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Factors Influencing Basic Immunization Coverage in the Working Area of Puskesmas Dombusoi, Sigi Regency

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Abstract: *The national achievement of Complete Basic Immunization (CBI) in 2024 only reached 83.09%, failing to meet the Strategic Plan (Renstra) target of 100%. This shortfall reflects real barriers in protecting children against Vaccine-Preventable Diseases (PD3I). This study aims to analyze the factors influencing the administration of basic immunization in the working area of UPT Puskesmas Dombusoi. A quantitative study using a cross-sectional design was conducted with 76 maternal respondents. Data were analyzed using bivariate chi-square tests and multivariate multiple logistic regression. The bivariate test detected significant effects of maternal knowledge ($p = 0.000$), maternal attitude ($p = 0.000$), location/distance ($p = 0.002$), and family support ($p = 0.000$) on immunization status. However, multivariate testing demonstrated that all variables lost their partial significance ($p > 0.05$) due to strong interactions and overlaps among the variables in the field. The study concludes that knowledge, attitude, geographical access, and family support contribute simultaneously as a unified determinant of child immunization status. Consequently, Puskesmas Dombusoi must reformulate its intervention strategies by combining persuasive Information, Education, and Communication (IEC) with the optimization of mobile health posts (posyandu keliling) in hard-to-reach areas to achieve national coverage targets.*

Keywords : Knowledge, Attitude, Location/Distance, Family Support, Basic Immunization

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INTRODUCTION

Complete basic immunization serves as a crucial public health intervention to minimize morbidity, disability, and child mortality caused by Immunization-Preventable Diseases (PD3I) such as diphtheria, pertussis, tetanus, and measles (Kemenkes RI, 2024). Globally, expanding vaccine access is a vital pillar for achieving the United Nations Sustainable Development Goals (SDGs); however, progress has stagnated, leaving millions of children classified as "zero-dose" individuals (World Health Organization, 2023). According to global monitoring, Indonesia ranks sixth highest in the world for the number of children who have not received complete basic immunization, underscoring the urgent need to strengthen regional healthcare delivery systems (World Health Organization, 2023).

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To address these vulnerabilities, the Ministry of Health of the Republic of Indonesia mandates a comprehensive vaccination schedule for infants aged 0–11 months, encompassing Hepatitis B, BCG, Polio, DPT-HB-Hib, Measles-Rubella, PCV, and Rotavirus. Although the national Strategic Plan (Renstra) sets a complete basic immunization (IDL) coverage target of 100%, the national achievement in 2024 only reached 83.09%, exposing real structural and behavioral barriers in child protection (Kemenkes RI, 2024). This gap is pronounced at the regional level; in Central Sulawesi Province, Central Sigi Regency reported a severe decline in IDL coverage from 80% in 2023 to 63% in 2024, slightly recovering to 66% in 2025 (Profil Dinas Kesehatan Kabupaten Sigi, 2025). Within the UPT Puskesmas Dombusoi work area in West Marawola District, coverage has continuously deteriorated, dropping linearly to 72% by 2025 (Profil Dinas Kesehatan Kabupaten Sigi, 2025). This persistent drop raises substantial theoretical and practical questions regarding the local determinants of health-seeking behaviors.

An evaluation of this program reveals a critical disconnect between the state-guaranteed availability of free vaccine logistics and actual public participation (Dinas Kesehatan Kabupaten Sigi, 2025). Based on Lawrence Green's behavioral framework, a mother's decision to utilize immunization services is driven by the interaction of predisposing, enabling, and reinforcing factors (Notoatmodjo, 2013). Empirical literature indicates that internal maternal attributes—such as cognitive knowledge and psychological attitudes—are primary drivers of compliance (Notoatmodjo, 2013). However, in remote areas like West Marawola, these cognitive factors are heavily disrupted by enabling conditions such as difficult mountainous geography, alongside reinforcing structures like domestic social support (Dinas Kesehatan Kabupaten Sigi, 2025). Past studies frequently examine these variables in isolation, leaving a distinct research gap regarding how internal maternal factors and external environmental barriers interact simultaneously within remote Indonesian communities.

To bridge this literature gap, this study analyzes behavioral health determinants through an integrated, simultaneous lens. Specifically, this research aims to analyze the factors influencing the administration of basic immunization—focusing on maternal knowledge, maternal attitude, geographic location/distance, and family support—within the work area of UPT Puskesmas Dombusoi, West Marawola District, Sigi Regency. Theoretically, this study enriches public health literature by contextualizing behavioral models in remote, topographically isolated regions. Practically, it provides an empirical foundation for healthcare management to reformulate targeted outreach strategies.

Based on this theoretical framework and problem formulation, the following hypotheses are proposed alternative hypothesis (H_1) there is a statistically significant influence of maternal knowledge, maternal attitude, geographic location/distance to health facilities, and family support both partially and simultaneously on the administration of basic immunization to infants within the work area of Puskesmas Dombusoi. Null hypothesis (H_0) there is no statistically significant influence of maternal knowledge, maternal attitude, geographic location/distance, or family support on the status of infant basic immunization in the designated region.

METHODOLOGY

This study utilizes a quantitative approach with a correlational study design through a cross-sectional framework. The observation and measurement of the independent variables (maternal knowledge, maternal attitude, location/distance, and family support) and the dependent variable (the status of basic immunization coverage in infants) were conducted simultaneously at a single point in time in the field. The research was carried out in the working area of the Dombusoi Public Health Center (UPT Puskesmas Dombusoi), West Marawola District, Sigi Regency, Central Sulawesi Province.

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The subjects of this study were mothers with infants aged 0–11 months registered in the working area of the Dombusoi Public Health Center. The accessible population consisted of 76 mothers. Given the relatively limited population size and to prevent sampling bias, a total sampling (saturated sampling) technique was employed, wherein all members of the population who met the inclusion criteria were included as research samples. Consequently, the total number of respondents in this study was established at 76 mothers.

The data collection method integrated both primary and secondary data. Primary data were obtained directly from the respondents through structured interviews using a questionnaire instrument that had been tested for validity and reliability. The questionnaire was designed to measure the level of maternal knowledge (good/poor), maternal attitude (supportive/unsupportive), location or distance from home to the health facility (near if ≤ 1 km / far if > 1 km), and family support (supportive/unsupportive). Meanwhile, secondary data were gathered from the Maternal and Child Health (MCH) handbook, infant cohort registers at the Dombusoi Public Health Center, and profile data from the Sigi Regency Health Office to verify the validity of the infants' basic immunization status (complete/incomplete).

The data collection procedure commenced with the preparatory stage, which involved obtaining research clearances from the Faculty of Public Health at Universitas Muhammadiyah Palu, the National Unity and Politics Agency (Kesbangpol) of Sigi Regency, and a written permit from the Head of the Dombusoi Public Health Center. The implementation phase was conducted through home visits to the respondents, accompanied by local health volunteers (*kader kesehatan*). Prior to initiating the interviews, the researcher explained the objectives and benefits of the study and requested the respondents' consent by signing an informed consent form. The interviews were conducted in compliance with health protocols while maintaining respondent data privacy through anonymity and confidentiality.

Data analysis techniques were performed progressively across three levels of analysis using statistical software. First, univariate analysis was applied to describe the characteristics of each variable in the form of frequency distribution tables and percentages. Second, bivariate analysis was employed to examine the effect or relationship between each independent variable and the dependent variable using the Chi-Square test (χ^2) at a 95% confidence level ($\alpha = 0.05$), where a p-value < 0.05 denotes statistical significance. Third, multivariate analysis was implemented using Multiple Logistic Regression with the Enter method to test the independent variables simultaneously and identify the most dominant determinant factor influencing the provision of basic immunization in the area.

RESULTS AND DISCUSSION

1. Univariate Analysis

Table 1. Distribution of Respondents Based on Maternal Age

No	Maternal Age	Frequency (f)	Percentage (%)
1	< 18 Years	1	1,3
2	18 – 35 Years	67	88,2
3	> 35 Years	8	10,5
	Total	**76**	**100%**

Source: Primary Data, 2026

Based on Table 1, the majority of the respondents fall within the healthy reproductive age range (18–35 years), accounting for 67 individuals (88.2%), followed by those over 35 years old at 8 individuals

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(10.5%), and only 1 individual (1.3%) under 18 years old. The predominance of this mature age bracket (18–35 years) reflects better psychological and cognitive readiness, which is anticipated to directly correlate with a positive maternal awareness regarding the timely completion of their infants' basic immunizations.

Table 2. Distribution of Respondents Based on Educational Level

No	Educational Level	Frequency (f)	Percentage (%)
1	No Formal Schooling	6	7,9
2	Elementary School	13	17,1
3	Junior High School	25	32,9
4	Senior High School	27	35,5
5	Bachelor's Degree / Diploma	5	6,6
	Total	**76**	**100%**

Source: Primary Data, 2026

Based on Table 2, the majority of the respondents have a secondary education background, consisting of 27 individuals (35.5%) with a senior high school education and 25 individuals (32.9%) with a junior high school education. This is followed by 13 individuals (17.1%) with an elementary school education, 6 individuals (7.9%) with no formal schooling, and 5 individuals (6.6%) holding a Bachelor's degree or Diploma. This level of education influences the mothers' capacity to absorb immunization-related information. A secondary education makes mothers more receptive to health counseling, yet intensive educational communication remains essential to ensure that this understanding translates into tangible action.

Table 3. Distribution of Respondents Based on Occupational Status

No	Occupational Status	Frequency (f)	Percentage (%)
1	Housewife	54	71,1
2	Civil Servant	3	3,9
3	Contract/Honorary Employee	1	1,3
4	Farmer	9	11,8
5	Entrepreneur	9	11,8
	Total	**76**	**100%**

Source: Primary Data, 2026

Based on Table 3, the majority of the respondents are unemployed/housewives, accounting for 54 individuals (71.1%), followed by farmers and entrepreneurs at 9 individuals (11.8%) each, civil servants at 3 individuals (3.9%), and only 1 individual (1.3%) as a contract/honorary employee. Housewife status provides greater time flexibility to take infants to healthcare facilities for immunization. However, this condition often leaves mothers dependent on their husbands' decisions, making family support a crucial factor.

Table 4. Distribution of Respondents Based on Maternal Knowledge

No	Maternal Knowledge	Frequency (f)	Percentage (%)

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1	Poor	37	48,7
2	Good	39	51,3
	Total	**76**	**100%**

Source: Primary Data, 2026

Based on Table 4, there are 39 respondents (51.3%) with good knowledge and 37 respondents (48.7%) with poor knowledge. The high percentage of poor knowledge (48.7%) poses a risk of creating misconceptions or myths regarding side effects, as well as a lack of awareness about immunization schedules. This condition highlights the importance of intensive education and counseling from healthcare workers to improve maternal understanding and achieve complete basic immunization coverage.

Table 5. Distribution of Respondents Based on Maternal Attitude

No	Maternal Attitude	Frequency (f)	Percentage (%)
1	Negative	31	40,8
2	Positive	45	59,2
	Total	**76**	**100%**

Source: Primary Data, 2026

Based on Table 5, the majority of the respondents exhibit a positive attitude, accounting for 45 individuals (59.2%), while those with a negative attitude number 31 individuals (40.8%). A positive attitude reflects good acceptance and motivation toward immunization. However, the high percentage of negative attitudes (40.8%), driven by concerns over side effects or rumors, highlights the need for a persuasive approach by healthcare workers to alter this stigma and achieve optimal complete basic immunization coverage.

Table 6. Distribution of Respondents Based on Accessibility / Distance

No	Accessibility / Distance	Frequency (f)	Percentage (%)
1	Difficult Access	8	10,5
2	Easy Access	68	89,5
	Jumlah	**76**	**100%**

Source: Primary Data, 2026

Based on Table 6, the majority of the respondents fall into the Easy Access category, accounting for 68 individuals (89.5%), while the Difficult Access category consists of 8 individuals (10.5%). This physical ease of access minimizes distance and transportation barriers for mothers. However, the group with difficult access (10.5%) still requires special attention, such as immunization sweeping programs or mobile health services, to ensure that children's rights to immunization in remote areas are met equitably.

Table 7. Distribution of Respondents Based on Family Support

No	Family Support	Frequency (f)	Percentage (%)
1	Low	36	47,4
2	Adequate	40	52,6

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Total	**76**	**100%**

Source: Primary Data, 2026

Based on Table 7, there are 40 respondents (52.6%) with adequate family support and 36 respondents (47.4%) in the low category. The high percentage of low support (47.4%) from husbands or relatives can act as a major barrier for mothers, leading to obstacles such as a lack of transportation or restrictions due to fear of post-immunization fever. These results highlight the importance of involving family members in health counseling so that they can also provide positive encouragement toward compliance with infant immunization.

Table 8. Distribution of Respondents Based on Basic Immunization Coverage

No	Basic Immunization Status	Frequency (f)	Percentage (%)
1	Incomplete	36	47,4
2	Complete	40	52,6
	Total	**76**	**100%**

Source: Primary Data, 2026

Based on Table 8, the basic immunization status of the children shows that 40 children (52.6%) are in the Complete category and 36 children (47.4%) are in the Incomplete category. This suboptimal achievement toward the Universal Child Immunization target poses a serious issue, as 47.4% of the children remain vulnerable to vaccine-preventable diseases (VPDs). This condition serves as an alarm for the public health center to evaluate hindering cognitive factors, attitudes, geographical access, and family support in order to improve immunization coverage.

2. Bivariate Analysis

Table 9. The Association Between Maternal Knowledge and Basic Immunization Status

No	Maternal Knowledge	Basic Immunization Status				Total		p value
		Incomplete		Complete				
		f	%	f	%	f	%	
1	Poor	36	97,3	1	2,7	37	100	**0,000**
2	Good	0	0	39	100	39	100	
	Total	**36**	**47,4**	**40**	**52,6**	**76**	**100**	

Source: Primary Data, 2026

Based on Table 9, among the 37 mothers with poor knowledge, the vast majority had children with incomplete immunization, accounting for 36 individuals (97.3%), while only 1 individual (2.7%) completed it. Conversely, among the 39 mothers with good knowledge, all of them (100.0%) had children with complete immunization status. The Chi-Square test yielded a p-value of 0.000 ($p < 0.05$), demonstrating a statistically significant association between maternal knowledge and the status of basic immunization coverage.

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Table 10. The Association Between Maternal Attitude and Basic Immunization Status

No	Maternal Attitude	Basic Immunization Status				Total		p value
		Incomplete		Complete				
		f	%	f	%	f	%	
1	Negative	2	6,5	29	93,5	31	100	**0,000**
2	Positive	34	75,6	11	24,4	45	100	
	Total	**36**	**47,4**	**40**	**52,6**	**76**	**100**	

Sumber: Data Primer, 2026 Source: Primary Data, 2026

Based on Table 10, among the 31 mothers with a negative attitude, 29 individuals (93.5%) had children with complete immunization and 2 individuals (6.5%) had incomplete immunization. Conversely, among the 45 mothers with a positive attitude, 34 individuals (75.6%) had children with incomplete immunization, while 11 individuals (24.4%) completed it. The Chi-Square test yielded a *p*-value of 0.000 ($p < 0.05$), indicating a statistically significant association between maternal attitude and the status of basic immunization coverage.

Table 11. The Association Between Accessibility / Distance and Basic Immunization Status

No	Accessibility / Distance	Basic Immunization Status				Total		P value
		Incomplete		Complete				
		f	%	f	%	f	%	
1	Difficult Access	8	100	0	0	8	100	**0,002**
2	Easy Access	28	41,2	40	58,8	68	100	
	Total	**36**	**47,4**	**40**	**52,6**	**76**	**100**	

Source: Primary Data, 2026

Based on Table 11, among the 8 respondents in the Difficult Access category, all of them (100.0%) had children with incomplete basic immunization. Meanwhile, among the 68 respondents with Easy Access, 40 individuals (58.8%) provided complete immunization and 28 individuals (41.2%) did not complete it. The Chi-Square test yielded a *p*-value of 0.002 ($p < 0.05$), thereby accepting the alternative hypothesis (H_a) and proving a statistically significant association between accessibility/distance and the status of basic immunization coverage.

Table 12. The Association Between Family Support and Basic Immunization Status

No	Family Support	Basic Immunization Status				Total		p value
		Incomplete		Complete				
		f	%	f	%	f	%	
1	Unsupportive	35	97,2	1	2,8	36	100	**0,000**
2	Supportive	1	2,5	39	97,5	40	100	

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Total	**36**	**47,4**	**40**	**52,6**	**76**	**100**

Source: Primary Data, 2026

Based on Table 12, among the 36 respondents with unsupportive families, 35 individuals (97.2%) had children with incomplete immunization, while only 1 individual (2.8%) completed it. Conversely, among the 40 respondents with supportive families, 39 individuals (97.5%) had children with complete immunization status. The Chi-Square test yielded a p-value of 0.000 ($p < 0.05$), demonstrating a statistically significant association between family support and the status of basic immunization coverage.

3. Multivariate Analysis

a. Goodness-of-Fit Test for the Logistic Regression Model

The goodness of fit analysis using Hosmer and Lemeshow's Test serves to assess the compatibility of the logistic regression model with the field data. This Chi-Square-based test establishes the null hypothesis (H_0) if the Sig. value is > 0.05 (model fits / matches empirical data) and the alternative hypothesis (H_a) if the Sig. value is < 0.05 (model does not fit). The following table presents the results of the model goodness-of-fit estimation:

Tabel 13. ***Hosmer and Lemeshow Test***

Step	Chi-square	df	Sig.
1	0,000	3	1,000

Based on the estimation results, a Chi-square value of 0.000 was obtained with a significance (p-value) of 1.000. Since the significance value is greater than the significance level (1.000 > 0.05), H_0 is accepted. This empirically proves that the logistic regression model is a good fit and matches the field data, rendering the model viable and accurate for predicting the factors that influence the coverage of basic immunization.

b. Accuracy of the Logistic Regression Model

Through a classification matrix, the predictive accuracy and validity of the logistic regression model are measured specifically based on its ability to classify real data into the correct categories. This test provides a realistic overview of the model's accuracy level and predictive sensitivity toward the dependent variable in the field. The comprehensive details of the model's classification performance are presented in the following table:

Tabel 14. ***Classification Table***[a]

Observed	Predicted		
	Basic Immunization Status		Percentage Correct
	Incomplete	Complete	

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Step 1	Basic Immunization Status	Incomplete	36	0	100
		Complete	1	39	97,5
	Overall Percentage				**98.07.00**

a. The cut value is ,500

Based on the classification table, the logistic regression model is proven to have very high accuracy in estimating the likelihood of basic immunization coverage. The overall percentage indicator shows a value of 98.7%, which means that the constructed statistical model is capable of predicting the overall basic immunization status in the field with an accuracy rate reaching 98.7%.

c. Logistic Regression Analysis

Tabel 15. ***Variables in the Equation***

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Maternal Knowledge	34.148	7253,371	,000	1	,996	676547570773423,500
	Maternal Attitude	-5.048	12489,920	,000	1	1,000	,006
	Accessibility Distance	-,767	18320,268	,000	1	1,000	,465
	Family Support	16,922	4725,517	,000		,997	22335567,983
	Constant	-61,410	48970,831	,000	1	,999	,000

a. Variable(s) entered on step 1: Maternal Knowledge, Maternal Attitude, Accessibility Distance, Family Support.

Based on the Variables in the Equation table, none of the variables show a statistically significant partial effect ($p > 0.05$): maternal knowledge ($p = 0.996$), maternal attitude ($p = 1.000$), accessibility/distance ($p = 1.000$), and family support ($p = 0.997$). Theoretically, maternal knowledge ($B = 34.148$) and family support ($B = 16.922$) exhibit a positive direction, indicating an increase in the likelihood of immunization coverage. Conversely, maternal attitude ($B = -5.048$) and accessibility/distance ($B = -0.767$; $\text{Exp}(B) = 0.465$) demonstrate a negative direction, wherein difficult access reduces the likelihood of basic immunization coverage by 0.465 times.

The results of the univariate analysis indicate that the complete basic immunization coverage in the working area of the Dombusoi Public Health Center remains suboptimal, with nearly half of the sample (47.4%) having an incomplete status. Bivariately, using the Chi-Square test, it was found that maternal knowledge, geographical accessibility/distance, and family support exert a statistically significant influence on immunization status ($p < 0.05$). The characteristics of the respondents, which are dominated by those within the healthy reproductive age range (88.2%) and housewife status (71.1%), theoretically provide vital modalities in the form of cognitive maturity and time flexibility to utilize healthcare services. However, the

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high proportion of mothers with poor knowledge (48.7%) and low family support (47.4%) proved to be tangible barriers directly contributing to the failure to achieve children's basic immunization in the field.

Critically, the results of the multivariate analysis using multiple logistic regression revealed a contradictory phenomenon, wherein none of the independent variables demonstrated a statistically significant partial effect ($p > 0.05$). Evaluation of the regression model demonstrated exceptionally high viability, indicated by a p-value of 1.000 in the Hosmer and Lemeshow's Test (model fit) and a predictive accuracy (overall percentage) reaching 98.7%. The lack of significant partial effects suggests the presence of multicollinearity or highly robust intercorrelations among the independent variables themselves. This implies that maternal knowledge, attitude, location, and family support do not operate in isolation; instead, they interact simultaneously to shape the mother's final decision to immunize her infant.

Interpretation of the direction of the relationships (B-value) indicates that the level of maternal knowledge ($B = 34.148$) and family support ($B = 16.922$) offer the greatest positive probability of increasing immunization compliance. Mothers with good understanding are capable of filtering health information rationally, while support from husbands—such as providing transportation or reminding them of schedules—serves as a reinforcing factor for tangible action. Conversely, the location/distance variable demonstrates a negative direction, where difficult geographical access reduces the likelihood of basic immunization coverage by 0.465 times ($\text{Exp}(B) = 0.465$). This condition reaffirms that although the majority of respondents have easy access (89.5%), geographical barriers for a small segment of the community in remote areas remain a physical constraint that diminishes the motivation to visit healthcare facilities.

Interestingly, the attitude variable exhibits a negative relationship direction ($B = -5.048$), which substantially illustrates an anomaly in the field. The bivariate analysis showed that among the 31 mothers with a negative attitude, 93.5% actually had children with complete immunization. A critical evaluation of this issue suggests that a mother's internal attitude—which may initially be reluctant or anxious regarding side effects (AEFI/KIPI)—can be overridden by compelling external factors, such as strong pressure from the family or administrative requirements in public services. Negative stigma or rumors circulating in the community are proven to be degraded when there is a persuasive educational intervention and intensive assistance from local healthcare workers.

Although the statistical model in this study possesses very high predictive accuracy, several limitations exist that may affect the generalizability of the findings. The cross-sectional research design employed only provides a snapshot of the situation at a single point in time, thereby failing to explain causal relationships within a profound temporal sequence. Additionally, data collection relying on questionnaires is susceptible to recall bias or respondent subjectivity when assessing family support and their own level of knowledge. The limited sample size (76 respondents) and the study's focus, which only encompasses a single public health center's working area, also restrict data variation, causing the logistic regression model to generate highly extreme odds ratio ($\text{Exp}(B)$) estimates for certain variables.

CONCLUSIONS

The results of the study conclude that bivariately, maternal knowledge, accessibility/distance, and family support exert a statistically significant influence on basic immunization coverage ($p < 0.05$). However, multivariately, none of the variables demonstrate a statistically significant partial effect ($p > 0.05$), indicating a simultaneous interaction wherein these factors mutually influence one another in the field, rather than operating in isolation. Model evaluation demonstrates an exceptionally high predictive accuracy of 98.7%. The limitations of this study lie in its cross-sectional design, which cannot explain

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temporal causal relationships, the potential for recall bias due to questionnaire subjectivity, and the limited sample size (76 respondents), which triggered extreme odds ratio estimates for certain variables.

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