

# Socio-demographic characteristics, lifestyles, social support quality and mental health in college students: A cross-sectional study

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## Research Article

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## Abstract

**Background:** Mental health problem is an important public health issue among college students and is associated with various social factors. However, these influencing factors were scarcely summarized in Chinese college students comprehensively. This study aims to assess the associations between socio-demographic characteristics, lifestyles, social support quality (SSQ) and mental health among Chinese college students.

**Methods:** A cross-sectional study was conducted in Wuhan, China, from October 2017 to February 2018. College students from 18 colleges or universities were randomly recruited using multi-stage 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 evaluate the associations between socio-demographic characteristics, lifestyles, SSQ and mental health problems.

**Results:** A total of 10676 (96.24%) college students were included in the study. Among them, 21.4% were identified as having mental health problems. Students being a female, aged 18-22 years old, whose mother held college degrees and above, and drinking alcohol were more likely to have mental problems ( $P < 0.05$ ). Contrarily, having general or higher family economic levels, working and resting regularly, and sleeping  $\geq 7$  hours could be preventive factors ( $P < 0.05$ ). Especially, there was a decreasing trend in the risk of mental health problems with the improvement of SSQ.

**Conclusion:** Besides socio-economic and lifestyle factors, social support is a critical factor for mental health among college students. Improving SSQ, especially which from the family, could be an effective method to prevent mental problems among college students.

## Background

Mental health problem is a significant and growing public health issue, 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]. Unfortunately, the effect of mental health problem can be long-lasting or recurrent. Student's mental health is an important topic throughout the education system, which not only affects students' academic performance, but is a significant predictor of personal development [2]. Previous studies on students' mental health problems mostly focused on the primary and secondary school years [3, 4]. However, it is also a prominent health problem among college students, and the depression and anxiety are among the most common [5].

Most of college students are just entering adulthood, it is a crucial time for personal identity development and psychology transition. In this period, they are generally sensitive to the shift of surroundings, such as changes of living and learning environments [6, 7]. On the other hand, entering college/university is generally followed by considerable academic pressure and more adult-like responsibilities, but they have not enough cognitive maturity or foundational skills required for adulthood [8]. A mental health survey performed by WHO in 21 countries showed that 20.3% of college students had suffered from mental health problems, but only 16.4% of them received appropriate healthcare [9]. China has the largest number of college students in the world and mental health problem is a prominent health challenge for them, 16%-30% college students have suffered from depression, anxiety, or other mental problems [10]. Some studies also suggested the average prevalence of depression in college students was 30.39% [11], and the prevalence of anxiety was around 40% for male and even 45% for female students [12].

Mental health status is affected by complex reasons, such as socio-demographic characteristics [13, 14], lifestyles [15, 16], as well as family conditions and social networks [17, 18]. Social support refers to the help provided by individuals who comprise the social network of a person who occupies the position of ego in this network [19], its quality may vary due to the number, intensity and frequency of social contacts. Social support quality is considered as another critical influencing factor for mental health status [20, 21], and dissatisfaction with insufficient or poor-quality social supports is closely associated with mental problems in emerging adulthood [19].

Although there were some attempts to estimate the prevalence and influencing factors of mental health status among college students and provided general knowledge of their relationship, the sample sizes of these studies were relatively small [22, 23], or only focused on a specific dimension rather than comprehensive studies. In addition, we have two hypotheses: firstly, there would be a significant trend in relationships between mental health status and SSQ from various resources; secondly, SSQ from the family would be better in preventing mental health problems than those from the friends or significant others. Therefore, we conducted a large-scale epidemiological study among Chinese college students with two objectives. Firstly, we aimed to analyze the influencing factors of mental health problems among Chinese college students; secondly, we sought to evaluate the association between college students' mental health status and SSQ from different sources.

## Methods

### Sample and data collection

We conducted a large population-based, 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 subject settings, we categorized the 18 colleges/universities into seven groups: five comprehensive universities, seven universities of science and technology, two universities of finance and economics, and one university of teacher-training, agronomy, nationalities as well as sports, respectively. Secondly, we randomly selected, in the proportion of students sizes, several classes from each grade (from undergraduate to doctoral degree) in every college/university. Then, all students in selected classes were encouraged to participate in this survey with the voluntary principle and ensured no less than 500 questionnaires were received from each college/university. All participated students were asked to fulfill an online questionnaire on their computers or cellphones. The questionnaire was used to collect students' information including socio-demographic characteristics, individual lifestyles or behaviors, perceived social support, physical and mental health status. Ultimately, a total of 11750 college

students participated in the survey and 11093 questionnaires were collected on a computer terminal, with a response rate of 94.41%. After excluding those completed in less than five minutes, 10676 qualified questionnaires were included in final 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) [24] consists of 12 items with response options scoring from 1 (very strongly disagree) to 7 (very strongly agree). It estimates SSQ from three sources: family (item 3, 4, 8, and 11), friends (item 6, 7, 9, and 12) and significant others (item 1, 2, 5, and 10) [25]. Scores of all items are added up and then divided by 12. The mean scores ranging from 1 to 2.99, 3 to 5 and 5.01 to 7 are classified as low, medium, and high perceived support levels, respectively [24]. MSPSS has a sound factorial validity (with Cronbach's alpha coefficients of 0.953), and internal consistencies for the full scale and subscales are both satisfactory [26]. The Chinese version has been suggested as a reliable tool for assessing SSQ [27].

### Mental health status

The 12-items General Health Questionnaire (GHQ-12) [28] is one of the most widely used versions measuring individual mental health problems. It includes 12 items corresponding to three dimensions: anxiety/depression (item 1, 2, 7, and 10), social dysfunction (item 3, 4, 5, 6, 8, and 9) and deficiency of confidence (item 11 and 12) [29]. There are four answers ranging 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) has been adopted in our study [30]. Higher score corresponds to worse mental health status. A total score of 4 or more was classified as having notable mental problem [31]. GHQ-12 had satisfactory reliability (with Cronbach's alpha coefficients of 0.886) and extensive sensitivity, which had been previously validated.

### Socio-demographic characteristics and lifestyles

The questionnaire includes the following demographic variables: age, gender, ethnicity, religious belief, place of residence, single-parent/-child family or not, paternal/maternal education level, and family economic status. Family economic status was assessed by asking the question of "what do you think of your family economic condition?" with optional responses of "very affluent", "more affluent", "the general", "less affluent", or "non-affluent". Based on the responses, family economic status was categorized as good, general, and poor.

Lifestyle variables refer to physical exercise, regular work-rest or not, sleep duration, smoking and alcohol drinking status. Physical exercise was judged from the question of "do you have chronic aerobic exercise (e.g. setting-up exercise, jogging, walking) for 30 minutes and longer three times a week?", and the responses were classified into "never/seldom", "sometimes", and "usually/always". Regular work-rest was estimated by the question of "do you have a regular daily routine?", and the options were also classified into three categories: "never/seldom", "sometimes", and "usually/always". Sleep duration was divided into "<7 hours", "7-8.9 hours", and "≥9 hours" based participants' answers to "In recent three monthes, you sleep for XX hours, XX minutes every day on average." Smoking and alcohol drinking were dichotomized as "yes" and "no" according to participants' responses.

## 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 frequencies and percentages for categorical data. We analyzed respondents' demographic characteristics, and compared the differences of SSQ and mental health statuses among various demographics by  $\chi^2$  tests. Potential influencing factors of psychological problem were identified via multivariate logistic regression analyses. Furthermore, we described the correlation between MSPSS and GHQ-12 by matrix analysis and estimated relationships between SSQ and mental problems under different adjustments using trend analysis. Potential confounders included age, gender, ethnicity, religious belief, residence area, single-parent/-child family, parental education level, family economic status, work-rest routine, sleep duration, alcohol drinking, and smoking. Significance level was accepted as  $P < 0.05$  (two-tailed) for all tests.

## Results

Referring to Table 1, among the included 10676 college students (with a mean age of 19.66 [SD=2.22]), 56.7% were female, and 2284 (21.4%) students had mental health problems. The results of  $\chi^2$  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 ( $P < 0.05$ ). A lower SSQ (score 1-2.9) were found in males, students aged 18-22 years old, and those having religious beliefs, living in rural areas, from single-parent, or non-single-child families. It also showed in students whose parents' education levels were primary or below and those from families with lower economic statuses ( $P < 0.05$ ). For mental health problem, 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 ( $P < 0.05$ ). Females, minority students, and students aged 18-21 years old, having religious beliefs, living in rural areas, from single-parent or non-single-child families, whose parents' education levels were primary or below, and from families with poorer economic status were more likely to have mental problems ( $P < 0.05$ ).

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

Demographics		Sample size (%)	Social support quality			$\chi^2$	P	Mental health status (%)		$\chi^2$	P
			Low	Medium	High			Normal	Problematic		
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	Poor	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		
	Good	945 (8.9)	1.7	22.5	75.8			81.4	18.6		

Note. SSQ, Social support quality.

Demographics	Sample size (%)	Social support quality			$\chi^2$	P	Mental health status (%)		$\chi^2$	P
		Low	Medium	High			Normal	Problematic		
<b>Total</b>	10676 (100.0)	181 (1.7)	3947 (37.0)	6548 (61.3)			78.6 (8392)	21.4 (2284)		

Note. SSQ, Social support quality.

As shown in Table 2, 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 ( $P < 0.05$ ). Among 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  $\geq 7$  hours, having moderate and high social support quality were more likely to have better mental health statuses (ORs ranged from 0.245 to 0.709, all  $P < 0.05$ ). Among them, SSQ was one of the most significant influencing factors for students' mental health problems (moderate vs. low: OR=0.521, 95% CI=0.383-0.708; high vs. low: OR=0.245, 95% CI=0.180-0.333).

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

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

Note, OR=odds ratio, CI=confidence interval, LL= Low limit, UL=Upper limit, ref=reference.

In Table 3, the correlation matrix suggested that SSQ was negatively associated with mental problem ( $r = -0.184$ ). Among the three social support sources, family provided the strongest effect on mental health problem ( $r = -0.182$ ), 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).

Table 3  
Correlation between MSPSS and GHQ-12.

Variables	Quality of SSQ	Subscale-family	Subscale-friends	Subscale-significant others	Mental health problem
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 problem	-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.					

As presented in Table 4, compared with low SSQ, both moderate and high SSQ reduced the risk of mental health problem (ORs ranged from 0.184 to 0.526,  $P < 0.05$ ). In different models of each subscale, there were significant difference in effect of different SSQ on mental health status ( $P_{\text{difference}}$  all  $< 0.05$ ). Furthermore, in all three models with different adjustments, there were significant positive trends in associations between both full scale and subscales of SSQ and mental health problems ( $P_{\text{trend}}$  all  $< 0.001$ ). Especially, in model 3, with the full adjustment, both higher and moderate SSQ had greater negative impacts on mental problems than the low SSQ (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 health problems (high/moderate SSQ=0.412/0.219), then followed by friends supports (0.434/0.234) and significant others supports (0.524/0.285).

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

Variables	Unadjusted			Model 1 <sup>a</sup>			Model 2 <sup>b</sup>			Model 3 <sup>c</sup>					
	OR	95% CI LL	P trend	OR	95% CI UL LL	P trend	OR	95% CI UL LL	P trend	OR	95% CI UL LL	P trend			
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
	$P_{\text{difference}}$		<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
	$P_{\text{difference}}$		<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
	$P_{\text{difference}}$		<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
	$P_{\text{difference}}$		<0.05			<0.05				<0.05				<0.05	

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

<sup>a</sup> Adjusted for age and gender.

<sup>b</sup> Furthermore adjusted for ethnicity, religious belief, residence area, single-parent or not, signal-child or not, family economic status, paternal and maternal ed

<sup>c</sup> Furthermore adjusted for exercise, life schedule and sleep duration.

## Discussion

A total of 10676 college/university students were included in this study and the prevalence of mental health problem was 21.4%. Although this result was lower than the finding (28.0%) from a survey conducted in Finnish university students [32], it was higher than results of a cross-nation mental health survey (20.3%) [9] and another one (19.0%) from Hungary [33], all above studies were conducted among college students using the GHQ-12. These differences might be attributed to racial, cultural, and socio-demographic disparities [34, 35]. With the increase of SSQ, the risk of mental health problem among college students showed a significant decreasing trend, suggesting that improving the SSQ could be an effective and practical method to prevent mental health problems of college students.

Compared with liberal education in western developed countries, China follows a relatively conservative education model. Under this model, schools are prone to pursue attractive academic achievement rather than students' quality-oriented education and healthy psychological development [36]. Heavy academic burden and insufficient healthcares on mental health lead to negative mental health status among Chinese students. However, because mental health problems are long-lasting throughout the entire education period, plus the transitional period of psychological development, which is sensitive to surrounding environment, lifestyles or behaviors, and social supports from family, friends or significant others, the mental health problem are prominent among college students.

Mental health problem was associated with various factors. Similar to previous studies [23], 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 [37, 38], but we found that mother with college degree or above was a risk factor for students' mental health. A possible explanation is higher academic degree generally corresponds to longer work time and heavier work loads, which deprives the time and energy to accompany with children. Alcohol drinking was negatively associated with mental health. Students who drank alcohol tended to have decreased sensitivity, intense emotions, and interpersonal conflicts, and eventually increased the risk of mental health problems [39, 40]. 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. This bidirectional relationship warrants further studies.

Higher family economic status could protect students from being mental problems, which aligned with the previous evidences [41]. Coupled with the increasing self-esteem of college students, the gap between subjective demands and objective facts due to poor economic condition contributed to psychological imbalance and ultimately induced mental problems [42]. Students followed regular work-rest schedule had significant lower risk of mental problems than those who never/seldom work-rest regularly. This finding was partly supported by a study based on the UK Bio-bank, where circadian disruption was reliably associated with various adverse mental health outcomes [43]. However, as its study sample aged 37-73 years old, the result might be not applicable for college students, further prospective studies and randomized controlled trials are needed to confirm such relationship. In addition, sleep seven hours and longer would decline the risk of mental health problem significantly, which was consistent with results of a recent meta-analysis [44]. Adequate sleep could preserve the homeostasis of affective brain, and optimally prepare next-day emotional functioning, leading to a stable and healthy mental status [45].

Compared with low SSQ, moderate and high level of SSQ 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 health problem, which were consistent with previous studies [46]. Under different levels of adjustment, medium and high SSQ and their subscales were all negatively associated with mental problem when compared to low SSQ. Adequate high-quality social supports could give individuals comfortable mental consolation and a sense of security, which benefits college students to keep a healthy psychological status [47]. In general, family is the most important source of social support. Due to the conservative family values and collectivist nature of Chinese society, family ties were deemed as the most important social relationships [48]. People affiliated with mental health problems often create the feelings of stigma or shame. In this case, the family could play a key role in guiding family members with psychological problems to receive treatment, and making patients healthy through active interventions [49]. However, several studies listed friends as the most important source of supports, ahead of family and significant others [50]. 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. However, in this study, SSQ could improve college students' mental health, regardless of from family, friends or significant others. This finding informed that university administrators and teachers should improve students' SSQ, especially the supports from family and friends, so as to prevent mental problems in college students better.

## Strengths And Limitations

There were several strengths in this study. Firstly, we included 10676 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 confirmed the influencing factor network of college students' mental health, and provided statistical data for international comparisons on this topic.

However, some limitations should be acknowledged. Firstly, the study was a cross-sectional design, the results only suggested the observational correlation rather than the causality between SSQ and mental health problems. Secondly, students' SSQ 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. Thirdly, the classification on socio-demographic and lifestyle variables (e.g. alcohol drinking, family economic status) in this study were simple, which, to some extent, limited further analyses on the impact of specific socio-demographic characteristics or lifestyles on individual mental health status. Studies based on detailed classification on socio-demographic and lifestyle variables should be conducted in the future. Finally, 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

Besides socio-economic and lifestyle factors, social support is a positive and critical factor for mental health. The higher SSQ, especially which from the family, could be better in preventing mental health problems those from friends or significant others. Our findings may provide valuable and practical clues for the prevention of mental disorder among 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

Ref, reference

## 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. The submission and publication of the manuscript have been approved by all authors and tacitly or explicitly by the responsible authorities of the institutes where the survey was carried out. Human data included in this manuscript was obtained in compliance with the principles outlined in the Helsinki Declaration.

### Consent for publication

Not applicable.

### Availability of data and materials

All data generated or analysed during this study are included in this manuscript. The datasets generated and/or analyzed during the current study are not publicly available due the data is collected by the project team, we can use it with authorization, but cannot share it publicly, but are available from the corresponding author on reasonable request.

### 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 and YG designed of the questionnaire, analyzed the data and cross-checked the paper. HJ and YG checked the draft of the paper and gave advice on statistical methodology. CL contributed to the design of the paper. ZL provided suggestions and supervision of the work. All authors read and approved the final version.

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