Proportion and Determinants of Incomplete Vaccination among Children Aged Less than Two Years in Baghdad City

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ABSTRACT:

BACKGROUND:

Immunization is the most important public health advance of the 20th century and the most cost-effective and a life-saving intervention. The public health initiative is to get 90% of the nation's children adequately immunized before their third birthday.

OBJECTIVE:

To determine the proportion and determinants of incomplete vaccination among a sample of children aged less than two years in Baghdad city.

Design: A cross sectional study.

Setting: A random sample of 11 Primary Health Care Centers in Baghdad city.

Data Collection time: Feb/1st-May/31st / 2008

SUBJECTS AND METHODS:

A systematic random sample of 562 children aged less than two years, living in Baghdad city, and attended the selected Primary Health Care Centers for various health complaints apart from immunization. Vaccination status of children was verified for their age and according to the national Expanded Program of Immunization.

RESULTS:

The proportion of incomplete vaccination was18.8%; 0.5% were completely non-vaccinated. The proportion of incomplete vaccination increased with increasing age (P=0.000). Males showed higher proportion of incomplete vaccination (24.1%) than females (14.2%) (P =0.003). The major proportion of incomplete vaccination was among children of illiterate mothers (43%) (P =0.000). The main causes of incomplete vaccination were immigration problem (46.23%), security problem (29.25%), and parent's related problem (15%), and other causes (9%).

CONCLUSION:

Around one of every five children aged less than two years in Baghdad was incompletely vaccinated; immigration and security obstacles were the main causes of incomplete vaccination.

KEY WORDS: proportion, determinants, incomplete vaccination, Baghdad

INTRODUCTION:

The development of vaccines for prevention of infectious diseases has revolutionized the approach to public health. In many countries people enjoy better health because of effective immunization programs which have diminished the morbidity and mortality of common infectious diseases [(1)].

Immunization is the most important public health advance of the 20th century and the most cost-effective and a life-saving intervention which prevents needless suffering through sickness, disability and death. It benefits all people, not only through improvements in health and life expectancy but also through its social and economic impact at the global, national and community level [(2,3)].

Immunization averted about "two million" deaths in 2002. In addition, contagion is reduced, strain on health-care systems is eased, and money is frequently saved that can be used for other health services [(3-4)].

Immunization is a proven tool for controlling and even eradicating disease as with small pox. Eradication of poliomyelitis is within reach. Since the launch of Global Polio Eradication Initiative in 1988, infections have fallen by 99%, and some five million people have escaped paralysis. Between 1999 and 2003, measles deaths dropped worldwide by almost 40%, and some regions have set a target of eliminating the disease. Maternal and neonatal tetanus will soon be eliminated in 14 of 57 high-risk countries [(5)].

The public health initiative is to get 90% of the nation's children adequately immunized before their third birthday. Immunization and other linked health interventions will contribute significantly to the achievement of the Millennium Development Goals (MDGs) by improving health, especially among

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children and women, and contributing to poverty reduction and development efforts. Routine vaccination is now provided in all developing countries against measles, polio, diphtheria, tetanus, pertussis, and tuberculosis [6,7]. To this basic package of vaccines, this served as the standard for years, have come new additions. Immunization against hepatitis B is now recommended by WHO for all nations, and is currently offered to infants in 147 of 192 WHO Member States. Immunization against Haemophilus influenzae type b (Hib), Rota virus and Pneumococcal pneumonae is recommended where resources permit its use and the burden of disease is established [8,9]. The objective of this study is to determine the proportion and determinants of incomplete vaccination among children aged less than two years in Baghdad city.

SUBJECTS AND METHODS:

This is a cross sectional study conducted during the period Feb-May/2008 in eleven PHCCs; five in Al Kerkh and six in Al Resafa sides of Baghdad. These PHCCs were randomly selected from the list of PHCCs obtained from Kerkh and Resafa Directorates of Health (DOH). These PHCCs are located in areas that differ in their socio-economic status.

The sample size was estimated using the suitable equation for the cross sectional survey. The number of children obtained from each centre was estimated according to the proportion of the annual attendants of the center to the total attendants of the 11 centers. All children aged less than two years who attend the center for different health complaints were considered illegible for inclusion. A systematic random sampling technique was used to include the children in each centre where the time needed to complete the form was used as a system.

Data was collected using a questionnaire filled through direct exit interview with the child' parents or other attendants. Beside basic demographic data, the questionnaire included detailed information on the vaccination status of the child. The questionnaire was tested by a pilot study before initiation of the study.

Vaccination status was classified into: completely immunized children who received all vaccines in national EPI schedule according to their age, partially immunized children who did not receive all vaccines in the schedule according to their age group, and completely unimmunized; who received none of the vaccines.

Statistical analysis

Statistical Package of Social Sciences (SPSS) version 16 was used for data entry and analysis. Chi square test was used to test association between different categorical variables. P-value of <0.05 was considered significant.

RESULTS:

The total number of study sample was 562 children; male to female ratio was 0.89: 1, and the mean age (±SD) was (11± 7) months.

It was found that 81.1% of the children were completely vaccinated, 18.3% were partially vaccinated, and only 0.5% was completely non-vaccinated as shown in figure (1). Because of the extremely small number of completely non-vaccinated children, we combined this group with the partially vaccinated and label them as incompletely vaccinated group.

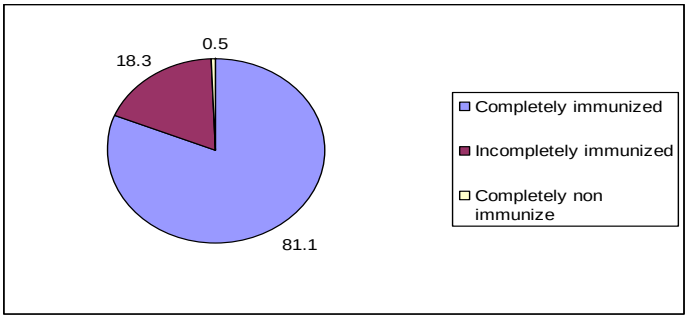

Figure 1: Distribution of study group by vaccination status

Distribution of study group by vaccination status and age and gender is demonstrated in table 1. The proportion of incompletely vaccinated children significantly increased with increasing age, reaching maximum at age group 15-17month (39.1%), then the proportion slightly decreased (P=0.000). The proportion of incomplete vaccination was significantly higher among males (24.1%) than females (14.2%) (P =0.003).

Table 1: Distribution of study group by vaccination status and age and gender

Variable	Vaccination status				Total		P value
	Completely vaccinated		Incompletely vaccinated				
	No.=456	%	No.=106	%	No.=562	%	
Age category							0.000
1 month	30	(100)	0	(0)	30	(5.3)	
2-3 month	71	(97.3)	2	(2.7)	73	(13)	
4-5 month	76	(92.7)	6	(7.3)	82	(14.6)	
6-8 month	57	(78.1)	16	(21.9)	73	(13)	
9-14 month	83	(72.8)	31	(27.2)	114	(20.3)	
15-17 month	39	(60.9)	25	(39.1)	64	(11.4)	
18-24 month	100	(79.4)	26	(20.6)	126	(22.4)	
Gender							0.003
Male	202	(75.9)	64	(24.1)	266	(47.3)	
Female	254	(85.8)	42	(14.2)	296	(52.7)	

Regarding mother's education, we found a significant statistical association between mother's education and vaccination status (P=0.000), and the proportion of incompletely vaccinated children was highest among children of illiterate mother (42.9%).

Similarly, father education was also found to be significantly associated with incomplete vaccination (0.002). No statistical significant association was found between vaccination status and mother's current marital status (P=0.824). (Table 2)

Table 2: Distribution of study group by vaccination status, mother and father education, current mother marital status and residence

Item	Vaccination status				Total		P value
	Completely vaccinated		Incompletely vaccinated				
	No.=456	%	No.=106	%	No.=562	%	
Mother Education							0.000
Illiterate	16	(57.1)	12	(42.9)	28	(5)	
Primary school	171	(87.7)	24	(12.3)	195	(34.7)	
Secondary school	199	(81.9)	44	(18.1)	243	(43.2)	
University or higher	70	(72.9)	26	(27.1)	96	(17.1)	
Father Education							
Illiterate	20	(95.2)	1	(4.8)	21	(3.7)	0.002
Primary school	59	(77.6)	17	(22.4)	76	(13.5)	
Secondary school	279	(71.5)	49	(14.9)	328	(58.4)	
University or higher	98	(81.1)	39	(28.5)	137	(24.4)	
Current marital status of the mother							
Currently married	420	(81.4)	96	(18.6)	516	(91.8)	0.824
Divorced	5	(7.5)	1	(22.5)	6	(1.1)	
Widowed	31	(83.3)	9	(16.7)	40	(7.1)	

Regarding the type of missed vaccine, we found that the majority of incompletely vaccinated children had missed measles (90.6%) and MMR (80.2%), and more than half had missed sixth month vaccines ((DPT3, ToPV3, HBV3). (Table 3)

Table 3: Distribution of incompletely vaccinated children by type of missed vaccines

Missed Vaccine	No=106	%
1st week Vaccines (BCG, ToPV0,HBV1)	3	2.8
2nd month vaccines(DPT1,ToPV1, HBV2)	13	12.3
4th month vaccines(DPT2, ToPV2)	57	53.8
6th month vaccines(DPT3, ToPV3, HBV3)	96	90.6
9th month vaccine(Measles)	85	80.2
15th month vaccine (MMR)	52	49.1
18th month vaccines (DPT, ToPV)	37	34.9

Note: Many children missed more than one vaccine

Concerning the reasons for incomplete vaccination, we found that 31.1% of incomplete vaccination was due to interior immigration (internally displaced people), 29.2% due to security problem, 15.1% due to exterior immigration, and the remaining is attributable to other reasons (Table 4).

Table 4: Distribution of study group by reasons of incomplete vaccination

Reasons of incomplete vaccination	No=106	%
Problem of security	31	29.2
Problem of interior immigration	33	31.1
Problem of exterior immigration	16	15.1
Parents think that vaccines are harmful	14	13.2
Vaccine do nothing to the children	2	1.9
Problem of transportation	7	6.6

DISCUSSION:

EPI was introduced in Iraq in 1985; great progress in vaccination coverage was achieved since that time. But we noticed that in the last few years, the coverage of vaccination in Iraq had significantly declined [10].

About 81% of the studied children in Baghdad city were completely vaccinated; this figure is higher that that reported in Iraq Multiple Indicators Cluster Survey-3 (MICS-3), 2006 which showed that the percentage of completely vaccinated children in Iraq by age 12 months is 39 % only [10]. This could be attributed to the fact that our study conducted in Baghdad only where the chance is highest to achieve the best health services and could be due to different age categories included. Ram et al 2006 in India showed that only 46% of children were completely immunized, and 34% were partially immunized, while 20% were completely non immunized [11].

Immunization coverage decreased from 99% for first week vaccines (BCG, HBV1, OPV0), to 72% for DPT3 and OPV3 (sixth month vaccines), below the Healthy People 2000 goal of 90% coverage among all 2-year-old children. MICS-3, 2006 showed similar considerable reduction in immunization coverage between first week and six months vaccines [10]. In India, Ram et al, 2006, found similar dramatic reduction in vaccine coverage between first week and six month vaccines [11].

Gender was a significant factor affecting vaccination status, while Sheikh et al, 1991[12] in Iraq and Nasseri et al, 1990 in the Islamic Republic of Iran found that gender was not a significant factor affecting vaccination [13]. In this study, females found to be more completely vaccinated than males. Sheikh et al 1991 also found that females were more completely vaccinated than males in rural part of Iraq. This could be attributed to the attitude of the families to protect their females against diseases that harbor potential serious consequences.

Mother's educational status found significantly associated with child's vaccination status; this is consistent with many other studies [11, 14,15].

Interestingly, we found that the vaccination coverage of children of mothers with university plus education is not high as expected. This could be due to rumors about the vaccines side effects or its storage.

Regarding causes of incomplete vaccination, we found that violence and widespread insecurity put severe pressure on the health services in Iraq. This pressure increases as people move within the country and into neighboring countries [16]. Previously, negligence and ignorance were the most important causes of incomplete vaccination in Iraq [11].

Government policies are the main force behind vaccination in Iraq; birth certificates are not issued unless the child received BCG vaccine. As a consequence BCG coverage was tremendously high, and as the child vaccinate with BCG, vaccination with HBV1 and OPV0 are done at the same time.

CONCLUSION:

That around one out of five children aged less than two years in Baghdad is not completely vaccinated. Increasing child age, male gender, and low mother's and father's education are important predictors. Security instability and immigration were important direct reasons of incomplete vaccination.

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