The Pandemic Fatigue and Preferences for COVID-19 Public Health and Social Measures in China: A Nationwide Discrete Choice Experiment

Meng Yang, Zonglin He, Yin Zhang, Taoran Liu, Wai-kit Ming

Submitted to: JMIR Public Health and Surveillance
on: January 20, 2023

Table of Contents

The Pandemic Fatigue and Preferences for COVID-19 Public Health and Social Measures in China: A Nationwide Discrete Choice Experiment

Meng Yang[1] MBBS; Zonglin He[2] MBBS; Yin Zhang[3] MPH; Taoran Liu[4] PhD; Wai-kit Ming[4] MD, PhD, MPH

[1]School of Medicine Jinan University China CN
[2]Division of Life Science Hong Kong University of Science and Technology Hong Kong CN
[3]Department of Medicine The University of Hong Kong Hong Kong HK
[4]Department of Infectious Diseases and Public Health City University of Hong Kong Hong Kong HK

Corresponding Author:
Wai-kit Ming MD, PhD, MPH
Department of Infectious Diseases and Public Health
City University of Hong Kong
Room 1A-503, 5/F, Block 1, To Yuen Building
31 To Yuen Street
Hong Kong
HK

Abstract

Background: Evidence on the public's preferences for the current public health and social measures (PHSMs) and people's mental health under the PHSMs was insu?cient.

Objective: The present study aims to quantify the public's preferences for varied PHSMs and measure the level of pandemic fatigue under the COVID-19 normalization stage in China.

Methods: A nationwide cross-sectional study with discrete choice experiments and psychometric scales was conducted to assess public preferences for and attitude towards PHSMs. COVD-19 pandemic fatigue scale was used to screen fatigue level in the respondents. Multinomial logit model (MNL) and latent class model (LCM) and Mann-Whitney Test were used for statistical analysis.

Results: A total of 689 respondents across China completed the survey. The discrete choice experiments revealed that respondents attached the greatest importance to the risk of COVID-19 infection within 3 months (45.53%), followed by loss of income within 3 months (30.69%). Vulnerable populations (the low-income and the elderly) were more sensitive to the risk of infection while the younger respondents are more sensitive to income loss and preferred non-suspension of social places and transportation. Migrants and those with pandemic fatigue have less acceptance to the mandatory booster vaccination and suspension of transportation. Additionally, a higher fatigue level was observed in females, younger respondents, migrants, and relatively lower-income respondents.

Conclusions: Pandemic fatigue is widely prevalent in respondents across China, and the respondents yeaned for the resumption of normal social life while confronted with the fear of COVID-19 infection at the normalization stage of COVID-19 in China. Upon future pandemics, mental burden and adherence of the residents should be considered for the proper implementation of the PHSMs.

(JMIR Preprints 20/01/2023:45840)
DOI: https://doi.org/10.2196/preprints.45840

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✔ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**

Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v

Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

Original Paper

The Pandemic Fatigue and Preferences for COVID-19 Public Health and Social Measures in China: A Nationwide Discrete Choice Experiment

Meng Yang[a], MBBS, Zonglin He[b], MBBS, Yin Zhang[c], MPH, Taoran Liu[d*], PhD, Wai-kit Ming[*d], MD, PhD, MPH

[a] School of Medicine, Jinan University, Guangzhou, China

[b] Division of Life Science, Hong Kong University of Science and Technology, Hong Kong, China (Hong Kong)

[c] Department of Medicine, The University of Hong Kong, Hong Kong, China (Hong Kong)

[d] Department of Infectious Diseases and Public Health, City University of Hong Kong, Hong Kong, China (Hong Kong)

[*] Corresponding to Taoran Liu: taoranliu3@cityu.edu.hk; and Wai-kit Ming: wkming2@cityu.edu.hk

Abstract

Background: Evidence on the public's preferences for the current public health and social measures (PHSMs) and people's mental health under the PHSMs was insufficient.

Objective: The present study aims to quantify the public's preferences for varied PHSMs and measure the level of pandemic fatigue under the COVID-19 normalization stage in China.

Methods: A nationwide cross-sectional study with discrete choice experiments and psychometric scales was conducted to assess public preferences for and attitude towards PHSMs, using the quota sampling method. The COVD-19 pandemic fatigue scale was used to screen fatigue level in the respondents. Multinomial logit model (MNL) and latent class model (LCM) and Mann-Whitney Test were used for statistical analysis. We also conducted the subgroup analysis based on sex, age, monthly income, mental health status and pandemic fatigue status.

Results: A total of 689 respondents across China completed the survey. The discrete choice experiments revealed that respondents attached the greatest importance to the risk of COVID-19

infection within 3 months (45.53%), followed by loss of income within 3 months (30.69%). Vulnerable populations (the low-income and the elderly) were more sensitive to the risk of infection while the younger respondents are more sensitive to income loss and preferred non-suspension of social places and transportation. Migrants and those with pandemic fatigue have less acceptance to the mandatory booster vaccination and suspension of transportation. Additionally, a higher fatigue level was observed in females, younger respondents, migrants, and relatively lower-income respondents. A higher pandemic fatigue level was observed in females, younger respondents, migrants, and relatively lower-income respondents (CPFS correlation with age: r=-0.274, p<.001; with monthly income: r=-0.25, p<.001). Mandatory booster COVID-19 vaccination was also not preferred by the respondents with a higher level of pandemic fatigue, while respondents with a lower level of pandemic fatigue preferred universal COVID-19 booster vaccination.

Conclusions: Pandemic fatigue is widely prevalent in respondents across China, and the respondents yeaned for the resumption of normal social life while confronted with the fear of COVID-19 infection at the normalization stage of COVID-19 in China. During future pandemics, the mental burden and adherence of the residents should be considered for the proper implementation of the PHSMs.

Keywords: Pandemic fatigue; preference; PHSMs; Discrete choice experiment; COVID-19

Introduction

The transmission of the SARS-CoV-2 Omicron variant has led to a sharp rise in infected cases in mainland China, spreading from major cities like Guangzhou and Shanghai, among others, to the entire country [1]. To contain the transmission of the virus, various public health and social measures (PHSMs) have been conducted at municipal and provincial levels in China under the dynamic zero-COVID policy [2]. These measures include suspension of public transport, closure of public places, close management of communities, mandatory nucleic acid testing, home quarantine, and isolation of infected and suspected cases, among others [3-5] . However, the severe epidemic combined with high-level public health policies during this Omicron wave have significant impacts on the normal life of the citizens from different dimensions and may result in mental health issues [6].

Fatigue issues have been noticeable during the COVID-19 pandemic, especially the adverse psychological impacts of non-pharmacological interventions (NPIs) [7]. In China, the prevalence of anxiety and depression symptoms was reported to be 29% and 37.1%, respectively, during the

COVID-19 pandemic in 2020 [8]. A study in Italy found that 38% of the general population suffered from psychological distress during the early stage of the COVID-19 pandemic [9]. Among them, vulnerable populations, including the elderly [10, 11], migrant workers [12, 13], children [14-16], adolescents [16, 17], and individuals with pre-existing mental illness [18, 19], may suffer a greater risk of psychological difficulties due to the increased exposure to external adverse circumstances. During the Omicron wave, the prevalence of mental disorders was found to be higher than the wave of the wild type. For example, the study of Lu Y et al. [20] found that the prevalence rates of anxiety among non-medical and medical staff were 55.0% and 47.3%, respectively, and the prevalence of depression was 62.4% and 53.4%, respectively.

Long-term COVID-19 public health policy may result in pandemic fatigue [21, 22], further resulting in the decline of public compliance [23, 24]. Changes in people's perception of risk assessment have also led to behavioural change [23, 25]. Rayani et al. [26] reported that higher levels of risk perception might allow people to maintain positive preventive behaviours. A study by Mehran Alijanzadeh et al.[27] in Iran also showed that individuals' risk perception can influence preventive COVID-19 behaviours through their fear of COVID-19 and trust in the healthcare system. Meanwhile, public participation at the policy level in preventive behaviour, disease response, and surveillance has become increasingly important [28]. Information on public perceptions and attitudes towards social distancing measures is prominent in the unofficial media. In contrast, formal research evidence on the public's preferences towards the current PHSMs and people's mental health problems during the Omicron wave under the strengthened COVID-19 policies was insufficient and remains unknown. Also, there are no studies to date that capture the desirability of the different PHSMs towards the pandemic in China, nor do they capture the general public's willingness to trade. Such insufficient information on the general public's pandemic fatigue and preference may hinder the priority settings when no single PHSM can sufficiently combat the transmission of the virus.

In the context of PHSMs, this study aims to explore the public's preferences and preference homogeneities and heterogeneities for varied public health social measures. Furthermore, based on assessing the current level of prevention and control measures in participants' regions, this study also considered the impact of PHSMs fatigue on preferences based on the epidemic fatigue scale [29, 30].

Methods

Overview

In the present study, we used various instruments to investigate mental health problems among the general population, especially migrant workers, those who work in non-registered locations for three months or more [31]. The first instrument is DCE, a survey-based experiment design that solicits and quantifies respondents' utilities and preferences toward a set of attributes and levels of PHSMs. Following the DCE, a set of Likert psychometric scale of pandemic fatigue were used to measure the respondents' perception of current PHSMs and level of pandemic fatigue. Additionally, we conducted a subgroup analysis [32] to explore the heterogeneities based on demographic information and socioeconomic status, and comparison was conducted of the preference of respondents with relatively lower pandemic fatigue level and higher level.

Respondents

The inclusion criteria of the present study were that respondents should be at least 18 years of age and without cognitive impairments (self-report). Respondents were recruited and selected through an online social media advertising platform (Credamo Inc, which has over 3 million samples and covers all provincial administrative regions in China)[33-36]. Credamo randomly distributed the survey in 31 provinces of China (excluding Hong Kong, Macao, and Taiwan). Specifically, we provide a quota size of 350 per sex group and 140 per age group (oversampled). According to this census, the population of China was approximately 1.411 billion, with a sex composition of 51.24% males (723.34 million) and 48.76% females (688.44 million) [37, 38], leading to a sex ratio of approximately 105.07 males for every 100 females. We also refer to the National Bureau of Statistics of China [37] for age-specific quota design, with 63.35% in the age group of 15 to 59, and 18.70% in the age group of 60 and over. However, due to budget restrictions and practical issues during the pandemic, we provide a 1:1 per sex group and 140 per age group for the data collection platform. No personally identifiable information was collected since the survey was anonymous. The consent was obtained with the respondents actively pressing the button marked "I have been informed with the

sufficient information of the study and agree to participate in this study" after viewing the introductory section of the questionnaire where the background and objectives of the study were presented. Respondents can only access the questionnaire if they consent and report that they are older than 18 years old without cognitive impairments. The translation of the original survey was attached in the supplementary materials (***Supplementary 1***). Respondents received RMB 20 for participation as an incentive.

Data collection

An anonymous self-administrated survey, composed using Lighthouse Studio (Sawtooth Software, version 9.9.1), was distributed from July 01, 2022, to September 30, 2022, and the respondents from nationwide were collected. The minimal sample size requirement of the present study was calculated using the rule of thumb proposed by Johnson and Orme[39]. Specifically, the equation for sample size calculation was:

$$N > \frac{500\,c}{t \times a}$$

where t refers to the choice tasks in the survey, the number of alternatives was indicated as a, and the number of analysis cells was determined by c. Specifically, the number of analysis cells c in the present study refers to the largest number of levels for any of the attributes. As such, the minimal sample size in the present study should be 125 respondents. Also, according to the standard parametric approach [40] of sample size calculation, the minimum sample is 267 (***Supplementary information***).

All the questions were close-ended, with tick boxes provided for responses and no question skipping allowed, and no data would be stored if the questionnaire website were closed before completion.

Survey and DCE instrumental design

The survey of the present study contains four main sections. Specifically, in the first section, we aimed to solicit respondents' demographic information, including socioeconomic information (age, sex, education level, religion, marital status, occupations, income level, and their current residence and registered permanent residence city).

In the second section of the survey, respondents' vaccination history and medical history were collected. Respondents were asked how many doses of COVID-19 vaccination they have received

and whether they have ever been diagnosed or are currently experiencing psychological diseases (such as depression, anxiety, obsessive-compulsive disorder, phobia, bipolar disorder, neurasthenia, schizophrenia, and personality disorder, among others), and have they ever been infected with COVID-19. If respondents answered that they have ever been diagnosed or currently are experiencing psychological diseases, they would be required to answer what specific disease they encountered, the severity of their diseases, and whether they have ever received or currently receiving treatment. In addition, if respondents indicate that they have ever been infected with COVID-19, they were required to provide information about how they found they had been infected, their symptoms and complications, and their date for hospitalization and discharge.

The third section of the survey is the DCE. Respondents were presented with nine sets of scenarios, and in each scenario, respondents faced three hypothetical counties, namely, “Option A”, “Option B”, and “Neither”. Respondents were required to select the measure that they felt most satisfied with. The attributes and level of different measures of DCE were determined by literature review [41-43] and consultation with local epidemiologists and experts, and design guidelines for DCE [44]. As a result, we determined eight attributes in our study: (1) Risk of COVID-19 infection within 6 months, (2) Closure of social occasions, (3) Suspension of on-campus educational activities, (4) Suspension of public transportation, (5) Contact tracing, isolation and quarantine, (6) Nucleic acid screening program, (7) Mandatory booster vaccination, and (8) Loss of income in 6 months. All the attributes and levels selected in the study have been summarized in **Table 1**. A sample of the hypothetical choice task shows in **Figure 1**. The levels in task choices of different versions were designed according to the principle of (1) orthogonality and (2) balance. The number of task choices in the DCE section is 8 random choices and 1 fixed choice (We use fixed choice for further data quality control). Since the DCE questionnaires are relatively more complicated for respondents to understand, and such cognitive burden imposed on respondents may lead to some bias in their selection, therefore, we added the following texts and forced respondents to stay on the questionnaire page for at least one minute and carefully read the texts to help the respondents better understand what discrete choice tasks are, and how to select the choices subsequently (more details were incorporated in ***Supplementary information***):

“*In this part, you will face a series of tasks; these are called discrete choice tasks, a method we use to understand preferences and decision-making processes. Each task will offer you two hypothetical options and a “none” option, each with a set of attributes or features. Your task is to choose the option that you prefer or that you would most likely choose in real life. Please read the descriptions*

of each option carefully. Each option is different, with its unique set of attributes or characteristics. Remember, there's no right or wrong answer here. We are interested in your genuine preferences. Choose the option that best aligns with what you would prefer in real life, based on the attributes presented. Some scenarios may not happen in real life since they were hypothetical; however, please also select an alternative based on your own preferences."

According to the full factorial design, there are 11,664 (6*2*2*3*3*3*3*6) policies and 11,664*11,663 task choices. To significantly reduce the complication of the design to ensure that respondents could complete the tasks, we applied a fractional factorial design based on balance (the frequencies of attribute levels are roughly equal across all tasks) and orthogonality (the frequencies of attribute pairs are roughly equal across the tasks) principles.

Psychological Likert scales were included in the fourth section of the survey, and the pandemic fatigue scale was assessed on a five-point Likert scale. The reliability (alpha = 0.885) and validity (Kaiser-Meyer-Olkin Measure = 0.737) of the Likert scale in pandemic fatigue were tested. And the pandemic fatigue model designed by Lilleholt et al. [29]. was sued to ask about demotivation towards COVID-19 PHSMs and the desire to know the development of the epidemic, we adjusted the applied the pandemic fatigue model in our study. The adjusted pandemic fatigue model contained a series of questions on public attitudes or views on the strengthening of relevant measures for epidemic prevention and control at the current stage and a series of scales to measure the public's pandemic fatigue. The first question asked about local confirmed cases in the respondents' living area (town, county, district), followed by the question asked about the current public health and social measures in that area. The third question contained a scale on respondents' perceived risk of being infected with COVID-19. The fourth question contained the scale on measuring respondents' perceptions of the current measures. Subsequently, respondents were measured epidemic prevention fatigue situation under the current situation of strengthened epidemic prevention measures in the fifth question.

Figure 1. A sample of task choice in the DCE survey.

Notes: Nine task choices in total were contained in the DCE part. Each task choice contains two options and "opt-out" option (None of both). Options were characterized by eight attributes and random levels. Respondents were required to select an option among two options and "opt-out" option.

Table 1. Attributes and levels selected in the DCE survey.

Attributes	**Levels**
Risk of COVID-19 infection within 3 months	0%

	20%
	40%
	60%
	80%
	100%
Closure of social occasions	Yes
	No
Suspension of on-campus educational activities	Yes
	No
Suspension of public transportation	Full suspension
	Suspension in high-risk areas
	Normal operation
Contact tracing, isolation and quarantine	Voluntarily
	Compulsory
	None
Nucleic acid screening program	Only high-risk units, workplaces and vulnerable public
	Nucleic acid screening for all
	None
Mandatory booster vaccination	Universal vaccination
	Only high-risk groups are vaccinated (long-term patients, people over 60 years old, etc.)
	None
Loss of income in 3 months	0%
	20%
	40%
	60%
	80%
	100%

Statistical analysis

Descriptive analysis was applied to describe respondents' demographic information and socioeconomic information, as well as whether migrants, COVID-19 vaccination history, mental health diseases history, exposure to COVID-19, whether they were infected with COVID-19 and whether they were experiencing community closed management.

We used the multinomial logit (MNL) model to quantify respondents' relative utilities in the overall respondents. The MNL model of the present study follows the random utility maximization theory[45]. We calculate the odds ratio (OR) and 95% confidence interval (CI) based on respondents' relative utilities among levels and attributes to further measure respondents' preferences. In addition, we applied Latent Class Model (LCM) to determine how respondents' preferences differ due to the group memberships. We used Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) to determine the appropriate number of groups among the respondents. The Mann-Whitney test was applied for the analysis of quantitative variables. The data of the scale were analyzed using SPSS, version 23. And the MNL and LCM were performed in Lighthouse Studio (version 9.9.1).

Subgroup analysis procedure

The LCM were robust in identifying unobserved heterogeneity within the data, and this method allows for the identification of latent classes of individuals who exhibit similar preferences or characteristics. However, the LCM were not appropriate for investigating the association between pandemic fatigue and preference heterogeneities, since the covariates such as sex, age, and mental health status were not controlled. Therefore, to further explore the preference heterogeneities among the respondents in controlling the sex, age, and mental health status, we also conducted sub-group analyses based on respondents' demographic information, including sex, age, and monthly income, and mental health status. We also conducted a sub-group analysis based on respondents' level (high level or low level) of pandemic fatigue based on the results of the pandemic fatigue scales.

Ethical approval

We collect respondents' consent through the online consent in the survey. The present study was approved by the Institutional Review Board (IRB) at the City University of Hong Kong. The reference number was: 11-2022-65-E. We adhered to the guidelines of the International Society for Pharmacoeconomics and Outcome Research (ISPOR) reporting guidelines for design and reporting research questions, attributes, and levels determination and statistical analysis for the DCE.

Results

Respondents' characteristics

A total of 1183 respondents clicked and entered the link of our survey, 855 of whom completed the survey. After the control process of data quality by deleting the questionnaire in which the trap question was wrongly answered, 689 respondents were included in the final analysis. Among the 689 respondents, 341 (49.5%) were male, and 348 (50.5%) were female. Additionally, 286 (41.5%) of the respondents were aged 35 years and below. Most respondents (509, 73.8%) have a monthly income equal to or less than RMB 10,000, and around 30.5% of respondents were migrants (**Table 2**).

The preferences for public health measures

The attribute having the most weighted importance in respondents' decision-making is the risk of being infected with COVID-19 in 3 months (45.53%), followed by the loss of income due to the COVID-19 measure (30.69%). Suspension of on-campus educational activities (1.29%) had the weakest weighted preference (**Figure 2**). Weaker preferences were observed when increasing the risk of infection with COVID-19. Compared with full suspension of public transportation, respondents believed that suspension in only high-risk areas (areas with 10 or more local confirmed cases will be designated as high-risk areas) brought them larger utility (OR: 1.168, 95% CI: 1.106-1.234, *p*=.002). Also, compulsory contact tracing was favored by respondents (vs. voluntary, OR: 1.294, 95% CI: 1.225-1.366, p < .001). In addition, respondents were willing to accept booster doses of COVID-19 vaccines, and their utility decreased along with loss of income within 3 months due to the PHSMs (**Table 3**).

Table 2. Demographic and socioeconomic information of respondents

Characteristics	Respondent No. (%)
Sex	
Male	341 (49.5%)
Female	348 (50.5%)
Age, y	
18-25	128 (18.6%)
26-35	159 (22.9%)
36-45	135 (19.6%)
46-55	129 (18.7%)
>=56	139 (20.2%)
Education level	
Below bachelor's degree	181 (26.3%)
Bachelor's degree	401 (58.2%)
Above Bachelor's degree	107 (15.6%)
Current residence	
Northeast China	28(4.06%)
North China	122(17.71%)
East China	244(35.41%)
Central China	105(15.24%)
South China	103(14.95%)
Southwest China	66(9.58%)
Northwest China	21(3.05%)
Origin residence	
Northeast China	29(4.21%)
North China	108(15.67%)

East China	233(33.82%)
Central China	143(20.75%)
South China	86(12.48%)
Southwest China	70(10.16%)
Northwest China	20(2.90%)
Religion	
Christian	16 (2.3%)
Mohammedanism	3(0.4%)
Buddhism	63(9.1%)
Others	2(0.3%)
None	605(87.8%)
Marital status	
Unmarried and single	188 (27.3%)
Unmarried and cohabiting	21 (3.0%)
Married	469 (68.1%)
Divorced	9 (1.3%)
Widow	2 (0.3%)
Migrant	
Yes	210 (30.5%)
No	479 (69.5%)
Occupation and working status	
Student	130 (18.9%)
Managers	95 (13.8%)
Technicians and associate professionals	124 (18.0%)
Clerical support works	105 (15.2%)
Service and sales workers	106 (15.4%)
Skilled agricultural, forestry and fishery workers	28 (4.1%)
Plant and machine operators and assemblers	50 (7.3%)
Other	51 (7.4%)
Income monthly(%)	
RMB 10,000 and below	509 (73.8%)
RMB 10,001 and above	180 (26.2%)
History of mental health disease(%)	
Yes	42 (6.1%)
No	634 (92.0%)
Prefer not to say	13 (1.9%)

Table 3. Respondents' preference and utilities of different attributes' levels.

Variable	Coefficient[a]	SE[b]	*P* value[c]	OR	95% CI
Risk of COVID-19 infection within 3					
0%	0.832	0.044	<.001	Reference	
20%	0.516	0.044	<.001	0.729	(0.669 - 0.795)
40%	0.299	0.044	<.001	0.587	(0.538 - 0.639)
60%	-0.171	0.046	<.001	0.367	(0.335 - 0.401)
80%	-0.535	0.049	<.001	0.255	(0.231 - 0.281)
100%	-0.941	0.055	<.001	0.170	(0.152 - 0.189)
Closure of social occasions					
Yes	-0.025	0.018	.16	Reference	
No	0.025	0.018	.16	1.052	(1.016 - 1.090)
Suspension of on-campus educational					
Yes	-0.025	0.018	.16	Reference	
No	0.025	0.018	.16	1.051	(1.015 - 1.089)
Suspension of public transportation					
Full suspension	-0.067	0.028	.02	Reference	
Suspension in high-risk areas	0.088	0.028	.002	1.168	(1.106 - 1.234)
Normal operation	-0.021	0.028	.46	1.048	(0.992 - 1.106)
Contact tracing, isolation and					
Voluntarily	-0.098	0.028	<.001	Reference	
Compulsory	0.159	0.028	<.001	1.294	(1.225 - 1.366)
None	-0.061	0.028	.03	1.038	(0.983 - 1.097)
Nucleic acid screening program					
Only high-risk units, workplaces and	0.083	0.028	.003	Reference	
Nucleic acid screening for all staff	0.096	0.028	<.001	1.013	(0.959 - 1.070)
None	-0.179	0.029	<.001	0.770	(0.728 - 0.814)
Mandatory booster vaccination					
Universal vaccination	0.082	0.028	.003	Reference	
Only high-risk groups are vaccinated	-0.055	0.028	.047	0.872	(0.826 - 0.921)
None	-0.026	0.028	.35	0.898	(0.850 - 0.949)
Loss of income in 3 months					

0%	0.541	0.044	<.001	Reference	
20%	0.426	0.044	<.001	0.891	(0.817 - 0.972)
40%	0.207	0.045	<.001	0.716	(0.656 - 0.782)
60%	-0.148	0.047	.002	0.564	(0.514 - 0.617)
80%	-0.371	0.048	<.001	0.561	(0.510 - 0.616)
100%	-0.655	0.051	<.001	0.602	

Notes: [a] The results were calculated using the multinomial logit model. A positive sign represents a positive utility for respondents choosing the specific level, and a negative sign represents a negative utility for respondents choosing the specific level.

[b] SE: Standard error.

[c] *P*-values were rounded according to the exact value. When $p > .01$, then the exact *p*-values were rounded to 2 digits. When $p < .01$, then the exact *p*-values were rounded to 3 digits.

Sub-group analysis of preferences for public health and social measures

To better trace the heterogeneities of the preferences, sub-group analyses were conducted in terms of age and different monthly income level (**Figure 3**). Compared with high monthly income respondents, respondents with lower monthly income were less sensitive to the risk of infection with COVID-19 within 3 months, yet more sensitive to the loss of income due to the measure within 3 months. Moreover, lower-income respondents care more about nucleic acid test screening for all and prefer the suspension of public transportation in only high-risk areas. Additionally, respondents with lower income preferred not to be close to social and living places, which was in contrast with high-income respondents.

Similarly, respondents older than 35 years were more sensitive to the risk of COVID-19 infection and less sensitive to the loss of income within 3 months. Moreover, compared with older respondents, younger respondents prefer nucleic acid test screening in only high-risk units, workplaces, and vulnerable public, while older respondents prefer screening for all. Also, younger respondents prefer not suspending on-campus educational activities and not closing the social and living places.

Respondents diagnosed with mental health diseases do not favor contact tracing, isolation and quarantine, and closure of social and living places, compared with those with no mental health diseases. The sub-group analysis for migrants and non-migrants indicates that migrants have less acceptance of the mandatory booster vaccination and accept the suspension of transportation in high-risk areas or normal operations.

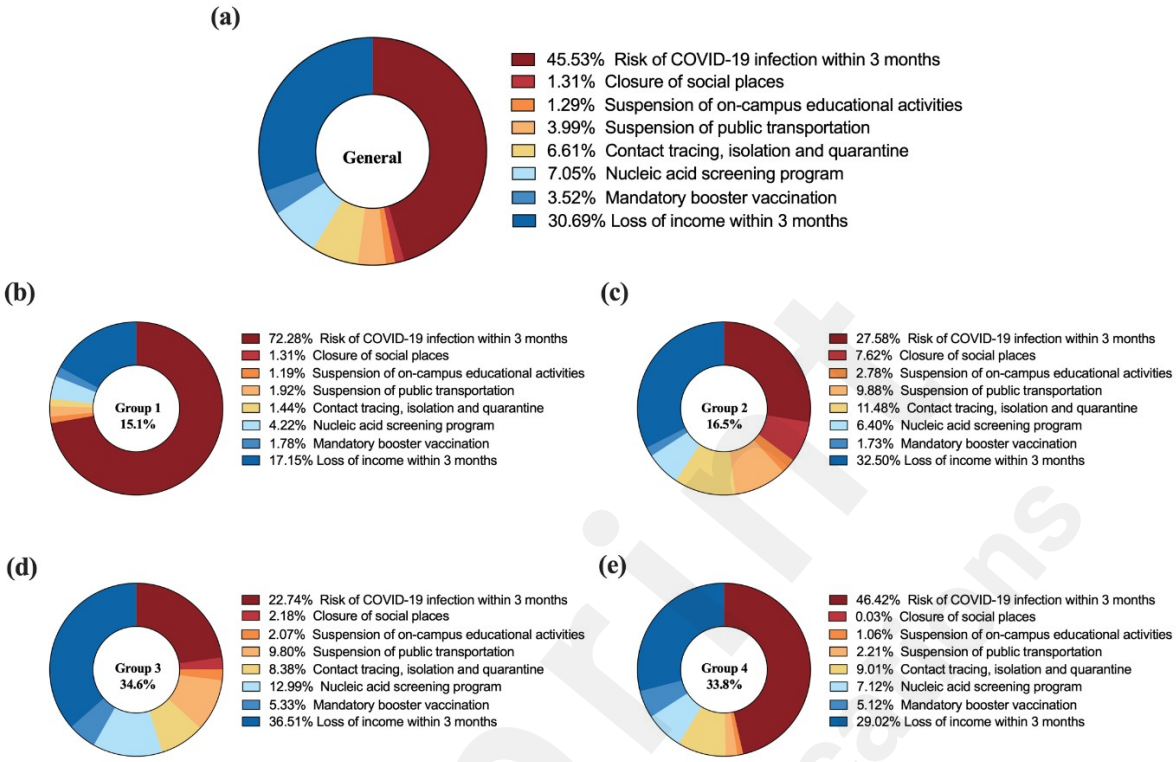

Figure 2. Attribute weighted importance among public and different latent classes of respondents.

***Notes*:** Panel (a) indicates the weighted attribute importance among total respondents. Panel (b), panel (c), panel (d) and panel (e) indicate the weighted attribute importance among four latent classes of respondents. A larger proportion represents a higher attribute importance.

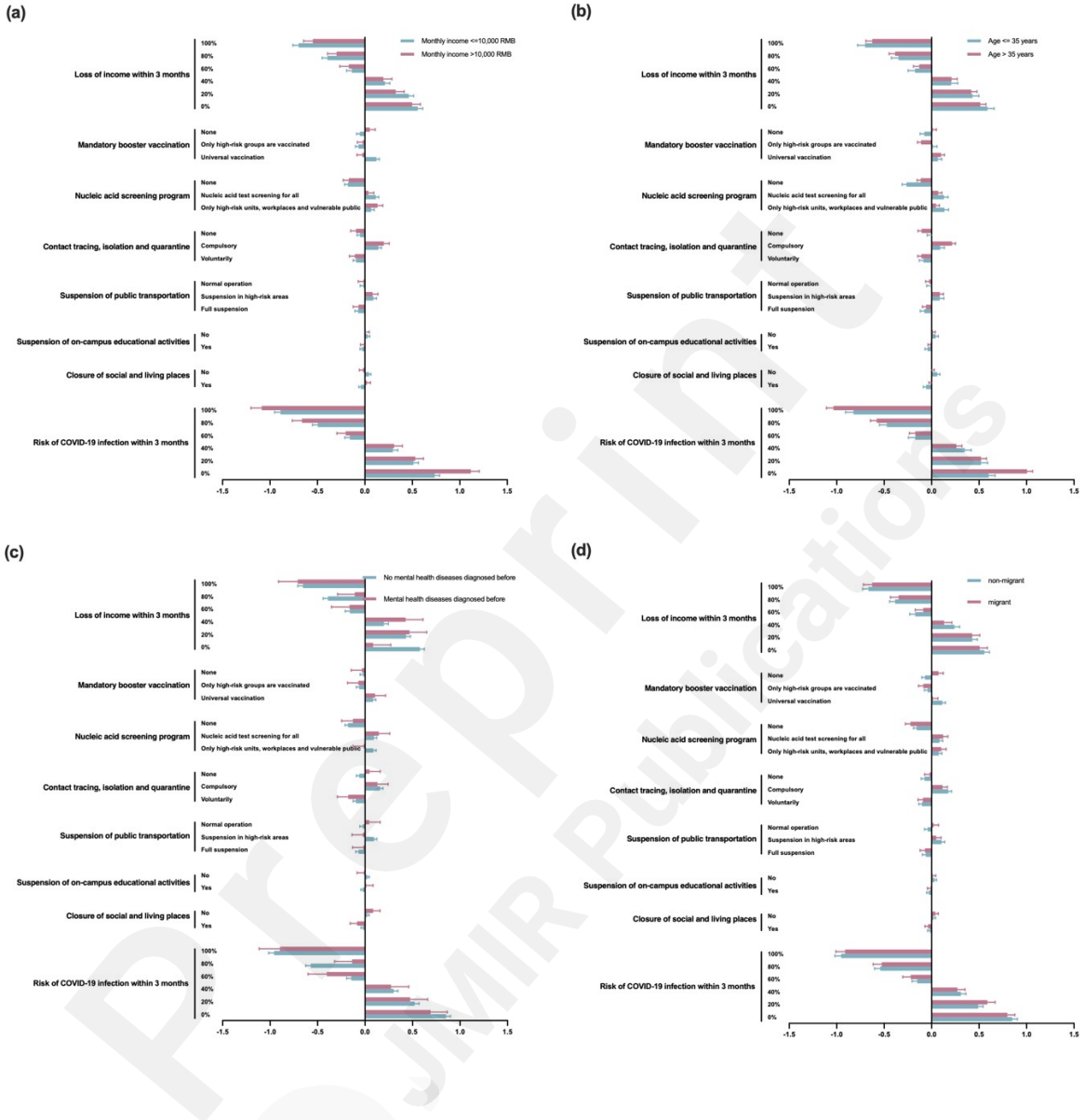

Figure 3. Sub-group analysis based on sex, age, mental health disease history, and residence status.

Note: Panel (a) represents the sub-group analysis of preferences of respondents with <=10,000 monthly income or >10,000 RMB monthly income. Panel (b) represents the sub-group analysis of preferences of respondents <=35 years old or >35 years old. Panel (c) represents the sub-group analysis of preferences of respondents with no mental health diseases diagnosed before or mental health diseases diagnosed before. Panel (d) represents the sub-group analysis of preferences of non-migrant respondents or migrant respondents.

Subgroup-analysis Pandemic fatigue and preference heterogeneities

A higher pandemic fatigue level (**Table 4**) was observed in females, younger respondents, migrants, and relatively lower-income respondents (CPFS correlation with age: r=-0.274, p<.001; with monthly income: r=-0.25, p<.001). Based on the results of COVID-19 pandemic fatigue scale, some preferences of heterogeneities were also found among respondents with a lower or higher level of pandemic fatigue (**Figure 4**). Respondents with a higher level of fatigue tend to be less sensitive to the risk of COVID-19 infection within 3 months, and more sensitive to income loss within 3 months. Additionally, compared with respondents with a lower level of fatigue, those with a higher level of pandemic fatigue prefer non-suspension of social places and non-suspension of on-campus educational activities. Mandatory booster COVID-19 vaccination was also not preferred by the respondents with a higher level of pandemic fatigue, while respondents with a lower level of pandemic fatigue preferred universal COVID-19 booster vaccination.

Table 4. Results of the pandemic fatigue scale.

Variables		N	Scores mean, SD	*P* value [a]	Correlation [b]	*P* value
	Whole	689	15.24±5.262		—[c]	—
Gender					—	—
	Male	341	14.71±5.350	0.01		
	Female	348	15.75±5.120		—	—
Age[d]						
	18-25	128	18.28±4.836			
	26-35	158	15.01±4.939			
	36-45	135	14.5±4.982	<.001	-0.274	<.001
	46-55	129	15.08±5.758			
	>=56	139	13.55±4.671			
Education level						
	Middle school education and	26	16.54±5.798		—	—
	High school education	63	14.87±3.744		—	—
	Vocational school education	92	14.63±5.353	.18	—	—
	Bachelor’s degree	401	15.07±5.214		—	—
	Master’s degree	97	16.12±5.938		—	—
	PhD degree	10	17.5±5.255		—	—
Religion						
	Christian	16	13.19±4.49		—	—
	Mohammedanism	3	18.33±7.506	.29	—	—
	Buddhism	63	14.89±5.873		—	—
	Other	2	17.00±6.272		—	—
	No	605	15.3±5.197		—	—
Marital status						
	Unmarried and single	188	17.65±4.989		—	—
	Unmarried and cohabiting	21	16.81±4.633	<.001	—	—
	Married	469	14.08±4.979		—	—
	Divorced	9	20.44±5.175		—	—

	Window	2	18.5±10.607		—	—
Migrant						
	Yes	210	16.12±5.288	.001	—	—
	No	479	14.85±5.209		—	—
Occupation and working area						
	Student	130	18.58±4.767		—	—
	Managers	95	14.18±5.357		—	—
	Technicians and associate	124	14.42±5.516		—	—
	Clerical support works	105	13.65±4.218	<.001	—	—
	Service and sales workers	106	15.26±5.231		—	—
	Skilled agricultural, forestry	28	16.54±56.215		—	—
	Plant and machine operators	50	13.10±3.754		—	—
	Other	51	15.25±4.56		—	—
Income monthly[d]						
	□<=5000	220	16.76±4.985			
	□5000-□10000	289	14.78±4.768			
	□10001-□15000	103	14.45±5.656	<.001	-0.25	<.001
	□15001-□20000	47	13.45±6.064			
	>=□20000	30	14.00±6.623			
History of mental health						
	Yes	42	16.95±5.635	.02	—	—
	No	634	15.04±5.194		—	—
Exposure to novel coronavirus						
	Yes	198	15.84±5.613	.143	—	—
	No	491	14.99±5.099		—	—
Community closed						
	Yes	90	15.93±6.005	.421	—	—
	No	599	15.13±5.138		—	—

[a]Mann-Whitney Test
[b]Spearman correlation coefficients for non-continuous variables

[c] Not applicable
[d] Continuous variable

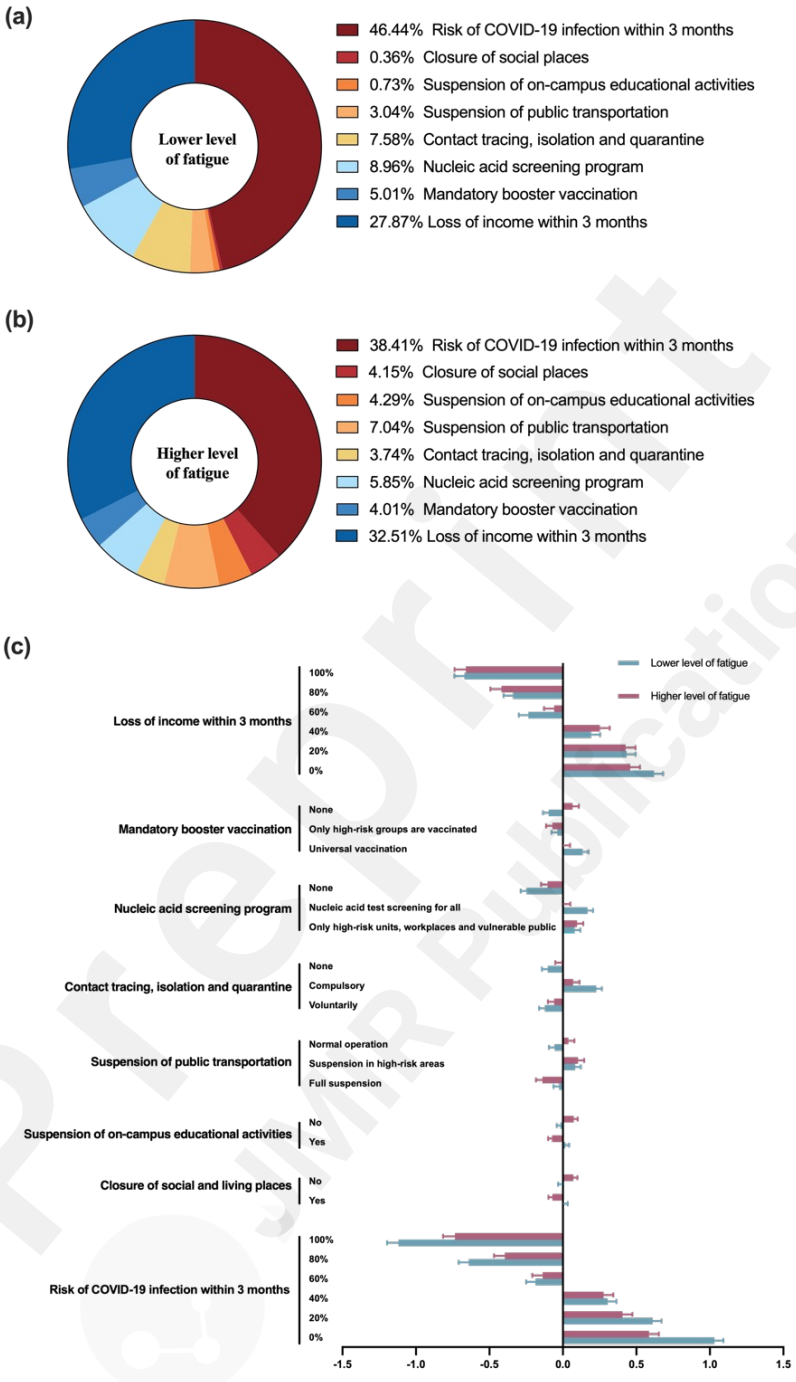

Figure 4. Weighted importance of attributes and levels among respondents based on pandemic fatigue level.

***Notes*:** Panel (a) indicates the weighted attribute importance among respondents with a lower level of COVID-19 pandemic fatigue, and panel (b) indicates the weighted attribute importance among respondents with a higher level of COVID-19 pandemic fatigue. Panel (c) indicates the relative utility of levels among two groups of respondents.

Latent class analysis

According to the AIC and BIC of the LCM, four latent groups of respondents were determined, with the lowest BIC to be 9680.29, and AIC of 9104.82. All the other model fitting values have been included in the ***Supplementary information***. The segmented sizes were 15.1%, 16.5%, 34.6%, and 33.8%. As shown in **Figure 2**, respondents in groups 1 and 4 put the most attention on the risk of COVID-19 infection within 3 months, while respondents from groups 2 and 3 attached importance to the loss of income within 3 months. Additionally, following the risk of COVID-19 infection and loss of income within 3 months, groups 2 and 4 considered contact tracing and nucleic acid test screening to be the third and fourth important attributes. Group 3 believe nucleic acid test screening and suspension of public transportation very essential in their component of preference.

Discussion

The COVID-19 pandemic posed tremendous challenges to delivering mental and physiological health services throughout China. The present study sought to comprehensively investigate public mental health and preference for PHSMs. This is the first study to estimate public preferences for PHSMs using a DCE for a nationally representative population in China. Risk of COVID-19 infection within 3 months, contact tracing, isolation and quarantine, nucleic acid screening program, and loss of income within 3 months significantly influenced the preferences for PHSMs.

In our study, we found that the respondents placed the greatest importance on the risk of COVID-19 infection in the last 3 months when considering public health measures for COVID-19 mitigation. With its rapid spread and causing serious complications, COVID-19 created an important fear in the vast majority of people, whether they were in the risk group or not. In a population-based survey conducted in American [46], the population was fearful, worried, and uncertain about COVID-19, especially in more densely populated communities, communities with higher presumptive and reported COVID-19

case concentrations and urban locations. Additionally, one online survey in Italy that asked about health behaviors and the psychological and overall impact of COVID-19 found that only the fear of infection significantly dissuaded people from violating epidemic prevention rules [47]. Hence, the risks of infection and adverse outcomes secondary to the infection should be clearly outlined by the media or governments to the public to enhance mutual understanding, reduce the psychological burden and improve the compliance of people's epidemic prevention behavior.

Furthermore, the respondents in our survey attached more importance to income loss in their preference. According to an analysis based on economic forecasts in the EU, the COVID-19 crisis had an indispensable impact on household' disposable income, similar to the one experienced during the 2008–2009 financial crisis, with lower-income households being more severely hit [48]. The high preference may be due to the huge negative economic, living, and psychological effects of lower income [49]. This was consistent with the fact that migrant workers, accounting for about one-fifth of the whole Chinese population, were faced with the huge housing stress and psychological burden from the sudden loss of income and further quarantine enforcement during the COVID-19 pandemic [31]. Therefore, the government should consider subsidies related to epidemic prevention, particularly for the low-income population, take fiscal policy measures as appropriate to reduce the risk and scale of income reduction, and cushion the impact of the epidemic crisis on inequality and poverty through policy interventions.

Respondents in our study showed preference heterogeneity for epidemic prevention measures. Understanding the heterogeneity of information and differences in personal values towards epidemic prevention measures can help policymakers understand individuals' preferences so that more rational and customized PHSMs can be formulated to reduce the negative emotions caused by epidemic prevention. For example, younger participants preferred not to do nucleic acid screening, but older people were more afraid of having novel coronavirus pneumonia. The probable cause is that the case fatality rate of novel coronavirus pneumonia is low in young people and increased in a log-linear model by age among individuals older than 30 years [50]. Therefore, relevant

departments should be responsible for community humanistic care, appeasing the mood of the masses, eliminating panic, guiding the community to carry out scientific and orderly epidemic prevention work, implementing vaccine booster shots in the population, and publicizing the scientific knowledge of COVID-19.

Our study showed that migrant workers had a higher level of pandemic fatigue to the suspension of transportation and closure of social places, which aligned with existing literature [31, 51], which had shown that vulnerable groups, including migrants and the older population [52], were more prone to suffer from psychological pressure due to unemployment, suspension of the public transportation network, and loss of income [12, 53]. These findings emphasize the importance of psychological placation for susceptible populations during the outbreak to help provide support and managed care for individuals at risk of psychological impact. On the other side, we found higher pandemic fatigue scores in young participants than in other age groups, consistent with one study [54] reporting that university students were associated with significantly reduced mood and reduced social interactions during lockdown periods. For migrant workers, the elderly, and other susceptible populations, governments should develop effective mental health interventions and strategies and carefully assess and manage the mental health needs of vulnerable groups and provide mental health services through community management or digital platforms during the epidemic.

Although the COVID-19 PHSMs is at a dynamic status, our findings helped contribute to the existing literature in a better understanding of the psychological impact of the pandemic and were useful for formulating and planning effective prevention strategies and psychological counseling for the public and susceptible populations, moreover, the findings of the current study may provide great insight for PHSMs design when epidemics outbreak in the future. Through the analysis of heterogeneous populations that have been affected by the pandemic mentally and emotionally, our research provides key insights that can inform the formulation and priority settings and planning of more effective prevention strategies and psychological support mechanisms. This is particularly relevant for public health authorities and policymakers who are challenged

and tasked with conditions not only the physical but also the mental well-being of the public and more vulnerable groups during such crises. Furthermore, the implications of our findings extend far beyond the current pandemic context. As we investigated the psychological effects of COVID-19 and the preferences of various PHSMs in mitigating these impacts, we lay a foundational understanding that can be pivotal in the face of future infectious disease outbreaks. Moreover, our research highlights the necessity of incorporating psychological considerations into the priority settings of PHSMs. This approach ensures that interventions are holistic, addressing both the epidemiological and emotional aspects of disease control.

There are limitations in the present study, especially in the sampling methods. Since we applied the quota sampling without providing the quotas of regions in the present study due to the budget, results are may have potentially biased to infer the general population and selection bias may also exist. Moreover, in our study, we collected 689 respondents' preference data from 31 provinces in China, however, considering the 1.4 billion population in China, only around 22 respondents in each province may relatively lose the representativeness of sampling. This is partially causative to (1) the budget for data collection was limited, (2) and the off-line sampling procedures were largely restricted due to the COVID-19 pandemic lockdown, therefore, the flexibility of the sampling was largely limited. Further studies with larger and more representative samples for investigation general populations' mental health under the pandemic may be required to more accurately quantify populations' perspectives for PHSMs. In addition, the study acknowledges the limitations imposed by the use of quota sampling, particularly the equal representation of sexes and the simplified categorization of age groups, which may not accurately reflect the complex demographics of the adult population in China. Due to the challenges posed by the pandemic and budgetary constraints for data collection, the study could not completely adhere to the exact adult age structure of the Chinese population in its sampling methods. This limitation may affect the generalizability of the findings to the entire adult population of China. While this is a limitation that future research might overcome with alternative strategies or under different circumstances. Finally, we acknowledged that the DCE questionnaire may impose some cognitive

burden on respondents to understand, and this may lead to some biases when they select among the alternatives. Therefore, the face-to-face approach should be better than the online approach. However, due to the lockdown of the pandemic, the face-to-face approach was not feasible. In future research to understand people's pandemic fatigue and preferences, a face-to-face approach should be applied if there are no lockdowns.

Conclusions

In conclusion, variability in the preference for COVID-19 policies was found between different groups. Pandemic fatigue and fear of COVID-19 infection contributed to the public's mental health problems. Hence, at the late-stage pandemic, policymakers should consider reducing people's mental burden via relieving people's fear of infection when PHSMs are being relaxed. And this also provides insights for the outbreaks' PHSMs implementation in the future since our research highlights the necessity of incorporating heterogeneous psychological considerations into the priority settings of PHSMs. This may ensure that interventions are holistic, addressing both the epidemiological and emotional aspects of disease control.

Acknowledgements

Conceptualization: T.L., Z.H., W-k.M.; *Data curation*: M.Y., T.L.; *Formal analysis*: T.L., and M.Y.; *Funding acquisition*: M.Y., W-k.M; *Investigation*: M.Y., T.L., Z.H., T.Z.; *Methodology*: M.Y., Y.Z., T.L., H.Z.; *Project administration*: W-k.M. and T.L.; *Resources*: W-k.M.; *Supervision* W-k.M. and T.L.; *Validation*: T.L., M.Y., H.Z., and W-k.M.; *Writing-original draft*: T.L. and M.Y.; *Writing-review and editing*: M.Y., T.L.., and H.Z.

Conflicts of Interest

None declared.

Data availability

The data can be achieved via email to the corresponding author at: wkming2@cityu.edu.hk

Multimedia Appendix 1

References

1. Ma X, Ai J, Cai J, Chen S, Wang S, Zhang H, et al. Dynamic disease manifestations among non-severe COVID-19 patients without unstable medical conditions: a follow-up study—Shanghai Municipality, China, March 22–May 03, 2022. China CDC Weekly. 2022;4:1-6.
2. Bai W, Sha S, Cheung T, Su Z, Jackson T, Xiang YT. Optimizing the dynamic zero-COVID policy in China. International journal of biological sciences. 2022;18(14):5314-6. PMID: 36147473. doi: 10.7150/ijbs.75699.
3. Dyer O. Covid-19: Lockdowns spread in China as omicron tests "zero covid" strategy. BMJ (Clinical research ed). 2022 Mar 31;376:o859. PMID: 35361680. doi: 10.1136/bmj.o859.
4. Qian Y, Cao S, Zhao L, Yan Y, Huang J. Policy choices for Shanghai responding to challenges of Omicron. Frontiers in public health. 2022;10:927387. PMID: 36016887. doi: 10.3389/fpubh.2022.927387.
5. Zhang X, Zhang W, Chen S. Shanghai's life-saving efforts against the current omicron wave of the COVID-19 pandemic. Lancet (London, England). 2022 May 28;399(10340):2011-2. PMID: 35533708. doi: 10.1016/s0140-6736(22)00838-8.
6. Ganesan B, Al-Jumaily A, Fong KNK, Prasad P, Meena SK, Tong RK. Impact of Coronavirus Disease 2019 (COVID-19) Outbreak Quarantine, Isolation, and Lockdown Policies on Mental Health and Suicide. Frontiers in psychiatry. 2021;12:565190. PMID: 33935817. doi: 10.3389/fpsyt.2021.565190.
7. Pfefferbaum B, North CS. Mental Health and the Covid-19 Pandemic. The New England journal of medicine. 2020 Aug 6;383(6):510-2. PMID: 32283003. doi: 10.1056/NEJMp2008017.
8. Hossain MM, Tasnim S, Sultana A, Faizah F, Mazumder H, Zou L, et al. Epidemiology of mental health problems in COVID-19: a review. F1000Research. 2020;9:636. PMID: 33093946. doi: 10.12688/f1000research.24457.1.
9. Moccia L, Janiri D, Pepe M, Dattoli L, Molinaro M, De Martin V, et al. Affective temperament, attachment style, and the psychological impact of the COVID-19 outbreak: an early report on the Italian general population. Brain, behavior, and immunity. 2020 Jul;87:75-9. PMID: 32325098. doi: 10.1016/j.bbi.2020.04.048.
10. Lee K, Jeong GC, Yim J. Consideration of the Psychological and Mental Health of the Elderly during COVID-19: A Theoretical Review. International journal of

environmental research and public health. 2020 Nov 3;17(21). PMID: 33153074. doi: 10.3390/ijerph17218098.
11. Banerjee D. The impact of Covid-19 pandemic on elderly mental health. International journal of geriatric psychiatry. 2020 Dec;35(12):1466-7. PMID: 32364283. doi: 10.1002/gps.5320.
12. Choudhari R. COVID 19 pandemic: Mental health challenges of internal migrant workers of India. Asian journal of psychiatry. 2020 Dec;54:102254. PMID: 32593122. doi: 10.1016/j.ajp.2020.102254.
13. Liem A, Wang C, Wariyanti Y, Latkin CA, Hall BJ. The neglected health of international migrant workers in the COVID-19 epidemic. The lancet Psychiatry. 2020 Apr;7(4):e20. PMID: 32085842. doi: 10.1016/s2215-0366(20)30076-6.
14. Liu JJ, Bao Y, Huang X, Shi J, Lu L. Mental health considerations for children quarantined because of COVID-19. The Lancet Child & adolescent health. 2020 May;4(5):347-9. PMID: 32224303. doi: 10.1016/s2352-4642(20)30096-1.
15. de Figueiredo CS, Sandre PC, Portugal LCL, Mázala-de-Oliveira T, da Silva Chagas L, Raony Í, et al. COVID-19 pandemic impact on children and adolescents' mental health: Biological, environmental, and social factors. Progress in neuro-psychopharmacology & biological psychiatry. 2021 Mar 2;106:110171. PMID: 33186638. doi: 10.1016/j.pnpbp.2020.110171.
16. Imran N, Zeshan M, Pervaiz Z. Mental health considerations for children & adolescents in COVID-19 Pandemic. Pakistan journal of medical sciences. 2020 May;36(Covid19-s4):S67-s72. PMID: 32582317. doi: 10.12669/pjms.36.COVID19-S4.2759.
17. Ravens-Sieberer U, Kaman A, Erhart M, Devine J, Schlack R, Otto C. Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. European child & adolescent psychiatry. 2022 Jun;31(6):879-89. PMID: 33492480. doi: 10.1007/s00787-021-01726-5.
18. Chatterjee SS, Barikar CM, Mukherjee A. Impact of COVID-19 pandemic on pre-existing mental health problems. Asian journal of psychiatry. 2020 Jun;51:102071. PMID: 32334407. doi: 10.1016/j.ajp.2020.102071.
19. Kavoor AR. COVID-19 in People with Mental Illness: Challenges and Vulnerabilities. Asian journal of psychiatry. 2020 Jun;51:102051. PMID: 32298968. doi: 10.1016/j.ajp.2020.102051.
20. Lu Y, Zhou Y, Li Y, Cao J, Zhao W, Hu Y, et al. Mental health during the omicron pandemic: A comparison between medical staff and non-medical staff. Journal of Affective Disorders. 2023 2023/11/01/;340:221-7. doi: https://doi.org/10.1016/j.jad.2023.08.005.
21. Habersaat KB, Betsch C, Danchin M, Sunstein CR, Böhm R, Falk A, et al. Ten considerations for effectively managing the COVID-19 transition. Nature human behaviour. 2020 Jul;4(7):677-87. PMID: 32581299. doi: 10.1038/s41562-020-0906-x.
22. Ilesanmi OS, Bello AE, Afolabi AA. COVID-19 pandemic response fatigue in Africa: causes, consequences, and counter-measures. The Pan African medical journal. 2020;37(Suppl 1):37. PMID: 33456661. doi: 10.11604/pamj.supp.2020.37.37.26742.
23. Bodas M, Peleg K. Pandemic Fatigue: The Effects Of The COVID-19 Crisis On

Public Trust And Compliance With Regulations In Israel. Health affairs (Project Hope). 2021 Aug;40(8):1225-33. PMID: 34339236. doi: 10.1377/hlthaff.2021.00171.
24. Liu H, Chen C, Cruz-Cano R, Guida JL, Lee M. Public Compliance With Social Distancing Measures and SARS-CoV-2 Spread : A Quantitative Analysis of 5 States. Public health reports (Washington, DC : 1974). 2021 Jul-Aug;136(4):475-82. PMID: 33909541. doi: 10.1177/00333549211011254.
25. Petherick A, Goldszmidt R, Andrade EB, Furst R, Hale T, Pott A, et al. A worldwide assessment of changes in adherence to COVID-19 protective behaviours and hypothesized pandemic fatigue. Nature human behaviour. 2021 Sep;5(9):1145-60. PMID: 34345009. doi: 10.1038/s41562-021-01181-x.
26. Rayani M, Rayani S, Najafi-Sharjabad F. COVID-19-related knowledge, risk perception, information seeking, and adherence to preventive behaviors among undergraduate students, southern Iran. Environmental science and pollution research international. 2021 Nov;28(42):59953-62. PMID: 34148194. doi: 10.1007/s11356-021-14934-y.
27. Alijanzadeh M, Ahorsu DK, Alimoradi Z, Mahmoudi N, Griffiths MD, Lin CY, et al. Fear of COVID-19 and Trust in the Healthcare System Mediates the Association between Individual's Risk Perception and Preventive COVID-19 Behaviours among Iranians. International journal of environmental research and public health. 2021 Nov 19;18(22). PMID: 34831900. doi: 10.3390/ijerph182212146.
28. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? Lancet (London, England). 2020 Mar 21;395(10228):931-4. PMID: 32164834. doi: 10.1016/s0140-6736(20)30567-5.
29. Lilleholt L, Zettler I, Betsch C, Böhm R. Pandemic Fatigue: Measurement, Correlates, and Consequences2022.
30. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. International journal of biological sciences. 2020;16(10):1745-52. PMID: 32226294. doi: 10.7150/ijbs.45221.
31. Liu ZH, Zhao YJ, Feng Y, Zhang Q, Zhong BL, Cheung T, et al. Migrant workers in China need emergency psychological interventions during the COVID-19 outbreak. Globalization and health. 2020 Aug 19;16(1):75. PMID: 32814575. doi: 10.1186/s12992-020-00608-w.
32. Eshun-Wilson I, Mody A, McKay V, Hlatshwayo M, Bradley C, Thompson V, et al. Public Preferences for Social Distancing Policy Measures to Mitigate the Spread of COVID-19 in Missouri. JAMA network open. 2021 Jul 1;4(7):e2116113. PMID: 34236410. doi: 10.1001/jamanetworkopen.2021.16113.
33. Gong Y, Zhang L, Sun Y. More than just a mental stressor: psychological value of social distancing in COVID-19 mitigation through increased risk perception—a preliminary study in China. Humanities and Social Sciences Communications. 2021;8(1):1-6.
34. He J, Brytek-Matera A, Cooper M, Cui S, Chen G. Chinese translation of the Clinical Impairment Assessment (CIA 3.0): Psychometric properties and

measurement invariance across sex and age in adolescents, young adults, and adult men. Eating Behaviors. 2022;45:101623.
35. He J, Murray S, Compte EJ, Song J, Nagata JM. The Muscularity-Oriented Eating Test, Drive for Muscularity Scale, and Muscle Dysmorphic Disorder Inventory among Chinese Men: Confirmatory Factor Analyses. International Journal of Environmental Research and Public Health. 2021;18(21):11690. PMID: doi:10.3390/ijerph182111690.
36. Jin X, Li J, Song W, Zhao T. The impact of COVID-19 and public health emergencies on consumer purchase of scarce products in China. Frontiers in public health. 2020;8:617166.
37. Yearbook CS. National Bureau of Statistics of China, 2012. URL: http://www stats gov cn/tjsj/ndsj/2016/indexch htm [accessed 2022-12-19]. 2019.
38. Iliyasu R, Etikan I. Comparison of quota sampling and stratified random sampling. International Journal of Biometrics. 2021 08/21;Volume 10:24-7. doi: 10.15406/bbij.2021.10.00326.
39. de Bekker-Grob EW, Donkers B, Jonker MF, Stolk EA. Sample Size Requirements for Discrete-Choice Experiments in Healthcare: a Practical Guide. The patient. 2015 Oct;8(5):373-84. PMID: 25726010. doi: 10.1007/s40271-015-0118-z.
40. Schwarzinger M, Watson V, Arwidson P, Alla F, Luchini S. COVID-19 vaccine hesitancy in a representative working-age population in France: a survey experiment based on vaccine characteristics. The Lancet Public Health. 2021;6(4):e210-e21. doi: 10.1016/S2468-2667(21)00012-8.
41. Eshun-Wilson I, Mody A, McKay V, Hlatshwayo M, Bradley C, Thompson V, et al. Public Preferences for Social Distancing Policy Measures to Mitigate the Spread of COVID-19 in Missouri. JAMA Network Open. 2021;4(7):e2116113-e. doi: 10.1001/jamanetworkopen.2021.16113.
42. Mouter N, Boxebeld S, Kessels R, van Wijhe M, de Wit A, Lambooij M, et al. Public Preferences for Policies to Promote COVID-19 Vaccination Uptake: A Discrete Choice Experiment in The Netherlands. Value in Health. 2022 2022/08/01/;25(8):1290-7. doi: https://doi.org/10.1016/j.jval.2022.03.013.
43. Sicsic J, Blondel S, Chyderiotis S, Langot F, Mueller JE. Preferences for COVID-19 epidemic control measures among French adults: a discrete choice experiment. The European Journal of Health Economics. 2022 2022/03/19. doi: 10.1007/s10198-022-01454-w.
44. Bridges JF, Hauber AB, Marshall D, Lloyd A, Prosser LA, Regier DA, et al. Conjoint analysis applications in health--a checklist: a report of the ISPOR Good Research Practices for Conjoint Analysis Task Force. Value Health. 2011 Jun;14(4):403-13. PMID: 21669364. doi: 10.1016/j.jval.2010.11.013.
45. Adams J, Bateman B, Becker F, Cresswell T, Flynn D, McNaughton R, et al. Effectiveness and acceptability of parental financial incentives and quasi-mandatory schemes for increasing uptake of vaccinations in preschool children: systematic review, qualitative study and discrete choice experiment. Health Technol Assess. 2015 Nov;19(94):1-176. PMID: 26562004. doi: 10.3310/hta19940.
46. Fitzpatrick KM, Harris C, Drawve G. Fear of COVID-19 and the mental health consequences in America. Psychological trauma : theory, research, practice and policy. 2020 Aug;12(S1):S17-s21. PMID: 32496100. doi: 10.1037/tra0000924.

47. Balbuena L, Monaro M. Fear of Infection and the Common Good: COVID-19 and the First Italian Lockdown. International journal of environmental research and public health. 2021 Oct 28;18(21). PMID: 34769858. doi: 10.3390/ijerph182111341.
48. Almeida V, Barrios S, Christl M, De Poli S, Tumino A, van der Wielen W. The impact of COVID-19 on households´ income in the EU. Journal of economic inequality. 2021;19(3):413-31. PMID: 34093098. doi: 10.1007/s10888-021-09485-8.
49. Li TW, Lee TM, Goodwin R, Ben-Ezra M, Liang L, Liu H, et al. Social Capital, Income Loss, and Psychobehavioral Responses amid COVID-19: A Population-Based Analysis. International journal of environmental research and public health. 2020 Nov 29;17(23). PMID: 33260472. doi: 10.3390/ijerph17238888.
50. O'Driscoll M, Ribeiro Dos Santos G, Wang L, Cummings DAT, Azman AS, Paireau J, et al. Age-specific mortality and immunity patterns of SARS-CoV-2. Nature. 2021 Feb;590(7844):140-5. PMID: 33137809. doi: 10.1038/s41586-020-2918-0.
51. Giorgi G, Lecca LI, Alessio F, Finstad GL, Bondanini G, Lulli LG, et al. COVID-19-Related Mental Health Effects in the Workplace: A Narrative Review. International journal of environmental research and public health. 2020 Oct 27;17(21). PMID: 33120930. doi: 10.3390/ijerph17217857.
52. Grolli RE, Mingoti MED, Bertollo AG, Luzardo AR, Quevedo J, Réus GZ, et al. Impact of COVID-19 in the Mental Health in Elderly: Psychological and Biological Updates. Molecular neurobiology. 2021 May;58(5):1905-16. PMID: 33404981. doi: 10.1007/s12035-020-02249-x.
53. Huang C, Feng Q, Zhang B, Ren H, Liu Z, Kang Y, et al. Income and social support related with mental health during COVID-19 outbreak in China. Medicine. 2022 Mar 11;101(10):e29022. PMID: 35451402. doi: 10.1097/md.0000000000029022.
54. Gritsenko V, Skugarevsky O, Konstantinov V, Khamenka N, Marinova T, Reznik A, et al. COVID 19 Fear, Stress, Anxiety, and Substance Use Among Russian and Belarusian University Students. International journal of mental health and addiction. 2021;19(6):2362-8. PMID: 32837418. doi: 10.1007/s11469-020-00330-z.

Supplementary Files

Multimedia Appendixes

Supplementary information.
URL: http://asset.jmir.pub/assets/cf021c8c38529a67847c72cb5c4b4165.pdf

Response letter to editors and reviewers point-by-point.
URL: http://asset.jmir.pub/assets/636ac3e11e6cf194ba2fc140379603e5.pdf