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Research Article

Assessment of Missed Opportunities of Immunization among Children Below Five Years Attending Primary Healthcare Centers in Al-Karkh District, Baghdad

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Abstract

Background: A missed opportunity of immunization (MOI) is one of the important contributing factors for the poor immunization status of the Al-Karkh district in Baghdad city. ***Objective***: The present study is aimed at knowing the prevalence of MOI in children attending primary health care centers. ***Methods***: The study was designed as a cross-sectional interview and has been conducted in primary health care centers in Baghdad/Al-Karkh, including 400 children aged under five years enrolled randomly collected during the period from the 1st of October 2022 to the 5th of January 2023. The present study used the standard protocols recommended by the WHO to assess missed opportunities of immunization. ***Results***: The mean age of children was 17.24 months with a standard deviation of 15.13 months. 57.3% of the children were male and 42.8% were female. The prevalence of missed opportunities for immunization among children aged 1–59 months in Al-Karkh district was 224.5%. C***onclusions***: There is a highly significant relationship between the missed opportunities of immunization and child age, as well as strong relationships between the missed opportunities of immunization and the educational level of the mother and socioeconomic status. Raise vaccination awareness among those who look after children and deepen their understanding of the advantages of immunization.

Keywords: Immunization, Missed opportunities, Primary healthcare, Vaccine preventable diseases.

تقييم الفرص الضائعة للقاحات الاطفال تحت الخمس سنوات الوافدين لمراكز الرعاية الصحية الاولية في قضاء الكرخ / مدينة بغداد

الخلاصة

الخلفية: يعد ضياع فرصة التحصين أحد العوامل المهمة المساهمة في ضعف حالة التحصين في منطقة الكرخ في مدينة بغداد. **الهدف**: تهدف هذه الدراسة إلى معرفة مدى انتشار وزارة الداخلية لدى الأطفال الملتحقين بمراكز الرعاية الصحية الأولية. **الطرائق**: تم تصميم الدراسة كمقابلة مقطعية وتم إجراؤها في مراكز الرعاية الصحية الأولية في بغداد / الكرخ ، بما في ذلك 400 طفل دون سن الخامسة تم جمعهم عشوائيا خلال الفترة من 1 أكتوبر 2022 إلى 5 يناير 2023. استخدمت هذه الدراسة البروتوكولات المعيارية التي أوصت بها منظمة الصحة العالمية لتقييم فرص التمنيع الضائعة. **النتائج**: بلغ متوسط عمر الأطفال 17.24 شهرا بانحراف معياري قدره 15.13 شهرا. كان 57.3٪ من الأطفال من الذكور و 42.8٪ من الإناث. بلغ معدل انتشار فرص التحصين الضائعة بين الأطفال الذين تتراوح أعمارهم بين 1-59 شهرا في مديرية الكرخ 224.5٪. **الاستنتاجات**: هناك علاقة ذات دلالة كبيرة بين فرص التمنيع الضائعة وسن الطفل، فضلا عن العلاقات القوية بين فرص التمنيع الضائعة والمستوى التعليمي للأم والحالة الاجتماعية والاقتصادية. رفع مستوى الوعي بالتطعيم بين أولئك الذين يعتنون بالأطفال وتعميق فهمهم لمزايا التحصين.

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INTRODUCTION

Immunization is one of the most effective public health interventions by which morbidity and mortality from vaccine-preventable diseases can be minimized [1]. It prevents up to 3 million deaths every year in all age groups from diphtheria, tetanus, pertussis, and measles [2]. The Expanded Program on Immunization (EPI) initiated by the World Health Organization (WHO) in 1974 aimed to provide vaccines to children worldwide [3]. Many factors have been standing beyond these low immunization coverage rates, but the most frequently observed were missed opportunities for immunization (MOI) [4]. Missed opportunities for vaccination (MOV) include any contact with health services by a child (or adult) who is eligible for vaccination (unvaccinated, partially vaccinated, or not up-to-date, and free of contraindications to vaccination), but which does not result in the individual receiving all the vaccine doses for which he or she is eligible [5]. It is one of the important contributing factors for poor immunization status. It is a hurdle for achieving full immunization, and these missed opportunities for immunization may

result in avoidable deaths and disability in children [6]. This prompted us to conduct a study on the assessment of missed opportunities for immunization in our area. This study aims to evaluate the prevalence of missed opportunities for immunization among children attending primary healthcare centers in Al-Karkh, Baghdad.

METHODS

Study design and setting

The study was designed as a cross-sectional interview and has been conducted in primary health care centers in Baghdad/Al-Karkh. Data was collected for four months during the period the 1st of October 2022 to the 5th of January 2023. The sample for the study consisted of 400 children aged under five years enrolled randomly who constituted present study material by using card and recall method to find out the prevalence of missed opportunities. The children who had missed an immunization opportunity were compared with those who had not, for socio-demographic variables. The present study used the standard protocols recommended by the WHO to assess missed opportunities of immunization.

Inclusion criteria

Children aged 0-59 months.

Exclusion criteria

Children whose companions refused to participate. Children whose companions did not have sufficient knowledge about the vaccination status of the child, if they were not carrying the immunization card with them.

Data collection technique

A survey sample targeted 400 Children. Data was collected by using direct interview with Child companions (face to face interview) technique.

Statistical analysis

The following statistical data analysis approaches were used to analyze and assess the results of the study under application of the statistical package (SPSS) version22.One sample Chi-Square test for statistical analyses. Significance considered whenever the *p*-value is less than 0.05.

RESULTS

A total of 400 children aged 1-59 months who visited the selected primary health care centers during the study period were included in the study. Age varied from under 1 month to 59 months, and the mean age was 17.24 months with a standard deviation of 15.13 months. The highest percentage of children About 282 (70.6%) of the studied children were under 24 months of age, and the remaining 118 (29.4%) were in the age group (24-59 months). The female-to-male ratio was approximately 1:1.4, as shown in Table 1.

Table 1: Distribution of participants (SDCv) according to age and gender (n=400)

Children's SDCv	Groups	n(%)
Age Group (month)	1-11	183(45.8)
	12-23	99(24.8)
	24-35	49(12.3)
	36-47	39(9.8)
	48-59	30(7.5)
	Mean±SD	17.24±15.13
Sex	Male	229(57.3)
	Female	171(42.8)

A total of 400 companions who had visited the primary health care centers with their children were interviewed upon exiting the center, and the distribution of the observed frequencies of all their characteristic groups was 24 (6%) were younger than 20 years, 336 (84%) aged between 20 and 39 years, 40 (10%) aged between 40 and 59 years, and the mean age was 29.88 years with a standard deviation of 7.09 years. Concerning their gender, 58 (14.5%) were males, and 342 (85.5%) were females. Most of their marital status, 392 (98%), were married. Of them, 231 (57.75%) were educational levels under secondary school, while the remaining companions, 169 (42.3%), have a secondary school, college, and more. Most of the sampled studies had a low socio-economic status, and they accounted for 234 (58.5%); 138 (34.5%) of them were recorded at a moderate level, while the remaining companions, 28 (7.0%), had a high level (Table 2).

Table 2: Demographic characteristics of parents (n=400)

Companion's SDCv	Groups	n(%)
Age groups (year)	< 20 yrs.	24(6)
	20 - 29	174(43.5)
	30 - 39	162(40.5)
	40 - 49	34(8.5)
	50 > yrs.	6(1.5)
	Mean±SD	29.88±7.09
Gender	Male	58(14.5)
	Female	342(85.5)
Marital Status	Married	392(98)
	Widowed	8(2)
Education Level	Illiterate	9(2.3)
	Read and write	29(7.3)
	Primary	125(31.3)
	Intermediate	68(17)
	Secondary	47(11.8)
	College and more	122(30.5)
Socio-Economic Status	(121-150) High	28(7)
	(90-120) Middle	138(34.5)
	(0-89) Low	234(58.5)

Results show that complete vaccination status forms three quarters of the studied sample (302; 775.5%); of them, 85 (21.3%) were incomplete vaccination status left over of not vaccinated were forms 13 (3.3%), as shown in Table 3.

Table 3: Vaccinations Status (overall MOI assessments)

Vaccinations Status	no(%)
Not Vaccinated	13(3.3)
Incomplete	85(21.3)
Complete	302(75.5)

The results show that weak relationships are accounted for with gender at $p>0.05$, while high significant relationships are accounted for with age groups at $p<0.01$ (Table 4). Results show that weak relationships are accounted for with gender, age groups, and marital status at $p>0.05$, while strong relationships are accounted for with education level and socio-economic status, since high significant relationships at $p<0.01$ are reported (Table 5).

Table 4: Distribution of Factors Associated with MOI and studied children

Child's SDCv	Groups	Assessment		Total	C.S. (*) *p*-value
		Missed	Not Missed		
Gender	Male	60(26.2)	169(73.8)	229(100)	CC= 0.046 *p*= 0.360
	Female	38(22.2)	133(77.8)	171(100)	
	Total	98(24.5)	302(75.5)	400(100)	
Age groups (month)	1-11	34(18.6	149(81.4)	183(100)	CC= 0.221 *p*= 0.000
	12-23	40(40.4)	59(59.6)	99(100)	
	24-35	7(14.3)	42(85.7)	49(100)	
	36-47	8(20.5)	31(79.5)	39(100)	
	48-59	9(30)	21(70)	30(100)	
	Total	98(54.5)	302(75.5)	400	

Testing based on a Contingency's Coefficient test.

Table 5: Distribution of factors associated with MOI and studied companion's SDCv

Companion's SDCv	Groups	Assessment		Total	C.S.* *p*-value
		Missed	Not Missed		
Gender	Male	18(31)	40(69)	58(100)	CC= 0.062 *p*= 0.211
	Female	80(23.4)	262(76.6)	342(100)	
	Total	98(24.5)	302(75.5)	400(100)	
Age groups (year)	<20	7(29.2)	17(70.8)	24(100)	CC= 0.065 *p*= 0.790
	20-29	38(21.8)	136(78.2)	174(100)	
	30-39	41(25.3)	121(74.7)	162(100)	
	40-49	10(29.4)	24(70.6)	34(100)	
	≥50	2(33.3)	4(66.7)	6(100)	
	Total	98(24.5)	302(75.5)	400(100)	
Education level	Illiterate	2(22.2)	7(77.8)	9(100)	CC= 0.219 *p*= 0.000
	Read and write	11(37.9)	18(62.1)	29(100)	
	Primary	42(33.6)	83(66.4)	125(100)	
	Intermediate	12(17.6)	56(82.4)	68(100)	
	Secondary	15(31.9)	32(68.1)	47(100)	
	College and more	16(13.1)	106(86.9)	122(100)	
	Total	98(24.5)	302(75.5)	400(100)	
Marital Status	Married	94(23.7)	298(76.3)	392(100)	CC= 0.104 *p*= 0.114
	Widowed	4(50)	4(50)	8(100)	
	Total	98(24.5)	302(75.5)	400(100)	
Socio-Economic Status	Low	69(29.5)	165(70.5)	234(100)	CC= 0.152 *p*= 0.009
	Moderate	27(19.6)	111(80.4)	138(100)	
	High	2(7.1)	26(92,9)	28(100)	
	Total	98(24.5)	302(75.5)	400(100)	

Testing based on a Contingency's Coefficient test.

DISCUSSION

Because many national vaccination programs exclusively target children under one year of age, older children may have been considered "too old" to be eligible, which could account for age being a risk factor for MOV [7]. One of the primary causes of having an MOV was discovered to be age as a misleading contraindication in a WHO evaluation of factors connected to under-vaccination. This finding indicated that the mean age was 17.24, with a standard deviation of 15.13 months. This finding is consistent with the findings in Ethiopia, according to the authors, who conducted a community-based cross-sectional study with 846 children aged 12-23 months. Participants' average ages were 16.39 ± 3.75 months [8]. In the current study, 45.8% of them were accounted for in the age of less than 11 months, followed by 24.8% in the age 12-23 months. This finding conflicted with another cross-sectional study that had 558 kids, 75% of whom were under 12 months old and 25% of whom were between 12 and 24 months [9]. In Basra, Iraq, 225 children participated in a descriptive cross-sectional survey, which revealed that 64% of the children were under 1 year old and 36% were between 1 and 2 years old [10]. According to a review article conducted in Africa by [11], studies from African settings have indicated that child-level variables such as the child's age, sex, birth order, and the number of under-five children in the home are strongly associated with MOV. This research indicated that there were more male cases (57.3%) than female cases (42.8%). This finding is consistent with the findings from Ethiopia, where a cross-sectional survey of 422 children found that 236 (54.9%) of them were boys and 186 (44.1%) were girls [2]. Additionally, this outcome conflicted with a study conducted in 2017 by Verma et al., who discovered that 35.20% of participants were female and 64.79% were male. In the current study of child's

companions, 43.6% of those we found were between the ages of 20 and 29; next came 40.5% of those between the ages of 30 and 39. According to [12], the study's caregivers had a median age of 25 years (with a range of 18-63 years) and were 78.6% (206/262) female, with mothers making up most of this group. In this study, under-vaccination was not related to the mothers' marital status or age. These results were in line with those of other research where the utilization of immunization services did not depend on the mother's age or marital status. Children's immunization rates were positively impacted by the length of moms' education. In this research, it was indicated that 30.5% of them had a college degree while 31.3% had only an elementary education. A cross-sectional study including 521 companions was carried out in Iraq by [1]. Regarding their level of education, 8.1% had no formal education, 2.9% could read and write, 34.5% had only completed elementary school, 32.4% had only started secondary school, 12.1% had finished secondary school, and 10.0% had more than secondary education. In a cross-sectional study of 797 respondent children in Togo, West Africa, it was shown that respondents' sex, level of education, and marital status were all related to incomplete immunization ($p < 0.001$), as well as the absence of an immunization card [13]. Children who do not receive their vaccinations on time are more likely to come from low-income families and have parents with poor levels of education [14]. 58.5% of the participants in this study had low SES, while 34.5% had intermediate SES. This study demonstrated a highly significant connection between missed opportunities for immunization and SES at the *p*-value of 0.01. In Sudan, a cross-sectional survey of 191 kids revealed that having a vaccination card and having a decent socioeconomic standing were both related to having had all recommended immunizations, with *p*-values of 0.00 [15]. In this study, the prevalence of missed opportunities for immunization among children aged 1–59 months in Al-Karkh district administration was 24.5%.

Conclusion

Most children were under 11 months old, and male cases were more common than female cases. The parents were female, between the ages of 20 and 29, married, with only a primary education, and low socioeconomic status. There is a highly significant relationship between the missed opportunities of immunization and child age, as well as strong relationships between the missed opportunities of immunization and the educational level of the mother and socioeconomic status. About a quarter of children who are less than five years old attending primary health care centers in Al-Karkh district in Baghdad city have missed opportunities for immunization.

Recommendation

It's critical to raise vaccination awareness among those who look after children and to deepen their understanding of the advantages of immunization. SMS phone message reminders for vaccination appointments.

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Conflict of interests

No conflict of interest was declared by the authors.

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Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request

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