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Perceived facilitators and barriers to intentions of receiving the COVID-19 vaccines among elderly Chinese adults

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ABSTRACT

Elderly adults hold different beliefs regarding vaccination and are at higher risks for COVID-19 related illnesses and deaths. The current study aims to explore elderly (aged 65 or above) Chinese adults' intentions to get vaccinated against COVID-19 and the facilitators and barriers to vaccination intentions. We conducted in-depth interviews with 35 elderly adults in China through the lens of the integrative model of behavioral prediction. The results identified a number of facilitators, including convenience (both individual and collective), psychological and physiological wellbeing, collective wellbeing, supportive normative referents, and trust in the government, and some barriers, including vaccine ineffectiveness, side effects, safety, unsupportive normative referents, and the accessibility, affordability, and availability of COVID-19 vaccines. In addition, the results revealed participants' decision-making process: collective wellbeing and trust in the government overrode perceived barriers and perceived individual-level risks, which eventually overwhelmingly led to a high level of intentions to get vaccinated. Practical implications related to vaccine promotion and trust in the government were discussed.

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1. Introduction

Coronavirus disease 2019 (COVID-19) was discovered in China in December 2019 and spread over the world in the following months [39]. This deadly pandemic had major consequences around the world and resulted in more than three and a half million deaths as of May 2021 [41]. A considerable amount of medical and public health efforts have been devoted to developing COVID-19 vaccines and the promotion of vaccine uptake. According to the World Health Organization [40], as of May 2021, ninety-seven vaccines are in different stages of clinical development, and 183 are currently in pre-clinical development. China has approved four domestic vaccines as of May 2021 and aims to vaccinate 70% of its population by the end of 2021 [18].

As of June 23, 2021, China had administered 1096 million doses of COVID-19 vaccine to its population [24]), but China's vaccination schedule is unique compared to other countries. Contrary to many Western countries in which the government focused on vaccinating elderly adults as soon as possible, China has focused on inoculating people aged between 18 and 59 first [27]. For exam-

ple, in the United States, adults aged over 65 were the first group (along with healthcare providers) eligible to receive the vaccines. The Chinese government did not recommend adults over 60 be vaccinated until March 2021 [35]. Consequently, the vaccination uptake rate among elderly adults was drastically different in China versus most other countries. In the United States, 86.9% (approximately 48 million) of the 65 and older population has received at least one dose of the COVID-19 vaccine, and 76.5% (approximately 42 million) of the population has been fully vaccinated by June 2021 [4]. China has yet to publish official data on the vaccination rate of elderly adults. However, it has been widely suspected that the current uptake rate among elderly Chinese adults remained critically low.

Elderly adults have different vaccination beliefs than younger populations; some elderly adults tend to rely on traditional home-based health practices and healthy lifestyles as health maintenance strategies. Moreover, elderly adults reported a high level of doubt over vaccine effectiveness [23]. In addition to the different beliefs regarding vaccination, elderly adults are at higher risks of developing severe symptoms and morbidity of COVID-19 [22]. However, scholars have yet to fully investigate elderly adults' intentions to get vaccinated and the predictors of vaccination intentions. As many cities in China are gradually opening

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vaccination enrollment to elderly adults [43], it is necessary to examine the factors that facilitate or hinder their intentions to receive the vaccination. Thus, the current study examined the perceived facilitators and barriers to elderly Chinese adults' COVID-19 vaccination intentions through in-depth qualitative interviews.

2. Literature review

2.1. Vaccination intentions

A healthy number of studies have assessed the general public's COVID-19 vaccination intentions in many countries and the predictors of vaccination intentions (e.g., [9,29]). For example, Detoc et al. [6] conducted a survey study between March and April 2020 and found that 77.6% of people in France had the intentions to get vaccinated against COVID-19 and that being older, being a male, and perceived risks were positively associated with vaccination intentions. Sallam [30] conducted a systematic review and found that the vaccine intentions among the general public were highest in Ecuador (97.0%), Malaysia (94.3%), and Indonesia (93.3%) and were lowest in Kuwait (23.6%) and Jordan (28.4%).

A number of studies have assessed Chinese people's COVID-19 vaccination intentions, and the overall reported intentions were high across these studies. Lin et al. [14] conducted a national-level survey among Chinese adults aged between 18 and 70 in May 2020; the study results showed that 83.5% of the participants would probably or definitely get vaccinated against COVID-19. Moreover, they found that perceived benefits of the vaccine (e.g., decreased risk of infection) were positively related to vaccination intentions [14]. Wang et al. [37] found that 91.3% of Chinese people (aged 18 and above) would receive vaccination, and 980 of them (52.2%) would get vaccinated as soon as possible. Wang et al. also found that being a male, perceived risks of getting infected, and perceived vaccine efficacy positively predicted immediate vaccination intentions, whereas vaccination inconvenience and price negatively predicted immediate vaccination intentions.

2.2. Vaccination intentions among elderly adults

Most studies on COVID-19 vaccination intentions focused on the general public [12,13,15], and a limited amount of studies have examined elderly adults' vaccination intentions and the associated facilitators and barriers. Only one study [17] has assessed elderly adults' vaccination intentions to the best of our knowledge. Malieszka and Bozym [17] conducted structured cross-sectional interviews with 1427 adults aged 70 and above in Poland and identified several drivers and barriers to vaccination intentions. The drivers included suffering from chronic diseases, having a medical professional talking through side effects and the importance of getting vaccinated, and the ability to access medical service by walking or driving; the barriers were concerns for vaccine effectiveness and side effects.

Although the research on COVID-19 vaccination intentions among elderly adults is quite lean or still under review, many previous studies have investigated the factors that might influence elderly adults' influenza vaccination uptake. The factors that influence elderly adults' influenza vaccination uptake are different between elderly adults and the general public. Matsui et al. [19] found that perceived vaccine adverse effects and vaccine inconvenience had stronger negative impacts on the elderly adults' influenza vaccination rate than on other age groups. In addition, elderly adults identified transportation issues, physical disability, and expense as the barriers associated with influenza vaccinations [19]. Schmid et al. [32] conducted a systematic review of barriers to influenza vaccination intentions and uptake among high-risk

groups and the general public. By synthesizing the results of 470 studies, they found that although elderly adults and the general public shared some common barriers, such as perceived vaccine ineffectiveness and low perceived severity of the disease, elderly adults' vaccine uptake were also influenced by living alone, being unmarried, smoking status, and perceived health status. Because the factors that influence influenza vaccination intentions and behavior are different between elderly adults and the general public, it might be reasonable to assume that the facilitators and barriers to elderly adults' COVID-19 vaccination intentions could be different. Thus, the current study plans to conduct in-depth interviews with elderly Chinese adults to elicit their perspectives on the factors that would facilitate or hinder their vaccination intentions. To help us systematically understand the facilitators and barriers to vaccination intentions, we rely on the comprehensive health behavioral theory, integrative model of behavior prediction (IMBP [7]) as the theoretical framework.

2.3. Integrative model of behavioral prediction

Developed by Fishbein [7], the IMBP provides a comprehensive list of factors that may facilitate or hinder the formation of behavioral intentions. These factors include attitudes, norms, and perceived behavioral control [8]. Attitude can be defined as an individual's appraisal of outcomes related to the behavior [44], and it has the potential to influence vaccination intentions. Paul et al. [26] found that negative attitudes toward vaccines (e.g., mistrust of vaccine benefits and concern about unforeseen effects) predicted unwillingness to get vaccinated against COVID-19 among adults (aged 18 and above) in the United Kingdom. The results from another study [5] indicated that positive attitudes toward COVID-19 vaccines (e.g., believing in the vaccines' effectiveness in protecting people's health) predicted vaccination intentions among people aged above 16 in Malta.

Norms refer to the expected social pressure when performing a certain behavior, and it consists of injunctive norms (i.e., the extent to which important people support one of performing a behavior) and descriptive norms (i.e., the extent to which these important people would perform the behavior themselves [44]). A few studies have investigated the roles of normative beliefs in the formation of COVID-19 vaccination intentions. For instance, Shmueli [33] surveyed Israeli adults aged 18 and above; the results indicated that perceived norms were a significant predictor of the intentions to receive the COVID-19 vaccination. Mo et al. [20] surveyed 6922 Chinese college students and found that descriptive norms (i.e., perceived vaccination behaviors of classmates, roommates, and teachers) positively predicted the intentions to get vaccinated against COVID-19. The IMBP also suggests that perceived behavioral control, defined as one's perceived ability to perform a certain action, has the potential to facilitate the formation of behavioral intentions [44]. A few studies have assessed the potential of control beliefs to influence COVID-19 vaccination intentions. For instance, Guidry et al. [10] conducted a survey study among U.S. adults ($n = 788$) and found that perceived behavioral control was a significant predictor of participants' willingness to get vaccinated against COVID-19. Although factors influencing COVID-19 vaccination intentions have garnered attention in recent research, scholars have yet to explore the facilitators and barriers to elderly Chinese adults' COVID-19 vaccination intentions. Because of the health risks associated with age and China's unique COVID-19 vaccine schedule, scholars must examine what factors facilitate or impede the formation of COVID-19 vaccination intentions among elderly Chinese adults. Thus, we ask the following research question:

RQ1: What are the (a) facilitators and (b) barriers to elderly Chinese adults' intentions to get vaccinated against COVID-19?

Another important aspect of health behavioral and IMBP research is understanding not only what beliefs people hold regarding a health practice but also how these beliefs interact and form the eventual intentions. The previous IMBP research showed that the beliefs that influenced behavioral intentions vastly differed depending on the nature of the behavior and the population [8]. Thus, it is essential to understand how these facilitators and barriers come together and form the vaccination intentions among elderly Chinese adults. Thus, we ask the following research question:

RQ2: How do elderly Chinese adults weigh the facilitators and barriers to form the intentions to (or not) receive the COVID-19 vaccine?

3. Methods

The current study conducted 35 semi-structured one-to-one interviews with elderly Chinese adults aged 65 or above. The research protocols for this study were reviewed and approved by the appropriate research guideline review agency in China. We recruited a convenience sample of 35 elderly Chinese adults by approaching potential respondents at senior centers, nursing homes, and parks frequently visited by seniors. To be eligible for participation, participants must be 65 or older and could express their beliefs and thoughts using Mandarin. The screening criterion of 65 or older was chosen because this group had higher risks for COVID-19 related deaths and was recommended to receive vaccination first in most parts of the world [3]. Eligible participants were invited to participate in face-to-face semi-structured interviews. After obtaining consent, participants were asked to respond to a list of questions related to their attitudes, perceived norms, control beliefs, and intentions to get vaccinated against COVID-19 (see Appendix A for the interview questions). Demographic data was also collected at the end of each interview. We stopped conducting interviews once the theoretical saturation was met “when the complete range of constructs that make up the theory is fully represented by the data” [34] (p. 1375). These interviews were audio-recorded and lasted between 20 and 52 minutes. The data was collected between July 17 to August 11, 2020. All participation was voluntary, and no monetary compensation was given.

3.1. Participants

Thirty-five participants between the age of 65 to 85 ($M = 74.1$, $SD = 7.23$) were recruited for interviews. The majority of the participants were females ($n = 24$, 68.6%). Six participants (17.1%) received a bachelor's degree or higher; two participants (5.7%) graduated from high school; 14 participants (40%) finished middle school; the rest of the participants finished elementary school or below. Most of the participants had a monthly income of 2000–5000 Yuan (approximately 310 to 775 USD; $n = 11$, 31.4%) or 5001–10000 Yuan (approximately 775 to 1550 USD; $n = 12$, 34.3%). Thirty participants (85.7%) lived in an urban area, and five participants (14.3%) lived in a rural area. We strived to recruit a representative and generalizable sample of our target population. For example, the majority of our participants had relatively lower levels of education and income, which was consistent with the data from the Chinese Longitudinal Healthy Longevity Survey [16].

3.2. Data analysis

The audio was first transcribed verbatim and verified for accuracy. Then, we conducted a qualitative content analysis [31] with two independent coders. The coders read each transcript at least twice to understand the essence of each interview. Then, the

coders circled, underlined, and color-coded some quotes by participants that appeared to be “codable,” and then we split all the data into smaller codable moments [1]. The coders then identified the facilitators and barriers to vaccination intentions among elderly Chinese adults within the frame of IMBP. We then developed a codebook based on IMBP to summarize the codes, their descriptions, and some brief example quotes. We then coded how these codes were related to each other and, more importantly, how they influenced vaccination intentions by analyzing the structure of the dataset using data visualization. The disagreements between the coders were resolved through discussion until a consensus was reached. Transcription and data analysis was completed in simplified Chinese, and the quotes in this manuscript were translated and verified by two bilingual (English and Chinese) speakers. The English names identified in the results were all pseudonyms.

4. Results

Throughout the interviews, the participants identified a number of facilitators and barriers that influenced their intentions to receive the COVID-19 vaccine. We presented the facilitators and barriers within the frame of IMBP beliefs (i.e., attitudes, norms, and self-efficacy) below. We then discussed how these facilitators and barriers came together in the decision-making process to form the strong eventual vaccination intentions, specifically, how some facilitators outweighed the barriers and led to the high vaccination intentions. In order to save space, all participants' quotes corresponded with the quote number and can be found in Table 1.

4.1. Perceived facilitators

4.1.1. Positive attitudes

Positive attitudes were identified as evaluations of the potentially beneficial outcomes related to receiving the vaccine. Participants identified several potential benefits associated with getting the COVID-19 vaccine: convenience (both individual and collective), psychological wellbeing, physiological wellbeing, and, most importantly, collective wellbeing. Several participants recalled the inconveniences and disruptions to life routines caused by the pandemic (e.g., mask-wearing and quarantine at home) and regarded the vaccine as a remedy to address these inconveniences. Chiara said, [1] (all quotes can be found in Table 1). In another example, Yves said, [2]. In addition to the convenience for oneself, participants frequently mentioned collective convenience and believed that vaccination would make everyone's life convenient. Wendy said, [3].

Perceived psychological and physiological benefits were also salient facilitators to participants' vaccination intentions. Many participants perceived COVID-19 as severe, dangerous, and threatening and expressed their fear and uncertainty. Thus, receiving the vaccination is an effective way to mitigate and manage the potentially deadly physiological threats and the high level of psychological stress. One participant, Sally said, [4]. A safe and effective vaccine seems to be the remedy for the participants and would bring them a sense of safety. As Zoey said, [5]. In addition to perceived psychological benefits, participants also indicated that vaccination could be beneficial for one's physiological health and emphasized the importance of maintaining physiological wellbeing. As Lucy said, [6].

Most participants devoted a significant amount of time stating how vaccination may lead to collective benefits. Getting vaccinated would not only bring individual-level benefits but rather was perceived as a contribution to the larger collective societal wellbeing. The collective wellbeing included “societal harmony and advancement” and “decreased social and financial burden for others.”

Table 1
Participants' Quotes.

Quotes
[1] with one shot, I don't need to wear a mask anymore. If I get vaccinated, it will be convenient for me to do anything.
[2] I am 66 years old, and I've never worn a mask before this pandemic. This is my first time wearing a mask, and I feel inconvenient and aggrieved. Because of the pandemic, I cannot visit my family relatives or travel. I look forward to the day when the vaccine is available.
[3] because of the pandemic, many people are self-quarantining and practicing social distancing. After getting vaccinated, people don't need to quarantine, and their life can come back to normal and convenient... My life being convenient is not enough. Everyone's life being convenient is what matters.
[4] look at how severe this disease is. I have never seen this type of thing before. Oh, I feel scared.
[5] with the new vaccine, even if the virus comes again, we don't have to be afraid anymore... After getting vaccinated, one will feel safe and gain confidence in their immune system.
[6] getting vaccinated will decrease the risk of getting infected and reduce the spread of COVID-19... I am not quite sure [about the science], but I think the vaccine will help you build your immunity and is good for your body.
[7] each of us is a part of Chinese society. If we can get vaccinated and stay healthy, not only for ourselves but also for others, our society will become stable and harmonious. If we are all vaccinated, everyone will be able to live and work in peace and contentment. Then our country can have peace and prosperity for a long time.
[8] our country can grow faster and get strong and rich with us being vaccinated. It's our own country. We belong to this big family. Of course, we want it to be strong and wealthy, don't you agree?
[9] all the doctors and nurses try so hard to fight against COVID-19. They sacrificed a lot of their time and energy, even themselves sometimes. Us getting vaccinated can make their lives better.
[10] I certainly do not want to burden or impact my family members and the country if I get COVID, so the vaccine is the way to make sure that does not happen.
[11] COVID-19 has resulted in serious economic problems for China. We've lost too much money because of the pandemic. If we [elderly adults] can get vaccinated, everyone will be healthy, and everything can get back to normal. Ultimately, our country can move back to the development track.
[12] there is no doubt that everybody will support me to get vaccinated. My family, friends, relatives, and neighbors. And I think that they themselves will get vaccinated as well.
[13] a call from the country, and everyone in my network will definitely respond to the call positively.
[14] all of them [people in my life] will follow the 'trend'; whatever the task is, as long as it's assigned by the country, we [people in my network and I] would complete it.
[15] everyone in my network would support me because [herd community] is a goal for China and getting vaccinated is a requirement from the nation. Everyone will definitely support and follow the government. People who do not get vaccinated are opposing the government. I hate this type of person, and I think they are bad people.
[16] will it be difficult for me to get vaccinated? I don't think there will be difficulties. The government will take care of everything for me in time.
[17] our government and the party would do no harm to us. They will monitor and supervise the vaccination. [Getting vaccinated] won't be complicated. The government will have everything arranged and prepared.
[18] has the Communist Party ever deceived Chinese people? No, the party has been dedicating itself to serving and helping its people. As President Mao said, the party aims to serve the people wholeheartedly. President Xi Jinping is the same. He always talks about how to better serve and help Chinese people in meetings. All they do are trying to help and serve us Chinese people, and there is no reason not to believe them.
[19] I wonder how effective the vaccines can be. Will the vaccines work?
[20] my only concern is that COVID-19 vaccines may not be effective against the mutations. I mean, what if the virus mutates before everyone gets vaccinated.
[21] I doubt the safety of the vaccine. I mean, it's the first of its kind. Unlike young people that have a strong immune system, we are older and weaker. If there are some side effects, we might not be able to survive.
[22] I think there will be fake vaccines, just like counterfeit medications and the melamine-faced baby formula in 2008. With true vaccines coming, many fake versions may emerge. We have to be careful, otherwise, we will have lots of injuries and deaths.
[23] we have bad people in China. They are not satisfied with anything. Haters always hate. They just want to see us suffer.
[24] some people won't get vaccinated themselves. They just don't believe in science. They believe how they die and when they die are predetermined and destined. When it's time for them to die, they will die.
[25] people in poverty areas may not be able to get vaccinated. They may not have a job or income and cannot afford vaccination.
[26] if I need to travel to another city to get vaccinated, I may not go. It's too far away. It's difficult.
[27] if the price is extremely high and I cannot afford it, I won't get vaccinated. I need to consider the cost and money issues.
[28] of course, there are many benefits [of getting vaccinated]. After the vaccination, the disease will disappear, and we don't need to worry about getting infected. Also, [the pandemic] is causing great burdens to the country, the economy, and all other aspects. Oh my god, the economic downturn. With the vaccination, everything can get back to normal... I do have concerns about the side effects. Getting vaccinated means putting something into my body. What if it hurts my lung and abdomen?
[29] it is a reasonable sacrifice that [they are] willing to take for the overall societal wellbeing.
[30] the pandemic has caused too many damages and losses to our country. With vaccination, our country can solve all these problems. This is so important to me. Compared with such collective benefits, the risks are nothing to be worried about.
[31] if our government is promoting the vaccination, I don't think there will be any risks [that I have mentioned previously]. If there are risks, our country will not promote vaccination at all. So if the government is promoting it, I have nothing to worry about.
[32] we are a socialist country. When facing a large-scale disaster or pandemic, the government just needs to give an order, and everyone will unite and act accordingly. we will get together and try our best to complete the task and help the country. This is us. This is China. We are most hard-working; we can endure hardship and pain. We would always follow the Communist Party. This is a characteristic of Chinese people: whenever there is a problem, a call from the nation, we Chinese people unite, we face together, we fight together.
[33] for poor people that cannot afford to get vaccinated, the government will help them solve this problem
[34] we don't need to worry about vaccine convenience and affordability too much. You see the government made COVID-19 testing free and convenient for everyone. In [my city], nearly six million people have been tested, and they did not even need to go out the door. The government sent [medical workers] to your houses to get you tested. It would be the same for vaccination.

Note: All quotes were translated by two bilingual Chinese and English speakers.

These potential collective benefits were highly important to these elderly adults. Among all collective benefits, societal harmony and advancement were mentioned most frequently. We interpreted this concept to be stability and prosperity at the societal level; in other words, a safe, orderly, organized, and strong society without unmanageable or aversive events. Many participants believed that Chinese people were interdependent parts of the Chinese society.

Participants emphasized the importance of maintaining the harmony and order of the society by ensuring they would not be an outlier or opponent of the harmony. As indicated by Zoey, [7]. Another participant, Sam, furthered this idea and said, [8].

In addition to societal harmony and advancement, a number of participants stated getting vaccinated could decrease the social and financial burden of others. Some participants mentioned how

vaccination would alleviate the stress of healthcare providers. Lee said, [9]. Cassy stressed multiple times that [10]. Interviewees mentioned the negative consequences that COVID-19 has caused on China's economic system and development and how individuals' vaccination behaviors may help reduce the overall financial burdens. For example, Yves said, [11].

4.1.2. Supportive normative referents

In addition to the potential benefits associated with vaccination, the results indicated that supportive normative referents would also facilitate COVID-19 vaccination intentions. Almost all participants believed that the decision to get vaccinated against COVID-19 would be socially approved and supported by important people in their networks and that these people would get vaccinated themselves. As Will said, [12]. When we dived deeper into these highly supportive perceived norms (at least the perceptions of), interviewees linked these norms to the government and the country. Vaccination might be viewed as [13]. Will described it as, [14]. Chiara said, [15]. This sense or perception of norms that important individuals within the social network would directly follow the government's request is a unique one among elderly adults in China. Whether the people in the elderly adults' social network would feel this way remain unknown, but such perceptions of supportive normative referents would propel vaccination intentions among elderly adults.

4.1.3. Unique senses of self-efficacy

Another facilitator to vaccination intentions is a unique sense of self-efficacy (i.e., extremely high levels of trust in the government). When asked about their perceived abilities to receive vaccination, most participants, instead of mentioning individual abilities and autonomies, expressed their confidence in the government's performance and ability to get everyone vaccinated. As Jessica said, [16]. Another participant, Zen furthered this idea and said, [17]. The participants reported a high sense of self-efficacy not because of confidence in their own abilities but rather from their confidence in the government. Participants have linked their trust in the government to the mission of the Communist Party, [18]. Such strong faith in the government and party leads to a strong sense of self-efficacy, leading to participants' determined intentions to get vaccinated. This sense of self-efficacy placed within the trust of the government could be unique to Chinese culture and the population, as it is quite different from the "traditional" Western self-efficacy.

4.2. Perceived barriers

4.2.1. Negative attitudes

Negative attitudes are often the products of the evaluations of negative consequences related to receiving the COVID-19 vaccine. Participants have identified several concerns about COVID-19 vaccination, including vaccine ineffectiveness (i.e., general effectiveness and effectiveness against variants), side effects, and safety. A few participants expressed concerns about the general effectiveness of COVID-19 vaccines at preventing the disease. One participant, Zoey said, [19]. Participants were also concerned about the effectiveness against coronavirus variants and mutations [20]. Some participants reported a high level of concerns for potential side effects. They worried that the risks of experiencing severe side effects would be higher given their ages. As Simon said, [21].

Participants were also concerned about vaccine safety, particularly related to harmful "fake" vaccines. China had several large-scale reports of medicine safety and vaccine safety issues in the past with some of the biggest pharmaceutical companies in the country. Several participants were convinced that some (not all) manufacturers would come up with "fake" (whether ineffective

or even harmful) versions of vaccines for monetary gains, and they referred to prior incidents of "fake" medicines in China in their reasoning. One participant, Peter said, [22].

4.2.2. Hypothetical unsupportive normative referents

A few participants indicated that although they did not have any normative referents who would be unsupportive of vaccination behavior, they believed that there could be certain people (a hypothetical opponent) disapproving vaccination behavior. Participants perceived these people as a potential collective threat. For most participants, vaccination is a positive behavior with beneficial outcomes for both the country and individuals. Thus, for participants, anyone who would disapprove of vaccination behavior is a bad person who does not want to see the country and participants happy and healthy. As Jessica said, [23]. Some people who "have a weaker mind" might give in to those unsupportive normative claims and consequently give up on the vaccination. However, several participants claimed that they would not be influenced by these hypothetical unsupportive individuals. Participants also suggested that fatalism might impact some people in their life, although they did not know who these people might be. Participants mentioned that some people had strong beliefs in fate, destiny, and higher power, believing that some events are inevitable and that whether they would die in this pandemic does not depend on vaccination. As Lydia said, [24].

4.2.3. Issues that affect self-efficacy

The last barrier to vaccination intentions was the self-efficacy that whether receiving the COVID-19 vaccine might be up to other factors beyond one's control. For example, Lily said, [25]. These factors that could potentially lead to a lower level of self-efficacy included accessibility, affordability, and availability of COVID-19 vaccines. Participants expressed concerns about the location of vaccination sites (distance to vaccination sites), vaccine price, vaccine supplies, and convenience. Thus, whether they were confident in their abilities to receive the vaccine depended on these factors. Specifically, some participants worried that (a) there might not be vaccination sites in their residential areas, and they might need to travel to another city to get vaccinated; (b) vaccination might cost more than they could afford; (c) there might not be enough vaccines for everyone; and (d) it might not be easy or convenient to get vaccinated. For example, Chiara said, [26]. In another example, Sally said, [27].

4.3. Weighing the facilitators and barriers

Overall, participants expressed strong intentions to get vaccinated against COVID-19 when the vaccine would become available. The intentions were developed through a rationalized analysis of the facilitator and barriers. Participants were aware of the benefits and costs associated with getting the vaccine, and the decision was made after carefully evaluating both the facilitators and barriers that we have previously mentioned. For example, Amy said, [28].

Participants specifically identified how the importance of some facilitators outweighed the importance of the barriers. These strong overpowering facilitators were perceived collective benefits and confidence in the Chinese government. For one, the perceived collective benefits almost "canceled" the individual-level concerns for vaccine side effects, safety, and costs. As a participant has put, [29]. Participants considered fighting against COVID-19 as a task faced by the country and vaccination as a remedy to the collective threat posed by the COVID-19. They stated that it was "necessary" for them to respond positively to the call for the wellbeing of the country and others. They strived to contribute to collective wellbeing with a high level of willingness to undertake individual risks. As said by Yuri, [30].

Moreover, participants eased their own concerns for individual-level risks with a strong sense of confidence and trust in the Chinese government. Participants placed their trust in the Chinese government and believed that the government would not let those potential concerns harm them. Amy said, [31]. Some other interviewees mentioned how Chinese citizens had always followed the leadership of the government, and it had been a successful approach in the past. Thus, COVID should be no exception. Jessica said with a sense of pride and duty, [32].

Participants also expressed their confidence in the government's ability to address concerns related to vaccine accessibility, affordability, and availability. For example, Chiara said, [33]. Zack used COVID-19 testing as an example to explain why he believed that the government would address the accessibility and affordability issues, [34]. Thus, with a hefty commitment to the collective benefits and unshakeable trust in the government, the facilitators outweighed the barriers, which then translated to the high level of intentions to get vaccinated among these elderly adults.

5. Discussion

Elderly adults hold different beliefs toward COVID-19 vaccination and are at higher risks for developing severe COVID-19-related symptoms than younger individuals. However, scholars have yet to fully understand elderly adults' intentions to get vaccinated against COVID-19 and the facilitators and barriers to vaccination intentions. To fill this gap, we conducted in-depth interviews with 35 elderly Chinese adults aged 65 or above. Participants identified a number of facilitators to vaccination intentions: convenience (both individual and collective), psychological and physiological wellbeing, collective wellbeing, supportive normative referents, and confidence in the government's ability to get people vaccinated. Participants also described several barriers to vaccination intentions: vaccine ineffectiveness, side effects, safety, unsupportive normative referents, and the accessibility, affordability, and availability of COVID-19 vaccines. Nevertheless, participants reported strong intentions to get vaccinated, and such decisions were made after carefully evaluating and weighing the facilitators and barriers. Our study offers practical suggestions for vaccination promotion, especially among elderly Chinese adults.

5.1. Practical suggestions for vaccination promotion

The results suggested that elderly Chinese adults held different and somewhat unique beliefs regarding vaccination. When identifying the outcomes of getting vaccinated, all participants mentioned the benefits for the country and emphasized the importance of obtaining such collective benefits. More specifically, collective gains outweighed individual gains and losses and had the strongest influences on the participants' intentions to get vaccinated. In addition, although participants worried about the affordability, availability, and accessibility of the vaccines, they believed that the government had the ability to solve all these issues. These unique beliefs reflect on the strong collectivistic culture traits of elderly Chinese adults (i.e., prioritizing the group's goal over personal interests). Although China is still considered a collective society, the culture is gradually changing, accredited to the economic boom in the 2000s [36]. The unshakeable and even unconditional trust in the government and commitment to collective benefits might not be as apparent among younger Chinese individuals. Thus, media practitioners and campaign designers need to develop persuasive vaccination messages in accordance with these unique beliefs and cultural traits. For instance, pro-vaccination fliers for elderly Chinese adults can emphasize that getting vaccinated can benefit China and help maintain societal

harmony and that the government has addressed all the issues and concerns related to vaccination. However, these professionals might need to understand these messages might not be effective with younger adults in China. Strategically placing these messages with targeted locations could be an effective strategy to deliver these tailored messages.

5.2. Trust in the government

The level of trust in the government, especially during a public health pandemic, is a topic that would be discussed and debated for a long time to come. Previous research has pointed out the decline of trust in the government in many Western democratic countries and what it could mean for political and social issues [2]. During the COVID-19 pandemic, the fallouts related to the low trust in the government started showing as a social issue in many countries. Our results indicated that elderly Chinese adults had a high level of trust in the government and such trust was an important facilitator to their vaccination decision-making. Many participants in the current study experienced major historical events in China, such as the Second Sino-Japanese War and the economic reform, and these historical events were said to have a significant impact on Chinese people's political trust and cohorts [42]. Trust in the government plays an increasingly prominent role in the COVID-19 pandemic, as high trust leads to adherence to and support for government decisions [11] and compliance with public health policies [21]. Chinese people's trust in the government has begun to decline among younger generations. The decline may be explained by the emergence of post-materialist values, which emphasize freedom and autonomy over material security [42]. Post-materialist values, which fundamentally are pro-democracy values, make citizens more critical toward the government and lead to a lower level of political trust [38]. This decline has been common among many countries, especially Western democratic ones [2]. Because of the important role government trust plays in a public health pandemic, it is critical for many governments worldwide to strategically build and maintain a healthy level of trust among their people. However, trust in the government has to be substantiated and maintained with effective policies and actions, especially during a pandemic when public uncertainty is high [25].

6. Limitation and future research

The current study has one limitation. We only recruited participants that could express their beliefs about COVID-19 vaccination in Mandarin. However, 30% of Chinese people cannot speak Mandarin, and the majority of them are elderly adults [28]. Even just transcribing the audio recordings with some accents in our study was time-consuming. Elderly Chinese adults that speak only dialects may face different barriers to COVID-19 vaccination than participants in the current study. Future studies may try to elicit perspectives of non-Mandarin-speaking elderly Chinese adults.

7. Conclusion

The current study aimed to understand the unique beliefs related to COVID-19 vaccine uptake among elderly Chinese adults. The current study conducted in-depth interviews with 35 elderly Chinese adults through the lens of IMBP. Based on the interview results, we identified a number of facilitators and barriers to their vaccination intentions and further revealed the decision-making process. We hope our study contributes to the ongoing war against COVID-19, benefits the population of interest, and advances our understanding of the IMBP in different cultural contexts.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2021.11.039>.

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