Changes in lifestyle, mood, and disease management among community-dwelling older adults during the COVID-19 pandemic in China

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ABSTRACT

Background: Lives of older adults have been greatly affected by the COVID-19 pandemic.
Methods: A telephone survey was conducted among the older adults aged 60 and above who lived in downtown Shanghai. We compared the lifestyle, mood, and disease management of older adults before and during the COVID-19 pandemic.
Results: One hundred and fifty-six older adults in Shanghai completed the survey. The proportions of older adults with adequate consumption of meat (49.4% vs. 53.1%, $P = 0.0339$) and eggs (73.7% vs. 77.6%, $P = 0.0143$) were significantly higher than before. Participants spent significantly more time on housework (median: 2.0, IQR:1.0–3.0 vs. median: 2.0, IQR:1.0–2.0 h/day; $P = 0.0361$) and leisure activities (median: 7.0, IQR: 5.0–8.6 vs. median: 6.0, IQR: 4.0–8.5 h/day; $P<0.0001$) during the pandemic than before. More participants developed new hobbies (27.6% vs. 36.5%, $P = 0.0470$) and learned new skills (5.1% vs. 19.9%, $P<0.0001$). However, the number of participants routinely self-testing blood glucose and/or blood pressure decreased from 77.6% before to 64.1% during the pandemic ($P = 0.0002$).
Conclusions: The COVID-19 pandemic affected the lifestyle, mood, and chronic diseases management among community-dwelling older adults. Supportive measures and interventions need to be tailored to older adults living in the community.

1. Introduction

The outbreak of Coronavirus Disease 2019 (COVID-19) in Wuhan, Hubei Province, China, soon became a pandemic worldwide.. In January 2020, the World Health Organization declared COVID-19 a Public Health Emergency of International Concern [1]. By December 14, 2021, 2924 cases have been confirmed in Shanghai, with 2847 cured and 7 died [2]. Measures like social distancing, home isolation, and even total lockdown were implemented by the local government to prevent the virus transmission, which substantially changed people's lifestyles.

An online survey in Greece showed that older adults had a significantly higher proportion of moderate to severe depressive (81.6%) and anxiety symptoms (84.5%), as well as disrupted sleep (37.9%) during the pandemic [3]. Another one conducted in North America reported that 37.6% of older adults performed "much lower" or "somewhat lower" level of physical activity after the COVID-19 pandemic [4]. A survey of

1041 people aged 65 or older in Puglia, Italy, from June to August 2021 found that 58.2% of the participants reduced physical activity [5]. Similarly, a survey of 774 people aged 77 to 99 in Bibai, Hokkaido, Japan found that 43.8% of participants reported a decline in physical fitness [6]. No studies have been conducted to comprehensively investigate the life changes of older adults during the pandemic in the Chinese population. This study aimed to investigate the changes in lifestyle, mood, and disease management among the older adults in Shanghai during the COVID-19 pandemic [8].

2. Methods

2.1. Study participants

Older adults from Shanghai Aging Study [8] were invited to participate in the survey. Eligible participants were: (1) registered residents in

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the Jing'an Si community; (2) ≥ 60 years; (3) without schizophrenia or severe cognitive impairment based on their medical records; or (4) able to communicate via the telephone.

This study was approved by the Medical Ethics Committee of Huashan Hospital, Fudan University, Shanghai, China. Written informed consents were obtained from all participants and/or their legal guardians.

2.2. Study procedure and data collection

From April 13 to May 25, 2020, a telephone survey was conducted with each participant by research nurses. The survey questionnaire contained 2 parts: 1) basic characteristics and medical history, including gender, age, education, weight, height, smoking and drinking status, medical histories, and flu vaccination history. Participants who smoked daily within the past month were regarded as cigarette smoking, and alcohol consumption was defined as having at least one serving of alcohol weekly during the past year. Chronic disease histories such as hypertension, diabetes, heart diseases, stroke, and flu vaccination history, were inquired and confirmed from their medical records [7]; 2) current and pre-pandemic (2019/11–2019/12) status in regard to lifestyle, chronic disease management, and mood. Information on lifestyle including: a. length of homestay; b. sleep status, including sleep quality (good, fair, poor), when to sleep, when to wake up, sleep duration at night, nap duration; c. diet, including daily intake of meat (including fish and poultry), vegetables, eggs, fruits, and water. A daily consumption of 80 g of meat, 40 g of egg, 300 g of vegetables, 200 g of fruits, and 1500 ml of water was defined as sufficient intake, respectively, according to the "Chinese Residents' Balanced Diet Pagoda (2016)" [9]; d. exercise, including time spent on housework, walking or cycling, and other exercises per day; e. leisure activities, including time spent on playing chess, reading, and using electronic products; new hobbies; and new skills they learned during the pandemic. Chronic disease management included regular monitoring of blood pressure and glucose by older adults themselves or their caregivers; routine medication-taking; and occurrence of chronic bronchitis, asthma, or flu attack. Mood included feeling calm, nervousness, upset, fear, or irritability.

2.3. Statistical analysis

Student *t*-test and Wilcoxon signed rank-sum test were used for continuous variables depending on whether assumptions of normality and homogeneity of variance test were met or not. Paired $\chi2$ test was used for categorical variables. All analyses were performed using SAS version 9.4 (SAS Version 9.4, SAS Institute, Inc., Cary, NC, USA). $P < 0.05$ at both sides was considered statistically significant.

3. Results

3.1. Basic characteristics

As shown in Table 1, among 156 participants who responded to the survey, 69 (44.2%) were males and 87 (55.8%) were females, the mean age was 77.7 ± 5.1 years. The average years of education were 11.8 ± 3.4 years. Twelve participants (7.7%) received flu vaccine injections.

3.2. Lifestyle of sleep, diet

As shown in Table 2, older adults spent significantly more time at home during the pandemic than before (median: 24.0, IQR:23.0–24.0 h/day vs. median:22.0, IQR:20.0–23.0 h/day, P<0.0001). They also did significantly longer naps during the pandemic than before (median: 0.6, IQR:0–1.0 h/day vs. median:0.5, IQR:0–0.6 h/day, P<0.0001). No significant differences were observed for other sleep variables. During the pandemic, the proportions of older adults with adequate consumption of meat (49.4% vs. 53.1%, P = 0.0339), and eggs (73.7% vs.

Table 1
. Basic characteristics and medical history.

Characteristics	
Participants, n	156
Gender, male, n (%)	69 (44.2)
Age, years, mean (SD)	77.7 (5.1)
Education, years, mean (SD)	11.8 (3.4)
BMI, mean (SD)	24.8 (2.9)
Cigarette smoking, n (%)	15 (9.6)
Alcohol consumption, n (%)	12 (7.7)
Hypertension, n (%)	77 (49.4)
Diabetes mellitus, n (%)	22 (14.1)
Heart disease, n (%)	17 (10.9)
Stroke, n (%)	14 (9.0)
Flu vaccine injection, n (%)	12 (7.7)

BMI, Body Mass Index.

77.6%, P = 0.0143) were significantly higher than before. No significant differences were observed in regard to adequate consumption of vegetables, fruits, and water before and during the pandemic. The participants during the pandemic were more likely to gain weight (median: 63.0, IQR: 55.0–70.0 kg vs. median:62.0, IQR: 55.0–70.0 kg, P = 0.0207).

3.3. Lifestyle of exercise and leisure activities

As shown in Table 3, participants spent significantly more time on housework (median: 2.0, IQR:1.0–3.0 vs. median: 2.0, IQR:1.0–2.0 h/day; P = 0.0361) and leisure activities (median: 7.0, IQR: 5.0–8.6 vs. median: 6.0, IQR: 4.0–8.5 h/day; P<0.0001) during the pandemic than before. More participants developed new hobbies, such as enjoying music, practicing calligraphy, planting flowers, and baking, with the percentage of individuals with hobbies rising from 27.6% before to 36.5% during the pandemic. When staying at home for quarantine, more participants learned new skills, such as online shopping, internet surfing, mobile banking, photo editing, etc. 19.9% of participants became new skill learners compared to the pre-pandemic of 5.1% proportion. No significant differences were observed for the time spent for exercise before and during the pandemic.

3.4. Chronic disease management and mood

As shown in Table 4, the number of participants routinely self-testing blood glucose and/or blood pressure decreased from 121 (77.6%) before to 100 (64.1%) during the pandemic (P = 0.0002). Participants with stable blood glucose and/or blood pressure control decreased from 106 (68.0%) to 94 (60.3%) during the pandemic (P = 0.0290). There was no significant difference in the incidence of chronic bronchitis and/or asthma, and flu. However, the share of participants among the study group reported nervousness, upset, fear, or irritability increased from 1.9% before to 21.1% during the pandemic.

4. Discussion

This study showed that during the pandemic, more older adults consumed sufficient amounts of meat and eggs, were more likely to gain weight; some of them developed new hobbies and skills; they spent more time on doing housework, leisure activities, and napping; fewer of them regularly tested their blood pressure and/or glucose.

An earlier online survey investigated 103 older adults aged over 60 during home quarantine in Greece. The results indicated a significant percentage of older adults experienced moderate to severe depressive (81.6%) and anxiety symptoms (84.5%), as well as disrupted sleep (37.9%) [3]. Our study did not observe changes in sleep quality and sleep duration at night before and during the pandemic among the participants. However, nap duration during the pandemic was significantly longer than before. Although more older adults reported nervousness

Table 2
Sleep, diet before and during the pandemic.

	Before the pandemic (n = 156)	During the pandemic (n = 156)	P-value
Weight, kg, median (IQR)	62.0 (55.0, 70.0)	63.0 (55.0, 70.0)	0.0207
Duration at home, hour/week, median (IQR)	22.0 (20.0, 23.0)	24.0 (23.0, 24.0)	<0.0001
Sleep quality			0.8013
Good, n (%)	76 (48.7)	76 (48.7)	
Fair, n (%)	60 (38.5)	61 (39.1)	
Poor, n (%)	20 (12.8)	19 (12.2)	
Sleep duration at night, hour/day, median (IQR)	6.5 (6.0, 7.0)	6.5 (6.0, 7.0)	0.7266
Nap duration, hour/day, median (IQR)	0.5 (0, 0.6)	0.59 (0, 1.0)	<0.0001
Sufficient intake of nutrients			
Meat, n (%)	77 (49.4)	83 (53.1)	0.0339
Eggs, n (%)	115 (73.7)	121 (77.6)	0.0143
Vegetables, n (%)	13 (8.3)	14 (9.0)	0.7173
Fruits, n (%)	1 (0.6)	1 (0.6)	1.0000
Water, n (%)	42 (26.9)	43 (27.6)	0.3173

Table 3
Exercises and leisure activities before and during the pandemic.

	Before the pandemic (n = 156)	During the pandemic (n = 156)	P-value
Housework, hour/day, median (IQR)	2.0 (1.0, 2.0)	2.0 (1.0, 3.0)	0.0361
Exercise, hour/week, median (IQR)	0 (0, 1.8)	0 (0, 2.0)	0.1778
Leisure activities, hour/week, median (IQR)	6.0 (4.0, 8.5)	7.0 (5.0, 8.6)	<0.0001
Hobby			0.0470
0, n (%)	113 (72.4)	99 (63.5)	
1, n (%)	35 (22.4)	42 (26.9)	
2, n (%)	6 (3.9)	13 (8.3)	
3, n (%)	2 (1.3)	2 (1.3)	
Skill			<0.0001
0, n (%)	148 (94.9)	125 (80.1)	
1, n (%)	7 (4.5)	30 (19.2)	
2, n (%)	1 (0.6)	1 (0.6)	

Table 4
Chronic diseases management and mood before and during the pandemic.

	Before the pandemic (n = 156)	During the pandemic (n = 156)	P-value
Routine monitoring of glucose and/or blood pressure, n (%)	121 (77.6)	100 (64.1)	0.0002
Stability of glucose and (or) blood pressure, n (%)	106 (68.0)	94 (60.3)	0.0290
Continual medication for diabetes/hypertension, n (%)	86 (55.1)	88 (56.4)	0.6875
Chronic bronchitis and/or asthma attack, n (%)	1 (0.6)	1 (0.6)	1.0000
Flu, n (%)	5 (3.2)	6 (3.9)	0.6547
Mood			0.8013
Calm, n (%)	153 (98.1)	123 (78.9)	
Nervousness, n (%)	1 (0.6)	18 (11.5)	
Upset, n (%)	1 (0.6)	3 (1.9)	
Fear, n (%)	1 (0.6)	3 (1.9)	
Irritability, n (%)	0 (0.0)	9 (5.8)	

during the pandemic than before, the difference was not statistically significant. This may be due to the appropriate pandemic prevention strategies implemented locally in Shanghai or to the small sample size of the study population.

Another study investigating 1046 older adults living in US or Canada reported that 37.6% of the participants performed "much lower" or "somewhat lower" level of physical activities during COVID-19, while 35.7% performed "about the same" level of physical activities, compared to the pre-pandemic period [4]. A survey of 1041 people aged 65 or older in Puglia, Italy, from June to August 2021 found that 58.2% of the participants reduced physical activity[5]. Similarly, a survey of 774 people aged 77 to 99 in Bibai, Hokkaido, Japan found that 43.8% of participants reported a decline in physical fitness [6].In our study, we found no significant reduction in the duration older adults devoted to exercises. On the contrary, a significant increase was observed in the time older adults spent on housework during the pandemic than pre-pandemic. While outdoor activities are generally more feasible and diversified, with more facilities for all types of exercises, our data sug-

gested that exercise at home was still applicable during the pandemic. We support the idea that less exercise is better than doing nothing. There is a need to help older adults to keep simple exercise safely in confined spaces, to help them maintain or improve physical health, improve muscle and cardiopulmonary function, and enhance the immune system accordingly.

In addition, a survey of 407 older Israeli internet users showed a significant increase in internet use during the pandemic. The most increases involved the use of chat software (64.1%) such as Zoom, Skype, or WhatsApp, followed by other activities such as online shopping, financial management or medical appointments (41.7%), then online newspapers reading (40.8%), social networking (40.1%), and personal interests related websites visiting (36.6%), etc. [10]. Our study also showed that the older adults spent more time using electronic devices, by an average of 0.4 h increase per day. Among these, watching TV ranked the top, followed by chatting and listening to music, and learning online shopping, using computers, editing photos, etc. Pandemic prevention strategies like lockdown or home isolation in some way prompted the older adults

to learn online shopping and internet use. To our knowledge, our study is the first to report that the proportion of older adults who developed new hobbies, such as calligraphy, singing, painting, chess, and baking, increased from 27.6% before the pandemic to 36.5%. This may be because the study population was from the urban area of Shanghai, with a higher education and being more open to new knowledge and novel things. Another reason may be that due to the home quarantine, their children might be able to spare more time with them and teach them some new skills. We appeal more social and community support to provide learning opportunities for older adults, online or by video, during COVID-19.

Our study also demonstrated that the portion of the older adults with adequate consumption of meat and eggs was higher during the pandemic than before. This may be due to the wide coverage of internet media, the older adults were easier to get access to health information and paid more attention to nutrition intakes. However, weight management should be given more attention while focusing on nutrition.

In our study, poor management of blood pressure and/or glucose in the participants was observed during the pandemic, which might be caused by the inconvenience to visit community healthcare centers where older adults could test the blood pressure and/or glucose through self-service. It is suggested that health care institutions provide health services/education (telemedicine or telephone following-up, online prescription refilling) and pay more attention to the chronic disease management of older adults. Meanwhile, it is also suggested that older adults could have household electronic devices to monitor blood glucose and blood pressure routinely when staying at home.

Other positive findings from our study included the increased share (36.5%) of the older adults with hobbies compared to 27.6% before the pandemic. And the percentage of participants learning new skills increased from 5.1% before the pandemic to 19.9% during the pandemic. Outdoor activities are highly suggested to be limited in areas with medium-high risk of pandemic. Older adults should pay more attention to weight management and chronic disease management. At the same time, they are also encouraged to ensure sufficient nutrient intake, exercise actively, develop new personal interests and learn novel skills, to make home isolation more interesting.

The strength of the study is a comprehensive set of variables were investigated, covering sleep, lifestyle, diet, exercise, housework, leisure activities, chronic disease management, and mood. However, there are several limitations. First, the sample size is relatively small. Second, we used telephone interviews to get the data. The quality of the data depended on the recall of the participants about lifestyle, mood, and disease management pre-COVID-19 pandemic. There may be a bias of recall. Third, we investigated the information on sleep and exercise through self-reported questionnaires. In future studies, it is warranted to measure the sleep quality and exercise of older adults objectively. Fourth, the participants were from the central urban area of Shanghai, where the pandemic is well under control, and the study population had relatively high income and education, with a healthier lifestyle. Hence,

the study results may not be generalized to other populations and cannot represent the overall situation in China.

5. Conclusion

The COVID-19 pandemic affected the lifestyle, mood, and chronic diseases management among community-dwelling older adults. Supportive measures and interventions need to be tailored to older adults living in the community.

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