

Factors associated with delayed vaccination in children

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Abstract

Background: Complete and timely childhood vaccination is one of the most cost-effective interventions in improving child survival. Delay in receipt of vaccination might result in a child being susceptible to vaccine-preventable diseases. Identification of factors which contribute to delay in receipt of vaccination will help in developing targeted interventions.

Objective: The present study was conducted to assess the reasons for the delay in vaccination in children below 6-years-old and to determine the factors influencing the timeliness of vaccination.

Method: A cross-sectional study was conducted at the National Guard Comprehensive Specialized Clinic in Riyadh, Saudi Arabia. The study population consisted of 1000 mother-child pairs attending the Well Baby Clinic. Data was collected by direct interview using a predesigned questionnaire.

Results: Out of the 1000 study subjects, 224 (22.4%) had presented late for vaccination. The most common reason for the late presentation was that the child was ill on the scheduled day of vaccination. The higher level of maternal education and working mother were found to be statistically significantly associated with delayed vaccination.

Conclusion: The higher level of maternal education and working mother are significantly associated with delayed vaccination. These mothers need more health education on the importance of timely commencement of vaccination to ensure timeliness of receipt of doses of vaccines.

Keywords: vaccination, factors, timeliness, delay

1. Introduction

Vaccination programs are cost-effective public health measures and important components of the primary health care services. The aim of routine vaccination is to deliver a complete number of doses of potent vaccines in a timely, safe, and effective way to all children. Timeliness in the receipt of vaccination ensures that children are protected as early as possible from vaccine-preventable diseases [1]. Studies have shown that delayed and incomplete administration of vaccines increases the risk of vaccine-preventable diseases, thereby increasing mortality and morbidity [2]. Delay in the commencement of the vaccination series might also lead to delays in the completion of the series [3]. Delays in the commencement of child vaccination have been reported globally. In the United States of America, studies have shown that even though vaccination coverage rates are high, only few children receive their vaccination on time [4]. The Expanded Program on Immunization (EPI) was introduced in Saudi Arabia in 1979 for complete immunization of children [5]. Within a relatively short period, the Kingdom of Saudi Arabia made great strides in its program of childhood vaccination. More than 90% of school-age children are completely vaccinated, and the incidence rates of vaccine-preventable diseases have decreased by more than 90% from peak levels [6]. However, even amongst these vaccinated children, there appears to be a delay in vaccinated children.

2. Objective

The present study was conducted to assess the reasons for the delay in vaccination in children below 6-years-old and to determine the factors influencing the timeliness of vaccination.

3. Method

This present cross-sectional study was conducted at the National Guard Comprehensive Specialized Clinic in Riyadh, Saudi Arabia, targeting children aged between 2-months and 6-years-old with delayed vaccination who attended the Well Baby Clinic of the Institute. The services offered by the Well Baby Clinic include vaccination, growth monitoring, nutrition education, and general health education. About 6000 children receive their vaccinations in this facility yearly. All vaccines are provided free of cost, provided on a daily basis, both in morning and afternoon sessions. The clinic adopted a vaccination reminder system by sending Short Message Service (SMS) text messages to the child's caretaker 48 h before the scheduled day of vaccination. The study period was from 1st October 2017 to 26th December 2017. A total of 1000 children were enrolled in this study. The study was planned with purposive sampling, in which mothers of children with delayed vaccination were interviewed during the study period. Informed oral consent was obtained from the mothers. The response rate was 100%. A purpose-designed, structured questionnaire was used as a tool for data collection. The study variables included were the age of the mother, education, the mother's occupation, gender of the child, parity, and spacing. Delayed vaccination was considered when the child was brought > 30 days after the scheduled date of the vaccine. Eight different reasons for delayed vaccination were included in the questionnaire, and the mother was asked to choose one: child was ill, no appointment was available, parents were out of place, parents had forgotten the date, parents were busy with other work, no transportation facility, loss of the vaccination card or any other reason. Categorical data were

analyzed using percentage and chi-square tests. The data were analyzed using software SPSS version 20.

4. Results

Out of the 1000 children, 776 (77.6%) presented in time for vaccination, while 224 (22.4%) were delayed. Regarding gender distribution, 423 (42.3%) were male and 577 (57.7%) were female. The age range was from 2-months to 6-years-old; the majority were between 2- and 6-months-old (44.1%). The age range of the majority of the mothers was 26–30 years (46.8%). Half of the mothers had a bachelor degree, 41.3% finished secondary school, 5.5% finished intermediate school, and 3.2% had studied at a higher level. Most (64.5%)

mothers were housewives (35.5% were workers). Regarding the parity of the mothers, 459 (45.9%) had 2–3 children, 259 (25.9%) had 1 child, 231 (23.1%) had 4–5 children, and 51 (5.1%) had 6 or more children (Table 1). Among the 224 study subjects with late vaccination, the most common reason for late presentation was that the child was ill. The next common reason was no appointment was available. The third most common response was that the family was out of place on the scheduled day of vaccination. Other common reasons were parents were busy with other work, parents had forgotten the date, and no transportation facility. The least common cause for delay was loss of the immunization card (Table 2).

Table 1: Factors associated with delayed vaccination.

Presentation for immunization					
Factor	Timely	Delayed	Total	P value	
Sex of child	Male	325 (42%)	98 (44%)	423 (42.3%)	0.618
	Female	451 (58%)	126 (56%)	577 (57.7%)	
Age of the child	2 months – 6 months	349 (45%)	92 (41%)	441 (44.1%)	0.175
	> 6 months – 12 months	256 (33%)	79 (35%)	335 (33.5%)	
	>12 months – 24 months	124 (16%)	31 (14%)	155 (15.5%)	
	>24 months – 6 years	47 (6%)	22 (10%)	69 (6.9%)	
Age of mother	< 20 years	23 (3%)	5 (2%)	28 (2.8%)	0.142
	21 – 25	147 (18%)	31 (14%)	178 (17.8%)	
	26 – 30	365 (48%)	103 (46%)	468 (46.8%)	
	>31	241 (31%)	85 (38%)	326 (32.6%)	
Education of mother	Intermediate school	39 (5%)	16 (7%)	55 (5.5%)	0.015
	Secondary	341 (44%)	72 (32%)	413 (41.3%)	
	Bachelor	373 (48%)	127 (57%)	500 (50%)	
	Higher studies	23 (3%)	9 (4%)	32 (3.2%)	
Mother's occupation	Housewife	504 (65%)	127 (57%)	631 (63.1%)	
	Working	272 (35%)	97 (43%)	369 (36.9%)	
Parity	1	210 (27%)	49 (22%)	259 (25.9%)	
	2–3	349 (45%)	110 (49%)	459 (45.9%)	
	4–5	178 (23%)	53 (24%)	231 (23.1%)	
	> 6	39 (5%)	12 (5%)	51 (5.1%)	

Table 2: Reasons for delayed vaccination of children.

Reason for delay	Infant and children %
Child was ill	76 (38%)
No appointment was available	62 (31%)
Parents were out of place	32 (16%)
Parents had forgotten the date	16 (8%)
Parents were busy with other work	10 (5%)
No transportation facility	3 (1.5%)
Parents lost the vaccination card	1 (0.5%)
Other reasons	0 (0%)

5. Discussion

Despite free vaccination services being available at the National Guard Comprehensive Specialized Clinic in Riyadh, Saudi Arabia, some mothers are late in bringing their children for vaccination. In the present study, of the 1000 study subjects, 224 (22.4%) had presented late for vaccination. We found that the level of maternal education and working mothers were significantly associated with delayed vaccination. All other variables, including gender of the child, the age of the child, age of mother, and parity, were not significantly associated with delayed immunization.

This present study showed that education of the mother is significantly associated with delayed vaccination (p-value = 0.015). This in contrast to other studies which have found that the level of education of the mother influences the uptake of timely vaccination [2]; the reason for this finding is the strong

association between the higher level of maternal education and the possibility of being a working mother, which result in a busier mother and contributes to a delay in the child's vaccination. Compared to non-working mothers, we found that working mothers were more likely to be late for scheduled vaccination of their children (p-value = 0.024).

Three previous studies have reported an association between higher birth order (> two births) with delayed vaccination [2, 7, 8]. Thus, it appears that the women become more negligent as the birth order increases. However, this trend was not detected in the present study.

Two previous studies have noted that the likelihood of delayed vaccination increases for mothers' older than 26 years [8, 9]. No such association was found in the present study. Dyavarishetty *et al.* [2] detected a delay in the vaccination of female children. However, in the present study, we detected no difference with respect to child gender.

The most common reason for late presentation was that the child was ill, followed by no appointment was available, parents were out of place, parents had forgotten the date, parents were busy, no transportation facility, and parents lost the vaccination card. Some parents falsely believed that they should not attend the Well Baby Clinic without a vaccination card.

6. Conclusion

Almost a quarter of parents report being delayed for their

child's vaccination because the child was ill. Higher level of maternal education and being a working mother were significant determinants of delayed immunization. These mothers need more health education on the importance of timely commencement of vaccination to ensure timeliness of receipt of doses of vaccines.

7. References

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