

# Adherence to the National Immunization Schedule for the First Year of Life in Misan, Iraq

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## Abstract

**Background:** Compliance with age-appropriate receipt of immunization is critical for providing maximum effectiveness against the vaccine-preventable diseases. The Advisory Committee on Immunization Practices recommends specific ages and intervals for vaccines to be administered to maximize their effectiveness. Till now in Misan (South East of Iraq); a considerable proportion of morbidity and mortality was detected in children under the age of 5 years due to vaccine-preventable diseases.

### Objectives:

- To determine the rate of adherence to the immunization schedule in the first year of life in order to generate a baseline data that can be used to improve the vaccination uptake in Misan, thus, saving more lives.
- To determine the causes and risk factors influencing the pattern of immunization adherence.

**Patients and Method:** A cross-sectional study was conducted in Misan Hospital for Child and Maternity. By a random selection, the study enrolled 250 mothers having infants aged 1-2 years attending the hospital as out-patient visitors. Through an interview with the mother, the required data were collected.

**Results:** Among 250 infants; 22.8% with complete adherence to the national immunization schedule during the first year of life, 68% with partial adherence, and 9.2 % with no adherence. Statistically, immunization adherence was significantly associated with mother's education, residence, and place of delivery.

**Conclusion:** Adherence to the national immunization schedule in the first year of the life in Misan province was low and not the promising rate. Efforts toward the primary health care centers to raise the awareness and education about immunizations are still required to further reduce the vaccine-preventable morbidity and mortality in children.

**Keywords:** immunization, vaccine, adherence, infant, Misan.

## INTRODUCTION

Childhood immunization is one of the most important public health strategies in the control and prevention of infectious diseases<sup>(1,2)</sup>. In spite of these facts, some parents may delay vaccinating their children or may follow an alternative immunization schedule or may even reject the administration of some vaccines because of some beliefs or medical, religious, or socioeconomic causes<sup>(2,3,4)</sup>.

However, this attitude will make their children at more risk to have communicable diseases and will increase the chance of having outbreak via the loss of the herd immunity with the reemergence of the vaccine-preventable diseases<sup>(5,6)</sup>.

Furthermore, the World Health Organization has reported that about ten millions of children under the age of five years are still dying every year in the world and more specifically in developing countries. The communicable diseases are still representing 7 out of 10 major causes of death in children, and reach about 60% of all child deaths<sup>(7,8,9)</sup>.

Annually, the Advisory Committee on Immunization Practices recommends specific ages and intervals for vaccines to be administered to maximize

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their effectiveness. Therefore, compliance with age-appropriate receipt of immunization is critical for providing maximum effectiveness against the vaccine-preventable diseases <sup>(10)</sup>.

Iraq is one of the Middle East countries of over 30 million populations who have faced a lot of challenges till now. Misan province is located in the South East region of Iraq with about 1.1 million individuals according to the annual report at 2017 <sup>(11)</sup>.

In spite of the limited data, it was reported that the major causes of death in Iraq at 2009 were respiratory tract infection followed by diarrhea forming 34.0% and 24.4% respectively from the total mortality rate in children under the age of 5 years <sup>(12)</sup>.

It is of note that in Iraq, 2011; the rate of immunization uptake in infants (less than 1 year) was 78% only <sup>(13)</sup>. Currently, in Misan at 2017, the total hospitalization due to gastroenteritis in children younger than 5 years was approximately 21.5% from the total inpatient admission whereas the total mortality rate in children under the age of 5 years was 17/1000 live birth <sup>(11)</sup>.

For these reasons, this study had arisen to estimate the rate of immunization adherence in infancy in order to establish an approach to improve the vaccine compliance in Misan, hence, more vaccination uptake, less risk of vaccine-preventable diseases, and saving more lives.

## PATIENTS AND METHOD

A cross-sectional study was conducted in Misan Hospital for Child and Maternity during a period of 3 months from September 2018 to December 2018.

By a random selection, the study enrolled 250 mothers having infants aged 1-2 years attending the hospital as out-patient visitors. Through an interview with the mother, the required data were collected; infant's age, gender, place of delivery, residence, education level of the mother, and the causes beyond the partial or non-adherence to the immunization schedule.

Depending on the immunization card or based on mother recollection if no immunization card was available, the infants were classified into 3 groups according to the adherence pattern;

1. Infants who received all immunization doses of the first year of life according to the national

immunization schedule timing were called infants with complete adherence,

2. Infants who received all vaccines of the first year during the first year of life but did not restrict to the schedule timing and vaccines administration were frequently delayed were called infants with partial adherence,
3. And finally, infants with non-adherence who were unable to receive all the due vaccines for the first year of life before the first birthday.

The new National Iraqi Immunization program was applied in our country from November 2015 up to date <sup>(14)</sup>. These vaccines are free of charge and usually provided in the Primary Health Care Centers only.

The study protocol was approved by ethical committee of the Ministry of Higher Education, College of Medicine in Misan, Misan directorate of health and Misan Hospital for Child and Maternity to carry out this study. The data analysis was done by SPSS software version 21.0, and then it was formulated as tables and figures. Also, the Chi-square test was applied to determine the association between the different variables. Statistical significance was detected whenever *p*-value is equal or less than 0.05.

## RESULTS

Among 250 infants; the majority (68%) had a partial pattern of immunization adherence whereas infants with complete adherence were forming 22.8% as shown in **figure 1**.

Regarding the causes that affect the immunization adherence; it was found that more than half (52.8%) of infants had an acute illness during the time of vaccine and more than a quarter were of a busy family.

Other causes were being lived away from the primary health care center, had a chronic illness, and parental belief forming 12.4%, 4.1%, and 3.2% respectively as shown in **table 1**.

Statistically, there was a significant association between the pattern of immunization adherence and residence, place of delivery, and mother's education in which *p*-values were 0.008, 0.013, and 0.04 respectively as shown in **table 2**.

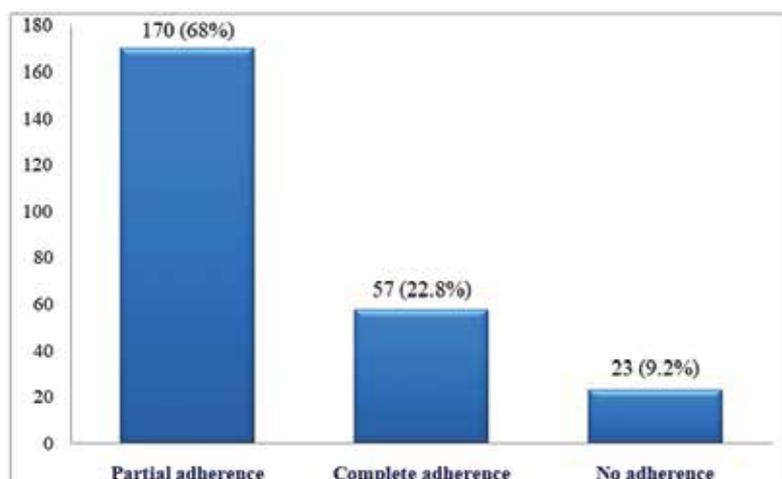


Figure 1: Patterns of immunization adherence in the first year of life

Table 1: Causes of non-adherence to the immunization schedule for the first year of life

Causes	Number (%)
Ill infant during the time of vaccine	102 (52.8%)
Busy family	53 (27.5%)
Living away from the primary health care center	24 (12.4%)
Infant with chronic illness	8 (4.1%)
Parental belief	6 (3.2%)
Total	193 (100%)

Table 2: Relationship between the immunization adherence and risk factors

Risk factors	Immunization adherence			Total No. (%)	P. value
	Complete adherence	Partial adherence	No adherence		
<b>Gender:</b>					
Male	36 (26.7%)	88 (65.2%)	11 (8.1%)	135 (100%)	0.26
Female	21 (18.3%)	82 (71.3%)	12 (10.4%)	115 (100%)	
<b>Residence:</b>					
Urban	20 (18.0%)	86 (77.5%)	5 (4.5%)	111 (100%)	0.008
Rural	37 (26.6%)	84 (60.4%)	18 (13.0%)	139 (100%)	
<b>Place of delivery:</b>					
Hospital	48 (22.0%)	154 (70.6%)	16 (7.4%)	218 (100%)	0.013
Home	9 (28.1%)	16 (50.0%)	7 (21.9%)	32 (100%)	
<b>Education level:</b>					
Illiterate	22 (20.4%)	72 (66.6%)	14 (13.0%)	108 (100%)	0.04
Primary	18 (20.9%)	65 (75.6%)	3 (3.5%)	86 (100%)	
Secondary	10 (25.0%)	24 (60.0%)	6 (15.0%)	40 (100%)	
College	7 (43.7%)	9 (56.3%)	0 (0.0%)	16 (100%)	

**DISCUSSION**

Immunization is considered one of the most cost-effective public health efforts in reducing mortality

in children under the age of 5 years<sup>(9)</sup>. The measles vaccination alone prevented 15.6 million deaths in children between 2000 and 2015 globally<sup>(15)</sup> indicating that the compliance to the recommended immunization

program is a challenge for the health care system to achieve Millennium Development Goal 4<sup>(7,9,15)</sup>.

The current study revealed that the rate of infants with complete adherence to the national immunization program was low and not reaching even one-quarter from the total (22.8% only). In comparison with United States (US) in 2016; it is lower than US rates (26%)<sup>(16)</sup>.

On the other hand, vaccines administration were frequently delayed in infants with partial adherence to the national immunization program and those were forming the vast majority of the cases reaching 68% whereas the rate of no-adherence was not low forming about 9.2%. Approximately, the same was seen in US in whom the vast majority (74%) was frequently not restricted to the schedule timing<sup>(16)</sup>.

Consequently, the delayed vaccination would abate the effectiveness of immunization<sup>(10)</sup>, affect the development of herd immunity, and lead to disease transmission<sup>(5)</sup>.

The present study showed that most common cause of non-adherence to the national immunization program was ill infant during the time of vaccine, thus, parents would decide to postpone the due vaccine according to their poor knowledge and these findings were consistent with Turkey (Istanbul)<sup>(17)</sup>. So failure to administer vaccines for infants with minor illness will impede the vaccination effectiveness<sup>(10)</sup>.

Lack of parental education was the second main barrier to the immunization as concluded by Bahari et al in Mosul (North Iraq)<sup>(18)</sup> and this was consistent with the results of the current study in which there was a significant relationship between the education and the adherence to the immunization program.

Moreover, the rate of being fully vaccinated infants is approximately nine times more in educated mothers than non- educated mothers as concluded by Torun et al study in Istanbul<sup>(17)</sup>.

The second cause affecting the parental adherence to the immunization was the busy family (27.5%) and this agreed with Sporton et al study<sup>(19)</sup>. This can be attributed to the importance of parental education about the importance and effectiveness of vaccines against communicable diseases.

Living away from the primary health care center was the third cause affecting the immunization adherence as

agreed by 12.4% of the total sample. This obstacle was also seen at a higher rate (43.6%) in Istanbul in those with poor knowledge about vaccinations and living in the villages<sup>(17)</sup>.

In Turkey, Topuzoglu et al concluded that the ability to reach the primary healthcare center is one of the important factors that should be taken in consideration when planning the immunization program in the developing countries<sup>(20)</sup>.

In Misan, there was a misunderstanding by mothers that any infant with chronic illness should not receive any vaccine as seen in 4.1%. Additionally, to date, there was 3.2% not adhering to the national program because of their belief that there is no benefit from the vaccine and this was in accordance with Greek study in which there was less than 5% of parents omit or postpone immunization secondary to their beliefs<sup>(21)</sup>. Again this affected by the educational level of the parent and would need more communication efforts with the immunization provider to clarify the precaution and contraindication of the vaccines and highlight the important value of immunization adherence<sup>(22)</sup>.

Regarding the place of delivery; the current study showed that there was a significant association between immunization adherence and the place of delivery. There was more chance to have good compliance with infants who delivered in hospital and this can be explained by the policy of a routine initiation of immunization by giving hepatitis B vaccine to all delivered newborns in the Iraqi governmental hospitals. This significant association was compatible with Mosul study which reported that infants who delivered in the general hospitals were 12.9 times more possible to have complete immunizations than infants born at homes<sup>(23)</sup>. Also, it is agreed with Istanbul<sup>(17)</sup> which revealed that the delivered infant at home would be at a double risk to have delayed vaccination than the delivered infant in the hospital.

Moreover, Hospitalization could be used as an opportunity to provide the recommended immunizations and efforts should be considered to administer vaccines during admission or at discharge<sup>(24)</sup>.

In studying the different associated risk factors; the present study reported no significant association between the immunization adherence and gender which was incompatible with Istanbul and Ghana which showed that the gender would affect the immunization uptake<sup>(17,25)</sup>.

Misan is consisting of urban (74%) and rural groups (26%)<sup>(11)</sup>. The present study revealed a significant relationship between the residence and the pattern of immunization adherence in which there were more infants with complete adherence in rural than urban areas and this was compatible with Turkey<sup>(20)</sup>.

Lately, the incidence and the associated risks of communicable diseases have been significantly declined in the Western countries due to the immunization strategies that focused on infants and children<sup>(2)</sup>.

Different studies emphasize the important role of education about immunization in achieving more parental compliance with immunization schedule, thus, increasing the immunization rate of their children as demonstrated by different studies in Iraq<sup>(18)</sup>, Istanbul<sup>(17)</sup>, Greece<sup>(21)</sup>, and Ghana<sup>(25)</sup>.

In addition, educational and reminders interventions have a recognizable role in achieving appropriate immunization adherence, as well as, increasing immunization rates as shown in different studies<sup>(18,26)</sup>.

Finally, the effective role of immunization in decreasing the morbidity and mortality in children and achieving Millennium Development Goal 4 cannot be launched without parental compliance and appropriate adherence to the immunization schedule<sup>(4, 7, 9, 15)</sup>.

## CONCLUSION

Adherence to the national immunization schedule in the first year of the life in Misan province was low and not the promising rate. Efforts toward the primary health care centers to raise the awareness and education about immunizations are still required to further reduce the vaccine-preventable morbidity and mortality in children.

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