

MOTHER-REPORTED CONDITIONS WITHIN TWO WEEKS AFTER MASS MEASLES IMMUNIZATION

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ABSTRACT

Measles ranks high among the leading causes of infant morbidity and mortality. It is imperative that steps are taken towards the prompt treatment and eradication of measles infection. Limited studies are available regarding the adverse events following measles immunization as well as public perception and tolerance of vaccine risk.

This study aims to determine the presence or absence of adverse events within 2 weeks post measles vaccination and to determine the perceptions of mothers on measles vaccination and their expected outcome post vaccination.

This study was conducted among children aged 9 months to 7 years who were given measles vaccine at PGH last February 2004 during the "Ligtas-Tigdas" campaign. A total of 291 subjects were included in the study. Each subject was followed up within 2 weeks after vaccination. Data encoding and analysis was done using statistical software packages (SPSS and Epi-info) and descriptive statistics for nominal variables.

Results showed that the mean age of the subjects was 2 years old, mostly male and majority (63%) lives within Metro Manila. A total of 35 adverse events were reported. The highest reported adverse event was fever (4.1%) followed by a loss of appetite (2%), post vaccination measles (1%) and rash (1%). Most mothers (78%) recognized the importance of measles vaccination and only 130 (44.7%) of them recognized the presence of adverse events post vaccination. The highest expected adverse event was fever followed by loss of appetite, rash, cough and colds and diarrhea. Most mothers were grade school graduates (43.6%).

Fever was the highest reported adverse event as well as expected adverse event post vaccination. Most mothers, including those with a low educational attainment recognize the importance of giving measles vaccine. However, results of this study showed the value of educating the public on adverse events that are due to vaccine reactions.

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INTRODUCTION

In the Philippines, measles ranks high among the leading causes of infant morbidity and mortality. Measles is highly prevalent among the less than 3 years age group and exhibits a peak incidence during the months of January to April¹.

In developing countries, young children often die from complications arising from measles infection such as pneumonia, diarrhea with dehydration and meningitis. Case fatality rates vary from 0.1% to 5% in different countries, but have been shown to reach 25% in outbreaks among communities where malnutrition is present². It is imperative that steps are taken towards the prompt treatment and eradication of measles infection.

Measles immunization at 9 months was first initiated in the Philippines in 1982. From 1990 to 1998, overall coverage was maintained in the mid to high 80% range, although it varied widely from area to area. Measles immunization was included for children in the national immunization days in 1993, 1994 and 1995 with a maximum coverage of 82% for children aged from 9 months to 5 years of age. Reported measles incidence did not decrease substantially as a result of immunization efforts but the time between epidemic peaks increased. In 1997, a total of 36,465 measles cases were reported representing a threefold increase compared to 1995. The Philippines decided to conduct a nationwide measles elimination campaign in 1998 to provide one supplementary dose of measles vaccine to all children aged 9 months to 14 years³.

Progress toward measles control varies substantially among countries and regions. Intensified efforts are necessary to implement appropriate control and elimination strategies, including supplementary vaccination campaigns, expansion of routine vaccination services and surveillance⁴.

A live attenuated measles vaccine has been in use since 1962 and in some countries this is included among routine immunizations of infants. An adverse event following immunization or AEFI is a medical incident that happens after immunization even though the vaccines

used in national immunization program are extremely safe and effective. Adverse events can occur following vaccine administration. The process of immunization is also a source of adverse events. Most common reactions are mild and with short duration. Most common minor events are pain and redness at injection site, fever and rash which occurs in 5 to 15 percent. The most serious but very rare adverse event in the course of immunization is anaphylaxis. It occurs once in about 3 million vaccinations (1:13 million vaccinations during the Ligtas Tigdas campaign in 1998 according to NEC,DOH)⁵.

REVIEW OF RELATED LITERATURE

A study by Abrena et al (1993) on mortality and morbidity patterns for measles in children 5 years old and below, 9 years (1983-1992) in relation to the expanded program on immunization in the city of Cebu showed a decline in the Incidence Rate and the Case Fatality Rate⁶.

Despite the widespread availability of safe and effective measles vaccine, measles still accounts for 10% of global mortality from all causes among children aged less than 5 years. Failure to deliver at least 1 dose of measles vaccine to all infants continues to be the primary reason for this preventable morbidity and mortality. More aggressive measles vaccination efforts are needed including the use of mass campaigns in large urban and other high-risk areas. Experience from countries such as the Philippines indicates that unvaccinated children frequently are missed by these campaigns unless special efforts are made to accurately identify the areas unreached by routine vaccination services. This experience emphasizes the need to develop the infrastructure necessary to provide routine vaccination services to these hard-to-reach communities⁷.

A study by Mangahas on factors contributing to mortality in measles: a review of 311 cases showed that only 12% of their population had measles immunization.⁸ Their data implies the importance of measles vaccination.

A study was done by Anderson which tested the hypothesis that immunization is related to the prevalence of atopic disease (asthma, allergic rhinoconjunctivitis, and atopic eczema) in childhood. Live measles vaccine promotes a TH2 type immune response in healthy adults but epidemiologic studies showed that measles immunization is not associated with an increased incidence of atopic disorders⁹.

Limited studies are available in the Philippines regarding adverse events following measles immunization as well as public perception and tolerance of vac-

cine risk. This study was conducted among children aged 9 months to 7 years who were vaccinated at PGH last February 2004 during the "Ligtas-Tigdas" campaign.

GENERAL OBJECTIVES

1. To determine the presence or absence of adverse events within two weeks post measles vaccination.

SPECIFIC OBJECTIVES

1. To describe the socio-demographic profile of the study population.
2. To determine the adverse events following measles vaccination within 2 weeks after vaccination.
3. To determine the perceptions of mothers on measles vaccination and their expected outcome post vaccination.

METHODOLOGY

Study design: Prospective cohort

Study Population:

Inclusion Criteria: children 9 months to 7 years old who didn't receive the vaccine for 1 month with consent

Exclusion Criteria:

1. children who received a dose of measles vaccine within 1 month prior to the follow up measles campaign
2. no consent
3. incomplete data
4. children who had subjective complaints such as cough, colds and fever during the day of vaccination
5. immunocompromised patients (malignancies, chronic steroid use, chronically ill)

SAMPLE SIZE CALCULATION:

Qualified subjects who were at PGH for the month of February were vaccinated. An informed consent was obtained from parents or guardians. A total of 291 subjects were included in the study. The distribution of the subjects by age, sex and place of residence is shown below.

Table 1. Distribution of Subjects by Age

Age	Frequency	Percentage
<1 year	9	3.1%
1-5 years	209	71.8%
>5 years	73	25.1%
TOTAL	291	100%

Table 2. Distribution of Subjects by Sex

	Frequency	Percentage
Male	159	54.6%
Female	132	45.4%
TOTAL	291	100%

Table 3. Distribution of Subjects by Place of Residence

	Frequency	Percentage
Bulacan	12	4.1
Cavite	34	11.7
Caloocan	9	3.1
Laguna	22	7.6
Pampanga	2	0.7
Quezon City	24	8.2
Manila	170	58.4
Nueva Ecija	1	0.3
Mindoro	1	0.3
Rizal	4	1.4
Aurora, Quezon	9	3.1
Leyte	2	0.7
Las Pinas	1	0.3
TOTAL	291	100%

STUDY PROCEDURE:

The mass measles immunization during the month of February 2004 in PGH had 2 assigned stations, at the Philippine General Hospital lobby and out-patient department. Two pediatric residents and interns were assigned at each station. Qualified subjects were vaccinated with measles vaccine after an informed consent from parents or guardian. Mothers were asked prior to vaccination if the child had an underlying health problem or condition. Mothers were also interviewed regarding their expected adverse events post vaccination and whether they believe in the importance of measles vaccination.

The measles vaccines used came in 10 dose vials in freeze-dried powder form. It was given at a dose of 0.5 cc of reconstituted measles vaccine per child via subcutaneous route at the deltoid region of the upper arm. Precautions were observed to ensure safety of injections such as observance of personal hygiene and sterility at all times during vaccine reconstitution and injection, following proper vaccine dosage and subcutaneous injection technique and the use of 1 sterile needle-syringe per child.

After vaccination, the address and contact numbers of each subject were taken. Possible adverse reactions to the vaccine was explained to the parent or guardian. They were advised to seek consult if any untoward reactions would occur. A pamphlet was given to each child (as shown below) and advised to bring them on their follow up within 2 weeks after vaccination. For patients who did not follow up, mothers were interviewed through phone.

DATA ANALYSIS

Data encoding and analysis were done using statistical software packages (SPSS, and Epi-info). Descriptive statistics were used for nominal variables. Adverse events following measles vaccination as well as perceptions of mothers on measles vaccination will be measured using frequencies and percentages.

RESULTS AND DISCUSSION

The mean age of the subjects was 2 years old. There were more males than females but there was no wide discrepancy between the 2. According to place of residence, most subjects (63%) lived within Metro Manila as shown in Table 4.

Table 4. Baseline Sociodemographic Profile

Variables	Descriptives (N=291)
Age in years	2 +/- 1
Gender	
M	159 (55%)
F	132 (45%)
Place of Residence	
Within Metro Manila	182 (63%)
Outside Metro Manila	109 (37%)

In an immunization coverage done in Canada, the immunization coverage for school-aged children exceeded the coverage for preschool children. The lower coverage in preschoolers reflects the fact that this age group is not as easily accessed as the school-aged population¹⁰.

According to the health department record, the Manila region was the hardest hit for measles for children less than five years old last year with 29% of the 8,395 total cases¹¹.

Previous studies showed that most of their subjects belong to the school age group in comparison to this study which were mostly preschoolers.

A total of 35 adverse events were reported. The highest reported adverse event was fever (4.1%) followed by a loss of appetite (2%), postvaccination measles (1%) and rash (1%) as shown in Table 5.

Table 5. Reported Adverse Event Within 2 Weeks After Measles Vaccination

Adverse Events	Frequency (N=291)
Adverse Events known to be associated with measles vaccine	
Fever	12 (4.1%)
Restlessness	2 (<1%)
Rash	3 (1%)
Adverse Events not known to be associated with measles vaccine	
Abdominal pain	1 (<1%)
Diarrhea	1 (<1%)
Hematoma	2 (<1%)
Colds	2 (<1%)
Cough	1 (<1%)
Chickenpox	1 (<1%)
Cervical lymphadenopathies	1 (<1%)
Adverse Events may or may not be associated with measles vaccine	
Increase in sleeping time	1 (<1%)
Loss of appetite	5 (2%)
Measles	3 (1%)

A study done by Nedelcu et al in Romania on October 1998-January 1999 was successfully conducted after a large measles outbreak. Approximately 2.1 million school-aged children (7 – 18 years) were immunized against measles. A total of 128 adverse events were reported. Of these, 16 met the definition of an adverse event; all were transient and without sequelae. The adverse events reported were syncope (5.2%), allergic reaction (0.4%), local reaction (0.1%), postvaccination measles (0.1%), possible anaphylaxis (0.1%), fever (0.05%), arthralgia (0.2%) and mild illness (0.05%)¹².

In the Philippines, 25 million children were vaccinated and adverse events reported in the measles immunization campaign on September 16 to November 30 1998 were fever (5-15%), rash(5%), febrile convulsions (1 in 10 000), serious allergic reaction (1-2 in 100 000) and anaphylaxis (1 in 1-3 million).¹³

In Canada, reported adverse events with a highest frequency was measles-like illness (25.5%), non specific (17.4%), allergic reaction (11.7%), local reaction (10.5%), joint pain or swelling (1.3%) and thrombocytopenia (0.1%)¹⁰

Majority of children who experienced adverse events were within the age of 1 to 5 years old while the least was less than 1 year old as shown in Table 6. Adverse events according to the age of the children is shown in Table 7.

Table 6. Adverse events reported within two weeks post vaccination

Age in Years	Presence of adverse events w/in 2 weeks		Total
	with (+)	without (-)	
< 1	1	9	10
1 – 5	30	179	209
> 5	9	63	72
Total	40	251	291

Table 7. Reported Adverse Events Within 2 Weeks After Measles Vaccination According to Age of the Children

Adverse Effect	Age in Years			Total
	<1	1 - 5	> 5	
Fever	1	7	4	12
Loss of appetite	0	1	2	3
Restless	0	2	0	2
Abdominal pain	0	1	0	1
Diarrhea	0	0	1	1
Hematoma	0	1	1	2
Rash	0	1	2	3
Colds	0	2	0	2
Measles	0	1	1	2
Chickenpox	0	1	0	1
Cervical lymphadenopathy	0	1	0	1
Cough	0	1	0	1
Increased sleep	0	1	0	1
Total	1	20	11	32

Most mothers (43.6%) were grade school graduates followed by (40.9%) high school graduates and (13.7%) college graduates and (1.7%) had no formal education as shown in Table 8. Since most of our mothers were grade school graduates, most of them reported adverse events which were not related to post measles vaccination such as cough and colds, passage of worms, diarrhea etc. as shown in Table 5 as well as their expected adverse events as shown in Table 9. Educational attainment has a high implication on the success or failure of vaccination as well as the observation of post vaccine adverse effects.

Table 8. Educational attainment of mothers

	Frequency	Percentage
None	5	1.7%
Grade school	127	43.6%
High school	119	40.9%
College	40	13.7%
TOTAL	291	100%

Most of the mothers (78%) recognize the importance of measles vaccine as shown in Table 9. On random interview, for those who recognize the importance of measles vaccine, most of them were educated as compared to those who said no, majority of them had no formal education. Their knowledge on the importance of measles vaccine were either acquired from school or through lectures done by barangay health workers.

Table 9. Mothers response regarding the importance of measles vaccines

	Frequency	Percentage
YES	227	78.0%
NO	64	22%
TOTAL	291	100%

Majority (55.3%) of the mothers are not aware of the possible of adverse events occurring post vaccination as shown in Table 10.

Table 10. Mothers who are aware that adverse events occur post vaccination

	Frequency	Percentage
YES	130	44.7%
NO	161	55.3%
TOTAL	291	100%

Among the mothers (44.7%) who were aware of the occurrence of adverse events post vaccination, the highest expected adverse event was fever followed by a loss of appetite, cough and colds, diarrhea and rash.

Table 11. Expected adverse events post vaccination

Fever	102
Cough and colds	9
Diarrhea	9
Loss of appetite	13
Rash	5
TOTAL	138

Majority of the mothers (93.8%) believe in the importance of measles vaccination as shown in Table 12. This is probably related to their belief in the ability of the vaccine to prevent the disease.

Table 12. Does not believe in measles vaccination at all

	Frequency	Percentage
YES	18	6.2%
NO	273	93.8%
TOTAL	291	100%

In a study done by Kimmel (2002) in Kansas City on vaccine adverse events, telephone surveys demonstrated that more than 80% of parents supported immunizing their children to keep them well. However, 25% incorrectly believed that too many immunizations could weaken their child's immune system. Respondents who were women, white or college graduates, or who had an alternative medical orientation were more likely to opt out of immunization for their children. More than 80% of respondents indicated that physicians were still their primary source of vaccine information¹⁴.

What level of vaccine-related risk will most parents tolerate? A study in western Ontario found that most mothers would accept a risk ranging from one adverse event per 100,000 to 1 million vaccination. However, 14% would not accept any risk of a serious adverse event. This zero-risk tolerant group tended to have a lower income and to prefer a nonnumeric statement of risk. Another study using a hypothetical vaccine found that 23% of persons would vaccinate only if the risk of a serious event was zero¹⁴.

In the absence of a direct threat from disease, it is clear that some people will not undergo vaccination unless absolute safety can be assured. Although absolute vaccine safety is the optimal goal, it is difficult to achieve in the real world¹⁴.

In this study, the importance of vaccine safety was observed through observation of aseptic technique in giving and handling of the vaccine. Possible adverse events were thoroughly explained to the mothers.

Roces MC et al did a study on the risk factors for measles mortality among children in Western Samar. Their study showed that the 3 most common reasons for non-immunization were unawareness of the expanded program on immunization(EPI) or its schedule (22%) and fear of side reactions(14%)¹⁵. On random of interview of the mothers in this study, majority were unaware of the expanded program on immunization and fear of side effects which are probably due to lack of education.

CONCLUSION

Fever was the highest reported adverse event as well as expected adverse event post vaccination. Most mothers, including those with a low educational attainment,

recognize the importance of giving measles vaccine. However, results of this study showed the value of educating the public on adverse events that are due to vaccine reactions.

RECOMMENDATIONS

The main objective of the mass measles immunization campaign is to vaccinate children in areas with low routine measles immunization coverage. It would probably have been more beneficial if the subjects were asked if they had previous measles immunization so that we will know if the mass immunization was really beneficial.

Three of the subjects were reported to have experienced measles within 2 weeks after vaccination. Further investigation should be sought in order to know if this is due to a vaccine failure.

Further studies should be done to come up with other methods to accurately observe possible adverse effects post vaccination.

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