



Quality of Life in the Community Versus Rehabilitation Hospital Setting During COVID-19 Quarantine in Shanghai, China

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ABSTRACT

Aim: The mutated strain of the new coronavirus, the OMICRON virus, began to spread in Shanghai in early April 2022. The government adopted a quarantine policy that lasted for two months. This study is looking at the effect that this specific time period had on mental health and Quality of Life (QOL) for the people of Shanghai 2022.

Methods: Patients, caregivers, and community members who did not suffer from COVID-19, but did experience the closure of the city, completed 281 valid questionnaires either online or on paper within one week of unblocking. Questionnaires included 9-item Patient Health Questionnaire (PHQ-9), 7-item Generalized Anxiety Disorder (GAD-7), and the Short Form-12 (SF-12).

Results: 281 valid questionnaires were completed; females 111, males 170, with an age range of 14 to 9252.32 ± 16.26. Gender and subject's education had no significant effect on depression or anxiety. For source, more patients in the rehabilitation setting scored >9 on PHQ and GAD questionnaires (PHQ 28%, GAD 16%) than the other 2 groups, and a significant difference was found in PHQ score (p value=0.032), while the GAD difference was not significant (p value=0.339). For age, more participants from group 1 (age 19-39) scored >9 on PHQ and GAD questionnaires (PHQ 29%, GAD 16%) compared to the other 2 groups. A significant difference was found in PHQ score (p value=0.022), while the GAD difference was not significant (p value=0.392). Regarding populations, there was also significant differences in PCS12 scores between patients and community members, p value<0.0001; patients and caregivers have significant differences, p value<0.0001; caregivers and community members have no significant differences, p value is 0.9434. There is significant difference in PCS12 scores between patients and caregivers, p value<0.0001. Regarding age, group 1 (age 19-39) and group 3 (age 60+) have significant difference in PCS12 scores, p value<0.0001; and group 1 and group 2 (age 40-59) have no significant difference, with the p value 0.3903.

Discussion and Conclusion: This cross-sectional study looking at quality of life in three different populations of Shanghai residents during COVID-19 lockdown demonstrated no significant differences in overall QOL between people living in the community versus those living in a rehabilitation hospital setting. There were significant differences specifically in physical functional scores (PCS12) and depression scores (PHQ-9) between patients in the rehabilitation setting when compared to their caregivers or community members. Patients demonstrated decreased physical functioning and increased levels of depression. More surprisingly, there were differences in depression and anxiety scores between age groups in all populations, with younger Shanghai residents demonstrating increased levels of depression and anxiety when compared to older residents following lockdown.

Keywords: COVID-19; Quality of Life (QOL); Quarantine; Rehabilitation

ABBREVIATIONS

QOL: Quality of Life; PHQ-9: Patient Health Questionnaire 9 (questions); GAD-7: Generalized Anxiety Disorder Questionnaire 7 (questions); SF-12: Short Form 12 (questions); PCS12: Physical Component Score of SF-12; MCS12: Mental Component Score of

SF-12; ANOVA: Analysis of Variance

INTRODUCTION

In December 2019, novel coronavirus 2019, later named COVID-19, was first reported in Wuhan, China. Since that time, the world has been significantly impacted by this disease. WHO (World Health

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Organization) raised the global risk assessment to the highest level, saying the outbreak was an international health emergency on January 30, 2020.

Each country used different public health interventions to deal with the virus. China has had a “dynamic zero-COVID” policy [1], which has included levels of centralized quarantine, social distancing, traffic restriction and forms of home quarantine. In 2020, the city of Wuhan was able to contain the epidemic by using these measures, locking down the city for 76 days. This successful strategy became an example for other cities and countries around the world.

However, it was recognized that this type of experience could lead to physical and psychological problems which can have a large effect on quality of life [2,3]. During 2020, especially in Wuhan, many cross-sectional studies were done looking into the effect of quarantine and isolation measures on mental health [3,4]. These studies included a variety of people in various Chinese settings, as well as other settings around the world. Some studies focused on those in centralized quarantine. Others focused on those patients in hospital settings [5]. Still others looked at different types of first-responders and medical workers in various locations [6,7]. Lastly, large population questionnaires were given, using platforms like WeChat in China, to better understand mental health among thousands of residents who stayed in their communities during quarantine [4,6,8]. Mental health problems reported included depression and anxiety, as well as possible Posttraumatic Stress Disorder (PTSD) and suicidal ideations [9,10].

Toward the end of 2020, different countries and companies quickly developed and tested vaccines that were designed to fight the original version of COVID-19, also recognizing that there could be variants of the virus. Much of the population of China quickly had access to the Sinopharm version of the vaccine, and were encouraged to become vaccinated, as well as encouraged to get at least one booster shot.

However, COVID-19 continues to exist in different forms, some of which, like the OMICRON variation, can be quite easily transmitted. While China put in many restrictions to stop the spread of any version of COVID-19, early in 2022, it was recognized that the OMICRON virus was more difficult to contain. Starting in the second half of March, Shanghai (Population: Approximately 24 million) began to see a growing number of cases that could not be easily contained. Subsequent lockdown measures were put into place that lasted approximately 60 days.

Our study is looking at the effect that this specific time period had on mental health and Quality of Life (QOL) for the people of Shanghai. Our study has a unique perspective of the population of Shanghai, in that we have access to patients and their caregivers who spent the entire 60 days of lockdown in a rehabilitation hospital. We also have access to different types of communities around Shanghai. Therefore, we wanted to provide QOL questionnaires to both populations immediately after (within one week) lockdown to see if there was any difference between groups regarding their mental health and QOL.

METHODOLOGY

Participants

Our study included three different populations, all of whom stayed in one location during the Shanghai lockdown, 2022. A

questionnaire was provided to all participants within one week following the lifting of lockdown (June 1-7, 2022). Our hospital sampling included patients and their caregivers (not professional caregivers, but family members or others) who stayed in an inpatient rehabilitation hospital setting at one of two Tongji University affiliated hospitals (First Rehabilitation Hospital, Shanghai). These two hospitals cater to largely to the local Shanghai community, with approximately 2/3 of the population demonstrating a primarily neurological diagnosis. The availability of hospital staff dictated the number of questionnaires that could be completed immediately following lockdown. Exclusion criteria for this population included only impaired cognitive ability, which was decided by the medical staff. Our community sampling was a convenience sample of subjects in the Shanghai community who had stayed in their homes during lockdown. We attempted to recruit community members from higher and lower economic status, as well as the spectrum of age groups. They were either given a QR code on social media to fill out the questionnaire online, or were asked to fill out the paper version. Population samples were chosen based on our focus to provide questionnaires as quickly as possible in two different but permanent settings during the lockdown. None of the participants in our study acquired COVID-19 during this time period, which could have led to them leaving their location and moving to a separate treatment facility.

Study design

Cross-sectional study with all participants filling out questionnaire within one week of lifting lockdown: According to subject preference, they could either fill out the questionnaire through an online link [11] accessed through community WeChat groups or using a paper version. Ethical clearance was provided through First Rehabilitation Hospital Ethical Committee, Shanghai China. (IRB#: YK-2021-02-028) Informed consent was provided for each individual, following hospital protocol, regardless of if the questionnaire was completed through WeChat or on paper. Participants were also allowed to stop the questionnaire at any time, and results reflect that decision.

Following the survey, any inpatients at First Rehabilitation Hospital, Shanghai who reported moderate to severe mental health issues were followed-up with by their primary physician.

Questionnaire(s)

We included three standardized questionnaires, all of which have validated Chinese versions: 9-item Patient Health Questionnaire (PHQ-9), 7-item Generalized Anxiety Disorder (GAD-7), and the Short Form-12 (SF-12) [11-16].

PHQ-9 looks at possible cases of depression, assessing symptoms in the last two weeks. Scores range from 0 to 27 and are classified thusly: normal (0-4), mild (5-9), moderate (10-14), and severe (≥ 15) depression [17].

GAD-7 measures for common anxiety disorders, asking specifically about symptoms in the last two weeks. Scores range from 0 to 21 and use this classification: Normal (0-4), mild (5-9), moderate (10-14), and severe (≥ 15) anxiety [18].

SF-12 is used to measure Quality of Life (QOL) in the general population, and can provide both a Physical Component Score (PCS12) and Mental Component Score (MCS12). Ware et al. provides a scoring algorithm assessing two items each related to physical functioning, role-physical, role-emotional and mental

health, as well as one item each related to pain, general health, vitality and social functioning [19]. The PCS scores the physical functioning, role-physical, pain and general health results, while the MCS looks at the vitality, social functioning, role-emotional and mental health results.

Statistical analysis

Data analysis was performed using IBM SPSS Statistics 27.0 and SAS 9.4 Software. Demographic information such as sources, gender, and education were described as continuous or categorical data. For PHQ-9 scores of 0-9 (no or mild depression) were separated from scores of 10-27 (moderate to severe depression). No or mild depression was considered as normal group and moderate to severe depression group was depression group.

For GAD-7 scores of 0-9 (no or mild anxiety) were separated from scores of 10-21 (moderate to severe anxiety). No or mild anxiety was considered as normal group and moderate to severe anxiety group was anxiety group. We then compared these groups across age groups, education levels and location/position during lockdown (community, rehabilitation patient, rehabilitation caregiver), using Chi-square, and adjusted Chi-square. ANOVA analysis was performed, looking at Kruskal-Wallis test results.

RESULTS

303 completed the questionnaire survey. 199 were completed using the online link and 104 were completed using paper questionnaires. (See Supplementary Material for specific questionnaire results.) Among them, 93 patients were provided questionnaires from July 1 to 7, 2022, representing 22.04% of the total hospital number of 422. Excluding 20 remote subjects (outside of Shanghai geographical limits) and 2 subjects beyond the age range, 281 questionnaires were valid and included. There were 111 females and 170 males, with an age range of 14 to 92, 52.32 ± 16.26 . Age was then grouped into young age=19-39 years old, middle age=40-59 years old and old age=60 years old and above. The gender, source, education and age

distribution of the subjects are shown in Table 1.

Demographic analysis shows that most of the patients in the survey population are elderly, with nearly 82% of the population aged 60 and over. And caregivers and community members are more concentrated in the 40-59 age group. By source, the number of male patients is slightly higher than that of women, while caregivers and community populations are more female than male. Most of the people from the three sources are educated at the middle level and above, while the education level of the community population is mostly concentrated in college.

To determine the effects of gender, source, education and age on depression and anxiety during the closure period, we analyzed the PHQ scores and GAD scores data and four factors by chi-square test. The following results were obtained. Firstly, gender had no significant effect on depression or anxiety (Table 2); p values were 0.156 (PHQ scores) and 0.164 (GAD scores), respectively. Also, subject education had no significant effect on depression or anxiety (Table 2); p values were 0.644 (PHQ scores) and 0.497 (GAD scores), respectively (Table 2).

Secondly, subjects from different sources and age groups also differ in psychological status. For source (community, patient, caregivers) (Table 3), more patients scored >9 on PHQ and GAD questionnaires (PHQ 28%, GAD 16%) than the other 2 groups, and a significant difference was found in PHQ score (p value=0.032), while the GAD difference was not significant (p value=0.339). For age (young age=19-39, middle age=40-59, old age=60 above) (Table 4), more participants from group 1 (age 19-39) scored >9 on PHQ and GAD questionnaires (PHQ 29%, GAD 16%) compared to the other 2 groups. A significant difference was found in PHQ score (p value=0.022), while the GAD difference was not significant (p value=0.392). These results showed that patients demonstrated more depression and anxiety tendencies compared with caregivers and people in a community setting, and the younger population may present with more depression and anxiety tendencies than the older population (Table 2).

Table 1: Description of demographic information.

Demographical information				
Source		Patient(93)	Caregiver(42)	Community(168)
Age	39 and below	6(6.452%)	0(0.000%)	64(38.095%)
	40-59	11(11.828%)	25(59.524%)	82(48.810%)
	60 and above	76(81.720%)	17(40.476%)	22(13.095%)
Gender	Female	42(45.161%)	32(76.190%)	114(67.857%)
	Male	51(54.839%)	10(23.810%)	54(32.143%)
Education	Primary	9(9.677%)	4(9.524%)	1(0.595%)
	Middle	25(26.882%)	25(59.524%)	15(8.929%)
	High	25(26.882%)	6(14.286%)	19(11.310%)
	College	31(33.333%)	6(14.286%)	93(55.357%)
	Postgraduate	3(3.226%)	1(2.381%)	40(23.810%)

Table 2: Gender and education effect on PHQ and GAD.

	Group	Gender		Total	X ²	Adjusted X ²	P
		Male	Female				
PHQ	No to mild depression	92	130	222	2.009	1.587	0.156
	Moderate to severe depression	16	36	52			
GAD	No to mild anxiety	99	143	242	1.934	1.436	0.164
	Moderate to severe anxiety	9	23	32			

Group	Education (1=Primary,2=Middle,3=High,4=College,5=Postgraduate)					Total	X ²	Adjusted X ²	P
	1	2	3	4	5				
PHQ	No to mild depression	10	45	39	100	28	2.504	2.504	0.644
	Moderate to severe depression	4	12	8	19	9			
GAD	No to mild anxiety	11	51	39	108	33	3.375	3.375	0.497
	Moderate to severe anxiety	3	6	8	11	4			

Table 3: Source effect on PHQ and GAD.

Group		Source			Total	X ²	Adjusted X ²	P
		Community	Patient	Caregivers				
PHQ	No to mild depression	129	59	34	222	6.907	6.907	0.032**
	Moderate to severe depression	25	23	4	52			
GAD	No to mild anxiety	138	69	35	242	2.161	2.161	0.339
	Moderate to severe anxiety	16	13	3	32			

Note: **The results of the chi-square test analysis show that for source, the significant P value is 0.032.

Table 4: Age effect on PHQ and GAD.

	Group	Age			Total	X ²	Adjusted X ²	P
		39 and below	40-59	60 and above				
PHQ	No to mild depression	49	93	80	222	7.604	7.604	0.022**
	Moderate to severe depression	20	13	19	52			
GAD	No to mild anxiety	58	94	90	242	1.872	1.872	0.392
	Moderate to severe anxiety	11	12	9	32			

Note: **The results of the chi-square test analysis show that for age, the significant P value is 0.022.

To further analyze the differences in psychological status and physical ability of subjects from different sources and at different age groups, we analyzed the data of PCS12 scores and MCS12 scores (Table 5) in the SF-12 scale of subjects of different sources and ages by ANOVA analysis method. The Kruskal-Wallis test results show patients in the hospital environment are significantly affected at the physiological level compared with their caregivers and the community residents. There is significant differences in PCS12 scores between group 2 and group 1, p value<0.0001; group 2 and group 3 have significant differences, p value<0.0001; group 3 and group 1 have no significant differences, p value is 0.9434. Different environment had no significant psychological impact on

the subjects from the three sources, as evidenced by the MCS12 scores (Table 5).

Also, for age (Young=18 and below, Middle=40-59, Old=60 and above) (Table 6), there is significant difference in PCS12 scores between group 2 and group 3, p value<0.0001; group 1 and group 3 have significant difference, p value<0.0001; and group 1 and group 2 have no significant difference, with the p value 0.3903. But for MCS12 scores (Table 6), there was no significant difference between the 3 groups (Table 5).

After multiple regression analysis, it can be shown that PHQ is not significantly correlated with source, gender, age, and educational level from Table 7.

Table 5: ANOVA analysis: PCS12 and MCS12 subscale scores for different sources.

PCS12 summary scales					
Source	N	Mean (std)	Median (IQR)	Range	P value*
Community	136	49.03 (8.2)	51.46 (46.17-55.3)	11.64-62.71	<0.0001
Patient	62	30.77 (9.4)	29.16 (23.73-34.8)	12.93-55.26	
Caregivers	33	48.43 (8.18)	51.46 (44.33-54.32)	21.5-58.02	
MCS12 summary scales					
Source	N	Mean (std)	Median (IQR)	Range	P value*
Community	136	47.97 (11.09)	52.39 (39.97-55.88)	16.83-64.06	0.0747
Patient	62	44.06 (13.11)	43.87 (32.34-55.33)	21.33-68.6	
Caregivers	33	49.05 (9.82)	51.62 (43.14-57.4)	25.03-61.6	

Note: PCS12 summary scales- *Kruskal-Wallis test results, there is significant difference between group 2 and group 1, p value <0.0001; group 2 and group 3 have significant difference, p value <0.0001; group 3 and group 1 have no significant difference, the p value is 0.9434.

Table 6: ANOVA analysis: PCS12 and MCS12 subscale scores for different age categories.

PCS12 summary scales					
Age	N	Mean (std)	Median (IQR)	Range	P value*
1.39 and below	58	48.7 (9.6)	51.88 (44.73-55.3)	12.93-62.54	<0.0001
2.40-59	95	47.14 (9.43)	49.21 (41.67-55.2)	20.03-62.71	
3.60 and above	78	36.79 (12.3)	34.7 (27.65-48.67)	11.64-57.6	
MCS12 summary scales					
Age	N	Mean (std)	Median (IQR)	Range	P value*
1.39 and below	58	44.18 (13.33)	49.58 (33.44-55.14)	16.83-60.79	0.101
2.40-59	95	49.03 (9.78)	52.14 (43.76-56.14)	25.03-61.6	
3.60 and above	78	46.85 (11.96)	45.88 (38.27-56.6)	21.33-68.6	

Note: PCS12 summary scales- *Kruskal-Wallis test results. There is significant difference between group 2 and group 3, p value <0.0001; group 1 and group 3 have significant difference, p value <0.0001; group 1 and group 2 have no significant difference, the p value is 0.3903.

Table 7: Multiple regression analysis of PHQ as it relates to source, gender, age, and educational level.

		Correlations				
		PHQ total	Source	Gender	Age	Education
Pearson correlation	PHQ total	1	-0.078	0.088	0.063	0.069
	Source	-0.078	1	-0.034	-0.529	-0.095
	Gender	0.088	-0.034	1	-0.075	0.029
	Age	0.063	-0.529	-0.075	1	0.046
	Education	0.069	-0.095	0.029	0.046	1
P value	PHQ total	–	0.087	0.063	0.139	0.117
	Source	0.087	–	0.278	0	0.049
	Gender	0.063	0.278	–	0.098	0.309
	Age	0.139	0	0.098	–	0.211
	Education	0.117	0.049	0.309	0.211	–

DISCUSSION

There have been multiple studies regarding how COVID-19 has affected quality of life in populations around the world for the last 2+ years [3,4,6-8]. China has provided many examples of successful policies that have kept virus numbers controlled during this time. Following the Chinese government “dynamic zero-COVID” policy, Shanghai was instructed to lockdown for what became at least 60 days for all districts of city.

During that time, the population had many different experiences. Our study focused on those people who had been inpatients in two rehabilitation hospitals, as well as their family members or individual hired caregivers during that time. We wanted to compare their quality of life over the 60+ days to those who lived in the Shanghai community (home). Therefore, we provided both groups with standardized questionnaires related to quality of life immediately following the lockdown to see if there were any differences between the experiences.

The most significant results of our study are related to source/location differences between populations. Not unusually, PCS SF-12 scores were lower in our inpatient hospital population. These results follow the fact that they are in a rehabilitation hospital due to decreased function.

Also, the rehabilitation patient population in this study presented with more significant depression, based on PHQ-9 data. There is significant research demonstrating a direct correlation between decline in physical function (with general aging or following injuries like a stroke) and depression [20,21]. Wei-Na Zhang and colleagues looked at 102 patients in China following stroke and found the prevalence of post-stroke depression to be 28% [22]. For patients, functional recovery and ADL improvement are their main goals. Due to staffing redistribution mentioned above, many patients did not have the ability to work towards their goals on a

daily basis during quarantine. Some of these participants voiced their frustration with the lack of this aspect of their care.

When compared to each other and the patient group, community members and caregivers demonstrated similar SF-12, PHQ-9 and GAD-7 scores. This was somewhat surprising, and goes against our original hypothesis. Due to the fact that they had different experiences during the lockdown, we initially believed that one group would experience more significant QOL differences. Were these groups similar because both were given different (better) access to information during lockdown? They had similar resource options, similar communication networks and similar cognitive abilities that many would consider superior to the patient group. For example, they could figure out ways to get a larger variety of food using group food buying options.

The other interesting results from our study were related to age. Our study did include subjects from a large range of ages (14 to 92 years). Considering age below 18 consisted of only 2 people (14 and 17 years old), which would not provide any statistical meaning, we removed them from our data analysis. However, subjects in the lower age range (19-39 years old) did demonstrate increased levels of depression and generalized anxiety, as evidenced by PHQ-9 scores and GAD-7 scores of >9. A large (n=2633) epidemiological study focused specifically on metropolitan China from 2009 found that the overall lifetime rates of depression was 3.6% of the population, significantly lower than that of other countries [23]. A meta-analysis looking at anxiety disorders in mainland China between 2000 and 2015 found “current” generalized anxiety rates 5.17%, which is also significantly lower than other countries [24]. Previous epidemiological studies performed primarily in Western countries looking at correlations between age and depression demonstrate mixed results [25,26]. However, more recent long-term longitudinal studies do demonstrate depressive symptoms appear to be highest in young adulthood, with a possible increase again in older adults (>70 years) [27-29]. Epidemiological studies

regarding anxiety disorders appear to follow the same trend [30]. A study by Ruhai Bai and colleagues (2022) that looked at depression trends in China from 1990 to 2019 using the Age-Period-Cohort (APC) model showed very different results [31]. They found that depression rates decreased in younger generations, but increased in the elderly population during this time period. Therefore, our study provides results that go against the trend noted before COVID-19.

We can speculate on reasons why this might be. Has the COVID-19 experience been more traumatic for the younger Chinese generations than anything else they have experienced? Or are younger Chinese generations more willing to consider and admit to the possibility of these feelings and emotions? As recently as 2020, research has been published about the stigma towards depression in the Chinese culture. Older age has been found to be related to greater personal and perceived stigma [32]. The authors of this research can see the possibility for future research and study related to this conceivable trend.

When looking at physical QOL, people in the older age group (60 yrs and above) did show significantly lower PCS12 scores than younger people, but these results are not terribly surprising, as we would expect physical function to decline with age.

As for education level, we did not see any difference within any data, which means education level may not be a key factor during quarantine that will influence mental health and QOL. Also, our study shows no gender differences in PHQ-9 and GAD-7 or SF-12 measurements.

Strengths and limitations

The primary strength of this study is the timeliness of the results. Surveys were conducted in both community and rehabilitation hospital settings within one week of release from lockdown, which helps to secure results are most specifically related to this specific period.

There are several limitations related to this cross-sectional study. Most notably, due to time constraints of the study design (collecting data within 1 week following lockdown lifting), it was more difficult to recruit enough subjects within the hospital setting numbers (either patients or caregivers). We also found out that for community setting, females (102, 66.2%) were more willing to fill questionnaires than males (52, 33.8%). As for caregivers in Chinese hospital setting, most people who do this job are females, which also could have affected overall results. Since it is widely recognized in Western literature that women are twice as likely to be diagnosed with both anxiety and depressive disorders, the impact of gender imbalance, both with hospital caregivers and in the community, likely did limit the ability to generalize these results.

While the goal of this study was to provide a specific snapshot of different populations within Shanghai during this unique experience, it might also have been helpful to compare our results of these questionnaires to data from the same week in time in other cities in China, or even outside of China.

Lastly, we might need to consider the order in which the questionnaires were given. In both the digital version and paper version, the PHQ-9 was given first, GAD-7 second and SF-12 third. While we did not find relevant research talking about most appropriate order for these questionnaires, or how it might affect answers, it is possible that results could be different if, for example,

the SF-12 was given first.

CONCLUSION

This cross-sectional study looking at quality of life in three different populations of Shanghai residents during COVID-19 lockdown demonstrated no significant differences in overall QOL between people living in the community versus those living in a rehabilitation hospital setting. There were significant differences specifically in physical functional scores (PCS12) and depression scores (PHQ-9) between patients in the rehabilitation setting when compared to their caregivers or community members. Patients demonstrated decreased physical functioning and increased levels of depression. More surprisingly, there were differences in depression and anxiety scores between age groups in all populations, with younger Shanghai residents demonstrating increased levels of depression and anxiety when compared to older residents following lockdown. To our knowledge, this is the first research of this kind. It provides a unique perspective into how different populations within different communities in Shanghai, China responded to their individual prolonged lockdown experiences due to COVID-19.

DECLARATIONS

Ethics approval and consent to participate

Ethical Approval was obtained from First Rehabilitation Hospital Ethical Committee, Shanghai China (IRB#: YK-2021-02-028) for this study.

Informed consent was provided for each individual, following hospital protocol, regardless of if the questionnaire was completed through WeChat or on paper. Participants were also allowed to stop the questionnaire at any time, and results reflect that decision. All other methods were carried out in accordance with relevant local guidelines and regulations.

Availability of data and materials

Please refer to data spreadsheets as supplementary material.

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Consent for publication

Not applicable

Competing interests

Not applicable

Authors' contribution

Amanda Ferland: Study design and manuscript writing and editing.

Zhang Zhe'An: Study design and manuscript writing.

Sun Tian'Bao: Administrative liaison of hospital.

Bai Chen'Yuan: Statistical analysis, manuscript writing of Results and questionnaire coordination.

Ma Xia: Manuscript writing and questionnaire coordination.

Geng Su'Ping: Statistical analysis and questionnaire coordination.

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