

Why do Chinese older adults in Hong Kong delay or refuse COVID-19 vaccination? A qualitative study based on Grounded Theory

Wendy Wing Tak Lam

University of Hong Kong School of Public Health <https://orcid.org/0000-0003-2383-0149>

Jingyi Xiao

University of Hong Kong School of Public Health

Michael Yuxuan Ni

University of Hong Kong School of Public Health <https://orcid.org/0000-0002-1217-5858>

Benjamin John Cowling

University of Hong Kong School of Public Health <https://orcid.org/0000-0002-6297-7154>

Qiuyan Liao (✉ qyliao11@hku.hk)

University of Hong Kong School of Public Health <https://orcid.org/0000-0002-1105-6857>

Jiehu YUAN

University of Hong Kong School of Public Health <https://orcid.org/0000-0003-3429-8514>

Research Article

Keywords: vaccine hesitancy, vaccine refusal, older adults, vaccination decision-making

Posted Date: April 18th, 2022

DOI: <https://doi.org/10.21203/rs.3.rs-1569282/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

Older adults have been disproportionately affected by the COVID-19 pandemic. While COVID-19 vaccines are effective for reducing mortality and severe complications, vaccine hesitancy remains a substantial concern particularly among older adults.

Objective

This was a qualitative study to explore the psychological and contextual factors that contribute to Chinese older adults' delay or refusal of COVID-19 vaccines.

Methods

Semi-structured in-depth interviews were conducted with 27 older adults aged ≥ 60 years who had never received COVID-19 vaccines. Grounded Theory approach guided the selection of informants, data collection, data analysis and report writing.

Results

Participants who delayed or refused COVID-19 vaccination exhibited a spectrum of vaccine-resistant and vaccine-hesitant attitudes which were weaved into the contexts of lacking decisional support from doctors, family and the government, and attitude roots of negative perception of ageing, fatalistic risk attitudes, low health literacy, present time perspective and negative values on western biomedicine, and reliance on the peripheral processing of vaccine-related information. While participants refused or delayed COVID-19 vaccination, they turned to alternative coping strategies to regain self-control in the pandemic.

Conclusions

Interventions to address vaccine hesitancy in older adults should focus on addressing attitude roots and strengthening the connectivity of older people with family, doctors, and government to engage older people in the vaccination decision making. Risk communication should shift to provide more personal relevant information in a caring style, meet older adults' preference for peripheral information processing, and address their existing misperceptions about COVID-19 vaccines.

Introduction

The COVID-19 pandemic has disproportionately affected older adults (1). Hong Kong, a metropolis with 18% of its 7 million population aged 65 years or above, had been severely affected by its fifth wave of COVID-19 pandemic caused by the omicron variant since January 2022. As of 5 April 2022, the fifth wave of COVID-19 pandemic in Hong Kong had directly or indirectly resulted in more than 8,000 deaths, with more than 95% of the deaths occurring in persons aged 60 years or above (2). Vaccination against COVID-19 is an effective intervention to reduce risk of severe complications and mortality due to COVID-19 in older adults (3). The case-fatality rates were 0.36% and 3.1% in older adults aged 70–79 and 80 years or above who had received at least two doses of COVID-19 vaccines, respectively, comparing to the case-fatality rates of 5.6% and 16% in the two respective age groups who were unvaccinated in Hong Kong (4). However, older adults' vaccine hesitancy remained high in Hong Kong. As of December 2021, before the fifth wave of COVID-19 pandemic in Hong Kong, around 35%, 50% and 80% of those aged 60–69, 70–79 and 80 years or above, respectively, had not received any dose of COVID-19 vaccines (5), whilst COVID-19 vaccination uptake rates in people aged 60 or above were above 90% in the United Kingdom, Singapore, and New Zealand (6–8).

Various contextual and psychosocial factors were associated with high COVID-19 vaccine hesitancy in older adults. These included distrust in authorities (9–11), the healthcare systems and vaccine manufacturers (12, 13), lacking recommendation from healthcare workers (11, 14, 15), concerns about vaccine safety and efficacy (13–16), and perceived low personal risk from COVID-19 (11, 14, 17). Most of the identified factors were derived from cross-sectional questionnaire-based surveys (10–12, 14–18). However, vaccination decision making is a complex process that involves multiple contextual and psychosocial factors and their interactions (19–21), which cannot be captured with purely questionnaire-based surveys. This highlights the need to conduct qualitative studies to exhaustively explore factors surrounding older adults' vaccination decision and the mechanisms through which these factors shape their final vaccination decision (22).

By the time of this writing, two qualitative studies regarding older adults' decision making for COVID-19 vaccination were identified (9, 23). Both were conducted before a COVID-19 vaccine was available when older adults did not have actual experiences with COVID-19 vaccination decision. In addition, both were descriptive qualitative studies without following specific qualitative methodological frameworks, which hindered full exploration of older adults' decision-making processes and vaccine hesitancy. Given that making vaccination decision involves ongoing interpretation of meaning and situations produced by individuals, Grounded Theory is a useful qualitative methodology to explore older adults' vaccination decision making (24, 25). Grounded theory emphasizes on revealing the "process" of or diverse perspectives surrounding a phenomenon in specific contexts, aiming to construct a "theory" grounded in data (26). It consists of systematic inductive, iterative, and constantly comparative approaches of working with the data through which a "theory" can be developed (24–26).

Existing studies on COVID-19 vaccination decision sampled general older adults (9–18, 23) without a focus on the vaccination hesitant or resistant group. To address the knowledge gaps, this qualitative study purposefully sampled older adults who delayed or refused COVID-19 vaccination to deeply explore

their concerns and the challenges they experienced regarding COVID-19 vaccination and described the process of how the identified factors resulted in final vaccine hesitancy or resistance in older adults.

Methods

Settings

We conducted regular population-based surveys to monitor the Hong Kong public's COVID-19 vaccine hesitancy since June 2020 (27). Although our surveys identified increasing vaccine hesitancy and low uptake of COVID-19 vaccines in older adults (28), there remained limited understanding about what shaped older adults' high vaccine hesitancy and the processes. To address these knowledge gaps, potential eligible subjects were identified from the regular population-based surveys from December 2021 to January 2022 for the current qualitative study. All in-depth interviews were conducted between 16 December 2021 and 23 January 2022 when daily number of COVID-19 confirmed cases caused by omicron variant started to rapidly increase in Hong Kong (29).

Participants

A total of 78 potentially eligible subjects who were aged ≥ 60 years and had never received COVID-19 vaccines were identified from the regular population-based surveys and gave their consent to participate in this qualitative study if they were invited. All identified older adults were community-dwelling. Other inclusion criteria included cognitively being able to complete the in-depth interview via telephone and being able to communicate in Chinese or English. Guided by Grounded Theory (25, 26), purposive theoretical sampling was employed to choose an initial set of participants who had heterogeneous demographic backgrounds and levels of COVID-19 vaccine confidence. Selection of subsequent informants was guided by emerging themes. Selection of informants, data collection and data analysis were iterative until we achieved theoretical data saturation which was defined as no new themes emerging from the last three consecutive interviews (24).

Ethical issues

Participants gave their verbal consents before the telephone-based in-depth interview started. This study has obtained ethical approval (Reference No.: UW 20-095).

Data collection

A semi-structured interview guide was drafted, pretested, and refined before the interviews started (Supplementary Appendix S1). The in-depth interviews began with a question of "Can you tell me why you have yet to receive a COVID-19 vaccine?" Participants were encouraged to talk as much as possible using questions that were not specific to any contextual factors at the very beginning. As the interview proceeded, questions to explore the influences of specific contextual factors such as family and doctors' opinions were explored if these factors were not mentioned by participants themselves. Each interview lasted ~30 minutes and was audio taped.

Data Analysis

All in-depth interviews were transcribed verbatim. To enable concurrent analysis, each interview was transcribed and analyzed after it was completed. Data from the former interview were used to guide recruitment of subsequent informants and what to be further explored in subsequent interviews. Based on the Grounded Theory, data analysis began with open coding to break down the data into meaningful elements by repeatedly reading the transcripts line by line. New codes were allowed to freely emerge during open coding. During this stage, the researcher constantly compared new emerging codes and existing codes for their similarities and differences to ensure all codes were conceptually different. Then axial coding was conducted during which codes were sorted, clustered, synthesized and developed into categories or subcategories. Thereafter, selective coding was employed to make connections between categories and subcategories to generate main research themes. A model was finally constructed to explain the interrelationships among research themes for understanding older adults' delay or refusal of COVID-19 vaccination. All qualitative data were managed and analyzed using QSR Nvivo 12.0.

Results

27 participants finally completed the in-depth interviews to reach data saturation. Of these participants, 14 were aged 70-79 years and eight were above 80 years old, while the remaining were 60-69 years old. In total, eighteen participants reported having been diagnosed with at least one chronic disease. A summary of participants' demographics is provided in Table 1.

Five research themes were identified to explain older adults' decision making for refusing or delaying COVID-19 vaccination (Figure 1). During the interviews, we identified a spectrum of vaccine-resistant and vaccine-hesitant attitudes relating to COVID-19 vaccines. Their vaccine-resistant and vaccine-hesitant attitudes were weaved into the contexts of lacking sufficient decisional support from doctors, family, and government, their attitude roots of negative perception of ageing, fatalistic risk attitudes, low health literacy, present time perspectives and negative value on western biomedicine, as well as reliance on peripheral processing of vaccine-related information. While participants delayed or refused vaccines, they turned to alternative coping strategies to regain self-control in the pandemic.

Insufficient social support in decision making

Participants generally received low support for their decision making regarding taking COVID-19 vaccination from doctors, family, and the government.

Lack of decisional support from doctors

Participants exhibited great trust but received limited support from doctors for COVID-19 vaccination decision. For most participants, lacking explicit recommendation or endorsement by doctors resulted in vaccine delay or refusal. Older adults generally take a less active role in their communication with doctors about the vaccines. Whilst perceiving lack of knowledge prompted older people to unconditionally

believed in doctor's judgement (including no recommendation for vaccine uptake), making the shared decision-making less possible.

None of the participants received doctor's recommendation/advice for taking COVID-19 vaccination unless they initiated the discussion with doctors about the vaccines. Of these participants who proactively asked their doctors about their eligibility for COVID-19 vaccination, however, only one received a firm recommendation from his doctor. The others mentioned that they remained hesitant after talking to their doctors about COVID-19 vaccines because their doctors gave ambiguous advice.

"I proactively asked (about the vaccine-related issues) twice... for the first time, the doctor asked me not to get vaccinated now and wait for a while due to my blood issue...For the second time, he said my blood turns normal, but told me that I should decide on my own..." (EV10).

Most participants indicated that they would rather passively wait for doctor's recommendation. One major reason for this was their concern that this would harm their long-term relationship with doctors.

"When I asked him (the doctor) 'how is my illness?', he was annoyed and unhappy. I am also worried about asking too many questions, which may make him feel unhappy... I would rather just take the medicine the doctor prescribed for me without asking questions..." (EV09).

Another reason for participants' unwillingness to discuss with their doctors about vaccines was perceiving lacking professional knowledge to initiate such discussion.

"I never think about discussing (vaccine-related issues) with the doctor... Because I do not know much about this field, and I am not good at communicating... If I discuss with the doctor, I am afraid that the next medical consultation will be interrupted" (EV11)

Lack of family support for COVID-19 vaccination

Participants consistently indicated that their families tended to return the vaccination decision back to themselves. Most participants lived alone or merely with other old family members (e.g., spouse) and thereby lacked connectivity with other family members (e.g., their children).

"My daughter did not give me any response... I think she prefers a free choice, depending on my own decision. I think she has no opinion." (EV07).

Lacking tangible support from family for getting to the vaccination site was also identified, especially for participants who had physical difficulties to travel to the vaccination venues.

"I asked my son to take me to (the vaccination venue), maybe he was not available... If my son accompanies me to get vaccination, then I will go with him..." (EV13)

Four participants, all of whom were female, worried about burdening other family if adverse effects occurred due to vaccination.

“If you take your old parents to take a vaccine and they really have some bad consequences, as their child, you won’t get peace...I understand their difficulty.” (EV06)

Insufficient decisional support from the government

As participants could not obtain clear recommendation from doctors and opinions from family, participants sought information from the government. However, information from the government was perceived to be confusing and insufficient, which prompted feeling of being “ignored” or not being involved in the vaccination decision-making process.

“The vaccination recommendation (from the government) is relatively uncommon... The government should show more concern and care for the elderly, telling us more vaccine-related information ... We can only learn from the news through television and radio ... We know little about other aspects about the vaccines... There are two types of vaccines available, one is Sinovac, and another is BioNTech. I don’t know which one is better, or which one is more suitable for the older people.” (EV15)

Attitude roots

Attitude roots are factors relevant to older adults’ personal values and historical education, serving as the underlying psychological factors that shape older adults’ attitudes and preference for COVID-19 vaccination, and perception of personal risk from COVID-19. During the interviews, participants repeatedly identified themselves to have more vulnerable health condition due to ageing. The negative self-perception of ageing constantly linked to their fatalistic views on pandemic risk and perception of being more physically vulnerable to vaccine risk. Participants’ concerns about vaccine risk were also rooted in their low health literacy which resulted in various misunderstandings about COVID-19 vaccines, a tendency to value the present more than the future, and negative value on western biomedicine.

Negative self-perception of ageing

Participants repeatedly mentioned their attitudes to death though not being prompted by the interviewer. They perceived that death was acceptable and “inevitable” as they aged. These thoughts prompted fatalistic views on the pandemic risk.

“No matter alive or dead, (my life) has already come to an end... nothing scares me” (EV19)

Eight participants expressed concerns about their ineligibility for taking a novel vaccine because of perceiving themselves to be “special” and “different”. Such belief was prompted by social comparison with other healthy and younger people.

“Young people’s physical function is definitely different from mine... They don’t have big health issues, of course they can take a vaccine...But I am different, I am fear of taking one (vaccine)” (EV05).

Fatalistic views on the pandemic risk

Participants repeatedly expressed little control over the pandemic risk. Eleven participants mentioned a “go-with-flow” attitude towards risk and believed that avoiding thinking too much was a coping strategy.

“It is inevitable when the COVID-19 virus comes... I will go with my flow.” (EV17)

Some participants attributed the cause of COVID-19 to luck or supernatural power, indicating perceiving low controllability over the pandemic.

“(The pandemic) is a natural phenomenon... The earth has so many rubbish that need to be cleared out...So this is God’s intention, some people should be wept out (from the pandemic) ... it is unavoidable...” (EV02).

Low health literacy

During the interviews, some misunderstandings about COVID-19 vaccines were identified. These misunderstandings reflected generally low health literacy of the participants. For instance, participants perceived that COVID-19 vaccines were for treatment rather than prevention.

“Why should I take a vaccine, I have no illness and pain!” (EV11)

Some participants held the belief that COVID-19 vaccination could increase asymptomatic infections which accelerated transmission.

“If people get too many vaccines, then they will become asymptomatic even get infection...They won’t realize this problem and walk around, this may cause virus spread and let others get infected as well...” (EV26)

Some participants perceived that they had limited medical knowledge and thereby were not confident to make vaccination decision.

“According to the experts, it will be better to take a vaccine...But you know, my medical knowledge is limited so I feel hard to make a judgement on that...” (EV02)

Present-oriented time perspective

Participants who were above 70 years old exhibited a present-focused time perspectives, valuing the importance of living for the moment rather than the prevention of future risk. This can be partly attributed to their perception of ageing. The present time perspective may drive a greater attention to the proximal cost caused by vaccination than future pandemic risk.

“It (the pandemic) is not a present matter...I will only think about it when I get infected in future later...I cannot foresee how the future will be.” (EV20)

Participants frequently expressed contentment with present and a preference for status quo.

“Many old people at my age have to use a crutch and they walk slower than me...So you asked me about getting infection (with COVID-19), I will tell you I don’t care too much. Present is good enough...” (EV02).

Negative value on western biomedicine

During the interviews, some participants expressed their preference for traditional Chinese medicine over western biomedicine including vaccination, which shaped a negative attitude towards vaccination.

“I seldom go to see doctors of western medicine. I usually go to see doctors of Chinese medicine... it is very annoying to take western medicine and get vaccinated at old age.” (EV24).

Peripheral processing of vaccine-related information

Peripheral information processing refers to reliance on cues, affect and personal experience rather than logics and cognitive deliberation to make risk judgment (30). When informational support from doctors, family and the government was insufficient, attitude roots became salient to prime participants’ attention to the more affect-loaded negative vaccine-related information from news reports or peers but rejected government’s explanations for the potential vaccine adverse effects. That is, a greater reliance on the peripheral information processing to evaluate the vaccine risk. The negative vaccine-related information usually contained more contextual information to allow mental simulation and affective cues being prioritized compared with government’s response to the negative vaccine-related reports.

Simulation of negative news reports about COVID-19 vaccines

Sixteen participants expressed their concerns about news on sudden deaths immediately following COVID-19 vaccination. They mentioned the characteristics of those reported death cases, for instance, having an older age and chronic diseases, which facilitated mental simulation of an event happening to themselves.

“I watched TV news earlier saying that some old people died due to their chronic illnesses (after taking vaccination), I also suffer from chronic illnesses...” (EV05).

Dissatisfaction with government’s response to potential vaccination adverse events

Meanwhile, participants expressed high dissatisfaction with the government’s official declaration of “no link existed between vaccination and the death cases”. This prompted them to interpret government’s response as an excuse to avoid responsibility. Such dissatisfaction was partly arisen from insufficient support from the government and deteriorated trust.

“HKSAR government is absurd...they claimed that vaccination has nothing to do with any consequences, even the two death cases were not relevant to vaccination... I do not believe in such statement.” (EV21).

Prioritizing negative anecdotal vaccination information from peers

Participants particularly those had chronic diseases highly valued the negative anecdotal information. Anecdotal information was usually peers' or family's personal experience and storytelling, hence were perceived to be more persuasive to participants.

"One of my schoolmates is an asthma sufferer, he had already got vaccinated and afterwards he fainted on the street one day... Then I am more worried about vaccination after knowing about his faint... and thus I am not willing to get vaccination..." (EV09)

Vaccine-hesitant and vaccine-resistant attitudes

Participants exhibited a spectrum of vaccination attitudes ranging from complete vaccine refusal or wait-and-see due to doubting vaccine efficacy and necessity, concern about vaccine safety and side effects, insufficient incentives for taking vaccination and feeling disgust about vaccine passport, to growing acceptance. Participants' vaccine-hesitant and vaccine-resistant attitudes were manifested in their understanding, attitudes and feeling about vaccine efficacy, necessity, vaccination benefits, vaccine safety and vaccine side effects, which were weaved into the context of lacking decisional support, attitude roots and the peripheral processing of vaccine-related information.

Complete vaccine refusal and distrust

Complete vaccine refusal resulted from complete distrust in vaccine efficacy, distrust in vaccine safety, distrust in the government, and fatalistic view on risk.

"I don't believe (in the efficacy of the vaccines) and have no interest to take one... They (the government) claimed that you won't fear anything after taking the vaccine...how that possible?" (EV01)

"Nothing can help...any vaccines are useless at my old age" (EV27).

Doubting vaccine efficacy and necessity

Most participants doubted the vaccine efficacy and necessity and thereby preferred wait-and-see. Doubting about vaccine efficacy was arisen from their impression that vaccines failed to protect against infections and insufficient understanding about the purposes of taking vaccine boosters. This was rooted in participants' low health literacy and insufficient informational support for their vaccination decision making.

"Some people took two doses of vaccines but still got infected...then why should I take the vaccine?" (EV17)

"To be honest, I don't fully believe vaccines can provide enough protection for me...Because even I take one, I still need the second dose and the third dose..." (EV08)

Concern about vaccine safety and side effects

Some participants raised their concerns about vaccine safety which linked to their peripheral processing of vaccine-related information and negative self-perception of ageing.

“The majority of older people are concerned about vaccination... they are worried about uncertain reactions after vaccination if they have any hidden illnesses...” (EV17).

Participants also raised their concerns about the vaccine novelty and quick development.

“I am more confident in the flu vaccine because it is mature...But the COVID-19 vaccines are just new products...” (EV18).

Participants who were more present-oriented mentioned their concerns about the immediate vaccination cost such as injection pain and discomfort.

Perceived insufficient incentives for taking vaccination

Some mentioned that current incentives for encouraging vaccination were personally irrelevant and would wait until the government gave more personally relevant incentives for vaccination.

“They (other people) preferred going to mainland China, they need to take a vaccine...I don't have such plan, so I won't think about it.” (EV01)

Feeling of being forced to accept the vaccines

Some participants raised their strong disgust about government's vaccine passport policy that prohibited them from accessing to their cultural activity of having Chinese style breakfast (e.g., “Yum Cha”) and public venues without vaccination.

“If I don't take a vaccine I cannot dine in the restaurant, then how should I do? Everyone won't favor such policy!” (EV14)

Growing vaccine acceptance

Participants who perceiving an increasing norm of accepting the COVID-19 vaccines seemed to be reassured about the vaccine safety and indicated planning to accept the vaccines.

“I see more people take the vaccine now, I think there will be no big problems...I plan to take one later.” (EV25)

Strategies to regain self-control in the pandemic

While participants refused or delayed vaccines, they turned to various strategies to obtain a sense of self-control in the pandemic. These strategies are illustrated below.

Avoiding vaccination decision

Avoid deliberating the vaccine-related information and discussing about COVID-19 vaccination with others was a strategy to keep participants from being “bothered” by the vaccination decision.

“Discussing (vaccines) with others is useless, they cannot inject for you right? ... So, I would leave myself quiet and don’t think too much on that.” (EV01)

Downplaying the pandemic risk

Many participants downplayed the pandemic risk to lower necessity or urgency for making the vaccination decision.

Such optimism was arisen from their past illness experiences:

“At this age, I am not worried about this virus... because I can actually suffer from any illnesses...So I would just go with flow.” (EV02).

Their experience of survival through the past pandemics:

“I do not find this COVID-19 pandemic severe... During SARS, nothing happened even though I did not wear masks...People at my old age cannot worry too much.” (EV04).

And pandemic situation comparison:

“I read the news reports worldwide...the probability of getting infection is so high! But Hong Kong is totally different, so I don’t feel worried in Hong Kong.” (EV22)

Contentment with nonpharmaceutical risk-reduction strategies

Almost all participants mentioned that they stuck with nonpharmaceutical measures such as avoiding the crowds and maintaining good personal hygiene and perceived this strategy to be within personal control and sufficient to protect against COVID-19.

“I am not too worried about the COVID-19 pandemic, since I have done well in my personal hygiene, and I avoid going to crowded places.” (EV10)

Waiting for “better” interventions

Participants indicated that they preferred to wait for better medical interventions, such as oral medication or one-shot COVID-19 vaccine.

“It would be better and more convenient to take oral medication. Vaccine components will enter the blood, while oral medication is absorbed through the digestion in stomach.” (EV09).

Discussion

This study built a model for explaining older adults' decision-making process of delay and refusal of COVID-19 vaccination. First, our study revealed that lacking sufficient decision support was an important contextual factor shaping older adults' vaccination resistance and hesitancy. Existing studies had highlighted the importance of doctors' recommendation (11, 14, 15), family encouragement (11, 19–21), and trust in government (9, 11) on older adults' vaccination uptake. However, our study revealed that doctors seldom initiated the discussion about COVID-19 vaccines or if they were asked by older people, preferred giving ambiguous opinions. On the other hand, older adults tended to avoid discussing COVID-19 vaccination with doctors due to fear of burdening doctors or believed that doctors had made implicit judgment about their vaccination eligibility. Unlike older people in selected Western settings who could maintain long-term and stable relationship with their family doctors (19, 23), older people in Hong Kong heavily relied on the healthcare services from the public health sector without continuity of care (31) and hence were unable to develop stable relationship with a doctor (32). Lacking a strong doctor-patient relationship can reduce older people's willingness and confidence to communicate with the doctors. Furthermore, Hong Kong older adults who lacked connectivity with their younger family members seldom received family members' opinions and instrumental support for vaccination decision. Family may avoid the surrogate decision makers for their older family's vaccination to avoid feeling of self-blaming or blaming by other family (33) and hence returned the decision back to older people themselves. Information from the government was also perceived to be insufficient, irrelevant, and irresponsible. All these can turn older adults to put more weights on affect-loaded and anecdotal information, which resulted into overconcern about vaccine risk.

Second, our study revealed various attitude roots that shaped older adults' information processing style, vaccine hesitancy, and vaccine resistance. One attitude root was negative self-perception of ageing. Older adults tended to perceive themselves as ineligible for vaccination and more vulnerable to vaccine side effects because of their older age. The negative self-perception of ageing was closely linked to their fatalistic risk attitudes, which can erode their confidence in vaccines and controllability over the pandemic. Older adults generally had low health literacy which resulted into various misunderstandings and misperceptions about vaccines. Some older adults valued the importance of living-for-the-moment over prevention of future risk and hence preferred status quos to avoid any vaccine-related costs. These findings align with the Socioemotional Selective Theory (34) that older people tend to prioritize present-focused goals for emotional stability. In addition, some older adults had negative values towards western medicine, which may link to their cultural values, norms, and habit of using traditional Chinese medicine for health management (35, 36).

Third, insufficient decisional support and their existing attitude roots could drive reliance on the peripheral information processing to judge COVID-19 vaccine risk (37). Compared with the official vaccine safety declaration, negative news reports about vaccines and negative anecdotal information from peers carried more contextual information and affective cues to allow older people to mentally simulate the events happening to themselves, and thereby was more influential on their vaccine risk judgment. This

highlights the importance of taking a more honest, context-based and caring communication style to meet older people's information-processing style and meet their needs for information (37, 38).

Shaping by insufficient decisional support, attitude roots and peripheral information processing, participants exhibited a spectrum of vaccine-hesitant and vaccine-resistant attitudes. Existing studies usually dichotomized older adults' vaccine attitudes as either acceptance or hesitancy/resistance (9, 10, 13, 15–18), this may overlook the heterogeneity in vaccine-related attitudes and the dynamic changes of such attitudes. We found that complete vaccine refusal was linked to distrust in government which resulted into distrust in vaccine safety and efficacy, fatalistic attitudes to pandemic risk, and negative perception of ageing. Participants who were wait-and-see were more likely to doubt the vaccine efficacy and necessity, worry about vaccine safety and side effects, and perceive no personally relevant vaccination benefits. These wait-and-see vaccine attitudes could be due to previous communications emphasizing taking COVID-19 vaccination for prevention of infection and achievement of herd immunity (39), older people's low health literacy, negative perception of ageing, and present-oriented time perspectives. Vaccine passport to access to catering and public venues was perceived to be a policy that force vaccination and evoked disgust (40). Conversely, perceiving a norm of increasingly accepting the vaccines seemed to enhance vaccine confidence, indicating that priming older adults with growing norms of vaccination acceptance in peers can be a useful strategy to promote uptake of a new vaccine (41, 42).

Finally, we found that while older adults refused or delayed COVID-19 vaccination, they adopted alternative strategies to regain self-control over the pandemic. These coping strategies despite providing some relief for older adults from the stress of pandemic risk were used as the expedient excuse for delaying or rejecting COVID-19 vaccines. These interventions also reflect older adults' preference for more familiar, traditional, and low-intrusive medical interventions for management of health (43).

Overall, our study indicates that risk communication that focuses on providing statistic risk information may be insufficient to address older adults' existing attitude roots and mental models. To promote vaccine acceptance, interventions should foster connectivity of older adults with doctors, family, and the government to empower older people's vaccination decision. Interventions should also be implemented to break the self-reinforced stigma of ageing and shape a positive future time perspective in older people. The 'right' information that can fit to older people's existing mental models should be provided (44) to address their misunderstandings, misperceptions, and meet their value-driven preference.

Limitations

Our study had several limitations. First, to comply with physical distancing measures during the pandemic, all in-depth interviews were conducted over telephone rather than face to face. This limited our control over the interview setting, particularly that for the interviewees, and hindered collections of non-verbal information from the participants to deepen the analysis. Second, our study focused on exploring the process of refusing or delaying COVID-19 vaccinations in older people and thus only provided a partial picture of vaccination decision making in older people. Third, since the current study focuses on

Chinese older adults' decision-making for COVID-19 vaccines, generalizability of our findings to other cultural contexts or other vaccines warrants further investigation.

Conclusion

Older adults' vaccine hesitancy and resistance weaved into the context of lacking sufficient decisional support, attitude roots of negative perception of ageing, fatalistic risk attitudes, present-oriented time perspectives, and negative values on western biomedicine, and the peripheral processing of vaccine-related information. While older people refused or delayed COVID-19 vaccines uptake, they tended to adopt alternative coping strategies to regain self-control over the pandemic risk.

Declarations

Acknowledgements

We thank all the participants for participating in the in-depth interviews. We thank Fion SY for assisting with quotations translation and peer debriefing.

Conflicts of interest

BJC consults for AstraZeneca, Fosun Pharma, GSK, Moderna, Pfizer, Roche and Sanofi Pasteur. The authors report no other potential conflicts of interest.

Declaration of Sources of Funding

This study was supported by funding from the Government of the Hong Kong Special Administrative Region, the Food and Health Bureau, The Hong Kong Special Administrative Region (Grant No.: COVID19F04) and the Health and Medical Research Fund, the Food and Health Bureau, The Government of the Hong Kong Special Administrative Region (Grant No.: COVID19F11).

References

1. Nations Unations. Policy Brief: The Impact of COVID-19 on older persons. <https://unsdg.un.org/sites/default/files/2020-05/Policy-Brief-The-Impact-of-COVID-19-on-Older-Persons.pdf> (5 April 2022, date last accessed).
2. Centre for Health Protection of the Department of Health and the Hospital Authority. *Statistics on 5th Wave of COVID-19*. https://www.covidvaccine.gov.hk/pdf/5th_wave_statistics.pdf (5 April 2022, date last accessed).
3. Moghadas SM, Vilches TN, Zhang K, et al.; The Impact of Vaccination on Coronavirus Disease 2019 (COVID-19) Outbreaks in the United States. *Clinical Infectious Diseases* 2021;**73**(12):2257–2264. DOI: 10.1093/cid/ciab079.

4. Centre for Health Protection of the Department of Health. *Latest Data on COVID-19 Death Cases An Analysis of The First 1153 Death Cases*. https://www.covidvaccine.gov.hk/pdf/death_analysis.pdf (5 April 2022, date last accessed).
5. The Government of the Hong Kong Special Administrative Region. <https://www.covidvaccine.gov.hk/en/dashboard> (5 April 2022, date last accessed).
6. National Health Service (England). *COVID-19 Vaccinations*. <https://www.england.nhs.uk/statistics/statistical-work-areas/covid-19-vaccinations/> (5 April 2022, date last accessed).
7. Ministry of Health (Singapore). *Vaccination Statistics*. <https://www.moh.gov.sg/covid-19/vaccination/statistics> (5 April 2022, date last accessed).
8. Ministry of Health (New Zealand). *COVID-19: Vaccine data*. <https://www.health.govt.nz/covid-19-novel-coronavirus/covid-19-data-and-statistics/covid-19-vaccine-data> (5 April 2022, date last accessed).
9. Chen T, Dai M, Xia S; Perceived facilitators and barriers to intentions of receiving the COVID-19 vaccines among elderly Chinese adults. *Vaccine* 2022;**40**(1):100–106. DOI: 10.1016/j.vaccine.2021.11.039
10. Silva TM, Estrela M, Roque V, et al.; Perceptions, knowledge and attitudes about COVID-19 vaccine hesitancy in older Portuguese adults. *Age and Ageing* 2022;**51**(3):afac013. DOI: 10.1093/ageing/afac013
11. Wang J, Yuan B, Lu X, et al.; Willingness to accept COVID-19 vaccine among the elderly and the chronic disease population in China. *Human vaccines & immunotherapeutics* 2021:1–16. DOI: 10.1080/21645515.2021.2009290
12. Thanapluetiwong S, Chansirikarnjana S, Sriwannopas O, et al.; Factors associated with COVID-19 Vaccine Hesitancy in Thai Seniors. *Patient preference and adherence* 2021;**15**:2389. DOI: 10.2147/PPA.S334757
13. Gallant AJ, Nicholls LAB, Rasmussen S, et al.; Changes in attitudes to vaccination as a result of the COVID-19 pandemic: A longitudinal study of older adults in the UK. *PloS one* 2021;**16**(12):e0261844. DOI: <https://doi.org/10.1371/journal.pone.0261844>
14. Callow MA, Callow DD; Older Adults' Behavior Intentions Once a COVID-19 Vaccine Becomes Available. *Journal of Applied Gerontology* 2021;**40**(9):943–952. DOI: 10.1177/07334648211019205
15. Nikolovski J, Koldijk M, Weverling GJ, et al.; Factors indicating intention to vaccinate with a COVID-19 vaccine among older US Adults. *PloS one* 2021;**16**(5):e0251963. DOI: <https://doi.org/10.1371/journal.pone.0251963>
16. Boon-Itt S, Rompho N, Jiarnkamolchurn S, et al.; Interaction between age and health conditions in the intention to be vaccinated against COVID-19 in Thailand. *Human Vaccines & Immunotherapeutics* 2021:1–7. DOI: 10.1080/21645515.2021.1979378
17. Macinko J, Seixas BV, de Melo Mambrini JV, et al.; Which older Brazilians will accept a COVID-19 vaccine? Cross-sectional evidence from the Brazilian Longitudinal Study of Aging (ELSI-Brazil). *BMJ*

- open 2021;**11**(11):e049928. DOI: 10.1136/bmjopen-2021-049928
18. Gallè F, Sabella EA, Roma P, et al.; Acceptance of COVID-19 Vaccination in the Elderly: A Cross-Sectional Study in Southern Italy. *Vaccines* 2021;**9**(11):1222. DOI: <https://doi.org/10.3390/vaccines9111222>
 19. Eilers R, Krabbe P, De Melker H; Factors affecting the uptake of vaccination by the elderly in Western society. *Preventive medicine* 2014;**69**:224–234. DOI: <https://doi.org/10.1016/j.ypmed.2014.10.017>
 20. Roller-Wirnsberger R, Lindner S, Kolosovski L, et al.; The role of health determinants in the influenza vaccination uptake among older adults (65+): A scope review. *Aging clinical and experimental research* 2021;**33**(8):2123–2132. DOI: 10.1007/s40520-021-01793-3
 21. Nagata JM, Hernández-Ramos I, Kurup AS, et al.; Social determinants of health and seasonal influenza vaccination in adults ≥ 65 years: a systematic review of qualitative and quantitative data. *BMC Public Health* 2013;**13**(1):1–25. DOI: 10.1186/1471-2458-13-388
 22. Maxwell JA; Designing a qualitative study. *The SAGE handbook of applied social research methods* 2008;**2**:214–253.
 23. Fadda M, Suggs LS, Albanese E; Willingness to vaccinate against Covid-19: A qualitative study involving older adults from Southern Switzerland. *Vaccine: X* 2021;**8**:100108. DOI: 10.1016/j.jvacx.2021.100108
 24. Cho JY, Lee E-H; Reducing confusion about grounded theory and qualitative content analysis: Similarities and differences. *Qualitative report* 2014;**19**(32). DOI: 10.1177/1049732305285972
 25. Walker D, Myrick F; Grounded theory: An exploration of process and procedure. *Qualitative health research* 2006;**16**(4):547–559. DOI: 10.1016/j.vaccine.2022.01.031
 26. Charmaz K. *Constructing grounded theory: A practical guide through qualitative analysis*: sage, 2006.
 27. Liao Q, Cowling BJ, Xiao J, et al.; Priming with social benefit information of vaccination to increase acceptance of COVID-19 vaccines. *Vaccine* 2022. DOI: 10.1016/j.vaccine.2022.01.031
 28. Xiao J, Cheung JK, Wu P, et al.; Temporal changes in factors associated with COVID-19 vaccine hesitancy and uptake among adults in Hong Kong: Serial cross-sectional surveys. *The Lancet Regional Health - Western Pacific* 2022;**23**:100441. DOI: <https://doi.org/10.1016/j.lanwpc.2022.100441>
 29. School of Public Health of the University of Hong Kong. Real-time dashboard <https://covid19.sph.hku.hk/> (5 April 2022, date last accessed).
 30. Petty RE, Barden J, Wheeler SC; The elaboration likelihood model of persuasion: developing health promotions for sustained behavioral change. 2009.
 31. Yam H-K, Mercer SW, Wong L-Y, et al.; Public and private healthcare services utilization by non-institutional elderly in Hong Kong: is the inverse care law operating? *Health Policy* 2009;**91**(3):229–238. DOI: 10.1016/j.healthpol.2008.12.012
 32. He AJ, Tang VF; Integration of health services for the elderly in Asia: A scoping review of Hong Kong, Singapore, Malaysia, Indonesia. *Health Policy* 2021;**125**(3):351–362. DOI:

<https://doi.org/10.1016/j.healthpol.2020.12.020>

33. Heath S. Fears Fuel Vaccine Hesitancy, Dissuade Access for Family Caregivers. Patient Care Access News. <https://patientengagementhit.com/news/fears-fuel-vaccine-hesitancy-dissuade-access-for-family-caregivers> (5 April 2022, date last accessed).
34. Löckenhoff CE, Carstensen LL; Socioemotional selectivity theory, aging, and health: The increasingly delicate balance between regulating emotions and making tough choices. *Journal of personality* 2004;**72**(6):1395–1424. DOI: 10.1111/j.1467-6494.2004.00301.x
35. Lam T; Strengths and weaknesses of traditional Chinese medicine and Western medicine in the eyes of some Hong Kong Chinese. *Journal of Epidemiology & Community Health* 2001;**55**(10):762–765. DOI: <http://dx.doi.org/10.1136/jech.55.10.762>
36. Chung V, Wong E, Woo J, et al.; Use of traditional Chinese medicine in the Hong Kong special administrative region of China. *The Journal of Alternative and Complementary Medicine* 2007;**13**(3):361–368. DOI: 10.1089/acm.2006.6152
37. Cauffman E, Shulman EP, Steinberg L, et al.; Age differences in affective decision making as indexed by performance on the Iowa Gambling Task. *Developmental psychology* 2010;**46**(1):193.
38. Peters E, Hess TM, Västfjäll D, et al.; Adult age differences in dual information processes: Implications for the role of affective and deliberative processes in older adults' decision making. *Perspectives on Psychological Science* 2007;**2**(1):1–23. DOI: <https://doi.org/10.1111/j.1745-6916.2007.00025.x>
39. Information Services Department, The Government of the Hong Kong Special Administrative Region. *Building double barriers against virus*. https://www.news.gov.hk/eng/2021/08/20210828/20210828_101038_731.html (5 April 2022, date last accessed).
40. South China Morning Post. *Angry but holding out: Hong Kong's vaccine pass restrictions hit unvaccinated hard, but some still refuse Covid-19 jabs*. <https://www.scmp.com/news/hong-kong/health-environment/article/3168553/angry-holding-out-hong-kongs-vaccine-passport> (5 April 2022, date last accessed).
41. Sparkman G, Walton GM; Dynamic norms promote sustainable behavior, even if it is counternormative. *Psychological science* 2017;**28**(11):1663–1674. DOI: <https://doi.org/10.1177/0956797617719950>
42. Mortensen CR, Neel R, Cialdini RB, et al.; Trending norms: A lever for encouraging behaviors performed by the minority. *Social Psychological and Personality Science* 2019;**10**(2):201–210. DOI: <https://doi.org/10.1177/1948550617734615>
43. Schwarz N; When thinking feels difficult: Meta-cognitive experiences in judgment and decision making. *Medical Decision Making* 2005;**25**(1):105–112. DOI: DOI: 10.1177/0272989X04273144
44. Telford R, Rogers A; What influences elderly peoples' decisions about whether to accept the influenza vaccination? A qualitative study. *Health Education Research* 2003;**18**(6):743–753. DOI: 10.1093/her/cyf059

Table 1

Table 1. Demographics of older adults who participated in the in-depth interviews

ID	Gender	Age groups	Education	Chronic condition	Household income (HK\$) ^a	Marital status
EV01	M	60-69	S	Depression and anxiety disorder	No income	S
EV02	M	70-79	S	Hypertension, Diabetes, Hyperlipidemia, High blood sugar	No income	S
EV03	M	80 or above	S	No	30,000-40,000	M
EV04	F	70-79	S	Hypertension, Diabetes	< 10,000	D
EV05	F	70-79	P	Hypertension	< 10,000	D
EV06	F	70-79	T	Cancer	50,000-60,000	M
EV07	F	70-79	P	No	NA	M
EV08	F	60-69	S	Hypertension, Diabetes	10,000-20,000	M
EV09	M	80 or above	T	Diabetes, Gout	< 10,000	M
EV10	F	60-69	T	Heart diseases	30,000-40,000	S
EV11	F	80 or above	P	Hypertension, High cholesterol, Diabetes, Stroke, Liver disease	< 10,000	D
EV12	M	70-79	S	No	30,000-40,000	M
EV13	F	70-79	S	Vision impairment	10,000-20,000	M
EV14	M	70-79	S	Heart diseases	NA	M
EV15	F	80 or above	S	Hypertension, High cholesterol, Geriatrics problems	< 10,000	M
EV16	M	60-69	T	No	No income	D
EV17	F	70-79	P	Hypertension, High cholesterol	30,000-40,000	D
EV18	M	60-69	S	Cancer	40,000-50,000	M
EV19	F	70-79	P	Hypertension	< 10,000	M
EV20	M	70-79	S	High blood sugar	No income	M

EV21	F	80 or above	S	Heart disease, Hypertension, Diabetes	< 10,000	M
EV22	M	70-79	T	Hypertension	< 10,000	S
EV23	M	70-79	S	No	< 10,000	M
EV24	F	70-79	S	Diabetes	NA	D
EV25	F	80 or above	S	Heart disease, Osteoporosis	< 10,000	D
EV26	M	80 or above	S	Liver disease	< 10,000	M
EV27	M	80 or above	P	Hypertension, Diabetes	< 10,000	M

^a HK \$ 1.00 approximately equals to US \$ 0.13.

M: Male; F: Female; P: Primary or below educational attainment; S: Secondary educational attainment; T: Tertiary or above educational attainment; NA: Participants refused to answer or reported “don’t know”; S: Single; M: Married or cohabiting; D: Divorced/ separated/ widowed.

Figures

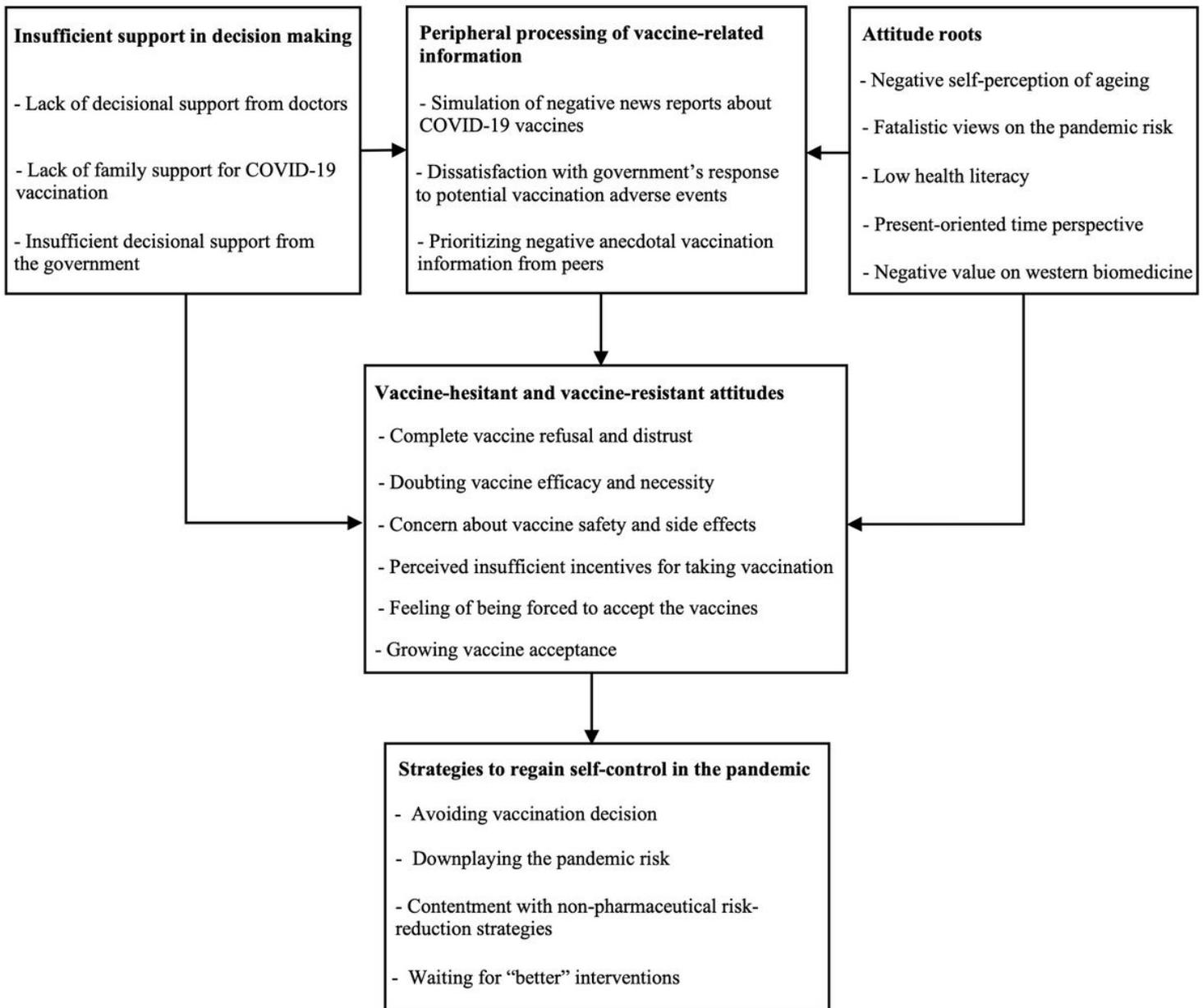


Figure 1

Research themes for understanding older adults' decision-making process of delaying or refusing COVID-19 vaccination

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [AppendixS1evdm.docx](#)