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ORIGINAL ARTICLE

DETERMINANTS OF PARTICIPATION SURVIVORS COVID-19 AMONG ≥45 YEARS OLD TO COVID-19 THIRD DOSE VACCINATION

Determinan Partisipasi Penyintas COVID-19 Berusia ≥ 45 Tahun dalam Vaksinasi COVID-19 Dosis 3

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ABSTRACT

Background: Booster vaccinations are a way to keep the body protected against COVID-19. Mojolangu Health Center is one of the densely populated areas which is part of the Lowokwaru sub-district and borders the Belimbing sub-district; the two sub-districts are ranked 2nd and 1st with the highest CFR (Case Fatality Rate) in Malang City. Therefore, examining public perceptions of vaccination to evaluate immunization programs and raise performance goals is essential. **Purpose:** To determine the relationship between the Health Belief Model components (perceived susceptibility, severity, benefits, barrier, and cues to action) and the participation of COVID-19 booster vaccination in survivors of COVID-19 aged ≥45 years. Conducted from April to November 2022, this research was located in the working area of Mojolangu Health Center (Mojolangu, Tunjungsekar, Tunggulwulung, and Tasikmadu village). **Methods:** This quantitative research used a case-control design study. This research sample comprised 82 people, selected using the purposive sampling technique with a 1:1 ratio for case and control. Data analysis was done using the Chi-Square test and Binary Logistics Regression tests. **Results:** The respondents were dominated by the middle age group (45-59 years), primarily entrepreneurs with a monthly income of more than IDR 3.5 million and domiciled in Mojolangu village. The perceived benefits variable showed p=0.04 (aOR=2.67; 95% CI=1.03-6.91) and perceived barriers p=0.01 (aOR=3.60; 95% CI=1.39-9.28), while perceived vulnerability p=1.00 (cOR=1.00; 95% CI= 0.32 – 3.16), perception of cues to act p= 0.18 (cOR= 1.82; 95% CI= 0.75 - 4.40). **Conclusion:** Factors related to booster vaccination participation are perceived benefits and barriers.

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ABSTRAK

Latar Belakang: *Vaksinasi booster merupakan salah satu cara untuk menjaga tubuh tetap terlindungi dari COVID-19. Puskesmas Mojolangu merupakan salah satu wilayah padat penduduk yang merupakan bagian dari kecamatan Lowokwaru dan berbatasan dengan kecamatan Belimbing, kedua kecamatan tersebut menduduki peringkat ke-2 dan ke-1 dengan CFR (Case Fatality Rate) tertinggi di Kota Malang.Oleh karena itu, mengkaji persepsi masyarakat tentang vaksinasi untuk mengevaluasi program imunisasi dan meningkatkan target capian guna memastikan perlindungan kesehatan yang maksimal sangatlah penting.* ***Tujuan:*** *Penelitian ini bertujuan untuk mengetahui hubungan antara komponen Health Belief Model (perceived susceptibility, severity, benefits, barrier, dan cues to action) terhadap partisipasi dalam melakukan vaksinasi COVID-19 pada penyintas COVID-19 usia ≥45 tahun. Dilaksanakan pada bulan April hingga November 2022, penelitian ini berlokasi di wilayah kerja Puskesmas Mojolangu (Kelurahan Mojolangu, Tunjungsekar, Tunggulwulung, dan Tasikmadu).* ***Metode:*** *Penelitian kuantitatif ini menggunakan desain penelitian case-control. Sampel penelitian ini berjumlah 82 orang yang dipilih menggunakan teknik Purposive Sampling dengan perbandingan 1:1 untuk kelompok kasus dan kontrol. Analisis data dilakukan dengan uji Chi-Square dan Regresi Logistik Berganda.* ***Hasil:*** *Responden mayoritas merupakan kelompok usia menengah (45-59 tahun), sebagian besar wiraswasta, dengan pendapatan per bulan lebih dari Rp3,5 juta, dan berdomisili di Kelurahan Mojolangu. Variabael persepsi manfaat menunjukkan p=0,04 (aOR=2,67; 95% CI=1,03-6,91) dan persepsi hambatan p=0,01 (aOR=3,60; 95% CI=1,39-9,28), sedangkan persepsi kerentanan p=1,00 (cOR=1,00; 95% CI= 0,32 – 3,16), persepsi keparahan p=0.12 (cOR=2,05; 95% CI=0,84-5,04), dan persepsi isyarat untuk bertindak p=0,18 (cOR=1,82; 95% CI=0,75-4,40).* ***Kesimpulan:*** *Faktor yang berhubungan dengan partisipasi vaksinasi booster adalah persepsi manfaat dan hambatan.*

INTRODUCTION

The new COVID-19 variant is still emerging. At the end of April 2024, a new sub-variant emerged in America called KP.2. which has replaced the previous sub-variant JN.1. The normalization of air travel or the high mobility of the Indonesian population has occurred, and the level of vaccine protection has decreased over time. The possibility of the emergence of new variants of COVID-19 in the future still exists. Providing continued protection for vulnerable groups is essential by getting a COVID-19 booster vaccination (1). One of the vulnerable groups that should also be protected is people who experience degenerative processes, which is the age group of 45 years and over who have a high risk of having comorbidities. So, their participation in COVID-19 booster vaccinations is essential to providing maximum protection (2).

The age group of 45 years and over is partly elderly; research from Kunoli and Rahayu (3) in July 2021 explained that someone aged 45 years and over at Undata Hospital in Palu at risk five times more likely to die from COVID-19 than those aged under 45 years. There is a high risk of death at the age of 45 and over because the body's functions decrease, so the regeneration ability of cells is reduced. Comorbidities at the age of 45 years and above also make the condition of people with COVID-19 more severe when infected. Another factor that should encourage people aged 45 years and over to get the COVID-19 vaccination booster is a history of COVID-19 infection. This is because even though there is natural immunity after being infected with COVID-19, the level of protection against repeated COVID-19 infections is below 50% (4). COVID-19 survivors are known to have been allowed to get another COVID-19 vaccination after one month of testing negative through the

swab result, provided that they do not have severe symptoms (not hospitalized); this is written in a Circular Letter Number: HK.02.01/I/2524/2021 Regarding COVID-19 Vaccination for Survivors.

Coronavirus Disease 2019 (COVID-19) is an infectious disease that, in recent years, has become a new health problem due to its high incidence. The virus's rapid spread causes COVID-19 to infect most people worldwide, including Indonesia's population. The incidence of COVID-19 in Indonesia has experienced a significant increase. On January 30, 2021, there were 14,518 cases, then on July 15, 2021, there were 56,757 cases, and the peak was on February 16, 2022, with 64,718 cases. East Java was the 4th on the list of provinces with the most active cases of COVID-19; there were 572,426 cases (5). The high number of confirmed cases in East Java was also followed by the low coverage of the first and second vaccination doses, which was below the average coverage rate for Indonesia. The coverage for the first dose was 91.28% of the target, while the average in Indonesia was 93.56%. Coverage for the second dose was 74.57% of the target, while the average in Indonesia was 74.63% (6).

Malang City is one of the cities in East Java Province with a confirmed case rate of 28,428 people and a death rate of 1,200 people. Malang City's Case Fatality Rate (CFR) was the highest at the provincial level at 4.22% and was the third most based on the number of confirmed cases of COVID-19 (7). The high CFR rate in Malang City, as previously explained, is known to be directly proportional to the high first and second COVID-19 vaccination coverage rates. Coverage for the first and second doses until March 2022 in Malang City is known to have exceeded 100%, there were 114.98% and 108.53%, unlike the case with third doses of COVID-19 vaccination or booster in Malang City, which still reaches 20.37% (6). Based on the complete release case data possessed by the Mojolangu Health Center, it is known that the number of COVID-19 patients in the period February 8-March 18, 2022, was 196 people, with the number who had received COVID-19 booster vaccinations only 38 people presented only 18.38%. This value is still under the COVID-19 booster vaccination achievement of Malang City, which reached 20.37%. Mojolangu Health Center, as a first-level health facility located in the Lowokwaru District area, has the responsibility to prevent and control COVID-19 in its working area (Mojolangu, Tunjungsekar, Tasikmadu, and Tunggulwulung Village). One control effort can be made by giving repeated COVID-19 vaccinations or boosters to priority groups and the elderly. Booster vaccination participation at first-level health facilities has been legalized through Circular Letter Number: HK.02.02/II/252/2022 Concerning Advanced Dose COVID-19 Vaccination (Booster) addressed to the heads of health service facilities throughout Indonesia, including Mojolangu Health Center. Vaccination is one of the government's efforts to control COVID-19. Vaccination occurs through each region's health facility units or public facilities. Giving mRNA-type vaccination for the third dose has an effectiveness rate of 82% -90% to prevent patients infected with the variant COVID-19 Omicron from having a severe condition (getting treatment at the Emergency Room (ER) or hospitalization) (8). Another reason for necessary booster vaccination is because there is a decrease in immunity or a period of protection after the second vaccination dose. A decrease in effectiveness is known to occur in users of this type of vaccine Astra Zeneca, Moderna, Pfizer, and Janssen 3 months after getting the second COVID-19 vaccination (9). The benefits of booster vaccination and the coverage are still low, and there is a history of COVID-19 infection in the target. Understanding why people want to participate in the COVID-19 vaccination is essential. Based on the Health Belief Model theory, changes in individual behavior to maintain their health status can be influenced by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action regarding health problems owned by individuals (10).

METHODS

The research was a quantitative study using a 1:1 Case-Control design study, with each case and control group of 41 respondents. The study was conducted from April to November 2022 in the working area of Mojolangu Health Center. The population in this study was 139 people. There were survivors of COVID-19 aged ≥ 45 years who, before testing positive, had not been vaccinated booster and domiciled in the working area of the Mojolangu Health Center (Mojolangu, Tunjungsekar, Tasikmadu, and Tunggulwulung Villages). The case group was the person who received a booster dose, while the control group was a person with the vaccination status of dose 2. The inclusion criteria for the case group included communicating well, being willing to be interviewed (filling in informed consent), being healthy and being declared hostile based on laboratory results, and receiving the COVID-19

booster vaccination after recovering from COVID-19. At the same time, the inclusion criteria of the control group are populations that have received the primary COVID-19 vaccination dose two but have not received the COVID-19 booster vaccination after recovering from COVID-19. The exclusion criteria for the case and control groups were that they were currently undergoing isolation and were sick at the time of the interview.

The sample was determined using purposive sampling. The purposive sampling technique in this study only allows researchers to sort out willing respondents and ensure the completeness of the respondents' data. This is because the data collection conditions still create a negative stigma against health workers. There was also limited data on COVID survivors in that period. So, to get respondents who are in accordance with the research objectives and are willing to become research subjects, purposive sampling is in accordance with the conditions and situation, respondent characteristics, and research objectives.

All characteristic variables were asked to provide an overview of the general characteristics of respondents. Age variables were categorized into three categories according to WHO age groups, namely "Middle Age" for those aged 45-59 years, "Elderly" for those aged 60-74 years, and "Old Age" for those aged 75-90 years. The age variable was obtained from the respondent's real-time age during the interview. Sex and religion were only asked as additional data in the respondent's characteristics. Income levels were classified into four based on BPS (Central Bureau of Statistics), namely 0-1.5 million as "low", 1.5 million-2.5 million as "medium", 2.5 million-3.5 million as "high", and "very high for those with income above 3.5 million. The categorization is based on the total monthly income of individual respondents based on interviews. Education level is classified into five levels based on the last education completed. The respondent's occupation was categorized into 12 based on the actual time occupation at the time of the interview. The respondents' domicile is categorized into four villages in the working area of Mojolangu Health Center.

The independent variable in this study is the component of the Health Belief Model, which consists of perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action. In contrast, the dependent variable is participation in booster vaccination. The dependent variable is obtained from the last vaccination status on the vaccine card information. Participation in COVID-19 booster vaccination refers to actions from respondents' participation in the COVID-19 booster vaccination. Participation is classified into two categories: boosted and Dosage 2. Vaccination participation refers to respondents' participation in the COVID-19 booster vaccination. All independent variables are measured through the level of trust using a Likert scale of Strongly Agree, Agree, Disagree, and Strongly Disagree. The perceived susceptibility variable is the respondent's perception that their body is susceptible to COVID-19. Perceived severity is the respondent's perception regarding the adverse effects that arise when infected with COVID-19. Perceived benefit is the respondent's perception that participation in the COVID-19 booster vaccination can provide benefits for health both physically, mentally, and socially. The perceived barrier is the respondent's perception that there are things that discourage or prevent them from getting a COVID-19 booster vaccination. Cues to action are actions taken by respondents and the surrounding environment that encourage respondents to take the COVID-19 booster vaccination. All these independent variables will be categorized into positive and negative perceptions depending on the median or mean data.

The risk of bias against the control group has been minimized by taking the same steps in selecting the control group and cases through operational definitions and using multiple logistic regression analysis to determine the chances of each variable and which variable has the most decisive influence. Data collection was carried out using a questionnaire and interview method. The researcher developed the questionnaire and passed the content and item validity and reliability tests with a Cronbach's Alpha score of 0.91. Process management data and data analysis were performed with SPSS.26. Data analysis was done using the Chi-Square and Binary Logistics Regression tests. Before this study, it had been reviewed by the ethics commission and declared appropriate according to the World Health Organization (WHO) eligibility standards through a certificate of eligibility with certificate number Reg.No.: 601 / KEPK-POLKESMA / 2022.

RESULTS

Based on Table 1, most respondents in a group of 45-59 years old (54.88%). Most of the respondents were female (54.88%). The religion most adhered to by respondents is Islam (89%). Most respondents have a monthly income above IDR—3,5 million and completed university

education (36.59%). In addition, it was found that 28% of respondents worked as entrepreneurs. The respondents' residential village represents the respondents' residence in this study; as much as 50% of the respondents live in the Mojolangu Village area.

Table 1
Frequency Distribution of COVID-19 Booster Vaccination Participation based on Respondent Characteristics

Characteristics	Booster		Dosage 2		Total	
	n	%	n	%	n	%
Age						
Middle Age (45-59 years old)	26	31.71	19	23.17	45	54.88
Elderly (60-74 years old)	14	17.07	21	25.61	35	42.68
Elderly Old Age (75-90 years old)	1	1.22	1	1.22	2	2.44
Sex						
Male	17	20.73	20	24.39	37	45.12
Female	24	29.27	21	25.61	45	54.88
Religion						
Islam	37	45.12	36	43.90	73	89.02
Christian	1	1.22	5	6.10	6	7.32
Catholic	3	3.66	0	0	3	3.66
Monthly income (IDR)						
0	5	6.10	14	17.07	19	23.17
<1,500,000	4	4.88	7	8.54	11	13.41
1,500,000-2,500,000	6	7.32	6	7.32	12	14.63
2,500,000-3,500,000	4	4.88	6	7.32	10	12.20
>3,500,000	22	26.83	8	9.76	30	36.59
Education Level						
Not completed elementary school	1	1.22	0	0	1	1.22
Elementary school	3	3.66	5	6.10	8	9.76
Junior high school	6	7.32	11	13.41	17	20.73
Senior high school	12	14.63	14	17.07	26	31.71
University	19	23.17	11	13.41	30	36.59
Occupation						
Entrepreneur	11	13.42	12	14.63	23	28.05
Civil Servant	4	4.88	0	0	4	4.88
Private Employee	5	6.10	8	9.76	13	15.85
State / Regional Owned Enterprises Employees	1	1.22	0	0	1	1.22
Factory Laborer	4	4.88	0	0	4	4.88
Lecturer	2	2.44	0	0	2	2.44
Driver	0	0	1	1.22	1	1.22
Household Assistant	1	1.22	1	1.22	2	2.44
Pensioner	5	6.10	2	2.44	7	8.54
Housewife	7	8.54	14	17.07	21	25.61
No Work	1	1.22	3	3.66	4	4.88
Domicile						
Mojolangu	23	28.05	18	22.95	41	50
Tunjungsekar	6	7.32	13	15.85	19	23.17
Tunggulwulung	4	4.88	7	8.54	11	13.41
Tasikmadu	8	9.76	3	3.66	11	13.41

Based on Table 2, the results show that the variable perception of benefits (p= 0.04, aOR(95% CI): 2.67 (1.03 – 6.91)) and barriers (p= 0.01, aOR(95% CI): 3.60 (1.39 – 9.28)) significantly affects participation in booster vaccination. These results can be interpreted that respondents with a positive perception of the benefits have a 2.67 times greater chance of participating in booster

vaccination than those with a negative perception, and respondents who have negative perceptions of barriers to participating in booster vaccination are 3.60 times more likely to get booster vaccination when compared to those who have a positive perception of barriers in carrying out booster vaccination.

Table 2
Relationship among the Health Belief Model components with the participation of COVID-19 booster vaccination in survivors of COVID-19

Variable	Vaccination Status				p	cOR (95% CI)	p	aOR (95% CI)
	Booster		Dosage 2					
	n	%	n	%				
Perceived Susceptibility								
Positive	34	41.46	34	41.46	1.00	1.00	-	-
Negative	7	8.54	7	8.54		(0.32 – 3.16)		
Perceived Severity								
Positive	28	34.15	21	25.61	0.12	2.05	-	-
Negative	13	15.85	20	24.39		(0.84 – 5.04)		
Perceived Benefits								
Positive	28	34.15	19	23.17	0.04	2.49	0.04	2.67
Negative	13	15.85	22	26.83		(1.01 – 6.13)		(1.03 – 6.91)
Perceived Barriers								
Negative	24	29.27	12	14.63	0.01	3.41	0.01	3.60
Positive	17	20.73	29	35.37		(1.37 – 8.53)		(1.39 – 9.28)
Cues To Action								
Positive	26	31.71	20	24.39	0.18	1.82	-	-
Negative	15	18.29	21	25.61		(0.75 – 4.40)		

DISCUSSION

Individuals are considered to be entering middle age when they turn 45 years old; this age limit is, in fact, also a boundary in examining the level of natural antibodies after getting a COVID-19 vaccination. It is recognized that someone aged 45 years and over has a lower natural immunity compared to those under 45 years of age (11). Characteristics of patients over 45 years of age also have a low intention to get a booster vaccination (12). In addition, in this age group, the body begins to suffer from decreased body function, which causes the appearance of various comorbidities that must be considered if they get a poor prognosis when infected and receive treatment (2,13). Therefore, this age group is at risk of developing severe conditions when receiving hospitalization, and the administration of booster vaccines is 82-90% effective in preventing patients from having a poor prognosis (8).

Perceived Susceptibility

The results of this research interpreted that most respondents, whether they have boosted or not, believe their bodies are susceptible to COVID-19 infection. In line with this research, Lin also found that perceived susceptibility was not a variable significantly influencing efforts to obtain COVID-19 vaccination (14). Wu et al (15), who conducted research in China, explained the opposite of this study, namely that it is known that perceived susceptibility is the most influential variable in participation in COVID-19 booster vaccination. The p-value of perceived susceptibility in Wu's research is <0.00, which means that the higher a person's perception of susceptibility to get booster vaccination is also higher (15).

There was no significant difference regarding whether the perception of susceptibility was positive in the case or control groups, which is most likely influenced by the respondents' experience of undergoing isolation because all respondents in this study were survivors of COVID-19. This experience made respondents feel the impact when

undergoing treatment due to COVID-19 infection. This sick experience factor influences changes in a person's perception, and the experience of getting treatment due to an illness that occurs to someone or others can increase an individual's perception of health (16). The second determinant that also positively influences the perception of susceptibility in 82.92% of respondents is the age factor of respondents, where all respondents in this study belong to the age group of 45 years and over. Older age causes an increased fear of being infected with COVID-19. This is associated with increased susceptibility to infection with COVID-19 (17). Another factor that positively influences the perception of susceptibility is the massive exposure to health education regarding the dangers of COVID-19 and the prevention of transmission of COVID-19 during the COVID-19 pandemic, which is carried out through various mass media, as stated by Rosyidi that the mass media also plays a role in changing a person's perception (18).

Perceived Severity

Perceived severity as one of the factors that influence a person's decision to participate in booster vaccination in this study is concluded to have a positive relationship, which means that the more a person has a strong perception that COVID-19 can harm health, the higher the person's willingness to participate in COVID-19 booster vaccination. According to (19), which explained that there was no significant relationship between perceived severity and participation in COVID-19 vaccination. However, a study conducted in Saudi Arabia found the opposite result with this study, where perceived severity (p = 0.03, aOR = 2.07; 95% CI = 1.08-3.96) was found to be associated with participation in COVID-19 booster vaccination. Based on the aOR value, it is known that someone who agrees with the perception of severity is 2.07 times more likely to participate in getting a COVID-19 booster vaccination than those who disagree (20).

Another research study with similar results explained that someone concerned about the risk of COVID-19 transmission to the family will be more willing to get a COVID-19 booster vaccination than those who do not care (21). The results of this study were most likely influenced by the education level of respondents, the majority of whom were in the excellent category. Most respondents' latest education level, namely high school/equivalent, is as much as 31.71%. Moreover, the highest level of education, namely college, is 36.59%. A high level of education is known to have a relationship with positive or high public perception. According to (22), a high level of insight and thinking will then affect a person's perception, knowledge, attitude, and behavior, which is influenced by a good level of education. Another factor that is likely to influence a person's perception is employment. It is known that 61% of respondents in the study are working in various types of jobs ranging from self-employed, civil servants / Indonesian Armed Forces/Police, private employees, State / Regional Owned Enterprises employees, factory laborers, lecturers, drivers, and household assistants. It is known that someone who works and experiences the impact during a pandemic is likely to worry about getting sick, not being able to work, or losing their job. Thus, perceptions related to the impact that will occur if infected with COVID-19 are understood by the majority of respondents (23).

Perceived Benefits

Perceived benefit, a person's belief that vaccination benefits the body, is one of the last reasons people accept COVID-19 booster vaccination. Analyzing this study, it is known that the higher a person's belief that vaccination has a positive impact on the body, the more willing they will be to participate in the COVID-19 booster vaccination. These results are in line with Wirawan et al (16), which explains that perceived benefits are statistically significant and positively related to participation (aOR = 1.85; CI 95% = 2.27-3.49) and intention (aOR = 1.85; CI 95% = 1.35-2.54) of a person to get a COVID-19 booster vaccination. The results explained that someone with a high perception of benefits is 2.81 times more likely to have the intention to vaccinate against a COVID-19 booster (16).

Determinants influencing respondents' decision-making to participate include occupation, education level, income, and participation in health insurance. In this study, respondents with jobs are more likely to be vaccinated. It is known in this study that 28 respondents (68.29%) who have been boosted have jobs, so the encouragement factor from the workplace can also influence individual decisions to participate in COVID-19 booster vaccination (16). Several types of professions, such as state / regional owned enterprises employees, lecturers, and factory workers, have a percentage of 100% participation in the COVID-19 booster vaccination. Qin et al (21) also described how employees in public institutions were more willing to participate in the COVID-19 booster vaccination. Then, regarding the education level factor,

respondents with higher education levels are more likely to do boosters.

Regarding income level, it is known that respondents with income > IDR 3.5 million are more likely to have the booster. Participation in health insurance was not examined in this study. This is related to the availability of a free booster vaccination program the government covers. Belief in the benefits of vaccines, such as effectively preventing symptoms from becoming severe (aOR=25.55), is known to increase participation in a COVID-19 booster vaccination 22.55 times more likely than those who do not believe (24).

Perceived Barriers

The perception of negative barriers is significantly associated with the participation of the 45-year-old and older age group who have a history of COVID-19 in getting a COVID-19 booster vaccination. Based on these results, it can be interpreted that someone with a negative perception of barriers to getting a COVID-19 booster vaccination has a more likely chance of participating in a COVID-19 booster vaccination than someone with a positive perception of barriers. In line with this study, perceived barriers, which are represented by perceptions of the side effects of a booster vaccination, significantly (p-value <0.00; OR = 0.25; 95% CI = 0.19-0.34) affect participation in getting booster vaccinations (25). These results can be interpreted that the variable of perceived barriers has a negative correlation (OR<1), which means that it is known that the higher the perception of barriers, the lower the level of participation in getting a COVID-19 booster vaccination.

The reluctance of individuals to participate in getting COVID-19 booster vaccinations is due to the risk of side effects that arise after the booster. Side effects caused by getting COVID-19 vaccination include heartbeat, joint pain, pain in the injected area, fatigue, fever, diarrhea, headache, and nausea (26). The onset of side effects was one of the factors negatively associated (aOR=0.25) with individual participation in COVID-19 booster vaccination (25). The onset of side effects is also known to be why most individuals are discouraged from participating in COVID-19 booster vaccination; another study also found that individuals who did not experience side effects after vaccination were more likely to get a COVID-19 vaccination (27).

Factors that influence the significant relationship between high perceived barriers (negative) and participation in COVID-19 booster vaccination, namely low education level and older age, never received COVID-19 vaccination, and widowhood has a tendency not to participate in COVID-19 booster vaccination (28). In this study, the middle age category (45-59 years) had a higher percentage (31.71% vs. 23.17%) of participating in booster vaccination compared to older age (60-74 years) (17.07% vs. 25.61%). In line with Qin et al (21), in this study, based on Table 1, respondents with low education levels below college (elementary, junior high, and high school) had a low percentage of participation in COVID-19 booster vaccination. However, the relationship between marital status and history of participation in previous COVID-19 vaccinations is still being determined in this study because the researcher assumes that most respondents have been married. Then related to previous vaccination history if referring to (Circular Letter Number: HK.02.02/II/ 252/2022 Regarding COVID-19 Vaccination Advanced Dose (Booster) shows that the COVID-19 booster vaccination is given to individuals who have completed the primary vaccination so that all respondents in this study have at least received the COVID-19 vaccination twice.

Cues to Action

Cues to action did not significantly affect participation in COVID-19 booster vaccination. Respondents who have received boosters tend to be more positive (26 of 41) 63.41% of the existence of cues to action. According to (29), his study also found similar research results, which found that cues to action were not significantly associated (p-value=0.59) with participation in COVID-19 booster vaccination. However, another study found that people who experienced cues to action were 2.02 times more likely to vaccinate against COVID-19 (30).

Cues to action are factors that become a realization between the accumulation of perceptions of susceptibility and perceptions of barriers, so that the higher the perception of susceptibility and the lower the perception of barriers and driven by cues to action, it can make someone carry out healthy behavior. Other determinants influencing cues to action include psychosocial factors, demographics, individual perceptions, health promotion efforts, and exposure to information from mass media (23).

Research Limitations

This research only examines the factors within the respondents that influence participation in the first booster vaccination. In the future, we aim to develop an analysis of external factors such as the

role of health workers, the level of vaccine effectiveness, and the affordability of health facilities, as well as analyze the overall level of follow-up vaccinations obtained. Hopefully, this can be done in the future to get a broader picture of the factors that influence COVID-19 booster vaccination. This study analyzes internal factors in the form of perceptions and practices owned or carried out by individual respondents that affect participation in vaccinating COVID-19 boosters. This study is essential to take into consideration for policymakers to focus on campaigning the benefits of booster vaccination and safety during and after getting booster vaccination in increasing participation in booster vaccination for the general public aged >45 years.

CONCLUSION

The variables significantly influence the participation of the > 45 age group with a history of COVID-19 in the Mojolangu Health Center working area to participate in COVID-19 booster vaccination, which is the perception of benefits and barriers. Other factors, perceived susceptibility, perceived severity, and cues to action, have no significant relationship. The recommendation for policymakers of Mojolangu Health Center is to organize health promotion by focusing on the perception of barriers and benefits of boosters in preventing the severity of symptoms and the risk of death and explaining that barriers such as side effects after getting vaccinated can be reduced. Promotion through educational and health campaigns can raise confidence or influence and change perceptions of the > 45 age group to participate in COVID-19 booster vaccination.

CONFLICT OF INTEREST

No potential conflict of interest.

AUTHORCONTRIBUTION

PDW: Designed the study, collected data, performed statistical analysis, and performed interpretation. HEW and LRA: Provided guidance and direction related to research design, reviewed the research instruments, provided guidance analysis and interpretation, and provided guidance in writing the article. RWG: contributes to monitoring this research and provides recommendations on the research flow and data analysis.

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