Study protocol: A cross-sectional study on psychology and behavior investigation of Chinese residents, PBICR

Yu-Jia Wang, Ayidana Kaiyebbieke, Si-Yuan Fan, Rui-Feng Zhang, Meng-Jie Huang, Han Li, Xiao-Nan Sun, Qi-Yu Li, Wen-Jia Meng, Wen-Yu Wu, Zhi Lin, Jing-Yao Liu, Xin-Pei Wang, Yun-Chou Wu, Jing-Qi Tang, Yi-Ke Sun, Ke Chen, Pu Ge, Wai-Kit Ming, Casper Zhang, Zheng Fei, Lei Feng, Xin-Yue Zhang, Yu-Yao Niu, Yu-Pei Yan, Yi-Le Jin, Guang-Ze Gao, Shuang Dai, Yu-Liu Li, Yue Tan, Yi-Wei Wu, Qi Zhang, Gui Guo, Xian-Li Pan, Yan-Ming Liao, Xian-Qi Zhao, Ya-Ting Zhang, Hui-Yi Chen, Yue-Wei Qiu, Xiao-Min Fu, Jiang-Ling Zhou, Dan Li, Ke-Han Li, Meng-Wei Xu, Zhe Wang, Yue-Qi Wang, Yong Ma, Xin-Ying Sun, Yi-Bo Wu

1. College of Humanities and Social Science, Harbin Medical University, Harbin, 150081, China.
2. School of Public Health, Xi’an Jiaotong University, Xi’an, 710061, China.
3. Department of Preventive Medicine, Yanjiao Medical College, Capital Medical University, Beijing, 101300, China.
5. School of Public Health, Shandong University, Jinan, 250012, China.
6. National Drug Clinical Trial Institute, The Second Affiliated Hospital, Xi’an Jiaotong University, Xi’an, 741004, China.
7. School of Humanities and Health Management, Jinhou Medical University, Jinhou, 121000, China.
8. School of Arts and Media, The University of New South Wales, Sydney, NSW 2052, Australia.
9. School of Health Management, Harbin Medical University, Harbin, 150081, China.
10. College of Communication and Art Design, University of Shanghai for Science and Technology, Shanghai, 200093, China.
11. Medical Equipment Department, Peking University First Hospital, Beijing, 100034, China.
12. School of Philosophy, Anhui University, Hefei, 230039, China.
13. College of Integrated Traditional Chinese and Western Medicine, Jining Medical University, Jining, 272000, China.
14. Faculty of Health Sciences, University of Macau, Macao, 999078, China.
15. Jockey Club College of Veterinary Medicine and Life Sciences, City University of Hong Kong, Hong Kong, China.
16. School of Public Health, The University of Hong Kong, Hong Kong, 000000, China.
17. Centre for Public Health and Wellbeing, School of Health and Social Wellbeing, College of Health, Science and Society, University of the West of England, Bristol BS16 1QY, UK.
18. Centre For Life Science, National University of Singapore, 117456, Singapore.
19. School of Stomatology, Zhejiang University School of Medicine, Hangzhou 310006, China.
20. Faculty of Arts and Humanities, University of Macau, Macao, 999078, China.
21. Department of Humanities, Arts and Media, Changzhhi Medical College, Changzhhi, 046013, China.
22. Baotou Clinical College, Inner Mongolia Medical University, Baotou, 010110, China.
23. Tongliao Clinical College, Inner Mongolia Medical University, Tongliao, 010110, China.
24. School of Imaging and Nuclear Medicine, Jinhou Medicine University, Liaoqin, 121000, China.
25. School of Pharmaceutical Sciences, Jilin University, Changshun, 130012, China.
26. School of Clinical Medicine, North Sichuan Medical College, Nanchong, Sichuan, 637000, China.
27. College of Communication and Art Design, University of Shanghai for Science and Technology, Shanghai, 200093, China.
28. School of Nursing, Jilin University, Changchun, Jilin, 130000, China.
29. Department of General Medicine, Chaohu Hospital Affiliated with Anhui Medical University, Chaohu City, 238000, China.
30. School of Health Management, Southern Medical University, Guangzhou, 510515, China.
31. School of Nursing and Rehabilitation, Shandong University, Jinan, 250012, China.
32. Faculty of Humanities and Arts, Macau University of Science and Technology, Macao, 999078, China.
33. School of Management, Hainan Medical University, Hainan, 570100, China.
34. School of Nursing, North Sichuan Medical College, Nanchong, Sichuan, 637100, China.
35. School of Economics and Management, Beijing Institute of Graphic Communication, Beijing, 102600, China.
36. School of Medicine, Tibet University, Lhasa, 850011, China.
37. Xiangyang School of Public Health, Central South University, Changsha, 410078, China.
38. School of Public Health, Ningxia Medical University, Ningxia, 750000, China.
39. School of Public Health, Peking University, Beijing, 100191, China.

*Corresponding to: Xin-Ying Sun, School of Public Health, Peking University, 38 Xueyuan Road, Haidian District, Beijing, 100191, China. Email: xysun@bjmu.edu.cn. Yi-Bo Wu, School of Public Health, Peking University, 38 Xueyuan Road, Haidian District, Beijing, 100191, China. Email: bimuwyibo@outlook.com.

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Author contributions
Kairendebeke A contributed to the collection and writing of all scale-related materials. Fan SY, Huang MJ and Li H were responsible for literature lookup and proofreading of dissertation details. Zhang RF was responsible for the production of the pictures. Sun XN, Li QX, Meng WJ, Wu YY, Lin Z, Liu YF, Wang XP, Wu YC, Tang JQ, Sun YK, Zhang XY, Chen K and Gao P participated in all phases of the design of this protocol. Ming WK, Zhang C, Ma ZF, and Lei F have made many valuable comments on our research. All authors contributed to the article and approved the submitted version.

Competing interests
The authors have declared that no competing interests exist.

Acknowledgments
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Abbreviations

Citation

Background
According to the World Health Organization (WHO), health is a state of physical, mental, and social adaptation, not just the absence of disease and weakness [1]. On 17th June 2022, the World Mental Health Report 2022 issued by the WHO mentioned that nearly 1 billion people worldwide suffer from mental diseases, and the Coronavirus Disease 2019 (COVID-19) epidemic has aggravated this crisis [2]. In previous reports, social factors have been considered as one of the basic elements of etiological models of mental illness. While in the 2022 report, social factors were regarded as a basic component of practical interventions to restore people’s mental health, in addition to new social determinants such as climate change and epidemics [3]. Depression is a common disorder that severely limits psychosocial functioning and reduces quality of life, and WHO ranks major depressive disorder as the third leading cause of global disease burden and expects it to rank first by 2030 [4,5]. Influenced by COVID-19 epidemic, mental health problems are increasingly prominent in the public. During the pandemic, the incidence of depression, pain, and suicidal thoughts that may occur in the general population is higher than expected [6]. A study of the prevalence of depression, anxiety, stress, and sleep problems 7 months before the COVID-19 pandemic showed that the prevalence of depression in China ranged from 8.3% to 48.3%, the prevalence of anxiety ranged from 2% to 37%, and the prevalence of stress ranged from 8.1% to 29.29% [7]. The survey of the mental health status of residents mainly in Hubei under the COVID-19 epidemic, which conducted by Lakhan R, et al. showed that the prevalence of depression was 50.7%, the prevalence of anxiety was 44.7%, the prevalence of stress was 73.4% and the prevalence of insomnia was 36.1% [8]. Mental health status is influenced by many factors, such as chronic disease status, environmental control variables (including COVID-19 control measures at the local community level and outbreak risk level at the current location) [9], potential stressors (length of time in self-isolation/isolation, living arrangements, specific employment/study status), and coping mechanisms (frequency of exercise, number of trips, interaction and impact of friends, family, and pets) [10].

Health behaviors refer broadly to all behaviors related to individual health and disease, including good health behaviors and poor health behaviors, such as adherence to exercise, reasonable diet, smoking, and alcoholism [16]. Changing adverse health behaviors can play a positive role in promoting human health promotion. Changes in people’s lifestyle are the result of interactions at multiple ecological levels such as interpersonal, environmental and policy levels [17]. Most studies on health behaviours focus on specific geographical areas, specific disease associations and other aspects, and the contents of concern including daily life style, dietary structure, and physical exercise. Chen Q, et al. [18], Zhang C, et al. [19], Li YY, et al. [20], conducted health behavior-related surveys of health care workers, adolescents, and internet users during the COVID-19 epidemic, respectively. Wang T, et al. [21] conducted a related study on the health behaviours of residents in the context of the COVID-19 epidemic. Roh HW, et al. [22] conducted a related study of smartphones to improve residents' health behaviours.

In summary, there is no nationwide, multi-group, more comprehensive survey of psychological and behavioral health status of a large sample; most current studies are limited to a single population or specific areas, such as the elderly [23], medical staff [24], patients [25], college students [26], and sleep and anxiety [27], and the current research is not enough to support physical and mental health research and strategy formulation in China and even the world. This study aims to establish a database in China through a multicenter, large-sample cross-sectional survey, provide strong data support for research and development in various fields, more comprehensively and systematically understand the physical and mental health of the public, and guide policy-makers and health care organizations to reform their programs to ensure the best interests of residents and their families.

Materials and methods

Research design and setting

This cross-sectional survey conducted from 20 June 2022 to 31 August 2022 in 148 cities, 202 districts and counties, 390 townships / towns / streets, and 780 communities / villages (excluding Hong Kong, Macao, and Taiwan) from 23 provinces, 5 autonomous regions, and 4 municipalities directly under the central government in China, initiated by Peking University School of Public Health. This study has been officially registered in the China Clinical Trial Registry (Registration No.: ChiCTR2200061046).

In this investigation, the researchers preliminarily designed the questionnaire by reading the literature, followed by inviting authoritative experts from relevant specialties, carried out more than thirty expert consultations, modified and improved the questionnaire, and conducted three rounds of pre-investigation. At the same time, through online release of the notice on the recruitment of provincial responsible persons of investigators, after strict resume screening and interview review, five rounds of online training shall be conducted for the provincial responsible persons recruited, and all the qualified persons shall officially become provincial responsible persons of investigators and carry out investigation.

During the investigation period, each provincial responsible persons of investigators in charge shall collect and give corresponding replies to the problems encountered by each provincial person in the form of Tencent meeting every week. For difficult problems, the research team will make a unified reply after discussion, conduct logical inspection on the returned questionnaire every week and publicize the latest results of corresponding data to ensure that there are problems and communicate and contact at any time, to ensure the smooth progress of the investigation.

After the questionnaire was returned, two investigators exported the data in the star of the questionnaire to an Excel spreadsheet, cleaned the data back-to-back according to the screening criteria, and finally performed data analysis and literature writing on the selected qualified questionnaire. The specific flow of the study is shown in the figure below (Figure 1).

Organizational framework

This cross-sectional survey is led by a general leader in charge of the project, and the working group consists of five groups: expert committee, investigator group, training and coordination group, scale design group and quality control group. Firstly, the expert committee has invited psychology experts, behavioral experts, public health experts and statistics experts, and so on. Next, the investigator group including provincial heads, survey teams, and investigators, each provincial administrative district is handled by an investigator, the provincial head, responsible for the recruitment, training, organization and coordination of investigators/team in the province. Thirdly, training coordination is mainly responsible for investigator training, ethical review submission, research registration, protocol writing and other work; fourth, scale design group is mainly responsible for questionnaire variable screening, original scale design, international scale introduction, scale item streamlining and jump logic setting and other work. At last, the main work of the quality control group is expert consultation, pre-survey coordination, sampling quality control and questionnaire logic inspection.

Study participants

Targeted participants are permanent residents of China with nationality of the People's Republic of China (Annual departure time: ≤1 month). Participants must be older than 12 years and be able to understand what each item of the questionnaire means and complete the questionnaire on their own or with the help of an investigator. All participants voluntarily participate in the study and are required to sign an informed consent form. People who are confused, mentally abnormal or have cognitive impairment will be excluded. People who are participating in other similar studies or are unwilling to participate in this study will also be excluded.

Quality control

In this study, quality control was performed mainly from five stages: questionnaire design, pre-investigation, investigator training, questionnaire distribution and data processing.

Questionnaire design stage. After reading books and literatures scientifically and comprehensively, the questionnaire was designed preliminarily. Before the questionnaire was officially used, online expert consultation and discussion were conducted between March and June 2022; thirty-eight experts with senior professional titles in the subject areas of social medicine, behavioral epidemiology, psychology, health education, health statistics, health service management, humanistic medicine, news communication, clinical medicine, pharmacy, nursing, sociology, and philosophy who were regionally and professionally representative were invited to review the questionnaire and put forward revision comments on the questionnaire. According to the experts’ comments, adjust feedback and distribute three rounds of pre-questionnaire.

Pre-investigation stage. In this study, three rounds of pre-investigation were conducted from June 5 to June 8, June 10 to June 13, and June 15 to June 18, 2022, respectively. The sampling method of pre-investigation was quota sampling, and the quota attributes were the same as those required for formal investigation. The sample sizes of the three surveys were 100, 100, and 200, respectively. During the pre-investigation period, the opinions fed back by the respondents were collected and collated in a timely manner; the reliability of the questionnaire was assessed by statistical analysis, and the questionnaire was revised and resubmitted to the experts for review after discussion by the members of the research group. The final questionnaire was revised after three rounds of pre-investigation. Questionnaires collected during the pre-survey phase were not included in the final study analysis.

Investigators' training process. A notice on recruiting provincial leaders of college students or graduate investigators in colleges and universities was publicly released on the internet, and the selection group conducted preliminary screening according to the registered resumes and interviewed the person who passed the resume screening in terms of information verification, communication ability test, and
familiarity with the regional language and cultural environment. The research group will conduct 1-2 hours of unified training for the investigators on May 26, May 28, May 31, June 3, and June 10, 2022, and answer the questions of the investigators and the investigation team. Investigators who passed the interview were trained in five rounds and tested according to the training content. Those who passed the test were assigned regional and specific tasks.

**Questionnaire distribution process.** During the questionnaire distribution, scientific research design principles and statistical requirements were followed to control possible biases in the data collection process. The filled questionnaires were registered and coded. Precautions were again emphasized to the investigators before starting the daily survey to ensure that all investigators who returned questionnaires were qualified. Every Sunday night, the study team members communicate with the provincial responsible persons of investigators, summarize and evaluate the collected questionnaires, timely ask questions and urge the provincial responsible persons of investigators to review and revise them and conduct real-time discussion, determination, and guidance on the options difficult to identify or divergent in the investigation.

**Questionnaire retrieval and analysis process.** Two investigators were selected to perform the logical examination and questionnaire screening back-to-back according to the established questionnaire screening criteria. The unqualified questionnaires were excluded. The screening criteria of the questionnaire were as follows: ① questionnaire with answering time less than 240 seconds; ② questionnaire with an inconsistent logical examination (question 3 selected 'male', while question 32 selected “female reproductive tumor”; question 4 selected '12-17 years old', while question 11 selected 'leave/retirement'; question 4 selected '12-17 years old', while question 10 selected 'member of the Communist Party of China (CPC)’ or ‘member of the Communist Party of China ‘other parties’; question 4 selected '12-17 years old', while question 57 selected 'married’ ‘divorced’ ‘widowed’; question 6 selected 'have religious belief', while chose question 10 selected ‘CPC member’ or ‘CPC probationary member’ or 'Communist Youth League member’; question 7 and question 8, those with abnormal Body Mass Index value after calculation, etc.); ③ questionnaire with incomplete information; ④ questionnaire filled repeatedly; ⑤ questionnaire selected options were the same or regular questionnaire. Consult expert opinions during analysis, select appropriate statistical methods for data analysis, and if singular values are found, find out the original questionnaire or consult investigators to check them correctly before continuing further analysis.

**Measurements**

The questionnaire of this study mainly includes eight aspects: personal basic information, personal health status, family basic information, social environment, psychological level scale, behavioral level scale, other scales and attitude to social hot issues. Detailed information of the scales is shown in table 1.

**Basic personal information.** At the beginning of questionnaire, participants are required illustrating personal information to locate specific features of participants. Basic personal information has 23 dimensions, including gender, age group, nationality, religious belief, height, weight, waistline, political status, occupational status, working hours per week, the year of retirement, highest education level, current phase of studying, current college, current specialty (category), current specialty (sub-category), have a separate room or not, have pets or not at home, current or pre-retirement occupation, residence for the last three months, birthplace, condition on having state or local subsidies.

**Personal health status.** This section aims to gain an in-depth understanding on health status of participants, which categorize participants by the type of illness, reasons for taking leave, and types of illness checks, including following questions, conditions of chronic disease, conditions of oral related disorders, conditions of ophthalmology related disorders, conditions of rare disease, hypertension classification, hypertensive complication, diabetes classification, type of malignant tumor, type of chronic respiratory disease, type of chronic viral hepatitis, hepatic function, fatty liver disease classification, helicobacter pylori infection, harm event profile, work, school or rest due to injury, days off work, school or rest due to an injury event, sick leave or leave from work, school, or rest in the past year, days of sick leave or rest, gastrointestinal endoscopy, painless gastrointestinal endoscopy experience.

**Family basic information.** The purpose of this section is to learn about the participant's family information from various aspects such as family member status, marital status, childbearing willingness, income status, and drug financial expenditure status. The following questions including, family type, permanent residence, household registration, marital status, willingness to marry, willingness to procreate, willingness to have two children, willingness to have three children, pregnant or not, living alone or not, living with spouse or not, living with spouse’s parents or not, living with parents or not, number of children, painless labor experience, number of children living together, age of youngest son/daughter, age of oldest son/daughter, number of siblings, number of siblings living together, housing area, number of house property, liabilities, per capita monthly household income, mode of medical expenses undertaking.

**Sampling and sample size**

Considering the overall size of the study subjects and the unfamiliarity with the overall units or elements, it was necessary to sample them completely based on probability sampling and equal probability sampling (stratified sampling) at the provincial, municipal, district and county levels, townships/towns/sub-districts and communities/villages levels. It can eliminate subjective factors, so that the selected samples were more representative and the errors were further reduced. When sampling from community/village to individual level, the overall sample size is further reduced, and researchers can be familiar with the characteristics of the overall, at this time according to the attributes of the sample non-equal probability sampling (quota sampling) can provide a reliable basis for the in-depth analysis of this study.

The study was conducted across the country. According to the population proportion offered by seventh national census data, including 23 provinces, 5 autonomous regions, 4 municipalities, the sampling ratio is determined. At least 500/1000/1500/2000/2500 persons shall be sampled from each province/autonomous region/municipality directly under the central government. The sample size is estimated at 20000 people. Finally, the municipal, district, county, township/town, street, community/village levels of sampling and sampling at the individual level according to gender and quota attribute age.

**Data collection**

The investigator sets up a questionnaire survey site in the health service center or relevant health service station of the sampling community in charge, and the investigator posts a poster and issues a paper or electronic recruitment notice to recruit the respondent. The investigator checks the identity of the respondent, solicits the informed consent of the respondent, and determines that the respondent meets the inclusion criteria and does not meet the exclusion criteria for the study subject.

If the community in charge of the investigator can conduct face-to-face investigation, the investigator distributes the electronic questionnaire to the public in their respective community one-on-one and face-to-face on the spot, and the questionnaire can be obtained by scanning the QR code; if the face-to-face investigation cannot be realized due to the limitation of the COVID-19 epidemic, the investigator distributes the electronic questionnaire one-on-one and face-to-face to the respondent with the help of instant communication tools such as WeChat, and carries out the online video investigation through Tencent meeting, WeChat video and other means. Each survey was approximately 30–40 minutes. Data collection will last approximately two months (Figure 2).
Figure 1 Study Flow Chart
<table>
<thead>
<tr>
<th>Scale</th>
<th>Abbreviation</th>
<th>Level</th>
<th>Applicable Age</th>
<th>Target Population</th>
<th>Dimension</th>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Five Inventory-10 items [28]</td>
<td>BFI-10</td>
<td>Psychological Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>5</td>
<td>10</td>
<td>1–5 (strongly disagree to strongly agree). reverse score: questions 1,3,4,5,7, forward score: questions 2,6,8,9,10. Higher scores indicate higher levels of a given personality trait.</td>
</tr>
<tr>
<td>Patient Health Questionnaire-9 items [29]</td>
<td>PHQ-9</td>
<td>Psychological Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>1</td>
<td>9</td>
<td>0–3 (never to nearly every day) 0–4 no depression, 5–9 mild depression, 10–14 moderate depression, 15–19 moderate to severe depression, 20–27 severe depression</td>
</tr>
<tr>
<td>Generalized Anxiety Disorder-7 items [30]</td>
<td>GAD-7</td>
<td>Psychological Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>1</td>
<td>7</td>
<td>0–3 (never to nearly every day) 0 to 4 no anxiety, 5 to 9 mild anxiety, 10 to 13 moderate anxiety, 14 to 18 moderate anxiety, 19 to 21 severe anxiety</td>
</tr>
<tr>
<td>Perceived Stress Scale-4 items [31]</td>
<td>PSS-4</td>
<td>Psychological Level Scale</td>
<td>18 + years(ad ults)</td>
<td>Junior high school or above</td>
<td>2</td>
<td>4</td>
<td>1–5 (never to always) 1–3 (never to often) total score ranges from 3 to 9</td>
</tr>
<tr>
<td>Three-Item Loneliness Scale [32]</td>
<td>T-ILS</td>
<td>Psychological Level Scale</td>
<td>18 + years(ad ults)</td>
<td>All Populations</td>
<td>1</td>
<td>3</td>
<td>1–5 (never before to all times). if the integral of percentage system is obtained, and the range is 0–100, the initial integral shall be multiplied by 4. 0 represents the worst possible quality of life and 100 represents the best possible quality of life, with higher scores indicating higher quality of life.</td>
</tr>
<tr>
<td>The 5-item World Health Organization Well-Being Index</td>
<td>WHO-5</td>
<td>Psychological Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>1</td>
<td>5</td>
<td>1–7 (strongly disagree to strongly agree), higher scores indicating greater perception of social support</td>
</tr>
<tr>
<td>Perceived Social Support Scale [33,34]</td>
<td>PSSS-SF3</td>
<td>Psychological Level Scale</td>
<td>18 + years(ad ults)</td>
<td>All Populations</td>
<td>1</td>
<td>3</td>
<td>1–5 (strongly disagree to strongly agree), with a total score ranging from 3 to 15 points, with higher scores indicating greater self-efficacy</td>
</tr>
<tr>
<td>New General Self-efficacy Scale [35,36]</td>
<td>NGSES-SF3</td>
<td>Psychological Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>1</td>
<td>3</td>
<td>0–10 (depending on the degree of deepening), with total scores ranging from 0 to 80 points, with higher scores indicating greater awareness of the disease</td>
</tr>
<tr>
<td>Brief Illness Perception Questionnaire [37]</td>
<td>BIPQ</td>
<td>Psychological Level Scale</td>
<td>12 + years</td>
<td>Patients</td>
<td>4</td>
<td>8</td>
<td>1–5 (never to always), with a total score ranging from 6 to 30 points, with higher scores indicating more frequent use of media Yes/No</td>
</tr>
<tr>
<td>Media Use Behavior Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>self-developed questionnaire</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication Behavior</td>
<td>Psychological Level</td>
<td>12 + years</td>
<td>All Populations</td>
<td>Self-developed questionnaire</td>
<td>2</td>
<td></td>
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<tr>
<td>Scale</td>
<td>Scale</td>
<td>Population</td>
<td>Scale</td>
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<tr>
<td>Nutritional Supplement</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>1</td>
<td></td>
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<tr>
<td>Taking Behavior Scale</td>
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<td></td>
<td>self-developed scale</td>
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<tr>
<td>Alcohol Behavior Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>7</td>
<td></td>
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<tr>
<td>Three-hand Smoking Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
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<tr>
<td>Tea Drinking Behavior Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>14</td>
<td></td>
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<tr>
<td>Water Drinking Behavior Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
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<tr>
<td>The International Physical Activity Questionnaire [38,39]</td>
<td>IPAQ-7</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall Injuries Scale</td>
<td>Behavior Level Scale</td>
<td>60 + years</td>
<td>People over 60 years old</td>
<td>10</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Eating Behavior Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
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<tr>
<td>Intermittent Fasting Behavior Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>Pittsburgh Sleep Quality Index [40-51]</td>
<td>B-PSQI</td>
<td>Behavior Level Scale</td>
<td>18 + years</td>
<td>All Populations</td>
<td>3</td>
<td></td>
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<tr>
<td>Intimate Relationship Violence Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
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<tr>
<td>Problematic Internet Use Questionnaire-Short Form 6 [53]</td>
<td>PIUQ-SF6</td>
<td>Behavior Level Scale</td>
<td>16 + years</td>
<td>All Populations</td>
<td>6</td>
<td></td>
<td></td>
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<tr>
<td>Horticultural Activity Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>6</td>
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<tr>
<td>Bedtime Smartphone Usage Scale</td>
<td>Behavior Level Scale</td>
<td>12 + years</td>
<td>All Populations</td>
<td>1</td>
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</tr>
<tr>
<td>Quality of Life Scale [56]</td>
<td>EQ-5D-5L</td>
<td>18 + years</td>
<td>All Populations</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EQ visual analogue scale</td>
<td>Other scale</td>
<td>18 + years</td>
<td>All Populations</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Health Scale-Short Form [57]</td>
<td>FHS-SF</td>
<td>18 + years</td>
<td>All Populations</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Walking MET = 3.3 x average daily walking time x weekly walking days.
2. Moderately strong MET = 4.0 x average time engaged in moderate intensity activity per day x days engaged in moderate intensity activity per week.
3. Strenuous activity MET = 8.0 x average time engaged in strenuous activity per day x days engaged in strenuous activity per week. Therefore, basal metabolic time per week (minutes) = ① + ② + ③.

Question 1 is "Yes or No" Question 2 and 3 are single choice Total score ranges from 0 to 15, with higher scores indicating poorer sleep quality
1–5 never to almost always, the total score range is 6-30 points, higher scores indicate more intense intimate violence.
1–5 never to always, with a total score ranging from 6 to 30 points, with higher scores indicating greater use of the problem network
1–5, with total scores ranging from 5 to 25, with higher scores indicating higher quality of life. Gliding multiple choice questions with EQ-VAS score of 0-100.
<table>
<thead>
<tr>
<th>Scale/Questionnaire</th>
<th>Age Group</th>
<th>Population</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Literacy Scale-Short Form-9 (HLS-SF9)</td>
<td>12+ years</td>
<td>All Populations</td>
<td>4–9</td>
<td>0–3 (very difficult to very easy), with total scores ranging from 0 to 27, with higher scores indicating higher levels of health literacy</td>
</tr>
<tr>
<td>Family Communication Scale [58-60] (FCS-10)</td>
<td>11+ years</td>
<td>All Populations</td>
<td>1–10</td>
<td>1–5 (strongly disagree to strongly agree), with a total score ranging from 10 to 50 points, with higher scores indicating higher levels of family communication</td>
</tr>
<tr>
<td>The FRAIL Scale</td>
<td>60+ years</td>
<td>People over 60 years old</td>
<td>4</td>
<td>one point for “yes” and no point for “no”</td>
</tr>
<tr>
<td>Suboptimal Health Status Questionnaire (SHSQ-9)</td>
<td>Under 60 years</td>
<td>People under 60 years old</td>
<td>9</td>
<td>1–5 (almost none to almost always), with total scores ranging from 9–45 points, with higher scores indicating more severe sub-health</td>
</tr>
<tr>
<td>Identity Bubble Reinforcement Scale (IBRS-6)</td>
<td>15+ years</td>
<td>All Populations</td>
<td>3–6</td>
<td>1–10 (completely inconsistent with me to completely consistent with me), with a total score ranging from 6 to 60 points, with higher scores indicating more pronounced identity bubble enhancement</td>
</tr>
<tr>
<td>Ocular Surface Disease Index (OSDI-6)</td>
<td>18+ years</td>
<td>All Populations</td>
<td>6</td>
<td>1–5 (never to all the time), with a total score ranging from 6 to 30 points, with higher scores indicating higher ocular surface disease indices.</td>
</tr>
</tbody>
</table>
Respondents recruitment through multiple ways

Check respondent identity
  Meets
  Not met

Check Respondent Eligibility
  Meets

Can it be face-to-face
  On-site face-to-face survey
  Video face-to-face survey

Questionnaire obtained via scanning QR code

Questionnaire sent via communication software

Informed consent
  N
  Y

Enter the questionnaire number

Start answering

Stop answering

Submit the questionnaire

End answering

Figure 2 Data collection flow chart
**Data management**

After obtaining the informed consent, the subjects will obtain the unique questionnaire code. After collecting the data powered by ‘www.wxj.cn’, the investigator will export the data in ‘www.wxj.cn’ to an Excel spreadsheet and save it in the investigator’s computer. Only the investigator has the right to read, modify and export the data. The investigator had all access to data during the study. Other persons who have made outstanding contributions or assisted in this study may apply for the use of the data only after submitting the study hypothesis and signing a data confidentiality agreement, and the data opening plan does not charge any fee. Publication of the study results will include processed data only and personal information will not be identified and exposed.

**Discussion**

Through a multi-center, large-sample cross-sectional survey, this study aims to comprehensively and systematically understand the mental health status and health behavior status of the Chinese population, provide strong data support for the development of research in various fields, and guide policy-makers and health care organizations to reform their programs to ensure the best interests of residents and their families. The survey content can not only reveal the personal physical health status of Chinese residents, the impact of their own diseases on their personal life/work, but also reveal the basic situation of their families, medical treatment, economic and social network characteristics. The mental health status, perceived stress ability and self-regulation ability of residents were measured by questionnaire to understand the status of residents in terms of medication, activity, diet, sleep, and interpersonal communication, as well as residents’ self-rated health status, health literacy, and family communication. Both coverage and survey breadth can meet the purpose of understanding the status of mental health and health behaviors among Chinese residents.

With the continuous economic and social development, the mental health status of residents is not optimistic, especially the COVID-19 pandemic has caused a great burden on the mental health of residents [61]. Understanding personal physical health status and living habits is of practical significance for improving residents’ mental health status. Just as practicing mindfulness meditation and physical exercise can reduce perceived stress after five weeks of practice, practicing mindfulness meditation can improve mental health at six months [62]. Complete family structure and harmonious family relationships have positive promoting effects on mental health, and meaningful work and a sense of reward for caring for family members are associated with better mental health [63]. The environment throughout life can have a profound impact on the mental health of older women. These conclusions have implications for policies and practices in resource-sufficient countries [64].

Health behavior is also influenced by many factors such as individual residents and families. Learning from others, opportunities for real-world practice, and an environment of interpersonal support can enhance residents’ sense of self-awareness, confidence, and control, thereby promoting changes in health behaviors [65]. At the same time, changing health behavior has a positive promoting effect on maintaining their own health. Results from a study on the acceptability of a mobile health behaviour promotion intervention for obese or overweight cancer survivors showed that participants perceived the intervention to have high efficacy in improving health and well-being (34/36, 94%) [66].

The study after a rigorous spot investigation and questionnaire design, a wide range of Chinese residents’ psychology and behavior survey database and a more comprehensive, research carried out at various fields to provide powerful large sample data support the results of the study will guide policy makers and health care organizations reform, to improve the physical and mental health of Chinese citizens. In 2021, we carried out a cross-sectional survey of family psychological and behavioral health within China and produced very fruitful research results, hoping that the study in 2022 will make more contributions to people’s health in China and even worldwide [67-75].

Study protocol publication enhances research transparency and informs the scientific community about what studies are being done, which helps avoid duplication and better coordinate research efforts.

**Ethics**

The Ethics Research Committee approved the current study (No.JKWH-2022-02, No.2022-K050). The cover page of the questionnaire will explain the study's purpose and assure anonymity, confidentiality, and the right to refuse to participate in the study. Informed consent was obtained from all subjects involved in the study.

**References**

31. Li YY. The impact of social support on the perceived stress of the elderly living alone — taking the old city chamber of Shanghai as an example. Shanghai Normal University. 2020.


