T3_22_parents knowledge about immunization

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ORIGINAL ARTICLE

Parents' Knowledge about Immunization with Missed Opportunity for Vaccination in Children

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ABSTRACT

Introduction: The WHO's Global Advisory Group recommends an immunization strategy that offers or administers vaccines to all eligible children at every opportunity. This strategy has potential obstacles, namely Missed Opportunities of Vaccination (MOV) which are defined as all contacts with health servi but children do not get the required vaccinations even though the child meets the requirements to be vaccinated. This research was aimed to analyze the prevalence of MOV and parental knowledge of immunization. **Methods:**Mothers who had children aged 9 months to 15 years of age participated, with a large mple of 1849 children. The research locations were 30 selected urban and rural areas in the province of East Java. This research found that there is a significant relationship between mothers with little knowledge ab immunization and MOV. **Results:** : Children with mothers who have little knowledge about vaccination are 6.73 times more likely to experience MOV compared to mothers who have a lot of knowledge about vaccination. **Conclusion:** Promoting immunizations, especially when considering the benefits, is expected to reduce the incidence of MOV that lead to the enhancement of vaccination timeliness, improvement of health service delivery efficiency in general, and synergy the curative and preventive care services efforts in healthcare facilities.

Keywords: Knowledge, Child, Immunization, Vaccines, Missed Opportunity

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INTRODUCTION

Immunization has been a success story for global health and development as it saves millions of lives and protects the health of populations every year (1). It is known that more than 20 life-threatening diseases can be prevented by immunization: polio, tetanus, influenza, hepatitis A, hepatitis B, rubella, Hib disease, measles, pertussis, rotavirus, chickenpox, etc. (2). Understanding the importance of immunization, especially among children, the World Health Organization Global Advisory Group is committed to administering vaccines to all eligible children at every opportunity as one of the strategies improve the accessibility of immunization services. According to the Centers for Disease Control and Prevention's re t in 2018, about two-thirds of the member countries the World Health Organization have surpassed the national vaccination coverage goal of 90% by 2020, yet the global vaccination coverage has remained stagnant at about 85& until 86% since 2010 (3).

The Immunization Agenda 2030 stated that there are important challenges from vaccine hesitancy, and that spread of misinformation about the safety and effectiveness of vaccines, population movement, demographic shifts, international conflict, political instability, inequitable access and use of vaccines were priority issues to be addressed in improving the coverage vaccination. Furthermore, it is reported that there are 20 million infants who did not yet receive a full course

of basic vaccines, and many more miss out on newer vaccines each year. Of this amount, there are possibly more than 13 million children who receive no vaccines through immunization programs (1). In addition to these challenges, Nnaji (4) identified a problem in prioritization and missed opportunities for immunization; he showed that contact with healthcare services by an individual who is eligible for vaccination often does not result in the person receiving all the needed vaccines for which they are eligible. It is well documented that a missed opportunity for vaccination has been one of the factors that contributes significantly to poor immunization status in various study settings (5,6).

The prevalence of missed opportunities for vaccination are various within and between countries, reaching 89% in some settings (7). There were several suggestions in the previous study regarding common reasons why opportunities for immunization were missed in healthcare services. In 2015, the United Nations International Children's Emergency Fund held a qualitative study that found some provider-based reasons for the missed opportunities for vaccination. One of them was a concern about wasting multi-dose vaccine vials after opening them because they were only used on a small number of children (8). Another study conducted by the World Health Organization (7) also found out why opportunities for vaccination were missed in health facilities. Reasons included the failure or inability of health workers to screen patients for eligibility, contraindications to immunization perceived by the providers and parents, vaccine shortages, rigid clinic schedules that separate curative services from immunization areas, and parental factors that lead to resistance to immunization (7).

Factors related to parental confidence in vaccines, complacency towards vaccines and vaccination programs, and the convenience of accessing vaccines have been identified as several drivers of vaccine hesitancy, which influence parental knowledge about vaccines, experiences with vaccination programs, and the intention to vaccinate (9,10). Therefore, evaluating the relationship between parental knowledge toward immunization may be helpful to diagnose the cause of the missed opportunities for vaccination in children.

MATERIALS AND METHODS

A cross-sectional survey using the Manual for Immunization Coverage Survey 2015 was conducted to describe the immunization coverage in 30 urban and rural areas; the survey used systematic sampling with probability proportional to estimated population size (PPES)—one of the methods suggested by the World Health Organization. Respondents in this study were mothers who had children aged 9 to 59 months of age and 5 to 15 years old, resulting in the large number of 1,849. Univariate analysis was performed to describe the demographic characteristics of the study sample, the status of missed opportunities for vaccination among children with diphtheria, factors influencing the status of missed opportunities for vaccination, and other causes reported by mothers for missed opportunities for vaccination. Bivariate analysis was also carried out to determine the empirical relationship between the mother's knowledge and status of missed opportunities for vaccination of the children. The strength of the association was measured using an odds ratio (OR).

ETHICAL CLEARANCE

This study was approved by Research Ethics Committee, Faculty of Public Health Universitas Indonesia No. 690/UN2.F10/PPM.00.02/2018

RESULT

Table I: Frequency distribution of the status of missed opportunities for vaccination among children in the province of East Java, 2018

Status of missed opportunities for vaccination	Number of children with diphtheria	
	n	%
Yes	256	14.33
No	1,543	83.45
Not sure/don't know	41	2.22
Total	1,849	100

This study found that there were 256 children with diphtheria (14.33%) who have missed the opportunity for immunization and 41 children (2.22%) whose status of missed opportunities for vaccination was unknown.

Table II shows that based on age groups, younger children were more likely to experience a missed opportunity than the older ones. In addition, 50.08% of the surveyed children that have experienced missed opportunity for vaccination were male and 49.92% were female. This study also found that most of the mothers had finished high school or equivalent (38,40%)

Table II: Frequency distribution of the study sample by characteristics

Characteristics	Percentage of study sample	
	n	%
Age groups		
6 – 10 years old	1,003	54.25
11 – 16 years old	846	45.75
Total	1,849	100
Sex		
Male	926	50.08
Female	923	49.92
Total	1,849	100

CONTINUE

Table II: Frequency distribution of the study sample by characteristics (CONT.)

Characteristics	Percentage of study sample	
	n	%
Sex		
Male	926	50.08
Female	923	49.92
Total	1,849	100
Mothers' education level		
Not in school yet	21	1.14
Didn't from elementary school/ equivalent	51	2.76
Finished primary school/equivalent	378	20.44
Finished middle school/equivalent	510	27.58
Finished high school/equivalent	710	38.40
Diploma	35	1.89
Bachelor	100	5.41
Missing	44	2.38
Total	1,849	100

Table III: Cross-tabulation of factors influencing the status of missed opportunities for vaccination among children in the province of East Java

Factors	Status of missed opportunity for vaccination in the province of East Java		
	Yes	No	Don't know
	n (%)	n (%)	n (%)
Location			
Urban	96 (36.23%)	775 (48.93%)	16 (39.02%)
Rural	169 (63.77%)	778 (51.07%)	25 (60.98%)
Status of Citizenship			
Citizens of the region	265 (100%)	1537 (99.61%)	40 (97.56%)
Citizens of other regions	0 (0%)	4 (0.26%)	0 (0%)
Don't know	0 (0%)	2 (0.13%)	1 (2.44%)
Adverse events following immunization			
Yes	212 (80.00%)	1000 (64.81%)	19 (46.34%)
No	53 (20.00%)	535 (34.67%)	4 (9.76%)
Don't know	0 (0%)	8 (30.77%)	18 (43.90%)
Return visit			
Yes	243 (91.70%)	772 (50.03%)	8 (19.51%)
No	6 (2.26%)	31 (2.01%)	1 (2.44%)
Don't know	16 (6,04%)	740 (47.96%)	32 (78.05%)
Time availability			
Yes	251 (94.72%)	1405 (91.06%)	22 (53.66%)
No	12 (4.53%)	84 (5.44%)	1 (2.44%)
Don't know/Not vaccinated yet	2 (0.75%)	54 (3.50%)	18 (43.90%)

Table III shows that children who live in rural areas in East Java tend to experience more missed opportunities for vaccination than their urban counterparts (63.77%). All children who have experienced missed opportunities for vaccination are the citizens of the region where they live. Children who have missed these opportunities have experienced adverse events following immunization. Most of the children with this status have revisited the providers. The immunization schedule is already perceived as convenient.

Table IV: Frequency distribution of the causes of missed opportunities for vaccination among children in the province of East Java

Causes of missed opportunities for vaccination	Children with missed opportunities for vaccination	
	n	%
Unavailability of vaccine doses	22	8.3%
Unavailability of vaccination appointments	2	0.75%
Unavailability of health workers	9	3.40%
Not enough children present to use up all the doses in multi-dose containers	20	7.55%
Perceived contraindication (e.g., children sick)	189	71.32%
Came late to the appointment	6	2.26%
Did not know the vaccination schedule	5	1.89%

Table IV shows that the leading reason indicated by mothers with children who experience a missed opportunity for vaccination is perceived contraindication (71.32%). Unavailability of vaccine doses (8.3%) is the second leading cause of missed opportunities for vaccination found in our study. There were mothers who also reported other reasons, such as the immunization schedule coinciding with the Outbreak Response Immunization and the absence of other mothers from the neighborhood. This also highlights the need for reminder calls to avoid missed opportunities for vaccination after an outbreak with support from healthcare workers.

Table V shows that there is a significant relationship (p-value < 0.05) between the mother's knowledge and the status of missed opportunities for vaccination of the children. Mothers who have less knowledge have 6.73 times more risk of having children with missed opportunities for vaccination compared to parents who have enough knowledge.

Table V: The relationship between the mother's knowledge and of missed opportunities for vaccination for their children in the province of East Java

Mother's knowledge	Children with missed opportunity for vaccination	
	Yes	No
	n	n
Not enough	261	1366
Enough	4	141

OR (1,2) = 6,735 ; 95% CI = 2,706 < OR < 21, 613 (p-value = 0,000)

DISCUSSION

In between 2000 and 2019, global child mortality declined by almost half, yet the progress to meet the Sustainable Development Goal 3.2 remains slower (11). Associated with preventable child mortality, latest measurement routine childhood vaccination coverage show that global vaccine coverage broadly plateaued and only 11 countries and territories were estimated to have reached the Global Vaccine Action Plan target of at least 90% coverage for all assessed vaccines (12). This study found that there were 256 children with diphtheria (14.33%) who have missed the opportunity for immunization and 41 children (2.22%) whose status of missed opportunities for vaccination was unknown. This number was found to be lower than in previous studies in the Ilorin metropolis (24.4%) (13) and in the Gozamen District Health Centers in northwestern Ethiopia (74.9%) (14). However, there is still room for improvement, specifically in the reduction of missed opportunities for DPT vaccination that are also known to be common in other countries (15,16).

It is shown that younger children were more likely to experience a missed opportunity than the older ones. This result is in line with a study in northwestern Ethiopia (14) that stated that younger age in children was independently associated with missed opportunities for vaccination. Moreover, this is in accordance with a study that found a high proportion (63%) of <15 years old diphtheria patients in higher case countries from a full dataset of 34 countries with 15,068 diphtheria cases. (17). Furthermore, 50.08% of the surveyed children that have experiences missed opportunity were male and 49.92% were female. A similar result was found in Jordan (8) that there was no significant gender difference among children experiencing a missed opportunity for vaccination.

Most of the mothers had finished high school or an equivalent (38.40%). Many studies have reported a significant correlation between mothers' education levels and immunization completion in the children; some have even found that mothers' education was determinant of the childhood vaccination uptake (18–21). Furthermore, a meta-analysis performed by (22) showed that the odds of immunization completion were 2.31 times (95% CI 1.90–2.79) greater in children whose mothers had received secondary or higher education compared to those whose mothers had no education or only primary level education. An educated mother is expected to have better access to health information, which leads to better health-seeking behavior that in turn increases child vaccination (18).

In 2018, the United Nations International Children's Emergency Fund stated that it was very important to provide a better understanding to mothers regarding vaccine contraindication (8) due to the high number of invalid perceptions regarding contraindication that are responsible for missed opportunities for vaccination. A manual that gives detailed information on valid contraindications and on whether patient refusal is considered a missed opportunity for vaccination is essential for mothers and healthcare workers (6).

The problem of vaccine shortages was also reported in previous studies due to the mismatch in vaccine supply and demand and the difficulties experienced by healthcare workers in ordering vaccines from other manufacturers when they were already familiar with one (23). To overcome these challenges, it is crucial for the immunization program manager or purchaser to ensure the availability of the vaccine doses to meet coverage targets (24). Additionally, an appropriate reminder should be prepared to ensure that all children receive the right number of vaccine doses when the vaccine is once again available (23).

Regarding the utilization of multi-dose vaccines, health care workers play a major role in being strategic about when to open a container, diligent about how they care for open containers, and proactive with community outreach to ensure optimal attendance and timely vaccinations for every child during a vaccination session (24). Okeibunor (25) suggested that the practice of not opening a multidose vial should also be discouraged. A policy that regulates the eligibility of opening a multidose vial even for one child must be emphasized. Our finding showed that there is a significant relationship (p-value < 0.0) between the mother's knowledge and the status of missed opportunities for vaccination of the children. Mothers who have less knowledge have 6.73 times more risk of having children with missed opportunities for vaccination compared to parents who have enough knowledge. This is in line with a study in Ekiki State, Nigeria, that stated that the knowledge of mothers about childhood immunization issues is one of the two significant determinants of compliance with childhood immunization besides their educational status (26).

Mothers' knowledge is very crucial in determining their attitude and practices toward immunization, and it contributes to their immunization decisions. Mothers who have proper knowledge about immunizations may have favorable attitudes and practices regarding

immunization (27). This was proven by a study in Afar Region, Ethiopia, that found that mothers who had proper knowledge about vaccinations were associated with increased odds of age-appropriate and timely vaccination practices (28).

CONCLUSION

There is a significant relationship between mothers' knowledge and children's missed opportunities for vaccination. Children with mothers who have little knowledge about immunization have a 6.73 times higher chance to experience missed opportunities for vaccination compared to mothers who have more knowledge. It is important to promote immunizations, especially when it leads to higher vaccination rates among children. Reducing missed opportunities for vaccinations will increase immunization coverage, timeliness of vaccination, and improve the efficiency of health service delivery.

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