



FACTORS RELATED TO THE SUCCESS OF MEASLES IMMUNIZATION IN CHILDREN AGED 2-3 YEARS

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ABSTRACT

Providing immunizations to children can prevent and protect them from other dangerous and contagious infectious diseases so that they can participate in activities such as playing and studying. To determine the factors associated with the success of measles immunization in toddlers 2-3 years old in Loji Village. The location of this research was the working area of the Pasir Mulya Community Health Center, specifically Loji Village, West Bogor District, Bogor City, West Java. This research was carried out from January to July 2023 for around seven months. This type of research used quantitative methods. This study used cross-sectional or cross-sectional. The sampling technique used was a total sampling technique with a sample size of 70. The research instrument used by the researchers this time was a questionnaire. This bivariate analysis uses the Chi-square test. The educational level of parents, type of work, and the role of health workers and posyandu cadres can influence the success of measles immunization in toddlers 2-3 years old with respective p values (0.004, OR: 36.6; 0.006, OR: 30.0; 0.014, OR: 32.0; 0.008, OR: 25.2). Therefore, it is essential to increase public awareness and participation in immunization programs to achieve optimal targets. In conclusion, socio-economic factors and the role of health workers greatly influence the success of measles immunization in toddlers 2-3 years old. Recommendations for targeted interventions to address disparities in access to healthcare and improve education on the importance of vaccination among parents and caregivers.

ABSTRAK

Pemberian imunisasi pada anak dapat mencegah dan melindungi anak dari penyakit infeksi lain yang berbahaya dan mudah menular, sehingga mereka akan berkesempatan untuk mengikuti kegiatan seperti bermain dan belajar. Untuk mengetahui faktor-faktor yang berhubungan dengan keberhasilan pemberian imunisasi campak pada balita usia 2-3 tahun di Kelurahan Loji. Lokasi penelitian ini dilaksanakan di wilayah kerja Puskesmas Pasir Mulya tepatnya di Kelurahan Loji Kecamatan Bogor Barat Kota Bogor Jawa Barat. Penelitian ini dilaksanakan pada bulan Januari sampai dengan Juli 2023 dengan rentang waktu sekitar 7 bulan. Jenis penelitian ini menggunakan metode kuantitatif. Penelitian ini menggunakan pendekatan cross sectional atau potong lintang. Teknik pengambilan sampel yang digunakan adalah teknik total sampling dengan jumlah sampel sebanyak 70 sampel. Instrumen penelitian kali ini yang digunakan peneliti adalah kuesioner. Analisis bivariat ini menggunakan uji Chi-square. Tingkat pendidikan orang tua, jenis pekerjaan, dan peran petugas kesehatan serta kader posyandu dapat memengaruhi keberhasilan imunisasi campak pada balita usia 2-3 tahun dengan nilai p masing-masing (0,004; 0,006; 0,014; 0,008). Oleh karena itu, penting untuk meningkatkan kesadaran dan partisipasi masyarakat dalam program imunisasi guna mencapai sasaran yang optimal. Sebagai kesimpulan, faktor sosial ekonomi dan peran petugas kesehatan sangat memengaruhi keberhasilan imunisasi campak pada balita usia 2-3 tahun. Rekomendasi intervensi yang tepat sasaran untuk mengatasi kesenjangan akses layanan kesehatan dan meningkatkan edukasi tentang pentingnya vaksinasi di kalangan orang tua dan pengasuh.

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INTRODUCTION

Immunization is one of the most important things parents do for their children (Al-lela et al., 2014; GebreEyesus et al., 2021; Jelly et al., 2023). Providing immunizations to children can prevent and protect them from other dangerous and infectious diseases so that they can participate in activities such as playing and studying. The main benefit of immunization is that it increases a child's immunity and reduces morbidity and death rates due to various dangerous infectious diseases that immunization can prevent. One of the immunizations for children is measles immunization (Nuwarda et al., 2022). Measles immunization specifically targets a highly contagious and potentially deadly disease that can lead to severe complications. By ensuring children receive the measles vaccine, we can significantly reduce the risk of outbreaks and protect vulnerable populations.

One effort to stop the transmission of measles is immunizing against measles. Measles, also known as morbilli or measles, is an acute and contagious disease caused by an RNA virus from the genus Morbillivirus (Misin et al., 2020). The measles virus can be transmitted through droplets from an infected person's nose, mouth, or throat. Measles can cause severe complications such as diarrhea, malnutrition, pneumonia, encephalitis, blindness, and even death (Hamzah, 2023). Vaccination is crucial in preventing the spread of measles, as it helps build immunity against the virus. It is essential for individuals to ensure they are up to date on their vaccinations to protect themselves and others from this highly contagious disease.

According to an analysis by the United Nations Children's Fund (UNICEF), in 2018, global coverage of the first dose of measles immunization only reached 84%, while in 2019, there was an increase in global coverage of the first dose of measles immunization to 86%. Even though there was an increase in measles immunization coverage in 2019, this coverage percentage has not yet reached the target of 95% (Unicef, 2019). This gap in coverage poses a significant challenge in achieving herd immunity and preventing measles outbreaks.

According to the Central Statistics Agency (BPS), measles immunization coverage in Indonesia will reach 70.14% in 2022; this figure has increased compared to last year, which only reached 68.67%. Aceh Province has the lowest measles immunization rate in its region, namely only 38.19%, far from the national average. The second lowest measles immunization rate is West Sumatra, which reached 56.48%, followed by Riau at 62.31% and Jambi at 63.65%. West Kalimantan at 64.65%. Bali has the highest national measles immunization rate, 81.69% (BPS, 2022). The data indicates that there is still a significant disparity in measles immunization rates among provinces in Indonesia. Efforts to improve vaccination coverage in regions with lower rates are crucial to prevent outbreaks and protect public health.

Measles immunization coverage in West Java in 2019 was 65.77% (BPS, 2022). Besides, according to the West Java Health Profile (2020), measles immunization data coverage in West Java was 92.7% in 2020. Although there was an increase in measles immunization coverage in 2020, this coverage percentage had not yet reached the target of 95%. In 2022, Bogor City has a 9-11 month measles immunization target of 95%. Bogor City exceeds the target of 96.55%. However, if immunization coverage is tracked by sub-region, the measles immunization coverage for 9–11 months is Gunung Batu Village 88.6%, Mulyaharja Village 91.1%, Pasir Jaya Village 95.6%, Pasir Mulya Village 100.5%, and Loji Village 101.6% (Dinkes Jawa Barat, 2020).

Several factors influence the success of measles immunization in toddlers aged 2-3 years, namely education, employment, the role of health workers, the role of posyandu cadres, and travel time to the immunization service site (Nazri et al., 2016). Previous research shows that education, employment, the role of health workers, the role of posyandu cadres, and travel time to immunization service sites are related to measles immunization. (Chau & Firmansyah, 2021; Saraswati & Gani, 2020).

The highest number of measles cases in 2023 was in Loji Village, which was 4 cases. This is what prompted researchers to take this area as a research area. We aim to determine the factors associated with the success of measles immunization in toddlers 2-3 years old in Loji Village. The factors studied were the role of health workers, the role of posyandu cadres, maternal education, and maternal employment. The novelty of this research lies in combining these factors in one study, which can provide a comprehensive picture of the success of measles immunization. It is hoped that the research results can provide recommendations for increasing measles immunization coverage for toddlers in Loji Village.

The solution was to conduct a study with mothers of toddlers in Loji Village to gather data on their experiences and perceptions of measles immunization. Additionally, analyzing the data collected has helped identify gaps or challenges in the current immunization program that may hinder its success. The aim was to determine the factors associated with the success of measles immunization in toddlers 2-3 years old in Loji Village.

METHOD

Research Design

This type of research used quantitative methods. This study used cross-sectional methods. The research was located in the working area of the Pasir Mulya Community Health Center, specifically in Loji Village, City of Bogor. It was carried out over a period of around seven months, from January to July 2023.

Population and Sample

The population in this research was all mothers who have toddlers aged 24-36 months in the working area of the Pasir Mulya Community Health Center, specifically in Loji Village, totalling 70 respondents because the population met the criteria in the research and can be reached by the researchers so that the data can be collected and used in research. The technique used by the researchers to select a relatively minor number of items or individuals from a predetermined population to be used as a data source for this research was a population of mothers with toddlers aged 24-36 months, totalling 70 respondents in Loji Village. In this study, inclusion and exclusion criteria were used as sampling criteria to determine whether the sample could be used in research. Inclusion criteria included mothers who were in good health and were Indigenous people in Loji Village and willing to be respondents in filling out questionnaires in Loji Village. Exclusion criteria were mothers who were unwell (sick) and not at home (going away). The sampling technique in this study used a total sampling technique. The reason that the researchers used total sampling was that the population of this study had less than 100 respondents. Therefore, the researchers used the entire population of mothers with toddlers aged 24-36 months in Loji Village as the research sample.

Data Collection

The research instrument used by the researchers this time was a questionnaire. The materials used by the researchers were looking at the immunization register, informed consent book, and interview techniques conducted by the researchers with health workers to find out the population of mothers with toddlers aged 24-36 months in Loji Village. The procedure involved submitting a research permit letter to Ibn Khaldun University's public health study program, The Bogor City Health Service, and issuing a permit for Pasir Mulya Health Center. The researchers tested the survey's validity and reliability, returned to explain the research's uses and objectives, and obtained consent from respondents. Respondents filled out a questionnaire, and all necessary information was carefully collected.

Processing and Analysis of Data

Before data collection is carried out, the instrument must first be tested for validity and reliability. Validity testing was carried out on 30 respondents in Gunung Batu Village. According to (Aithal and Aithal, 2020), the validity test carried out on 30 respondents is sufficient to prove the validity of the questionnaire. The processing used data processing software to find out whether each question item is valid or invalid with the following conditions:

- a. If $r_{count} > r_{table}$ has a significance level of 95%, then the instrument is declared valid.
- b. If the calculated $r < r_{table}$ has a significance level of 95%, then the instrument is declared invalid.

Based on the validity test attached to the attachment (data processing output), the r_{table} value for $n=30$ with an error rate (α) of 5% is 0.361. From the validity test process carried out on 30 respondents, the results of the validity test on questions regarding the health worker role questionnaire show that questions number 1, 2, 3, 4, 5, 6, 7, 8, and 10 are declared valid because the calculated r value $> r_{table}$. In contrast, question 9 is declared invalid because $r_{count} < r_{table}$. So, it can be concluded that 9 out of 10 questions from the questionnaire on the role of health workers are suitable as measuring

tools for measuring research data because they are declared valid and can be analyzed further. The validity test results on questions regarding the questionnaire on the role of posyandu cadres show that questions number 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are declared valid because the calculated r value $>$ r table. So, it can be concluded that the 10-question questionnaire on the role of health workers is suitable as a measuring tool for measuring research data because it is declared valid and can be analyzed further.

The validity test results regarding the travel time questionnaire to the immunization service location show that question 1 is declared valid because of the calculated r value $>$ r table. So, it can be concluded that 1 question on travel time to the immunization service is suitable as a measuring tool for measuring research data because it is declared valid and can be analyzed further. Based on the results of the reliability test attached in the attachment (data processing output) show that the reliability of the role of health workers is 0.652. The questionnaire is declared reliable because of Cronbach's alpha (α) $>$ 0.60. Based on the results of the reliability test attached in the attachment (data processing output) show that the reliability of the role of posyandu cadres is 0.667. The questionnaire is declared reliable because of Cronbach's alpha (α) $>$ 0.60. Based on the results of the reliability test attached to the attachment (data processing output) show that the reliability of travel time to the immunization service is 0.440. The questionnaire is declared reliable because of Cronbach's alpha (α) $<$ 0.60.

Data analysis was carried out using statistical tests with the help of computerization. Bivariate analysis was carried out to determine whether or not there was a relationship between each independent variable and the dependent variable. In this bivariate analysis, the chi-square test was used, with the characteristics of the data being linked being categorical to categorical. This research passed the ethical test from Ibn Khaldun University Bogor with number 018/K.11/KEPK/FIKES-UIKA. The university's ethics committee reviewed and approved the study protocol, ensuring all ethical considerations were met. Researchers obtained informed consent from all participants involved in the study to ensure voluntary participation and confidentiality of data.

RESEARCH RESULT

Table 1 Frequency Distribution of Respondent (n=70)

Variable	N	%
Measles Immunization Status		
Not given measles immunization	4	5.7%
Given measles immunization	66	94.3%
Mother's Education		
Low (No School – Middle School)	8	11.4%
Height (High School – College)	62	88.6%
Mother's job		
Work	9	12.9%
Not Work	61	87.1%
Role of Health Workers		
Poor	4	5.7%
Good	66	94.3%
The Role of Posyandu Cadres		
Poor	10	14.3%
Good	60	85.7%

Table 1 shows that the majority of respondents who have given measles immunization to toddlers aged 2-3 years are 66 (94.3%). The majority of respondents in the highly educated category are 62 (88.6%). Most respondents do not work, namely 61 (87.1%). Of the 70 respondents, 66 (94.3%) stated that the role of health workers is good. Of the 70 respondents, 60 (85.7%) stated that the role of posyandu cadres is good. The study indicates the respondents' positive perception of health workers and posyandu cadres. Notably, the high percentage of respondents who have given measles immunization to toddlers aged 2-3 years reflects a solid commitment to child health in the community.

The analysis of the relationship between maternal education and measles immunization success shows that most successful measles immunization respondents have high education, namely 61 respondents (98.4%). The chi-square test results obtain a value of $p = 0.004$, so it can be concluded that there is a relationship between maternal education and the success of measles immunization in toddlers 2-3 years old in Loji Village. With an odds ratio value = 36.6, mothers with higher education have a 36.6 times higher chance of providing measles immunization to toddlers than mothers with low education.

Table 2. Relationship between maternal education and the success of measles immunization in toddlers 2-3 years old

Variable	The success of Measles Immunization					P-Values	OR (95%CI)
	Measles immunization is not given		Given measles immunization		Total sample		
	n	%	n	%			
Education							
Low	3		5		70	0.004	36.6
High	1	5.7%	61	94.3%			(3.1 – 419.8)
Status							
Work	3		6		70	0.006	30.0
Jobless	1	5.7%	60	94.3%			(2.68 – 335.2)
Role of Health Workers							
Poor	2		2		70	0.014	32.0
Good	2	5.7%	64	94.3%			(2,866 – 357,331)
The role of Posyandu Cadres							
Poor	3	5.7%	7	94.3%	70	0.008	25.2
Good	1		59				(2.3 – 277.3)

The analysis of the relationship between maternal employment and the success of measles immunization shows that the most successful measles immunization respondents are mothers who do not work, namely 60 respondents (98.4%). The chi-square test results obtain a value of $p = 0.006$, so it can be concluded that there is a relationship between maternal employment and the success of measles immunization in toddlers 2-3 years old in Loji Village. With an odds ratio value = 30.0, mothers who do not work have 30.0 times more free time to vaccinate their children for measles than mothers who work.

The analysis of the relationship between the role of health workers and the success of measles immunization shows that the role of health workers is categorized as good and successful in carrying out measles immunization, namely 64 respondents (97.0%). The chi-square test results obtain a value of $p = 0.014$, so it can be concluded that there is a significant relationship between the role of health workers and the success of measles immunization in toddlers 2-3 years old in Loji Village. With an odds ratio value = 32.0, this means that respondents who do not get the role of health worker in the excellent category are 32.0 times more likely not to provide measles immunization than respondents who get the role of health worker in the excellent category.

The analysis of the relationship between the role of posyandu cadres and the success of measles immunization shows that the role of posyandu cadres is excellent and successful in carrying out measles immunization, namely 59 respondents (98.3%). The chi-square test results obtain a p-value = 0.008, so it can be concluded that there is a significant relationship between the role of posyandu cadres and the success of measles immunization in toddlers 2-3 years old in Loji Village. With an odds ratio value = 25.2, respondents who do not get an excellent posyandu cadre role are 25.2 times more likely to not provide measles immunization to toddlers than respondents who get an excellent posyandu cadre role.

The analysis of education and the success of measles immunization in toddlers 2-3 years old in Loji Village shows that 61 (98.4%) respondents are given measles immunization in the higher education category (high school – university). The results of statistical tests using chi-square show a p-value of 0.004, which is less than the value ($p < 0.05$), so there is a significant relationship between maternal education level and the success of measles immunization in toddlers 2-3 years old in Loji Village. From the results of the analysis, it is also found that the odds ratio value = 36.6, meaning that mothers who have a higher education have a value of 36.6 times higher for providing measles immunization to toddlers 2-3 years old at the Loji Famil more details can be seen in table 2 below.

DISCUSSION

Education significantly influences people's behavior; low public knowledge and awareness of health and disease can result in diseases occurring in society (Abbas et al., 2019; Raghupathi & Raghupathi, 2020; Yuan et al., 2015). Therefore, the school environment, whether a healthy physical environment or social environment, will significantly influence a person's healthy behavior (Rahmatika & Hernawati, 2016; Wang et al., 2023). This aligns with previous research by (Absari et al., 2023), which states that there are significant results between maternal education and measles immunization. The research (Yuliani, 2019) also showed a significant relationship between maternal education and measles immunization. This research finds that education influences a person's healthy behavior; the higher a person's education, the easier it is to receive information, so the more knowledge they have.

The results of the analysis between work and the success of measles immunization in toddlers 2-3 years old in Loji Village show that 60 respondents (98.4%) are unemployed. The results of statistical tests using chi-square show a p-value of 0.006, which is less than the value ($p < 0.05$), so there is a significant relationship between maternal employment level and the success of measles immunization in toddlers 2-3 years old in Loji Village. The analysis also finds that the odds ratio value = 30.0, meaning that mothers who do not work have an odds ratio value of 30.0 times higher for providing measles immunization to toddlers 2-3 years old at Loji Village.

Work is something that humans need (Górný, 2018). A person works because there is something he wants to achieve and the hope that the work activities carried out will bring him to a more satisfying situation to fulfil his needs. Work is related to education and income, plays a vital role in socio-economic life, and is related to other factors such as health (Zajacova & Lawrence, 2018). This aligns with previous research by (St. R. Hamzah & Hamzah, 2022), which states that there are significant results between maternal employment and measles immunization. In the research carried out (Teti & Jannah, 2022), the

results of the analysis of the relationship between employment and the provision of measles immunization at the Larangan Utara Community Health Center, Tangerang City, in 2021, there is no significant relationship between employment and the provision of measles immunization with a value ($p=0.568$).

Cultural factors such as beliefs, values, and traditions can impact attitudes toward immunization. For example, in some communities, there may be a distrust of vaccines due to historical events or misinformation. Additionally, local healthcare infrastructure and access to resources can also play a role in the success of immunization efforts. According to another research, the success of its national immunization program relied on the engagement and understanding of the beneficiaries in the local community. The immunization program was supported by consistent and reliable commitment, collaboration, awareness, and collective responsibility between the government, community, and partners. These networks are strengthened through a collective dedication to vaccination programming and a universal belief in health as a human right (Hester et al., 2022).

This study finds that maternal employment is related to the timeliness of measles immunization. Mothers who do not work have more free time to take their children to health services to provide complete immunizations to their babies compared to mothers who work. This is because mothers work outside the home or because the demands of work make mothers forget to provide immunizations to their children according to the schedule.

The analysis of the role of health workers and the success of measles immunization in toddlers 2-3 years old in Loji Village shows that the role of health workers is in a suitable category, namely 64 (97.0%). The results of statistical tests using chi-square show a p-value of 0.014, which is less than the value ($p<0.05$), so there is a significant relationship between the role of health workers and the success of measles immunization in toddlers 2-3 years old in Loji Village. The analysis also finds that the odds ratio = 32.0, meaning that respondents who do not get the health worker role in the excellent category have a 32.0 times greater chance of not providing measles immunization.

Health workers also play a role in mothers' behavior in immunizing their children (Suryani et al., 2022)(Balgovind & Mohammadnezhad, 2022). Immunization must be provided following service standards, operational procedures, and professional standards required by law. This is in line with previous research (Sari, 2023), which states that there is a significant relationship between the role of health workers and the provision of measles immunization. This also aligns with the research (Andika Fauziah, 2018). There is a relationship between the role of health workers and the provision of measles immunization with a value ($p\text{-value} = 0.001$). Health workers also play a role in increasing the willingness of mothers with babies or toddlers to be immunized by empowering posyandu, meaning that the immunization program can be achieved optimally if the community participates in it.

The analysis of the role of Posyandu cadres and the success of measles immunization in toddlers 2-3 years old in Loji Village shows that the role of posyandu cadres is in a suitable category, namely 59 (98.3%). The results of statistical tests using chi-square show a p-value of 0.008, which is less than the value ($p<0.05$), so there is a significant relationship between the role of Posyandu cadres and the success of measles immunization in toddlers 2-3 years old in Loji Village. From the results of the analysis, the odds ratio value = 25.2, meaning that respondents who do not get a posyandu cadre role have a 25.2 times greater chance of not providing measles immunization compared to respondents who get a Posyandu cadre role in the excellent category.

Cadres are an extension of the community to the government or the government to the community. Government programs that can run well cannot be separated from the role of cadres, especially the measles immunization program. This is in line with the results of previous research by (Sari, 2023), which states that there is a relationship between the role of posyandu cadres and the status of measles immunization in the Batu Horpak Community Health Center working area, South Tapanuli Regency with a value of ($p=0.014$). This also aligns with the research (Huvaid et al., 2020). After carrying out statistical tests, the result was $p\text{-value} = 0.001$ ($p < \alpha$); this means there is a significant relationship between the role of cadres and providing measles immunization to toddlers.

According to respondents, the role of cadres in implementing measles immunization is vital. With the excellent role of Posyandu cadres, respondents are more enthusiastic about taking their children to Posyandu for immunization, especially measles immunization. Thus, cadres must provide information, motivation, advice, and counselling to the respondents so they are more active in bringing

their children to measles immunization. Usually, cadres' activeness is the spirit of the respondents. Collaboration between the government, community, and health professionals is necessary to boost immunization coverage since socioeconomic factors and the participation of health workers significantly impact the effectiveness of measles vaccination in toddlers aged 2-3. In addition, parents who receive the proper education can contribute to a greater understanding of the significance of childhood vaccinations. It is envisaged that measles vaccination coverage for toddlers aged 2-3 years can grow dramatically with strong collaboration from all parties. Ultimately, this can help accomplish the main objectives of developing herd immunity and limiting the measles outbreak in local communities. Furthermore, continuous review and monitoring of immunization programs can guarantee that all children receive the required immunizations and point out areas for improvement.

CONCLUSION AND SUGESTION

Parental education level, type of employment, and the role of health workers and Posyandu cadres can influence the success of measles immunization in toddlers aged 2-3 years. Specific strategies to increase measles immunization coverage in this group need to be developed, such as training for health workers and posyandu cadres on the importance of immunization and counseling for parents on the benefits of immunization for their children. Future research should identify other factors that may also influence the success of measles immunization in toddlers aged 2-3 years, such as accessibility of health services and family socioeconomics. In addition, an evaluation of the implementation of specific strategies developed to increase measles immunization coverage in this group is also needed.

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