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ANALYSIS OF SOCIODEMOGRAPHIC FACTORS AND MATERNAL KNOWLEDGE ABOUT BCG IMMUNIZATION

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ABSTRACT
Immunization is a form of government commitment to reducing child mortality. The coverage of UCI in Central Java province in 2019 was 99.98%. Meanwhile, BCG immunization coverage in Karanganyar Regency is lower at 97.2% with pulmonary TB cases in 2019 reaching 245 cases. Mother's knowledge influences mother's behavior in administering BCG immunization. The study used an observational analytical method with a cross sectional approach. The research was conducted at the Karanganyar Regency Regional Health Center in April-May 2021. The variables in this study consist of the independent variable, namely knowledge about BCG immunization, and the dependent variable, namely the socio-demographic factors of mothers of toddlers. The instrument used a questionnaire that has been tested for validity and reliability. The population in this study is mothers who have babies aged 0-12 months who visit health centers in the Karanganyar Regency area to immunize. Sampling by purposive sampling technique with 35 respondents. Data analysis using logistic regression. The results of the study were obtained that there was a relationship between maternal age and parity with the level of maternal knowledge about BCG immunization with a p value of 0.02 and 0.036, respectively. The conslusions in this study is socio-demographic factors, namely maternal age, parity, education, employment and family income together have the ability to affect the level of maternal knowledge about BCG immunization by 57.8%, meaning that 42.2% are influenced by other factors outside the study variables.

Keywords : Socio-Demographic, Knowledge, Immunization, BCG, Maternal, Analysis

INTRODUCTION
Immunization is an effort to actively increase a person's immunity against a disease, with the hope that if exposed to the disease, they will only experience mild illness. Immunization is a form of the government's commitment to reducing child mortality. Based on data reported to the Directorate of Family Health through komdat.kesga.kemkes.go.id, in 2019, of the 29,322 infant deaths, 21% (6,151 deaths) occurred in the age group 29 days to 11 months and 10% (2,927 deaths) occurred in the age group 12 to 59 months (Kemenkes RI, 2015; Kemenkes RI, 2020).

Complete basic immunization coverage in Indonesia in 2019 was 95.41%, while in Central Java province it exceeded the national target of 102.7%. Meanwhile, village UCI coverage in Central Java province in 2019 was 99.98% (Kemenkes RI, 2020).

Complete basic immunization, which is mandatory for infants aged 0-11 months, consists of one dose of Hepatitis B, one dose of BCG (Bacillus Calmette-Guérin), three doses of Pentavalent, four doses of Polio, and measles. The BCG vaccine is given once at 1-3 months of age to prevent tuberculosis (Kemenkes RI, 2015).

BCG immunization coverage in Central Java province in 2019 reached 102.5%. Meanwhile, BCG immunization coverage in Karanganyar Regency was lower at 97.2%, with 245 cases of pulmonary TB, down from 339 cases in 2018. Meanwhile (Kemenkes RI, 2020; Dinkes Kab Karanganyar, 2020).

Research by Rivanica (2020) found that 20 respondents (66.7%) had good knowledge of BCG immunization. The analysis revealed a relationship between knowledge and BCG immunization (p-value 0.026). Wahyuni's (2013) study on maternal knowledge regarding BCG immunization found that 17.0% of mothers' knowledge was categorized as good, 32.1% as adequate, and 50.9% as poor. Knowledge is a crucial domain that influences a person's behavior. Knowledge is an important domain that influences a person's behavior. Knowledge is influenced by various factors such as age, education level, information, experience, culture and socioeconomic status (Rivanica, R., & Hartina, I, 2020; Wahyuni, 2017; Notoatmodjo, 2020).

Knowledge is one of the factors that affect the behavior of mothers in immunizing their children. The results of the study show that knowledge has a significant effect on immunization (Kartika, et.al., 2023). The results of this study are expected to be the basis for policies in conducting counseling on immunization by paying attention to the factors that affect it. It is hoped that increasing maternal knowledge will increase the achievement of immunization.

METHODS

This study uses an analytical observational method with a cross-sectional approach where the independent and dependent variables are collected simultaneously. The study will be conducted at the Karanganyar Regency Community Health Center in April-May 2021. The variables in this study consist of the independent variable, namely knowledge about BCG immunization, and the dependent variable, namely the socio-demographic factors of mothers of toddlers. The population in this study were mothers who have babies aged 0-12 months who visited the community health center in the Karanganyar Regency area for immunization, with a sampling technique using purposive sampling. The inclusion criteria for the sample were mothers who had toddlers aged 0-12 months, were present at the time of data collection, were willing to be respondents, the exclusion criteria were mothers who filled out the questionnaire incomplete, unable to communicate well. The number of samples was 35. The research instrument used a questionnaire consisting of 11 questions and a validity test was carried out with the Pearson Bivariate test obtained from 15 questions, 11 questions were valid with a calculated r value (0.703-0.895)> r table (n: 10) = 0.632), while the reliability test using Alpha (Cronbach's) obtained an r value of 0.952> 0.632 so it can be concluded that the questionnaire is reliable. Data analysis was carried out using logistic regression analysis techniques with the help of SPPS version 17.0.

RESULTS

This study was conducted in April-May 2021 with 35 respondents aged 0-11 months. The results of the research obtained the following data;

A. Univariate Analysis

1. Frequency distribution of respondent characteristics

Respondent characteristics are the characteristics or traits that exist in the respondent and are included in the research element. The results of the research obtained the following data:

Table 4.1 Characteristics of respondents

No	Characteristics of respondents	Total	Percentage (%)
1	Age		
	< 30 years	16	45,7
	> 30 years	19	54,3
2	Parity		
	Primipara	12	34,3
	Multipara	23	65,7

3	Education		
	Basic education	17	48,6
	Secondary-highre education	18	51,4
4	Employment		
	IRT	24	68,6
	Work	11	31,4
5	Income		
	<UMR	11	31,4
	>UMR	24	68,6

From table 4.1, it is known that the majority of female respondents aged >30 years old are 19 people (54.33%), multipara 23 people (65.7%), high school/PT education 18 people (51.4%), IRT as many as 24 people (68.6%) and income >UMR as many as 24 people (68.6%).

2. Frequency distribution of maternal knowledge about BCG immunization

Table 4.2 Distribution of respondents' knowledge about BCG immunization

No	Knowledge's level	Quantity	Percentage (%)
1	Less	14	40
2	Good	35	60
	Jumlah	35	100

Based on table 4.2, it is known that 21 (60%) respondents with good BCG immunization knowledge while 14 (40%) respondents with poor knowledge are 14 people (40%).

B. Data Analysis

Data analysis was carried out on 35 respondents using a logistic regression formula with the help of the SPSS version 17.0 program.

1. Overall test

Table 4.3. Nilai Omnibus Tests of Model Coeficients

Omnibus Tests of Model Coefficients

		Chi-square	Df	Sig.
Step 1	Step	19.535	5	.002
	Block	19.535	5	.002
	Model	19.535	5	.002

The results of the Omnibus test output above are known to be sig=0.002<0.05, meaning that Ho was rejected. The G2 value of 19,535 with a p-value of 0.002 can be interpreted that with a confidence level of 95%, there is at least one independent variable that affects the bound variable. So it can be concluded that the model is feasible and can be used for further analysis.

2. Partial Test

Table 4.4 Variables in the Equation

								95,0% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Maternityage(1)	-2.469	1.066	5.360	1	.021	.085	.010	.685
	Parity(1)	-2.667	1.271	4.403	1	.036	.069	.006	.839
	Education (1)	-.390	1.220	.102	1	.749	.677	.062	7.396
	Jobs	-.185	1.113	.028	1	.868	.831	.094	7.359

							95,0% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Revenue	1.803	1.253	2.069	1	.150	6.067	.520	70.751
Constant	1.674	1.176	2.026	1	.155	5.334		

a. Variable(s) entered on step 1: Maternityage, Parity, Education, Jobs, Revenue.

From the table above, it can be seen that there are 2 independent variables that affect maternal knowledge about BCG immunization, namely maternal age with a value (sig 0.021) and parity (sig 0.036). For the mother's education factor, employment and education level in this study showed that the results did not significantly affect the level of mother's knowledge. Hosmer and Lemeshow Test Testing It is a test used to determine whether the model formed is appropriate or not. It is said to be correct if there is no significant difference between the model and its observational value.

3. Hosmer dan Lemeshow Test

The results of the Hosmer and Lemeshow tests on the model obtained a significance value of 0.259 > 0.05, meaning that the logistic regression model is feasible and can be used to explain the relationship between independent variables and dependent variables. Bivariate Analysis

Table 4.5 Nilai Hosmer and Lemeshow test

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	7.725	6	.259

The results of the Hosmer and Lemeshow tests on the model obtained a significance value of 0.259 > 0.05, meaning that the logistic regression model is feasible and can be used to explain the relationship between independent variables and dependent variables.

4. Bivariate Analysis

Bivariate analysis was carried out with the aim of determining the influence of each sociodemographic factor on maternal knowledge about BCG immunization in Karanganyar Regency. The factors analyzed consisted of maternal age, parity, maternal education level, occupation, and family income. The data was analyzed using the SPSS version 16.0 program. The bivariate analysis of the variables carried out obtained the following results:

Table 4.6. Bivariate Analysis Results

Variabel	N	Df	Sig	Exp (B)
Ages	35	1	0,021	0,085
Parity	35	1	0,036	0,069
Education	35	1	0,749	0,677
Occupation	35	1	0,868	0,831
Family Income	35	1	0,155	6,067

From table 4.6, it is known that the p value for the age variable is 0.021<0.05 means that the mother's age has a significant influence on the mother's knowledge about BCG immunization. In the maternal parity variable, a p value of 0.036<0.05 was obtained, meaning that maternal parity affected the mother's knowledge about BCG immunization. Meanwhile, for the variables of education, employment status and family income, it is known that the p value was 0.746, 0.868, 0.150 >0.05, meaning that there was no significant influence on the mother's knowledge about BCG immunization.

5. Odds Ratio

Tabel 4.7 Odds Ratio Value

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	27.576[a]	.428	.578

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than ,001.

The value of Nagelkerke R Square is 0.578 and Cox & snell R Square is 0.428, meaning that the independent variable has the ability to influence the dependent variable of 0.578 or 57.8%, meaning that there are 42.2% other factors outside the model that affect the dependent variable.

DISCUSSION

The results of data analysis that have been carried out from 5 variables studied are known, 2 variables affect maternal knowledge about BCG immunization, Mother's age and parity. Mother's Age In this study, the age variables were categorized into 2 groups, namely young mothers (<30 years) and old age (age>30 years). The results of the study found that 16 respondents (45.7%) were < 30 years old and 19 respondents (54.3%) were ≥30 years old. The results of the bivariate analysis obtained a p value = 0.021<0.005 which can be interpreted that the mother's age affects the mother's knowledge of BCG immunization. Human life experience will increase with age, the more mature the experience will be, the more numerous and richer the experience. Personal experience will affect knowledge, increasing age will also affect a person's knowledge in this study is knowledge about BCG immunization. The majority of the age of the respondents in this study was >30, including in the human age where they have maturity in thinking and providing care to children, including immunization (Neil, 2022).

Parity is the number of children that have been born to a mother, both in life and death. The results of the study found that the majority of mothers were multipara, namely 23 respondents. The results of the bivariate analysis obtained a p value = 0.036 < 0.005, meaning that parity has a significant influence on maternal knowledge about BCG immunization. The majority of respondents were multipara, as many as 23 people (65.7%). Mothers who have given birth before and have children can gain immunization knowledge from previous experience caring for children so that it is possible to have better knowledge from primipara mothers. The results of this study are in line with the research of Utami (2021) who stated that the results of the statistical test had a positive relationship between parity and the level of maternal knowledge about basic immunization with a calculated value of 0.249<r table 0.374 (Utami & Ulpa, 2021).

Education Level Education is a learning process to acquire knowledge and skills. Education can be obtained formally or non-formally. In this study, the variables studied are the level of formal education, which is categorized into basic education (elementary-junior high school level) and advanced education (high school/equivalent-PT). The results of the study obtained almost the same proportion, namely 17 mothers (48.6%) had an elementary and junior high school education level and 18 mothers (51.4%) had a high school education level / equivalent-PT. Bivariate analysis obtained a p value of 0.749>0.005 and it can be concluded that there is no significant relationship between the level of formal education of mothers and the level of knowledge about BCG immunization in mothers in Karanganyar Regency.

Jobs Most of the respondents in this study were housewives (IRT) as many as 24 respondents (68.6%) and at least 11 mothers worked as bank employees, factory employees,

laborers, traders and tailors (31.3%). The mother's employment status is one of the factors that affect knowledge. The analysis of bivariate data obtained a p value of 0.868>0.005, so it can be concluded that in this study the variables of maternal employment status do not affect the mother's knowledge about BCG immunization. Mothers who do not work have more time to participate in posyandu activities and seek information about child care including immunization, on the other hand, working mothers can get knowledge from various sources including newspapers, television, radio, social media and others. This is in line with Fitrianingsih's et.al research which shows that there is no significant relationship between work and knowledge level. Mother's knowledge about immunization is very important, because it will affect the mother's attitude and behavior in immunizing her child. Immunization is one of the priority efforts to prevent the occurrence of infectious diseases to reduce morbidity in children (Fitrianingsih, Septiyaningsih, & Susilowati, 2023; (Pusdiknaskes, 2015).

Family income is the amount of real income of all family members consisting of the income of the husband, wife if working and other members who live in the same house. In this study, it is categorized into 2, namely < UMK and ≥ UMK. In 2021, the UMK in Karanganyar Regency are Rp. 1,989,000,-. Data obtained from 35 respondents, 24 respondents (68.9%) had income ≥ UMK and the remaining 11 (31.9%) had income < UMK. Bivariate analysis was carried out to determine the relationship between family income and the level of mother's knowledge about BCG, obtained a p value value = 0.155>0.005 which can be interpreted that family income affects mother's knowledge about BCG immunization.

Analysis with logistic regression obtained an R Square value of 0.578 and Cox & snell R Square of 0.428, meaning that the sociodemographic factors of the mother in the form of age, age, education, occupation and the amount of family income affected the mother's knowledge of BCG immunization 57.8% while 42.2% of the knowledge was influenced by other factors. A person's knowledge is complex and a person is influenced by various things, including age, education level, occupation, interests, experience and the availability of information sources. According to Notoatmodjo (2020), it is stated that knowledge is the result of human sensing of objects at a certain time. Consciousness is largely acquired through the senses of sight and hearing. Knowledge is influenced by the level of education, experience and availability of information sources. Increasing knowledge is not always obtained through formal education but also non-formal education such as counseling, by health workers, pregnant women's classes, mothers and toddlers classes and others (Notoadmojo, 2007).

Mother's knowledge is an important factor in household health, including the mother's actions in vaccinating her child. The results of the study were obtained that the knowledge variable had a positive effect on the completeness of basic immunization in infants (Memunah, Susmini & Tuanany, 2023). This result is in line with the research of Pakpahan et.al (2021) which states that there is a meaningful relationship between knowledge and complete basic immunization (Pakpahan & Silalahi, 2021). The results of another study also stated that most mothers have low knowledge about BCG immunization (Wibowo, et.al., 2025).

This further strengthens the importance of efforts to increase maternal knowledge about BCG immunization in particular and basic immunization, because the level of maternal knowledge will affect maternal attitudes and behaviors in immunizing their children. Mothers who have good knowledge tend to have good attitudes and behaviors in immunization and vice versa. By knowing the factors that affect knowledge, it is hoped that efforts are carried out appropriately so that the results are more effective.

CONCLUSION

1. Respondents who have knowledge of BCG immunization in the good category are 21 mothers (60%), the majority of mothers aged >30 years old are 19 mothers (54.3%), most of the respondents are multipara, as many as 23 mothers (65.7%), the proportion of mothers

who have studied up to high school and college is 18 mothers (51.4%), as many as 24 mothers (68.6%) are housewives, the majority of family income >UMK is 24 people (68.6%).

2. There was a relationship between maternal age and parity with maternal knowledge level of BCG immunization with p-values of 0.02 and 0.036, respectively.
3. Maternal formal education, employment status and family income had no significant relationship with maternal knowledge level of BCG immunization with p values of 0.749, 0.868 and 0.150, respectively.
4. The socio-demographic factors studied in this study, namely maternal age, parity, education, employment and family income together have the ability to affect the level of maternal knowledge about BCG immunization by 57.8%, meaning that 42.2% are influenced by other factors outside the study variables.

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REFERENCE

Dinas Kesehatan Kabupaten Karanganyar. (2020). *Profil kesehatan Kabupaten Karanganyar tahun 2019*. Dinas Kesehatan Kabupaten Karanganyar.

Fitrianingsih, R. D., Septiyaningsih, R., & Susilowati. (2023). Faktor-faktor yang mempengaruhi tingkat pengetahuan kader kesehatan tentang penyakit HIV/AIDS. *Jurnal Sains Indonesiana: Jurnal Ilmiah Nusantara, 1*(1), 87–99. https://sainsindonesiana.id/index.php/sainsindonesiana/article/view/12

Kartika, A. P. D., et al. (2023). Pengaruh pengetahuan dan sikap terhadap perilaku ibu dalam pemberian imunisasi dasar lengkap pada bayi di Indonesia: A literature review. *Sport Science and Health, 5*(4), 353–363. https://doi.org/10.17977/um062v5i42023p353-363

Kementerian Kesehatan Republik Indonesia. (2015). *Buku ajar imunisasi*. Pusat Pendidikan dan Pelatihan Tenaga Kesehatan.

Kementerian Kesehatan Republik Indonesia. (2020). *Profil kesehatan Indonesia tahun 2019*. Kementerian Kesehatan RI.

Memunah, N., Susmini, & Tuanany, N. N. (2023). Factors that affect the completeness of basic immunization in toddlers at the Dewi Sartika Posyandu, Malang City. *Scientific Journal of Health Sciences, 11*(2), 365–371. https://jurnal.unitri.ac.id/index.php/care

Neil, N. (2022). *Psikologi kesehatan: Pengantar untuk perawat*. ECG.

Notoatmodjo, S. (2007). *Ilmu kesehatan masyarakat*. PT Rineka Cipta.

Notoatmodjo, S. (2020). *Metode penelitian kesehatan*. PT Rineka Cipta.

Pakpahan, H. M., & Silalahi, D. (2021). Hubungan pengetahuan ibu dengan pemberian imunisasi dasar pada balita di Desa Ujung Rambe Kecamatan Bangun Purba Kabupaten Deli Serdang. *Jurnal Darma Agung Husada, 8*(2), 92–98. https://jurnal.universitasdarmaagung.ac.id/darmaagunghusada/article/view/1210

Pusat Pendidikan dan Pelatihan Tenaga Kesehatan. (2015). *Buku ajar imunisasi*. Pusdiknakes.

Rivanica, R., & Hartina, I. (2020). Pemberian imunisasi BCG pada bayi (1–3 bulan) berdasarkan tingkat pengetahuan dan sikap ibu. *Jurnal 'Aisyiyah Medika, 5*(1), 205–212. https://www.researchgate.net/publication/339879217

Utami, S., & Ulpa, U. (2021). Hubungan antara karakteristik ibu dengan tingkat pengetahuan tentang imunisasi dasar lengkap pada bayi di Desa Sridadi Puskesmas Sirampog

Kabupaten Brebes. *Jurnal Ilmu Kesehatan Bhakti Husada: Health Sciences Journal, 12*(1), 80–89. https://doi.org/10.34305/jikbh.v12i1.258

Wahyuni, R. (2017). Gambaran pengetahuan ibu tentang pemberian imunisasi BCG di Desa Pendalian IV Koto wilayah kerja Puskesmas Pendalian IV Koto. *Jurnal Kebidanan: Maternity and Neonatal, 4*(2). https://e-journal.upp.ac.id/index.php/akbd/article/view/1417

Wibowo, N. E., Puspitadewi, T. R., Wahyurianto, Y., & Utami, S. (2025). Faktor-faktor yang mempengaruhi ibu dalam pemberian imunisasi BCG di Desa Tegalbang wilayah kerja Puskesmas Sumurgung. *Jurnal Ilmiah Kesehatan, 4*(10), 464–474. https://doi.org/10.70570/jikmc.v4i10.1983