data, wrote the draft of the paper. SY, YYG and YG designed of the questionnaire, analyzed the data and cross-checked the paper. HJ and HX checked the draft of the paper and gave advice on statistical methodology. CL contributed to the design of the paper. ZL provided advices and supervision of the work. All authors read and approved the final version.

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References

1. Steel Z, Marnane C, Iranpour C, Chey T, Jackson JW, Patel V, Silove D: **The global prevalence of common mental disorders: a systematic review and meta-analysis 1980-2013.** *International journal of epidemiology* 2014, **43**(2):476-493.
2. **Mental health in China: what will be achieved by 2020?** *Lancet (London, England)* 2015, **385**(9987):2548.
3. WHO: **Mental health: facing the challenges, building solutions.** In: *Report from the WHO European Ministerial Conference.* Copenhagen, Denmark: WHO Regional Office for Europe; 2005.
4. Lefkowitz ES: **"Things have gotten better": Developmental changes among emerging adults after the transition to university.** *J Adolesc Res* 2005, **20**:40-63.
5. Kou C, Meng X, Xie B, Chen Y, Yu Q, Shi J, Yu Y, D'Arcy C, Huang Y: **The prevalence and correlates of neurotic disorders among undergraduates at a mainland Chinese university.** *Social psychiatry and psychiatric epidemiology* 2012, **47**(12):2011-2018.
6. J L: **Overview on study progress of college students' mental health in recent 20 years.** *Career Horizon* 2009(10):168-169.
7. Pan A, Franco OH, Wang YF, Yu ZJ, Ye XW, Lin X: **Prevalence and geographic disparity of depressive symptoms among middle-aged and elderly in China.** *Journal of affective disorders* 2008, **105**(1-3):167-175.
8. Jiang S, Li C, Fang X: **Socioeconomic status and children's mental health: Understanding the mediating effect of social relations in Mainland China.** *Journal of Community Psychology* 2018, **46**(2):213-223.
9. Tol WA, Barbui C, Galappatti A, Silove D, Betancourt TS, Souza R, Golaz A, van Ommeren M: **Mental health and psychosocial support in humanitarian settings: linking practice and research.** *Lancet (London, England)* 2011, **378**(9802):1581-1591.
10. Zhang J, Qi Q, Delprino RP: **Psychological health among Chinese college students: a rural/urban comparison.** *Journal of child and adolescent mental health* 2017, **29**(2):179-186.
11. Zhang M, Zhang J, Zhang F, Zhang L, Feng D: **Prevalence of psychological distress and the effects of resilience and perceived social support among Chinese college students: Does gender make a difference?** *Psychiatry research* 2018, **267**:409-413.
12. Gregory D, Zimet NWD, Sara G. Zimet, Gordon K. Farley: **The Multidimensional Scale of Perceived Social Support.** *Journal of personality assessment* 1988, **52**(1):30-41.
13. Osman A, Lamis DA, Freedenthal S, Gutierrez PM, McNaughton-Cassill M: **The multidimensional scale of perceived social support: analyses of internal reliability, measurement invariance, and correlates across gender.** *Journal of personality assessment* 2014, **96**(1):103-112.
14. Stewart RC, Umar E, Tomenson B, Creed F: **Validation of the multi-dimensional scale of perceived social support (MSPSS) and the relationship between social support, intimate partner violence and antenatal depression in Malawi.** *BMC psychiatry* 2014, **14**:180.
15. Guan NC, Seng LH, Hway Ann AY, Hui KO: **Factorial validity and reliability of the Malaysian simplified Chinese version of Multidimensional Scale of Perceived Social Support (MSPSS-SCV) among a group of university students.** *Asia-Pacific journal of public health* 2015, **27**(2):225-231.
16. Romppel M, Braehler E, Roth M, Glaesmer H: **What is the General Health Questionnaire-12 assessing? Dimensionality and psychometric properties of the General Health Questionnaire-12 in a large scale German population sample.** *Comprehensive psychiatry* 2013, **54**(4):406-413.
17. Graetz B: **Multidimensional properties of the General Health Questionnaire.** *Social psychiatry and psychiatric epidemiology* 1991, **26**(3):132-138.
18. **General Health Questionnaire (GHQ)**
19. Wang S, Li B, Ungvari GS, Ng CH, Chiu HF, Kou C, Liu Y, Tao Y, Wu Y, Fu Y *et al*: **Poor mental health status and its associations with demographic characteristics and chronic diseases in Chinese elderly.** *Social psychiatry and psychiatric epidemiology* 2016, **51**(10):1449-1455.
20. Oksanen A, Laimi K, Bjorklund K, Loyttyneimi E, Kunttu K: **A 12-year Trend of Psychological Distress: National Study of Finnish University Students.** *Central European journal of public health* 2017, **25**(2):113-119.
21. Auerbach RP, Alonso J, Axinn WG, Cuijpers P, Ebert DD, Green JG, Hwang I, Kessler RC, Liu H, Mortier P *et al*: **Mental disorders among college students in the World Health Organization World Mental Health Surveys.** *Psychological medicine* 2016, **46**(14):2955-2970.
22. Biro E, Adany R, Kosa K: **Mental health and behaviour of students of public health and their correlation with social support: a cross-sectional study.** *BMC public health* 2011, **11**:871.
23. Reiss F: **Socioeconomic inequalities and mental health problems in children and adolescents: a systematic review.** *Social science & medicine* 2013, **90**:24-31.
24. Spence ND, Wells S, Graham K, George J: **Racial Discrimination, Cultural Resilience, and Stress.** *Canadian journal of psychiatry Revue canadienne de psychiatrie* 2016, **61**(5):298-307.
25. Arnett JJ: **Emerging adulthood. A theory of development from the late teens through the twenties.** *The American psychologist* 2000, **55**(5):469-480.
26. Arnett JJ, Zukauskienė R, Sugimura K: **The new life stage of emerging adulthood at ages 18-29 years: implications for mental health.** *The lancet Psychiatry* 2014, **1**(7):569-576.
27. Pedrelli P, Nyer M, Yeung A, Zulauf C, Wilens T: **College Students: Mental Health Problems and Treatment Considerations.** *Academic psychiatry : the journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry* 2015, **39**(5):503-511.
28. Hunt J, Eisenberg D: **Mental health problems and help-seeking behavior among college students.** *The Journal of adolescent health : official publication of the Society for Adolescent Medicine* 2010, **46**(1):3-10.

29. Jaworska N, De Somma E, Fonseka B, Heck E, MacQueen GM: **Mental Health Services for Students at Postsecondary Institutions: A National Survey.** *Canadian journal of psychiatry Revue canadienne de psychiatrie* 2016, **61**(12):766-775.
30. Arroyo-Borrell E, Renart G, Saurina C, Saez M: **Influence maternal background has on children's mental health.** *International journal for equity in health* 2017, **16**(1):63.
31. Levin ME, Lillis J, Seeley J, Hayes SC, Pistorello J, Biglan A: **Exploring the relationship between experiential avoidance, alcohol use disorders, and alcohol-related problems among first-year college students.** *Journal of American college health : J of ACH* 2012, **60**(6):443-448.
32. Miller JW, Naimi TS, Brewer RD, Jones SE: **Binge drinking and associated health risk behaviors among high school students.** *Pediatrics* 2007, **119**(1):76-85.
33. Gonzales NA, Cox S, Roosa MW, White RM, Knight GP, Zeiders KH, Saenz D: **Economic hardship, neighborhood context, and parenting: prospective effects on Mexican-American adolescent's mental health.** *American journal of community psychology* 2011, **47**(1-2):98-113.
34. Wickrama KA, Surjadi FF, Lorenz FO, Conger RD, Walker C: **Family Economic Hardship and Progression of Poor Mental Health in Middle-aged Husbands and Wives.** *Family relations* 2012, **61**(2):297-312.
35. Lyall LM, Wyse CA, Graham N, Ferguson A, Lyall DM, Cullen B, Celis Morales CA, Biello SM, Mackay D, Ward J *et al*: **Association of disrupted circadian rhythmicity with mood disorders, subjective wellbeing, and cognitive function: a cross-sectional study of 91 105 participants from the UK Biobank.** *The lancet Psychiatry* 2018.
36. Baglioni C, Nanovska S, Regen W, Spiegelhalder K, Feige B, Nissen C, Reynolds CF, Riemann D: **Sleep and mental disorders: A meta-analysis of polysomnographic research.** *Psychological bulletin* 2016, **142**(9):969-990.
37. Goldstein AN, Walker MP: **The role of sleep in emotional brain function.** *Annual review of clinical psychology* 2014, **10**:679-708.
38. Guan NC, Sulaiman AR, Seng LH, Ann AY, Wahab S, Pillai SK: **Factorial validity and reliability of the Tamil version of multidimensional scale of perceived social support among a group of participants in university malaya medical centre, malaysia.** *Indian journal of psychological medicine* 2013, **35**(4):385-388.
39. Ditzen B, Heinrichs M: **Psychobiology of social support: the social dimension of stress buffering.** *Restorative neurology and neuroscience* 2014, **32**(1):149-162.
40. Zeng W, North N, Kent B: **Family and social aspects associated with depression among older persons in a Chinese context.** *International journal of older people nursing* 2013, **8**(4):299-308.
41. Patterson JE, Edwards TM, Vakili S: **Global Mental Health: A Call for Increased Awareness and Action for Family Therapists.** *Family process* 2018, **57**(1):70-82.
42. Mahon NE, Yarcheski A: **Parent and Friend Social Support and Adolescent Hope.** *Clinical nursing research* 2017, **26**(2):224-240.

Tables

Table 1. Demographic Characteristics of study participants by perceived social support quality and mental health status.

Demographics		Sample Size (%)	Perceived social support levels			χ^2	<i>P</i>	Mental health status		χ^2	<i>P</i>
			Low	Medium	High			Normal	Disorder		
Gender	Male	4625 (43.3)	2.2	40.2	57.6	51.547	<0.001	80.8	19.2	22.895	<0.001
	Female	6051 (56.7)	1.3	34.5	64.2			76.9	23.1		
Age (years old)	<18	680 (6.4)	1.8	36.9	61.3	26.571	<0.001	81.8	18.2	12.383	0.006
	18-22	8136 (76.3)	1.7	38.1	60.2			77.9	22.1		
	22-26	1640 (15.4)	1.6	32.3	66.0			80.1	19.9		
	≥26	157 (1.9)	2.5	28.6	69.0			84.2	15.8		
Ethnicity	Han	9476 (88.8)	1.7	36.9	61.4	0.110	0.946	79.1	20.9	11.955	0.001
	Minority	1200 (11.2)	1.8	37.3	60.9			74.8	25.3		
Religious belief	No	10097 (94.6)	1.6	36.7	61.7	14.614	0.001	78.9	21.1	9.215	0.002
	Yes	579 (5.4)	2.9	42.3	54.7			73.6	26.4		
Residence area	Rural	4978 (46.6)	1.9	40.4	57.7	52.118	<0.001	77.7	22.3	4.740	0.029
	Urban	5698 (53.4)	1.5	33.9	64.5			79.4	20.6		
Single-parent family or not	Yes	817 (7.7)	3.2	44.2	52.6	34.920	<0.001	73.2	26.8	15.407	<0.001
	No	9859 (92.3)	1.6	36.4	62.1			79.1	20.9		
Single-child family or not	Yes	4931 (46.2)	1.7	33.9	64.4	37.386	<0.001	79.9	20.1	9.740	0.002
	No	5745 (53.8)	1.7	39.6	58.7			77.5	22.5		
Paternal education level	Elementary school and below	1558 (14.6)	2.2	42.6	55.2	83.970	<0.001	76.4	23.6	9.173	0.027
	Junior high school	3872 (36.3)	1.6	39.8	58.6			78.7	21.3		
	High/Secondary school	2739 (25.7)	1.6	35.5	62.9			80.2	19.8		
	College and above	2507 (23.5)	1.6	30.8	67.7			78.1	21.9		
Maternal education level	Elementary school and below	2742 (25.7)	2.0	42.2	55.8	95.481	<0.001	76.6	23.4	15.565	0.001
	Junior high school	3711 (34.8)	1.5	38.6	59.8			79.9	20.1		
	High/Secondary school	2395 (22.4)	1.5	34.4	64.1			80.0	20.0		
	College and above	1828 (17.1)	1.9	29.2	69.0			77.1	22.9		
Family economic status	Lower	3358 (31.5)	2.5	44.5	53.1	202.644	<0.001	73.8	26.2	66.843	<0.001
	General	6373 (59.7)	1.3	35.2	63.5			80.7	19.3		
	Higher	945 (8.9)	1.7	22.5	75.8			81.4	18.6		
Total		10676 (100.0)	181 (1.7)	3947 (37.0)	6548 (61.3)			78.6 (8392)	21.4 (2284)		

Note. SSQ, Social support quality.

Table 2. Logistic regression analyses for the influencing factors of mental health among college students.

Demographics		β	S.E.	Wald χ^2	P	OR	95% CI	
							LL	UL
Gender (ref=male)	Female	0.309	0.055	31.581	<0.001	1.362	1.223	1.517
Age (years) (ref= <18)	18-22	0.269	0.107	6.334	0.012	1.308	1.061	1.613
	23-26	0.230	0.122	3.552	0.059	1.258	0.991	1.597
	≥ 26	0.012	0.225	0.003	0.958	1.012	0.651	1.572
Maternal education level (ref=Elementary school and below)	Junior high school	-0.094	0.067	1.973	0.160	0.910	0.798	1.038
	High/Secondary school	-0.001	0.086	0.000	0.989	0.999	0.844	1.183
	College and above	0.219	0.108	4.097	0.043	1.245	1.007	1.540
Family economic status (ref=Lower)	General	-0.344	0.058	35.042	<0.001	0.709	0.633	0.794
	Higher	-0.369	0.108	11.807	<0.001	0.691	0.560	0.853
Work-rest routine (ref=Never/Seldom)	Sometimes	-0.266	0.065	16.493	<0.001	0.767	0.674	0.872
	Usually/Always	-0.613	0.062	96.318	<0.001	0.542	0.479	0.612
Sleep duration (hours) (ref=<7)	7-9	-0.352	0.054	43.138	<0.001	0.704	0.633	0.781
	≥ 9	-0.347	0.129	7.286	0.007	0.707	0.549	0.909
Alcohol drinking (ref=No)	Yes	0.249	0.062	15.924	<0.001	1.283	1.135	1.450
Social support quality (ref=Low level)	Moderate level	-0.653	0.157	17.240	<0.001	0.521	0.383	0.708
	High level	-1.407	0.157	79.878	<0.001	0.245	0.180	0.333

Note, LL= Low limit, UL=Upper limit.

Table 3. Correlation between MSPSS and GHQ-12.

Variables	Quality of SSQ	Subscale-family	Subscale-friends	Subscale-significant others	Mental health disorder
Quality of SSQ	1.000				
Subscale-family	0.787	1.000			
Subscale-friends	0.789	0.586	1.000		
Subscale-significant others	0.835	0.656	0.717	1.000	
Mental health disorder	-0.184	-0.182	-0.167	-0.157	1.000

Note: MSPSS=Multidimensional Scale of Perceived Social Support; GHQ=General health questionnaire; SSQ=Social support quality.

All correlation coefficients were statistically significant at the 0.01 level.

Table 4. Multinomial logistic regression analyses for the associations between social support quality and mental health status.

Variables		Unadjusted				Model 1 ^a				Model 2 ^b				Model 3 ^c	
		OR	95% CI		P for trend	OR	95% CI		P for trend	OR	95% CI		P for trend	OR	95% CI
			LL	UL			LL	UL			LL	UL			LL
SSQ (ref=Low)	Medium	0.489	0.363	0.661	<0.001	0.472	0.349	0.637	<0.001	0.496	0.366	0.672	<0.001	0.526	0.386
	High	0.214	0.159	0.289		0.203	0.150	0.274		0.219	0.162	0.297		0.249	0.183
	P for difference		<0.05				<0.05				<0.05				<0.05
SSQ-Family (ref=Low)	Medium	0.385	0.303	0.489	<0.001	0.382	0.300	0.485	<0.001	0.403	0.317	0.513	<0.001	0.412	0.323
	High	0.187	0.147	0.237		0.184	0.145	0.233		0.199	0.156	0.254		0.219	0.171
	P for difference		<0.05				<0.05				<0.05				<0.05
SSQ-Friends (ref=Low)	Medium	0.400	0.308	0.521	<0.001	0.393	0.302	0.511	<0.001	0.415	0.318	0.542	<0.001	0.434	0.332
	High	0.202	0.156	0.263		0.196	0.151	0.255		0.211	0.161	0.275		0.234	0.179
	P for difference		<0.05				<0.05				<0.05				<0.05
SSQ-Significant others (ref=Low)	Medium	0.504	0.384	0.662	<0.001	0.482	0.366	0.635	<0.001	0.502	0.380	0.661	<0.001	0.524	0.396
	High	0.256	0.195	0.335		0.237	0.180	0.311		0.253	0.192	0.334		0.285	0.215
	P for difference		<0.05				<0.05				<0.05				<0.05

Note, LL= Low limit; UL=Upper limit; SSQ=Social support quality.

^a Adjusted for age and gender.

^b Furthermore adjusted for ethnicity, religious belief, residence area, single-parent or not, signal-child or not, family economic status, paternal and maternal education levels.

^c Furthermore adjusted for exercise, life schedule and sleep duration.