Analysis of the Fourth Vaccination Intention of the Elderly for COVID-19 Based on RPA Theory

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Abstract: With the open management of the epidemic in China, the first wave of the epidemic has passed, and the safety and health of the elderly have become a key concern in the face of the uncertain epidemic situation in the future. This study was conducted to analyze whether children would give their elderly family members a fourth dose of the Covid-19 vaccine, in addition to the third dose of the vaccine, in view of the fact that the elderly may have underlying diseases and their body functions are aging. This study uses the Risk Perception Attitude (RPA) framework to analyze not only the impression and credibility of the children in the family, but also the children's risk perception and self-efficacy and, thus, their willingness to allow their parents to receive the vaccine. Based on the questionnaire of "Elderly people receiving the fourth dose of the Covid-19 vaccine" in 2023, four seven-level scales were developed for each of the four variables, and the data were collected and analyzed for reliability and validity, and regression analysis was designed to gauge the behavior of the children in determining whether or not to vaccinate the elderly in their families under the influence of information media. It was found that media impression was deeply and positively related to risk perception and self-efficacy; media credibility was also profoundly and positively related to risk perception and self-efficacy; risk perception and self-efficacy had a significant effect on the final behavioral outcome.

Keywords: RPA Theory, Covid-19, vaccination, the elderly

1.   Introduction

In early 2020, the Health Commission declared the COVID-19 as pandemic. From December 7, 2022, nucleic acid negative certificates will no longer be required in certain places such as non-nursing homes and schools, which means that China's epidemic prevention and control policy will be gradually liberalized since the elderly population has a high risk of death after infection when they have basic diseases, as of December 13. Chinese residents have received two doses of the COVID-19 vaccine and one dose of a booster shot. In order to prevent infection and reduce mortality. The Health Commission announced on December 14 that "the second dose of enhanced

immunization will be carried out among high-risk people, people over 60 years old. people with more serious basic diseases and people with low immunity".

Previous research shows that people get health information through social medias like Twitter, Facebook, Instagram, WeChat etc. Research in Taiwan, China shows that 80 percent of the participants, particularly the elderly, obtain messages related to the new crown through online media [1]. It can be seen that the elders can meet media demand for new crowns related information. The new" information flu" is closely related to the change of psychological prevention mechanisms of the elderly. Therefore, the use of media promotes the elderly to form a risk perception attitude towards COVID-19. Although some researchers have found that the more media consumption is restricted, the less likely it is that individuals will receive vaccinations [2]. But this is targeted at all age groups, and the research background is in the period of the COVID-19 epidemic. Therefore, under the background of the first wave of the epidemic peak of China's open management, the research on the behavior of strengthening vaccination for the elderly, a special vulnerable population, is still vacant.

The RPA framework can predict the prevention motivation of the elderly audience through risk perception and self-efficacy. In the meantime, the theory about comprehensive use and satisfaction, including two variables of media contact and media reliability in the RPA theoretical framework, analyzes the relationship between the elderly group's media contact and media reliability and risk perception and self-efficacy and then can clarify the elderly group's willingness to receive the second dose of booster shot.

Therefore, this study based on the RPA theory and the perspective of use and satisfaction, explored the use of information media by the elderly to meet their needs for information about the COVID-19 epidemic situation through questionnaires so as to take the fourth dose of COVID-19 vaccination action. With a view to ensuring the health of the elderly more scientifically in the context of open management of the epidemic situation.

2. Literature Review

2.1. RPA Theory

The RPA framework was proposed by Rimal, which shows that personal protection behavior can be explained from two dimensions of risk perception and self-efficacy. Risk perception relates to the audience's response to the external environment, while self-efficacy refers to "People think they are able to perform at a certain level, impressing the events that have an impact on their life"[3]. Those with reactive attitudes will be more motivated to engage in self-prevention action if they have higher risk perception and self-efficacy. Therefore, the RPA theoretical framework can be used to study the behavior of middle-aged people exposed to media information and judge whether the elderly in their homes is injected with the fourth dose of vaccine.

Studies that have already been conducted have looked into the impact of risk perception attitudes on actions connected to health information. For example, some studies have shown that risk perception can be divided into health risk perception and information risk perception [4]. The former is positively related to health communication behaviors. and the latter is negatively related to health communication behaviors: The framework's themes and associated sub-concepts can be utilized as research terms to track public perceptions of risk during upcoming epidemics and pandemics [5]. Conclusions from such studies are mostly based on the strength and methods of health information-related behaviors that people take after perceiving risks and the follow-up.

Research on the implementation of specific health behaviors is relatively vacant. This article focuses on the specific health behavior problems that people take after using media and perceiving risks.

According to RPA theory, excessively high perceived risks are likely to cause panic or threat denial; however, extremely low perceived risks may result in decreased adherence to public health policies. Self-efficacy will significantly affect the specific health behaviors people take [6]. Therefore, two assumptions are proposed:

H1: Risk perception is correlated with middle-aged people persuading the elderly to inject the fourth dose of vaccine.

H2: self-efficacy is correlated with middle-aged people's persuasion of the elderly to inject the fourth dose of vaccine.

2.2. Risk Perception

The use and satisfaction theory shows that the public can choose the desired behavior mode only after completing the process of risk perception and self-efficacy after receiving media information. This process is the process of whether motivation is generated. Which includes the process of perception attitude, attribution and reasoning [7]. Risk perception refers to the perception of external social factors. and can also be seen as a manifestation of the public's monitoring motivation for society through the media, which is the main reason for the public to seek media, especially news media [8].

According to the RPA framework, two variables need to be considered through media monitoring and perception of society-media credibility and media contact. The existing media effect research has identified numerous essential and generally studied outcome variables. Among the countless results of media effects more attention is paid to risk perception. One of the most extensively researched topics in communication research, particularly in risk communication research, is the impact of the media on risk-related judgement [9]. According to the non-personal influence hypothesis, risk perception corresponds more to the social factors in the use and satisfaction theory. According to this hypothesis, the media mostly influences how people perceive danger in society through media information, especially new media and we media information [10]. The threat of COVID-19 to health, the severity of the pandemic, its management, and the likelihood of infection are all part of the particular sense of risk perception [11]. When people are exposed to media information, their personal perception of risk will also change. Therefore, the following assumptions are proposed:

H3: Media revelation has a lead to risk perception.

H4: Media credibility has an impact on risk perception.

2.3. Self-Efficacy

According to Bandura, self-efficacy is the level of assurance a person has in their ability to use their own abilities to accomplish a particular job behavior [12]. The situational conditions they are in and the positive encouragement and persuasion of others can effectively improve self-efficacy. High self-efficacy individuals will exert effective effort to increase their chances of success; otherwise, they will be more likely to fail. As noted by Child Star and Miao Jian Dong, people with high levels of self-efficacy might encounter more pleasant circumstances. This leads to the conclusion that individuals who have high self-efficacy exhibit more effective coping mechanisms.

In the closure and control of the epidemic, mobile phones, computers and televisions have become channels for the public to watch the media. The accessibility is very high, and the public has reached a degree of dependence on new media [13,14]. When individuals are exposed to media information, their judgments of self-efficacy tend to change. The fewer external factors that hinder vaccination, the stronger the will of the elderly to receive COVID-19 vaccine. Generally speaking, individuals take action because they believe they can benefit from this action. Self-efficacy relates

to the cognition of the individual's ability to take certain protective actions, that is, the individual's belief, judgment and subjective feelings about the level at which he can complete the action before performing a certain action. Some scholars have shown that media exposure and media credibility will change people's vaccination behavior. Some scholars have shown through qualitative research that the prediction of their own preventive ability will change after contacting media information. The older the elderly can understand the effectiveness of COVID-19 vaccine for themselves, the more confident they are about vaccination the fewer factors that hinder vaccination, and the stronger the elderly's willingness to vaccinate COVID-19 vaccine.

H5: Media contact has an impact on self-efficacy.

H6: Media contact has no impact on self-efficacy.

3. Method

3.1. Sample and Procedure

The research set up an online questionnaire to be placed in friends' circles and various group chats to find out the opinions of the children in their family on whether to give the second booster vaccination to the elderly. The questionnaire contains four variables: media credibility, media impression, risk perception and self-efficacy. The questionnaire was set up according to the scales of the variables and promised to protect the personal information of the respondents. The questionnaire was designed to understand the accessibility and trust of the target group and to obtain objective data on their subjective perception of risk and self-efficacy.

A total of 214 people participated in the survey, specifically 13 people (6.0%) between the ages of 16 and 25 and 201 people (94%) over the age of 26. The age data recovered reveals that more than 90% of the children were older than 26 years old, which is basically in line with the research theme of children's willingness to vaccinate the elderly.

3.2. Measures

3.2.1. Demographic Variables

The ethnic characteristics specified in our study included gender (male, female), geography (set with different choices of the city where they were located), and age (age was divided into four ranges, 16 to 25, 26 to 35, 36 to 45, and people above 46 years old).

3.2.2. Independent Variables

Following the description of media exposure pathways by He-X and others, the scale proposed by Hall and others on media exposure was mined from the references of that article, and its relevance was demonstrated by Holman's study. Media impressions were divided into six latitudes: television, radio programs, newspapers, online news, social media, and related books [15-17].

There are three questions from its scale based on Dang, Q.'s media credibility research on the danger perception of infecting Covid-19: Information on Covid-19 and cases of that released by medical specialists and the government is trustworthy; it is of a high caliber and professional nature; I have contact with trustworthy media [18].

The research created a questionnaire based on the scale used by Qin S et al. to assess risk perception in medical students [19]. This scale consists of 12 items covering the 4 perceived aspects of health, scare, severity, controllability, and infection risk.

The research also set up the questionnaire based on the scale used by Hassan M S et al. on the effect of self-efficacy and government trust on risk perception during a Covid-19 epidemic, with a

total of I believe I have the ability to protect the elderly in my family from Covid-19 [20]; I will get the elderly in my family to take the necessary action (vaccination) to prevent it even if it is difficult or unchanging; I am sure that I'm able to help the elderly in my family, I think I can lower the risk of Covid-19 infection in my elderly relatives; I have the willpower to get the elderly in my family vaccinated to prevent it; I have the confidence to get the elderly vaccinated to prevent the 5 problems.

The levels of four independent variables were set on a 7-point scale, respectively, with higher scores indicating higher levels. Due to the data in Table 1, the data for the four variables of media impression, media credibility, risk perception, and self-efficacy (0.957, 0.866, 0.952, and 0.922, respectively) have high validity, i.e., they indicate that the scales selected are able to accurately measure the variables. Moreover, because of the data in Table 2, the data for the four variables of media impression, media credibility, risk perception, and self-efficacy (0.873, 0.718, 0.924, and 0.865, respectively) are all greater than 0.700 with very high reliability, which means that the consistency of our questionnaire measurements is extremely high, stable, and reliable.

Table1: Reliability statistic.

Independent variable	Cronbach's Alpha
Media impressions	0.957
Media credibility	0.866
Risk perception	0.952
Self-efficacy	0.922

Table2: KMO and Bartlett's test.

Independent variable	KMO
Media impressions	0.873
Media credibility	0.718
Risk perception	0.924
Self-efficacy	0.865

4. Results

According to table 3, both model analysis and correlation analysis reveal a favorable association between self-efficacy and media exposure as well as perceived risk, with the figure standing at 0.423 and 0.546. Therefore, H_1 and H_2 are the same as anticipation. And the figure for media credibility represents strong correlations with perceived risk and self-efficacy, at 0.31 and 0.368. Therefore, the higher media credibility is, the higher perceived risk and self-efficacy are. Hence H_3 and H_4 also exist. Then, by combining the questionnaire and forthcoming research, the authors find that H_5 and H_6 are in line with proportion. People are likely to take action when they feel strong perceived risk and self-efficacy.

Table3: Correlation analysis.

		Media credibility	Media exposure	Perceived risk	Self-efficacy
Media credibility	Pearson Correlation	1	0.52	0.31	0.368
	significance（bilateral）	0.000	0.000	0.000	0.000
	N	214	214	214	214
Media exposure	Pearson Correlation	0.52	1	0.423	0.546
	significance（bilateral）	0.000	0.000	0.000	0.000
	N	214	214	214	214
Perceived risk	Pearson Correlation	0.31	0.423	1	0.498
	significance（bilateral）	0.000	0.000	0.000	0.000
	N	214	214	214	214
Self-efficacy	Pearson Correlation	0.368	0.546	0.498	1
	significance（bilateral）	0.000	0.000	0.000	0.000
	N	214	214	214	214

5.   Discussion

It is the purpose of research to explore how information media have an impact on people's behavioral intention to vaccinate fourth dose. In order to figure out the relationship between them, the research needs to explore the correlation between four variables.

From the perspective of media exposure, the statistic for it is highly related to perceived risk and self-efficacy. The result can reach an agreement with" It is more likely for people to predict perceived efficacy and perceived threat if they are exposed to news media" [21]. Supposing from the questionnaire, it is result from risk-related information and scientific introduction included in information media.

In terms of media credibility, when people highly trust the media, they will have intensive perceived risk and self-efficacy. This is a little bit different from the" Perceived benefit is not only significantly affected by source credibility and information quality, but also influenced by perceived risk" [22]. And there are mainly three reasons. Firstly, source credibility and information quality are essentially different from the meaning of media credibility. The formal one refers to the information itself, while the latter one is more related to media. Secondly, two researchers adopt totally different model. Some disparities may exist in the measurement progress. Finally, due to the time reason, the information that people have access to can be different.

In conclusion, the final result accord with our assumptions, for the questionnaire is set in a proper way and the sample take back is enough.

6.   Conclusion

The research has paid much attention to covid-19 since there was open management. The research investigates the behaviors of getting the fourth dose of vaccine under the influence of information media, anticipating making the information publicity departments understand their duty. Also, old people's children will clearly recognize how information media impact old people' behaviors of getting the fourth dose of vaccine and protecting old people from infection. However, there are still some limitations in the research. For one thing, the research does not contain some key control variables, such as the condition of virus infection, which can be important to the research. For another, certain error exists between the outbreak of covid-19 and the measurement of the questionnaire. During the progress, the author also find that content-related variables can be brought into the research, since these variables may have an impact on the media credibility. Therefore, future researchers can embark on the research as soon as the event happens and consider necessary control variables when needed.

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