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Assessment of reasons and factors affecting childhood immunization defaulters in Saladdin province, Iraq

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ABSTRACT

Background:

More than two million mortalities of children worldwide are delayed through effective immunization yearly.[1] This study was conducted to identify the reasons and factors affecting the immunization defaulting.

Subjects and method:

A cross sectional study was conducted in all the primary health care districts in Saladdin province between July – November 2019, caretakers of (359) children were interviewed, and data collected via self-administered questionnaire to their parents.

Results:

There were (274) defaulters and (85) non-defaulters with the defaulters having higher mean age for mothers and fathers than non-defaulters. The statistically significant factors associated with immunization defaulters were the maternal education, residency, distance to PHCC, socioeconomic status, ANC state and family size. The most common reasons for defaulting were busy parents forgetting the date of vaccination, child or caregiver illness, long distance to nearest PHCC and no sufficient parents' knowledge about schedule.

Conclusion:

Children born to older parents, illiterate mothers, living in rural distant areas or living in big or poorer families with poor ANC appear to have higher defaulting rates.

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Introduction

The most important cost-effective health intervention to reduce children mortalities is the immunization. Of the 10.5 millions under five-mortalities in 2002, about 2.5 millions are attributed to vaccine preventable diseases.[2]

More than two million mortalities worldwide are delayed through effective immunization yearly.[1] One of the indicators of inadequate preventive health care provision is the low immunization rate.[3]

As a cornerstone of the primary health care services in Iraq, all children are involved in free vaccination service. It is available in all governmental primary health care centers (PHCCs) where child health services are provided in rural and urban areas. Because of the importance of the immunization, it is necessary to implement the program and should be monitored very closely, which is carried out routinely at different levels of the Iraqi expanded program of immunization (EPI).

In Iraqi immunization program, defaulting immunization is defined as missing the vaccination date for one month or more. One of the challenges of this program is a failure of timely receiving the recommended doses of vaccination. There are many factors that could affect the compliance to the recommended vaccination schedule as family factors, health service provider factors and external or environmental factors.[4,5]

Family factors include lack of knowledge about the importance of vaccination, the burden of vaccine preventable diseases, socioeconomic issues, big family size, and families who live in temporary camps or houses.[6]

The health staff factors could include long waiting time, motivation and attitude of service providers and reaction to side effects. The external or environmental factors include difficulty in health care access due to poor roads or inadequate public transportation, and preparedness of community for immunization sessions.[7,8]

Aim of the study: is to find reasons and factors affecting childhood

immunization defaulters in Saladdin province. **Objectives** are to:

1. Determine the relation between socio-demographic factors and child immunization status.
2. Identify the effect of different paternal and maternal factors on child immunization status.

Subjects and method:

A cross sectional study was done among children under (24) months age between July and November 2019. The study was applied to all the nine primary health districts in Saladdin directorate of health, so that 30 defaulter children were assigned to each district with 10 non-defaulters to make a comparison group for statistical analysis purposes. The defaulter group sample was chosen by systematic random sampling using defaulters' registry books found in PHCCs, with a proportional skip interval and choosing the next record if the defaulter child could not be contacted. The non-defaulter group sample was gathered via simple random sampling. The above procedure resulted in a total of (359) subjects enrolled in the study, (274) of them were defaulters and (85) were non-defaulters.

Data collection was done by using a well-prepared questionnaire that was designed during an EPI directorate meeting with the districts EPI focal persons on the 7th of July 2019. The questionnaire was tested among pilot group and corrected accordingly. It contained closed and open-ended questions about the demographic, socioeconomic and environmental factors with another part of questions about defaulting reasons.

The field work was carried out from the 21st of July to the 4th of August 2019, all the nine EPI focal persons worked in their districts' PHCCs to collect the data. Informed consent was obtained from families who participated in the interviews. Data organization and analysis were done using Microsoft Excel 2013 and EpiCalc 2000 software. Statistical analysis was done using Chi square for categorical data and t-test for quantitative data to compare the means of two groups.

Results:

Table (1): Distribution of socio-demographical and maternal characteristics of the responders

Characteristic		Number	Percentage
Gender	Male	198	55%
	Female	161	45%
Residency	Rural	231	67%
	Urban	113	33%
Distance to nearest PHCC	<5 km	176	50%
	5-10 km	101	29%
	>10 km	73	21%
Socioeconomic level	High	10	3%
	Middle	257	78%
	Low	61	19%
Child rank in family	$1^{st} – 3^{rd}$	252	71%
	>= 4^{th}	103	29%
Type of delivery	NVD	231	67%
	CS	116	33%
Site of delivery	Private hospital	54	15%
	General hospital	210	60%
	Home	88	25%
Child age	<=12 months	210	59%
	>12 months	148	41%
ANC site	No ANC	90	25%
	Private clinic	140	39%
	PHCC	125	35%
	Hospital	4	1%
Maternal educational level	Illiterate	69	19%
	Primary	195	54%
	Secondary	68	19%
	Higher education	27	8%
Paternal educational level	Illiterate	34	9%
	Primary	150	42%
	Secondary	125	35%
	Higher education	50	14%

Distribution of socio-demographical and maternal characteristics of the responders showed that from the (359) children enrolled in the study, there were (198) males and (161) females, most (231) of them were living in rural areas, mainly less than 5 km from PHCC and (257) of them were from middle socioeconomic status and under one year of age. Most mothers had completed primary education level (195) compared to (150) fathers with same educational level, all of this is shown in table (1).

Distribution of socio-demographical and maternal characteristics of the responders according to defaulting showed that mean maternal age among defaulters' group is significantly higher than the non-defaulter group, (28.87 years compared to 26.82 years), the same as paternal age between the two groups (32.95 compared to 30.9 years). The rate of defaulting immunization is significantly higher as the maternal educational level is lower so that children born to illiterate mothers are more commonly missing vaccination doses. Another statistically significant finding is that children living in rural resident families are more liable for defaulting immunization, the same as children living in homes far from PHCCs (>10 km). Low socioeconomic status, poor ANC and big families had also a significant effect on defaulting rate. The above information is shown in details in table (2).

Table (2): Characteristics of defaulters and non-defaulters of immunization

Factor		Defaulter (n=274)	Non-defaulter (n=85)	Statistic	p value
Maternal age (years)					
	mean ± sd	28.87±5.9	26.82±5.3	t=2.819	**0.0051**
Paternal age (years)					
	mean ± sd	32.95±6.4	30.9±6.1	t=2.571	**0.0105**
Maternal education [n(%)]					
	Illiterate	59 (85.5)	10 (14.5)	x^2=11.18	**0.0107**
	Primary	152 (77.9)	43 (22.1)		
	Secondary	48 (70.6)	20 (29.4)		
	Higher	15 (55.6)	12 (44.4)		
Paternal education [n(%)]					
	Illiterate	28 (82.4)	6 (17.6)	x^2=7.482	0.058
	Primary	122 (81.3)	28 (18.7)		
	Secondary	92 (73.6)	33 (26.4)		
	Higher	32 (64)	18 (36)		
Maternal employment [n(%)]					
	Unemployed	260 (76.9)	78 (23.1)	x^2=1.151	0.2833
	Employed	14 (66.7)	7 (33.3)		
Paternal employment [n(%)]					
	Unemployed	199 (77.7)	57 (22.3)	x^2=0.983	0.321
	Employed	75 (72.8)	28 (27.2)		
Gender [n(%)]					
	Male	148 (74.7)	50 (25.3)	x^2=0.606	0.436
	Female	126 (78.2)	35 (21.8)		

Factor		Defaulter (n=274)	Non-defaulter (n=85)	Statistic	p value
Residency [n(%)]					
	Rural	192 (83.1)	39 (16.9)	x^2=20.16	**<0.0001**
	Urban	69 (61.1)	44 (38.9)		
Distance to nearest PHCC [n(%)]					
	<5 km	124 (70.5)	52 (29.5)	x^2=10.15	**0.006**
	5-10 km	79 (78.2)	22 (21.8)		
	>10 km	65 (89)	8 (11)		
Socioeconomic status [n(%)]					
	High	7 (70)	3 (30)	x^2=11.98	**0.002**
	Middle	187 (72.8)	70 (27.2)		
	Low	57 (93.4)	4 (6.6)		
Antenatal care [n(%)]					
	No ANC	78 (86.7)	12 (13.3)	x^2=39.35	**<0.0001**
	Private clinic	121 (86.4)	19 (13.6)		
	PHCC	74 (59.2)	51 (40.8)		
	Hospital	1 (33.3)	3 (66.7)		
Rank in family [n(%)]					
	1st - 3rd	180 (71.4)	72 (28.6)	x^2=10.21	**0.001**
	>= 4th	90 (87.3)	13 (12.7)		
Type of delivery [n(%)]					
	NVD	175 (75.8)	56 (24.2)	x^2=0.143	0.705
	CS	90 (77.6)	26 (22.4)		
Site of delivery [n(%)]					
	Private hospital	40 (74.1)	14 (25.9)	x^2=0.247	0.883
	General hospital	162 (77.1)	48 (22.9)		
	Home	68 (77.2)	20 (22.8)		
Child age [n(%)]					
	<=12 months	151 (71.9)	59 (28.1)	x^2=6.06	**0.0137**
	12-24 months	123 (83.1)	25 (16.9)		

The most reported reason for defaulting was busy parents (181), followed by child or caregiver illness (82), far PHCC (81) and insufficient knowledge about the schedule (81). All the reasons are shown in chart (1) below.

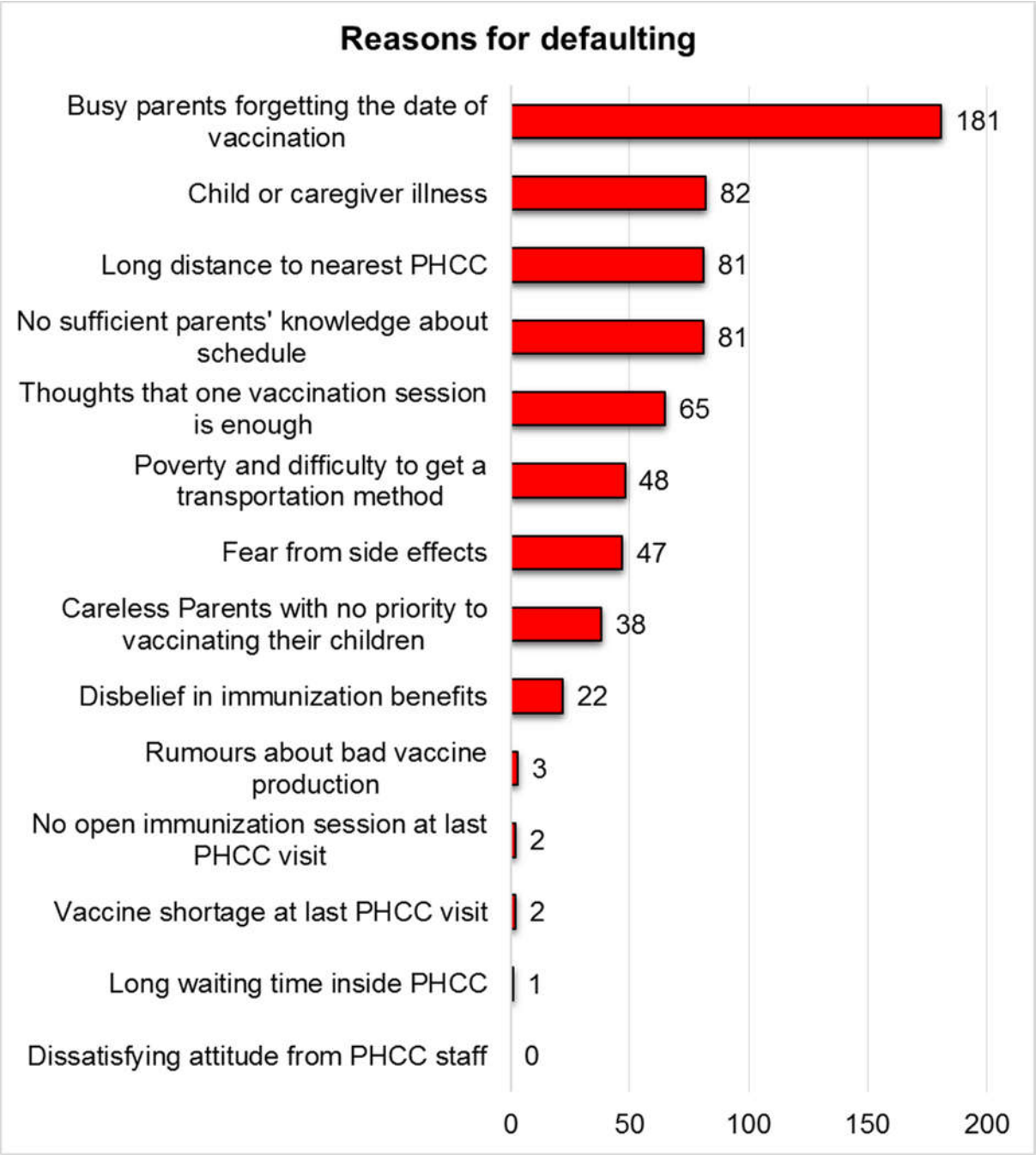

Chart (1): Reasons for immunization defaluting

Discussion:

Mean parental age of defaulter children was significantly higher than non-defaulters (p=0.0051 for maternal age and 0.01 for paternal age). This finding differs from a Malaysian study, which

stated that there was no relation between paternal age and defaulting.[9]

The lower maternal educational level was significantly associated with higher rates of defaulting (p=0.01), a finding that is similar to what is stated in the above mentioned Malaysian study and another study conducted in Istanbul.[8,9] Paternal educational level was also associated with a higher defaulter rate among the illiterates but this finding was not statistically significant (p=0.058).

There was no statistically significant relation between the defaulting rate and the parental employment status nor the children gender, the same finding was noticed in a similar study done in USA.[10]

As expected logically, it was found that children living in rural areas that are more than ten kilometers away from nearest health facility with poor socioeconomic status are more likely to default from immunization schedule (p<0.0001, 0.006, 0.002 respectively). These findings could be attributed to the fact that these living conditions usually affect the whole health status and services because of the difference in priorities and health access difficulties. The socioeconomic status finding went along with the results of the Multiple Indicator Cluster Survey 6 (MICS6) which was conducted in Iraq 2018 and found that poorest families have lesser percentage of fully vaccinated children.[11]

An interesting finding was that children born to mothers with poor antenatal care (ANC) or to mothers who were visiting an ANC private clinic tend to have higher rates of defaulting than those who were attending PHCCs or hospitals for their ANC services (p<0.0001). This could reflect failure of private clinics to deliver the message of the immunization importance or even the delivery of wrong messages and concepts about immunization.

Children who have three or more siblings were found to have higher defaulting rates (p=0.001), this agree with an Indian study conducted in 2012.[12]

The mode and site of delivery had no

relation to the defaulting rate, which was different from an Indian study which stated that children born at home had higher chances of defaulting from the immunization schedule.[12] This could be attributed to the difference in study population or limited sample size. Finally, children more than one year old tend to have a higher defaulting rate than those under one year old (p=0.013), a finding that can be explained by the decreased parental care with the increased children age due to the misbelief that the children older than one year will not need further vaccination doses. The most common reasons for defaulting were: busy parents, forgetting the date of vaccination, child or caregiver illness, long distance to nearest PHCC, no sufficient parents' knowledge about schedule and thoughts that one vaccination session is enough. These reasons were similar to reasons found in other studies conducted with slight differences which reflect the differences in knowledge, attitude and practice between different studies.

Conclusion:

1. Children born to older parents, illiterate mothers, living in rural distant areas in big and poor families with poor ANC tend to have higher defaulting rates, thus families with such characteristics should receive a good counselling about the importance of immunization to avoid defaulting from the schedule.
2. The most common reasons for defaulting were: busy parents forgetting the date of vaccination, child or caregiver illness, long distance to nearest PHCC and no sufficient parents' knowledge about the schedule.

Recommendations:

1. Future researches on this crucial subject are necessary to further investigate these factors.
2. Health promotion activities should focus on the defaulter groups to raise the immunization importance awareness.

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