



Knowledge, Attitudes, and Practices in Bungkulan Buleleng Village Communities Related to the Implementation of COVID-19 Vaccination

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ARTICLE INFO

Submitted : 24-08-2023

Revised : 17-04-2024

Accepted : 26-08-2024

Published : 30-09-2024

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ABSTRACT

Background: The contribution of the community through their knowledge, attitudes, and practices are essential to control COVID-19 through vaccination.

Objectives: This study aims to analyze the relationship between knowledge, attitudes, and practices of the community related to implementing the COVID-19 vaccine.

Methods: This observational study with a cross-sectional design was carried out from June to July 2023. Samples of 155 respondents were obtained through convenience sampling. Inclusion criteria include the community domiciled in Bungkulan Village, aged ≥ 18 years, and is willing to be involved in research, while respondents who didn't fill in the complete questionnaire are excluded from research. Data was collected using self-developed offline questionnaire. The relationship of knowledge, attitudes, and practices was analyzed by multiple linier regression and Spearman-rho test (95% CI).

Results: Findings showed that the majority of respondents were aged 25-29 years old (30.32%), male (76.13%), graduated from high school (65.16%), worked (89.68%), didn't experience comorbidities (96.13%) and AESI (87.10%), lack of knowledge (53.29 ± 23.24) but has a good attitude (75.18 ± 11.55) and practices (84.06 ± 16.17) related to the implementation of the COVID-19 vaccination. There is a significant relationship between knowledge with attitudes ($r = 0.352$; $p < 0.001$) and attitudes with practices ($r = 0.257$; $p < 0.001$), also knowledge and attitudes simultaneously influence the practice of Covid-19 vaccination ($p < 0.001$).

Conclusion: A person's attitudes and practices in a positive direction tend to begin with good knowledge. Strong sources of public health information and communication are necessary to develop good knowledge.

Keywords: attitudes; COVID-19; knowledge; practices; vaccination

INTRODUCTION

The coronavirus disease 2019 (COVID-19) has rapidly spread across the world, causing numerous deaths including in Indonesia. Bali, in particular, has experienced a significant rise in daily cases and deaths due to COVID-19. As of August 30, 2021, Bali Province has recorded the highest number of COVID-19 cases, with a total of 105.894 confirmed positive cases since 2020. Out of those, 6.221 people were hospitalized, 96.176 people have been declared cured, and 3.497 people have lost their lives due to the virus.¹ This increase in cases is due to high community mobility, and the reopening of Bali's tourism industry during the New Normal Bali era in July 2020. As a result, Bali's economy has contracted significantly, reaching -10.98%, especially in the second quarter of 2020.²

To effectively combat the spread of COVID-19, the World Health Organization (WHO) strongly recommends taking preventative measures such as increasing the body's defense system through vaccine administration and implementing health protocols. These protocols include diligently washing hands with soap

and running water, maintaining a safe distance from others while talking, avoiding touching your face with dirty hands, wearing a mask, and covering your nose and mouth when coughing. Vaccines are widely recognized as the most effective and economical way to prevent infectious diseases.^{3,4} As a result, governments across the globe, including Indonesia, have implemented vaccination programs to combat the pandemic and return the world to normalcy.

Vaccination activities must ensure several critical factors, such as providing accurate information and education on vaccine eligibility, potential risks, administering the vaccine, and procedures for vaccinating the public. These aspects are essential to ensure the smooth functioning of the vaccination program and safeguard the community from any harm.⁵ The research conducted by Mardiono et al⁶ highlights that there are still challenges in implementing the COVID-19 vaccination program, such as non-compliance and community reluctance to follow instructions. The primary among these is the lack of clear and accurate information available to the public, leading to a lack of understanding and fear of vaccination. Additionally, the spread of false information, such as vaccines being dangerous and containing fatal side effects, is further contributing to this issue.^{6,7}

The lack of information certainly poses a significant challenge to developing healthy behavior, particularly in influencing attitudes and practices toward the COVID-19 vaccination program. Abdul et al⁸ conducted thorough research that revealed several multilevel predictors that explain people's non-compliance with government regulations and advice during the COVID-19 pandemic and one of the key factors is knowledge, especially at the individual level. Furthermore, the area of residence also has a substantial impact on individual knowledge, which in turn affects attitudes and perceptions regarding information about COVID-19. The perception of the benefits of Covid-19 is a crucial factor that determines people's willingness to get vaccinated.⁹ There are stark disparities between the communication and information flow in rural and urban communities. The residents of urban areas can easily access electronic devices with robust internet signals. On the other hand, rural communities often struggle with limited access to communication and information, even if they possess devices, due to weak internet signals. This is especially true for those residing in highland or mountainous areas.¹⁰ Research by Toar (2020) also found that limited access to health information can lead to low levels of health literacy during the COVID-19 pandemic.¹¹

Extensive research has been conducted in different regions of Indonesia to analyze people's knowledge, attitudes, and practices regarding COVID-19 vaccination. In Badung Regency, Bali, Noviyanti et al¹² conducted research on communities and discovered that there were discernible differences in community practices after COVID-19 vaccination based on their level of knowledge ($p > 0.05$), but the research did not explain the aspect of attitude. According to a study conducted by Hadning et al¹³ in the Riau community of Indonesia, respondents exhibited a profound understanding of COVID-19 vaccination and exhibited highly positive attitudes and behaviors towards it. Although the study did not analyze the correlation between these variables, the results strongly indicate that the respondents are well-informed and supportive of COVID-19 vaccination efforts.¹³ The research conducted in a community in South Sumatra by Yonantriza et al¹⁴ has revealed a significant correlation between knowledge and attitudes toward receiving the COVID-19 vaccine, albeit partially. However, no simultaneous report was made on the influence of both knowledge and attitudes on the practice of receiving the COVID-19 vaccine.¹⁴ National research in Indonesia has also been carried out by Efendi et al¹⁵, which showed that there is a significant relationship between knowledge, attitudes, and self-confidence toward compliance with COVID-19 vaccination in young adults. However, the response rate was limited since the questionnaire was distributed online to rural communities.¹⁵ Based on the above background, researchers are interested in analyzing the partial and simultaneous relationships between knowledge, attitudes, and practices of the community regarding the COVID-19 vaccination program, particularly in rural areas in Bungkulan Village, Buleleng Regency, Bali.

METHODS

Study design

This is an observational study that was conducted from June to July 2023, employing a cross-sectional design with data collected during that specific timeframe. It delves into the knowledge, attitudes, and practices of the residents of Bungkulan Village, Buleleng Regency, Bali, concerning the implementation of the Covid-19 vaccination program.

Population and samples

This study involved a total of 155 respondents, obtained through a convenience sampling technique. All respondents were thoroughly screened and confirmed to meet the research's inclusion and exclusion criteria. Only native people or those who live in Bungkulan Village and have lived there since before COVID-19 was declared a pandemic until the time of data collection were eligible to participate. Additionally, participants were required to be at least 18 years old, have received socialization about COVID-19 vaccination, and be willing to participate in the research by filling out an informed consent form. The only exclusion criteria were those who did not complete the questionnaire.

Study instruments

The research instrument utilized in this study is a self-developed questionnaire. The questionnaire was meticulously adjusted to the conditions and references in the form of regulations in Indonesia regarding the COVID-19 vaccination program issued by the Ministry of Health of the Republic of Indonesia including Decree of the Minister of Health of the Republic of Indonesia Number 4638 of 2021 and Regulation of the Minister of Health of the Republic of Indonesia Number 23 of 2021 concerning Technical Guidelines for Implementing Vaccination COVID-19, as well as Circular Number HK.02.02/II/252/2022 concerning Advanced Dose (Booster) COVID-19 Vaccination.^{16,17,18} The construct of the questionnaire for each variable of knowledge, attitude, and practice was expertly adapted from research by Singh et al.¹⁹ The questionnaire to assess knowledge comprises 15 questions (Q) that cover various domains, including the definition and benefits of vaccines (Q1, Q2, Q3), vaccination program targets (Q4, Q5, Q6), vaccination facilities and services (Q7, Q8), vaccination costs (Q9), also dosage, side effects, and vaccination procedures (Q10, Q11, Q12, Q13, Q14, Q15).¹⁹ The questionnaire to assess attitudes consists of 10 questions that cover domains such as prevention attitudes (Q1, Q2, Q3, Q4), health-seeking attitudes (Q5, Q6, Q7, Q8), and risk considerations (Q9, Q10).¹⁹ The questionnaire to assess practice consists of 10 questions that cover domains such as prevention behaviors (Q3, Q8, Q9, Q10) and health-seeking behaviors (Q1, Q2, Q4, Q5, Q6, Q7).¹⁹ Before distributing the questionnaire, the researcher ensured that it had undergone rigorous validity testing using the Content Validity Index (CVI) method. The obtained CVI value was ≥ 0.80 , as assessed by two experts who are doctors in charge of implementing the COVID-19 vaccination program, amounting to CVI=1.000. The questionnaire also underwent reliable testing using the internal consistency method through Cronbach's alpha value. The questionnaire was declared reliable as the alpha value was greater than the r table based on the number of test respondents (> 0.361). This was carried out on 30 test respondents, with consecutive alpha values for each variable of 0.590, 0.751, and 0.674.^{20,21}

Data collection

Data was collected through a questionnaire comprising two parts: a form to gather the respondent's personal information and a questionnaire to assess their knowledge, attitudes, and practices concerning the implementation of the COVID-19 vaccine program. The form for personal information collects data on the respondent's age, gender, education level, working status, vaccination status, history of illness, and any Adverse Event of Special Interest (AESI) experienced after receiving the COVID-19 vaccine. These events include local reactions such as swelling, pain, redness at the injection site, and cellulitis, and systemic reactions such as headache, fever, weakness, muscle pain, and joint pain. Other reactions include allergic reactions such as syncope, anaphylactic reactions, edema, and urticaria.^{22,23,24} Only fever was reported by respondents after receiving the COVID-19 vaccine in this study, despite the presence of many potential AESIs.

Data analysis

When assessing the answers to the knowledge and practice questionnaire, the Guttman scale is used. A score of 1 is given to answers that are correct or "yes," while a score of 0 is given to incorrect answers, "don't know," or "no." The results of the questionnaire are calculated as a percentage by adding the scores from correct answers and dividing by the maximum score. This percentage is then multiplied by 100 and categorized as poor ($\leq 55\%$), sufficient (56-75%), or good ($\geq 76\%$) based on achievement criteria.²⁵ The attitude questionnaire uses a Likert scale, with positive questions and answer choices ranging from "1=Disagree" to "4=Strongly agree." Responses from each respondent are calculated by adding the scores for each question, dividing by the maximum scale, and multiplying by 100. The average level of response for each respondent is categorized as extremely poor ($< 20\%$), poor (20-39.9%), moderate (40-59.9%), good (60-79.9%), and excellent (80-100%).²⁶ The sociodemographic characteristics of respondents are analyzed descriptively and presented as frequencies and percentages. To identify the relationship between variables, the Spearman-rho correlation test is used because

the data is not normally distributed ($p < 0.001$), then a multivariate statistical test (linear regression model) is carried out with a confidence level of 95% to determine the variables (between knowledge and attitude, and simultaneously) that have the most influence on practice.

RESULTS AND DISCUSSION

Overview of Respondent Characteristics

The study's findings demonstrate that the majority of respondents were males (76.13%) over 40 years old (22.58%) (Table I). These results are consistent with the research conducted by Nuraini et al²⁷ which also noted that the majority of their respondents fell within this age range (41.5%). It is important to note that people in this age group are still highly productive and receptive to new information, knowledge, and ideas.²⁸ As individuals age, their level of maturity and strength in thinking increases, and their accumulated experience better prepares them to face different situations.²⁹ Furthermore, prior research conducted by Putra et al³⁰ corroborates our study's outcomes that most respondents were men (55.3%). Men are often perceived to have more leisure time and to be more conscious of their health, which makes them more likely to engage in healthy behaviors.³⁰

The other results revealed that the majority of respondents had completed high school education (65.16%) and were employed in the private sector (70.97%). This aligns with previous research by Putra et al³⁰ which also found that the majority of respondents had secondary or higher education (62.3%) and were employed (42.1%). Other studies by Baroroh et al³¹ and Handayanti & Gunawan³² have demonstrated that education level can significantly influence a person's thoughts and boost their knowledge. Further, according to Situmorang and Yosi (2013), work experience can be a crucial factor in helping individuals gain valuable knowledge and experience, either directly or indirectly.³³

This study provides valuable insights into the disease history and AESI of respondents who received the COVID-19 vaccine. The results indicate that the vast majority of respondents (96.113%) had no history of disease, and the majority (87.10%) did not experience AESI after receiving the vaccine injection (Table I). These findings highlight the significant role that the history of disease and the potential for AEFI plays in shaping the community's attitude towards COVID-19 vaccination. Research conducted by Tuloli et al³⁴ and Ratnasariani et al³⁵ supports the notion that individuals with a history of the disease are less likely to participate in or receive COVID-19 vaccination compared to those without a history of the disease. The Indonesian Ministry of Health has also emphasized that vaccines are only given to healthy individuals.³⁶ People with uncontrolled comorbidities such as hypertension or diabetes are not eligible to receive the COVID-19 vaccine. Before receiving the vaccine, all participants undergo a thorough medical check-up, and those with comorbidities must get approval from their treating doctor. This strict protocol is in place because people with accompanying or comorbid diseases tend to have a weak immune system, which makes it challenging to form antibodies.³⁷

Research conducted by Kholidiyah et al³⁸ have shown that misinformation about AESI related to the COVID-19 vaccine can cause doubt and anxiety in individuals. Similarly, a study by Farsida et al³⁹ revealed that many people still struggle with the decision to undergo COVID-19 vaccination due to anxiety, doubt, or rejection, particularly because of poor knowledge about the vaccine. However, seeking accurate and reliable information about COVID-19 vaccination can help reduce these negative emotions and promote informed decision-making.³⁹ It is important to note that vaccines, including the COVID-19 vaccine, generally do not cause significant reactions in the body. Mild local or systemic reactions such as pain at the injection site or a mild fever are natural and expected parts of the body's immune response.²² Several factors can influence the occurrence of AESI, including the individual's immune system and overall health, coincidental reactions, and vaccine components like adjuvants, stabilizers, and preservatives. Nonetheless, it is crucial to remember that the side effects of COVID-19 vaccination are typically mild and not harmful. In rare cases, side effects can occur due to incorrect injection procedures or anxiety associated with the fear of needles.^{22,40,41}

Respondents Knowledge

According to the respondents' data, it is evident that the average level of knowledge attainment (%) falls under the "poor" category, as demonstrated in Table II. This finding is consistent with the research conducted by Yonatriza et al¹⁴, which asserts that most respondents still lack sufficient knowledge about COVID-19 vaccination. The inadequate knowledge levels could be attributed to the lack of information about the significance of the COVID-19 vaccination program. Moreover, the abundance of misinformation and fake news in society has led to the formation of misconceptions among people.^{14,15}

Table I. Sociodemographic characteristics

| | Charateristic | N (155) | % |
|----------------------------------|----------------------------|------------------|-------|
| Age (years old) | 1. 18-20 | 16 | 10,32 |
| | 2. 21-24 | 28 | 18,06 |
| | 3. 25-29 | 47 ^a | 30,32 |
| | 4. 30-34 | 21 | 13,55 |
| | 5. 35-40 | 8 | 5,16 |
| | 6. >40 | 35 | 22,58 |
| Sex | 1. Male | 118 ^a | 76,13 |
| | 2. Female | 37 | 23,87 |
| Education level | 1. Elementary school | 2 | 1,29 |
| | 2. Middle school | 8 | 5,16 |
| | 3. High school | 101 ^a | 65,16 |
| | 4. Higher education | 44 | 28,39 |
| Employment status | 1. Unemployed | 16 | 10,32 |
| | 2. Private sector employee | 110 ^a | 70,97 |
| | 3. Entrepreneur | 26 | 16,77 |
| | 4. Laborer | 1 | 0,65 |
| | 5. Farmer | 2 | 0,13 |
| Comorbidities | 1. No | 149 ^a | 96,13 |
| | 2. Yes (hypertension) | 6 | 3,87 |
| AESI COVID-19 vaccination | 1. No | 135 ^a | 87,10 |
| | 2. Yes (fever) | 20 | 12,90 |

Abbreviation: (a), highest frequency; SD, the standard of deviation; COVID-19, Coronavirus disease-19; AESI, Adverse Event of Special Interest

Table II. Overall knowledge of the COVID-19 vaccination implementation

| No. | Categories | N (%) | Mean (SD) |
|-----|-------------------|------------|---------------|
| 1. | Poor (≤55%) | 94 (60.64) | 37.73 (11.81) |
| 2. | Moderate (56-75%) | 33 (21.30) | 65.45 (5.05) |
| 3. | Good (76-100%) | 28 (18.06) | 91.19 (8.18) |
| | Total | 155 (100) | 53.30 (23.32) |

Abbreviation: SD, the standard of deviation; COVID-19, Coronavirus disease-19

Having substantial knowledge about the COVID-19 vaccine is essential in shaping people's decisions and intentions to get vaccinated, which is crucial for the success of the vaccination program.⁴² To educate and communicate with the public about COVID-19 vaccination, various promotional activities can be conducted through different media channels, such as outreach programs, health campaigns, and personal approaches, both offline and online.⁴³ Many factors can influence a person's knowledge level, including their educational background, age, and employment status, as well as external factors like cultural and environmental factors.⁴⁴ However, with proper education and communication, it is possible to increase people's understanding of the vaccine, which can lead to higher vaccination rates.⁴²

Our recent studies have indicated limited knowledge among respondents regarding COVID-19 vaccination in several domains, which include definition and benefits, program targets, also dosage, side effects, and procedures (Table III). Faisal et al⁹ have reported that low awareness levels about the advantages and effectiveness of the COVID-19 vaccine can lead to negative perceptions, potentially increasing the likelihood of

Table III. The respondent's knowledge domain descriptions of the COVID-19 vaccination implementation

| No. | Domains | Range of score | Mean (SD) |
|-----|--|----------------|---------------|
| 1. | Definition and benefits | 0.00-100.00 | 39.57 (37.37) |
| 2. | Program targets | 0.00-100.00 | 47.10 (28.12) |
| 3. | Facilities and services | 0.00-100.00 | 80.00 (34.47) |
| 4. | Costs | 0.00-100.00 | 72.90 (44.59) |
| 5. | Doses, adverse effects, and procedures | 0.00-100.00 | 51.08 (30.19) |

Abbreviation: SD, the standard of deviation; COVID-19, Coronavirus disease-19

refusal to get vaccinated. To encourage people to get vaccinated, it is essential to disseminate accurate information about the vaccine's efficacy, safety, targets, and vaccination procedures.⁴⁵ The resulting study by Rosiana et al conducted at a community health center in Indonesia also explained that public knowledge about COVID-19 vaccination includes a comprehensive understanding of the vaccine's dosage, side effects, and vaccination procedures.⁴⁶

Respondents Attitudes

The data indicates that respondents' attitudes towards the COVID-19 vaccination program are overwhelmingly positive, according to Table IV. The average attitude achievement falls under the "good" category. These findings are supported by research conducted by Widjaja et al⁴⁷, which revealed that both health workers and the general public had very positive attitudes toward the implementation of the COVID-19 vaccination program (99% and 94%, respectively). Similarly, research conducted by Mamoto et al⁴⁸ reported that a majority of respondents had positive attitudes toward COVID-19 vaccination (64.1%). It is worth noting that having a positive attitude towards COVID-19 vaccination is crucial as it is a strong indicator of an individual's decision to seek vaccination services.⁴⁹

The mean value of each attitude domain is close to the overall mean value of all attitudes, as shown in Table V. In this research, attitudes related to health-seeking are beliefs, feelings, or intentions that help people seek the COVID-19 vaccine at a health service without any difficulty, at no cost. This enables people to feel less anxious about the transmission of COVID-19. Furthermore, a preventive attitude is the belief that COVID-19 vaccination, as instructed by the government and assisted by health workers, can help prevent the transmission of COVID-19 for both the community and individuals. The third attitude domain is risk consideration, which is the belief that the COVID-19 vaccine is safe for the public, and people should remain vigilant even after vaccination. These three attitude domains encourage people to participate in vaccination activities and help shape society's efforts to prevent the spread of COVID-19. By agreeing and taking real action to participate in the COVID-19 vaccination program, people can protect themselves and others from exposure to the virus. This is an effort to break the chain of the COVID-19 pandemic and shows the belief that the Indonesian people can fight and control the transmission of COVID-19 through the vaccination program.^{13,46}

A study conducted by Al-Jayyousi et al investigated the various factors that impact people's attitudes toward getting vaccinated against COVID-19. The study found that demographic characteristics play a significant role. For instance, elderly individuals are more willing to receive the vaccination in comparison to younger adults who may exhibit indifference or have doubts about the vaccine's safety and efficacy. Additionally, a person's level of literacy in obtaining information and knowledge about COVID-19 vaccines, such as their efficacy and safety, can also influence their attitude toward vaccination. Factors such as gender, race, ethnicity, religion, culture, health conditions, employment status, marital status, and location of residence also play a role in shaping one's attitude toward vaccination. The study also identified low levels of trust in the government and vaccine manufacturers as potential barriers to vaccination.⁵⁰

Respondents Practices

The study shows that respondents have achieved an average practice score of 84.06% ± 16.17% in implementing the COVID-19 vaccination program, which is a good achievement within the range of 80-100%. The results of this research are consistent with previous studies conducted by Putra et al³⁰ and Mamoto et al.⁴⁸, which confirm that the majority of respondents exhibit good practices (65%; 66.7%) in implementing COVID-19 vaccination. This positive trend in good practices can be attributed to the respondents' strict adherence to the government's directions and policies related to COVID-19 vaccination.⁵¹ The government has set a target of

Table IV. Overall attitude toward the COVID-19 vaccination implementation

| No. | Categories | N (%) | Mean (SD) |
|--------------|----------------------------|------------------|----------------------|
| 1. | Extremely poor (0%-19.99%) | 0 | 0 |
| 2. | Poor (20%-39.99%) | 0 | 0 |
| 3. | Moderate (40%-59.99%) | 7 (4.51) | 55.36 (2.47) |
| 4. | Good (60%-79.99%) | 89 (57.41) | 68.57 (4.98) |
| 5. | Excellent (80%-100%) | 59 (38.06) | 87.50 (6.90) |
| Total | | 155 (100) | 75.40 (11,58) |

Abbreviation: SD, the standard of deviation; COVID-19, Coronavirus disease-19

Table V. The respondent's attitude domain description of the COVID-19 vaccination implementation

| No. | Domains | Range of score | Mean (SD) |
|-----|-------------------------|----------------|---------------|
| 1. | Prevention | 25.00-100.00 | 74.52 (14.64) |
| 2. | Health-seeking attitude | 50.00-100.00 | 74.40 (13.86) |
| 3. | Risk considerations | 50.00-100.00 | 78.06 (15.69) |

Abbreviation: SD, the standard of deviation; COVID-19, Coronavirus disease-19

Table VI. Overall practices toward the COVID-19 vaccination implementation

| No. | Categories | N (%) | Mean (SD) |
|--------------|----------------------|------------------|----------------------|
| 1. | Poor ($\leq 55\%$) | 7 (4.51) | 45.71 (7.28) |
| 2. | Moderate (56-75%) | 40 (25.80) | 66.00 (4.90) |
| 3. | Good (76-100%) | 108 (69.68) | 93.24 (7.91) |
| Total | | 155 (100) | 84.07 (16.22) |

Abbreviation: SD, the standard of deviation; COVID-19, Coronavirus disease-19

achieving herd immunity, and the respondents have taken the directives and policies seriously, which has contributed to their excellent practices.⁵² Moreover, respondents are also well aware of the risks associated with contracting COVID-19, and that has further encouraged them to follow the best practices in implementing the COVID-19 vaccination program.⁵²

According to this study, despite the domain of prevention behaviors having a slightly lower value than the overall practice average, it still falls under the category of good practice (Table VII). Prevention behaviors involve the conscious efforts taken by the community to prevent COVID-19, including getting vaccinated adhering to health protocols, and encouraging others to do the same. These practices are known to significantly improve personal and social health.¹³ In countries like Singapore⁵³ and Thailand⁵⁴, individuals who have received vaccination continue to follow protective measures with the same level of diligence as before getting vaccinated, leading to a significant reduction in COVID-19 morbidity and mortality. Research conducted by Ngamchaliew et al⁵⁴ cites several reasons for this behavior, such as concerns about the emergence of new virus variants due to SARS-CoV-2 mutations, the efficacy of the vaccine, and apprehension regarding the side effects of using mixed and matched vaccines.

The Relationship between Knowledge and Attitudes

The results of the correlation test demonstrate a significant and positive relationship between knowledge and attitudes towards the COVID-19 vaccination program. The significance value (p) was 0.001 (<0.005), and the correlation coefficient (r) was 0.587 (Table VIII), indicating that individuals with a higher level of knowledge are more likely to have positive attitudes towards the program. Previous research by Putri et al⁵⁵ also showed that knowledge and willingness to be vaccinated against COVID-19 are correlated (p=0.000). Knowledge plays a critical role in shaping individuals' attitudes and practices, serving as an essential domain for the formation of real-world practices. Good knowledge can positively influence attitudes, which in turn leads to positive practices. On the other hand, a lack of public knowledge can lead to negative attitudes.⁵⁶ Greyling and Rossouw in their research suggest that providing additional information about vaccine safety and side effects can increase positive

Table VII. The respondent's practice domains description of the COVID-19 vaccination implementation

| No. | Domains | Range of score | Mean (SD) |
|-----|--------------------------|----------------|--------------|
| 1. | Prevention behaviors | 25.00-100.00 | 76.29 (1.12) |
| 2. | Health-seeking behaviors | 33.33-100.00 | 89.25 (0.96) |

Table VIII. The relationship between respondent's knowledge and attitude toward COVID-19 vaccination implementation

| K | A (N (Mean (SD))) | | | | | Total N | r value | p value |
|----------------|----------------------|----------------------|---------------------|---|----|---------|---------|---------|
| | E | G | M | P | EP | | | |
| G | 23 (91.41 (6.43)) | 5 (76.00 (1.37)) | 0 | 0 | 0 | 28 | 0.587** | <0.001* |
| M | 16 (86.56 (6.18)) | 16 (71.25 (4.65)) | 1 (57.50 (0.00)) | 0 | 0 | 33 | | |
| P | 20 (83.75 (5.99)) | 68 (67.39 (4.56)) | 6 (55.00 (2.74)) | 0 | 0 | 94 | | |
| Total N | 59 | 89 | 7 | 0 | 0 | 155 | | |

Abbreviation: (*) significant at the 0.05 level; (**) significant at the 0.01 level; K, knowledge; A, attitude; G, good; M, moderate; P, poor; E, excellent; EP, extremely poor; SD, the standard of deviation; COVID-19, Coronavirus disease-19

attitudes toward vaccines, which can help build public trust in vaccines. However, strict regulations and increasing vaccine accessibility are also crucial factors that need to be taken into consideration.⁵⁷

The Relationship between Attitudes and Practices

The results from Table XI indicate a significant and positive correlation between attitudes and practices related to the implementation of the COVID-19 vaccination program (p-value was <0.001; r-value was 0.566). This means that individuals who have positive attitudes towards the COVID-19 vaccination program are likely to have better practices in implementing it. These findings are consistent with previous research conducted by Angelina and Tjandra⁵⁸ that suggested a positive correlation between attitudes and practices. The study's results also align with research conducted by Hutapea et al⁵⁹, which found a relationship between attitudes and practices related to willingness to receive COVID-19 vaccinations (p=0.004).

The Influence of Knowledge and Attitudes on Practice

The data presented in Table X affirms that both knowledge and attitudes significantly influence the implementation of COVID-19 practices (p<0.05), whether considered separately or together. However, the study shows that knowledge and attitudes combined only account for 34.2% of the respondents' practices, with other factors playing a decisive role. This finding is supported by Kimbler et al⁶² who explain that people's fear of COVID-19 infection, normative beliefs, interpersonal concerns, and personality traits, such as agreeableness and openness, have a positive correlation with vaccination activities, along with their knowledge and attitude. In addition to this, workplace requirements, community culture, family support, personal experience with COVID-19, and sociodemographic factors like age, income, employment, and education level also affect people's practices.^{14,15,46}

We acknowledge that certain limitations in this research could potentially cause bias or variations in the results. The sample size was limited due to restricted access and time for data collection, which may have introduced bias in the research. This research did not differentiate between individuals who had received the COVID-19 vaccine and those who had not, the absence of data regarding the type of vaccine received, nor did it distinguish between individuals who had received different vaccine doses or those who were part of priority groups, such as health workers and the general public. This could affect the understanding of each group's response to the vaccination outreach. Additionally, the research uses self-report questionnaires to measure different variables, which are subject to the respondents' memory and perception. Despite these limitations, the research suggests that there is potential to improve vaccination practices by increasing knowledge and promoting positive attitudes. We believe that this can be achieved through various efforts, such as strengthening information and communication sources related to public health and implementing strict regulations, policies,

Table XI. The relationship between respondent’s attitudes and practice toward COVID-19 vaccination implementation

| A | P ((N (Mean (SD))) | | | Total N | r value | p value |
|----------------|----------------------|-----------------------|----------------------|---------|---------|---------|
| | G | M | P | | | |
| E | 55 (96.18 (5.77)) | 3 (70.00 (0.00)) | 1 (50.00 (0.00)) | 59 | 0.566** | <0,001* |
| G | 48 (89.79 (8.38)) | 36 (79.52 (13.88)) | 5 (71.86 (15.03)) | 89 | | |
| M | 5 (94.00 (8.94)) | 1 (60.00 (0.00)) | 1 (30.00 (0,00)) | 7 | | |
| P | 0 | 0 | 0 | 0 | | |
| EP | 0 | 0 | 0 | 0 | | |
| Total N | 108 | 40 | 7 | 155 | | |

Abbreviation: (*) significant at the 0.05 level; (**) significant at the 0.01 level; A, attitude; P, practice; G, good; M, moderate; P, poor; E, excellent; EP, extremely poor; SD, the standard of deviation; COVID-19, Coronavirus disease-19

Table X. Factors that influence respondent’s practices in carrying out COVID-19 vaccination include knowledge and attitudes

| Variable | p-value | R ² value |
|---|---------|----------------------|
| Knowledge to practices ^a | <0.001* | 0.342 |
| Attitudes to practices ^a | <0.001* | |
| Knowledge and attitudes toward practices ^b | <0.001* | |

Abbreviation: (*) significant at the 0.05 level; (a), partial regression test; (b), simultaneous significance test; COVID-19, Coronavirus disease-19

or standards.^{57,63} We appreciate the importance of these efforts and believe that they can support the implications of this research.

CONCLUSION

This research shows that there is a significant relationship between knowledge, attitudes, and practices related to the implementation of the COVID-19 vaccination program with an illustration of the average percentage achievement of respondents who are classified as having poor knowledge, but who have good attitudes and practices. There needs to be support from strong sources of information and communication in the community to avoid fake and untrue news so that it can increase the potential for attitudes and practices of vaccination in a positive direction, that vaccination is carried out because of the benefits it provides for oneself and society, not because it follows a certain trend in society.

ACKNOWLEDGEMENT

The authors reported no funding was received for this work. Thanks to all respondents who participated in this study and all parties who were willing to collaborate during this study period.

CONFLICT OF INTEREST

None to declare.

STATEMENT OF ETHICS

The study obtained Ethical clearance No. 205/EA/KEPK-BUB-2023, published on July 20, 2023, by the Health Research Ethics Committee of Sekolah Tinggi Kesehatan Bina Usaha Bali.

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