

Parental attitude and beliefs towards child vaccination: identifying vaccine hesitant groups in a family health center, Erbil city, Iraq

Awring Maroof Raof

Correspondence:

Dr. Awring Maroof Raof
Department of Community Medicine
Hawler Medical University
Erbil,
Iraq
Email: awringmaroof62@yahoo.com

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Abstract

Objectives: The current study was conducted to determine parental hesitancy toward vaccination inside Erbil city, Iraq, and to find associations between the parents' position towards vaccination and the outcome of immunization.

Methods: A descriptive study was done during the period from 1st of January 2014 till 1st of July 2015. The data were collected through a self-administered questionnaire. It included two sections: The first section related to the demographic characteristics of clients. The Parent Attitudes Childhood Vaccines (PACV) questionnaire, was used as the second part to detect parents who have concerns about vaccination.

Results: Parental position in respect to immunization of their child revealed that 65.3% were unquestioning acceptors, 20.6% were cautious acceptors, 9.9% were hesitant, 3.5% were late or selective vaccinator and only 0.7% were refusal. Immunization behaviors of parents among different groups showed that, 20.9% postponed their child's vaccination for causes other than sickness or sensitivity, while 73% were provided with immunization on time. More than two thirds (65.9%) were completely sure that, it is a good idea to follow the schedule of immunization for their child and only 26.6% were not sure.

Conclusion: The current study showed parents had some positive aspects related to vaccination and defects in some domains were recognized. Identifying these parents is important in order to implement the necessary measures to maintain and improve the vaccines uptake.

Key words: parental concerns, trust, vaccination coverage, vaccine safety, immunization; parental attitude; parental belief; vaccine.

Introduction

Immunization leads to a remarkable reduction in cases of vaccine-preventable infectious diseases between children. The rise in immunization conflict has encouraged several researchers to investigate childhood vaccination and parental judgment. Parents' decisions regarding immunization can impact immunization rates, including access to vaccinations, the communication of risks and benefits, the maintenance of accurate vaccination records, and strategies for vaccination reminders. Parents were divided into groups according to their attitudes and beliefs about childhood vaccination. Parents accepting vaccination without questioning were called unquestioning acceptors and the hesitant group were called the questioning group (1). Vaccine hesitancy was defined as postponement of vaccination regardless of accessibility of services (1).

Attention to hesitant parents was essential for consideration and for stabilizing rising immunization opposition. They constitute a much bigger group than the other group who absolutely refuse immunization (2) and were possibly the most liable to change their behavior because they were influenced by evidence from child health care workers about immunization (3). The best way is to approach hesitant parents to report their worries and to convert their concern about immunization into practical points for discussion (4-8).

Other studies have recommended, that uncertainties in respect to vaccination were habitually ignored and not addressed.(7) This deficit leads to incomplete immunization of children, who will subsequently be susceptible of acquitting infectious diseases such as mumps or measles (9,10,11).

The directions of the national immunization campaigns in Iraq recommended, that a child less than one year of life, must be immunized through regular immunization with: BCG vaccine; three doses of DPT (Diphtheria, pertussis, tetanus); polio vaccine (four doses), Hepatitis-B (three doses), and measles for nine months old children. On reaching the age of fifteen months MMR is given. WHO guidelines, considered a child as fully immunized if they took DPT vaccine (three doses), polio vaccine (three doses), BCG (one dose), and measles vaccine, at twelve months(12).

In respect to the coverage of immunization in this region; approximately 91 per cent of children aged 12 to 23 months received BCG during the first twelve months of age, and about 85 percent received the first dose of DPT. However, the percentage declines for the subsequent doses DPT: 75 percent for the second dose and 64 per cent for the third dose (12).

However, the success of an immunization program depends on high rates of acceptance and coverage. Refusal of vaccine results in outbreaks as evidence shows (4).

As the concept of "vaccine hesitancy" is quite new, the accessibility of obtainable research is inadequate, especially in this region. The aim of the current study was to address parental hesitancy toward vaccination inside Erbil city, Iraq, and to find associations between parents' position towards vaccination and the outcome of immunization. There is no evidence of such a study being conducted in the Kurdistan region or even in Iraq. The investigator found it necessary to conduct the current study in order to address this issue.

Methods

Study design:

A descriptive study was conducted during the period from the 1st of January 2014 till the 1st of July 2015.

Researchers classified families into two groups according to the definitions published by Leask et al (8). The first group included the Unquestioning acceptor (vaccinate with no specific questions) and Cautious acceptor (vaccinate despite minor concerns). The second was the hesitant spectrum which included; the hesitant parents (vaccinate but have significant concerns; focused on vaccine risk; trust in healthcare provider and have high levels of vaccine knowledge).

The second were called Late or selective vaccinator (had concerns about vaccination results in this group choosing to delay or select only some recommended vaccines; they have highest level of vaccine knowledge). The third were called Refusal of vaccines (they have strong and specific religious, cultural or philosophical beliefs with lower levels of vaccine knowledge).

The data were collected through a self-administered questionnaire. The questionnaire was distributed to them by researcher for one time only and it was anonymous. The first section of the questionnaire enquired about the demographic characteristics of the studied sample. This part included education of parents, ethnic group, marital status, number of children, and the parent answering the questions - whether the father or the mother. The second part was the Parent Attitudes Childhood Vaccines (PACV)(10) questionnaire, an instrument used to detect parents who have concerns about vaccines. The PACV has four domains. The first domain was about immunization behavior, which consists of ten items. The second part was opinions about vaccine well-being and effectiveness consisting of four items and the third domain was attitudes to vaccination and exclusions which included two items. The fourth domain is trust and also included two items. The total items numbered eighteen items to identify vaccine-hesitant parents. Scored from 0 to 100, the higher scores on the PACV corresponded with under-immunization and hesitancy. Parents were considered to be hesitant toward vaccines if they scored ≥ 25 . The tool had three different response formats on a Likert scale (e.g., yes/no/don't know); a five point Likert scale (e.g., strongly agree, agree, not sure, disagree, strongly disagree), and an 11 point scale (e.g. responses ranging from "0: not sure at all" to "10: completely sure"). The 11 point response scale

was used to maximize the information obtained regarding trust and overall hesitancy (10). The outcome of immunization among the hesitant parents was found.

Sampling: method and sample size

There are three family centers in Erbil city, two of which are under renovation; one health center was the setting of this study. The family health centers are public health clinics that provide two immunization days per aweek, before 12 pm. About twenty children were vaccinated in the clinic. The vaccines are provided by public clinics only and it is free for all. According to the Multiple indicator cluster survey, (12) a total of 120,000 children were to be immunized inside the city. The present study used this number as the total population from which the sample size was drawn. An automated software program (Raosoft sample size calculator for study: <http://www.raosoft.com/samplesize.html>) was used to calculate the sample size required for this study. With an accepted margin of error of 5% and a 95% confidence interval, the sample size required was 383 with the addition of 30% to the estimated sample size in order to overcome erroneous results and increase the reliability of the results and the conclusion. However, a sample of 600 parents were approached but only 564 parents responded and the response rate was 94%.

Data analysis

The data were analyzed using SPSS for windows (Statistical Package for Social Science) version 21.0 and ≤ 0.05 was used as level of significance. For measuring associations between nominal variables, the Chi-square test was used, and t-test used for finding difference in the mean scores between non-hesitant and hesitant groups. This scoring was used to find the degree of parental hesitancy.

Ethical consideration:

The proposal was submitted to the Directorate of Health of Erbil city. Approval from DOH was taken to assist the data collection by a researcher from the family clinic. The parents and health workers were well informed about the aim of the study. The parents were approached; informed verbal consent was taken, before filling in the questionnaire and confidentiality was assured.

Results

Table 1: Distribution of the studied sample by socio-demographic characteristics of the studied population

Father's education	No (%)
<13 yr	49 (8.7)
13-18 yr	70 (12.4)
>18 yr	445(78.9)
Mother's education	
<13 yr	80 (14.2)
13-18 yr	161(28.5)
>18 yr	323 (41.1)
Marital status	
Married	556 (98.6)
Widowed	8 (1.4)
Number of preschool children	
1	236 (41.8)
2-3	304 (53.9)
>3	24 (4.3)
Questionnaire answered by	
Father	200 (35.5)
Mother	364 (64.5)
Total	564

Table 1 shows 564 parents who participated in this study. Relation to the child, in 64.5% of the sample was the mother who answered the questionnaire in the clinic, while in only 35.5% the fathers did. Number of pre-school children was between two to three children in 53% of the sample.

Table 2: Distribution of the studied sample by immunization behaviors

Immunization behaviors items	Yes		No		Don't Know		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Delaying the shot for reasons other than illness or allergy	118	20.9	416	73.8	30	5.3	564	100
Deciding not to give a shot for reasons other than illness or allergy	26	4.6	532	94.3	6	1.1	564	100
	Completely sure		Not sure		Neutral			
Following the recommended shot schedule is a good idea	372	65.9	150	26.6	42	7.4	564	100
	Strongly Agree / Agree		Not sure		Disagree / Strongly Disagree			
Its parent's role to question shots	111	19.7	113	20.03	340	60.3	564	100
	Yes		No		Don't know			
Letting the second infant to get all the recommended shots	342	60.6	98	17.4	124	21.9	564	100
	Not at all hesitant / Not too hesitant		Not sure		Somewhat hesitant / Very hesitant			
The parent considering himself hesitant about shots	330	58.5	116	20.6	118	20.9	564	100

Table 2 shows immunization behaviors of parents among different groups. About 20.9% delayed the vaccination for reasons other than infection or sensitivity, while 73.8% had the immunization on time. More than two thirds (65.9%) were completely sure that to follow the suggested program is protective for their child and only 26.6% were not sure. Asking about the role of parents to question shots shows that two thirds (60.3%) disagreed and strongly disagreed with the idea, while 19.7% strongly agreed and agreed while, 20% were not sure. Those who considered themselves not hesitant about childhood shots were 58.5%; 20% were hesitant and another 20.6% not sure.

The difference between the unquestioning group and the questioning group (caution, hesitant, refusal, late or delay) was statistically significant in respect to immunization behaviour items when the mean was compared.

Table 3: Distribution of the studied sample by Beliefs about vaccine safety and efficacy

Beliefs about vaccine safety and efficacy	Strongly Agree / Agree		Not sure		Disagree / Strongly Disagree		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Children get more shots than are good for them	192	34.0	110	19.5	262	46.5	564	100
Believing that many of the illnesses shots prevent are severe	118	20.9	130	23.1	316	56.1	564	100
Getting immunity by sickness is better than a shot	94	16.6	78	13.8	392	69.5	564	100
It is better for children to get fewer vaccines at the same time	192	34.0	136	24.1	236	41.8	564	100
		Not at all concerned / Not too concerned		Not sure		Somewhat concerned / Very concerned		
Being concerned that a child might have a serious side effect from a shot	288	51.1	40	7.1	236	41.8	564	100
Being concerned about safety of childhood shots	376	66.6	46	8.2	142	25.2	564	100
Being concerned that a shot might not prevent the disease	400	70.9	58	10.3	106	18.8	564	100
		Yes		No		Don't know		
Knowing someone who has had a bad reaction to a shot	110	19.5	428	75.9	26	4.6	564	100

Table 3 shows that 34% of the studied sample agree and strongly agree that children get more shots, while 46.51% disagree and strongly disagree. For the second item concerning shots preventing severe diseases, 20.9% agree and strongly agree, and 56.1% disagree and strongly disagree. 16.6% agree on developing immunity by getting sick, while about 70% disagree. One third agreed on giving children fewer vaccinations at the one time, 51% were not disturbed about side effects of vaccines and 41.8% had concern about this issue; 70.9% were not concerned that vaccination will not give protection.

Table 4: Distribution of the studied sample by general attitude and trust

General attitude and trust	Yes		No		Don't Know		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Giving shots in order to enter daycare or school	46	8.2	486	86.2	32	5.7	564	100
	Strongly Agree / Agree		Not sure		Disagree / Strongly Disagree			
Trusting the information received about shots.	468	83	52	9.2	44	7.8	564	100
Openly discussing concerns about shots with child's doctor	436	77.4	58	10.3	70	12.4	564	100
	Completely trust		Trust		Don't trust at all			
How much trust in child's doctor	370	65.6	152	27	42	0.2	564	100

Table 4 shows that 8.2% of parents revealed that the only reason to get a shot is for entering the day care center, while 86.2% answered no. The majority (83%) believed the instructions they obtained regarding immunization, and 7.81% don't trust the information they receive about shots. Table 4 also shows that 77.4% discuss their worries about vaccine with health workers and 10.3% did not discuss their concern with the child's doctor. Parents in questioning acceptor group scored higher for attitude and trust mean score compared to parents in the second group (the unquestioning group).

Table 5: Distribution of the studied sample by hesitant parental position and vaccination outcome*

Parental position According to Hesitancy	Immunization status of children			
	Fully immunized	Selectively immunized	Unimmunized	Total
	No. (%)	No. (%)	No. (%)	No
Hesitant group spectrum (≥ 25)				
Hesitant	46 (57.5)	8 (14)	2 (3.5)	56
Late / Selective	16 (20)	4 (5)	0	20
Refusing	0	2(2.5)	2 (2.5)	4
Non-Hesitant group(score <25)	481(99.4)	3(0.62)	0	484
Total	543(96.3)	17(3.01)	4(0.7)	564

Chi-square =54.87 P=0.0023 between Hesitant and non-Hesitant group.*

Table 5 shows that 80 out of 564 (14.2%) parents were among the three sub-groups of hesitancy spectrum. 56 out of 80 (70%) were among the hesitant. The second late or selective vaccinator was 20 out of 80 (25%) and the third sub-group who refuse vaccination were only 5%. Among the hesitant 57% of their children were fully immunized, 14% were a selective immunizer and only 3.5% were unimmunized. The refusing parents show that 2.5% were unimmunized and the fully immunized among the non-hesitant group of parents was 99.41% with a statistically significant difference (p=0.0023).

Table 6: Distribution of the mean PACV screening score with presence of hesitancy or not*

PACV domains	Hesitant parents	Non-Hesitant parents	95%CI	P value
	Mean± SD	Mean± SD		
Immunization behaviors	45±4.1	22±3.2	39.1-48.2	0.001
Beliefs about vaccine safety and efficacy	42±1.2	20±4.2	31.4-47.2	0.025
General attitude and trust	36± 1.1	19±1.6	29.7–39.2	0.032
Overall	42±3.1	20 ±3.1	39.7–47.7	0.0012

*t- test was used to compare between two independent samples.

Table 6: The immunization behaviors domain mean score for the hesitant and non-hesitant was 45±4.1 and 22±3.2 respectively with statistically significant difference (p=0.001). The beliefs about vaccine safety and efficacy domain mean score was 42±1.2 and 20±4.2 respectively for the hesitant and non-hesitant groups with statistically significant difference (p=0.025). The overall mean score was 42±3.1 and 20 ±3.1 with statistically significant difference between the two groups.

Discussion

The demography of the participating parents showed that mothers were more responsible for children's vaccination (64.5%) which is expected since all participating parents had under 2 years old children who are usually more under the mother's care (12). The mean age of parents' was 34.9 years in the current study, similar to an Italian study (33.4 years mean age) (13) with more than two-thirds of mothers (69.6%) being of high-school education or higher.

Our finding showed that 65.3% of the parents in the center were willing to vaccinate their children without hesitancy or questioning, with another 20.6% who were slightly concerned but still maintain a positive view on vaccination (totaling 85.9%), a comparatively higher percentage than Dutch parents (43%)(14). While hesitant continuum parents (Hesitant, Late vaccinator, Refusal) were 14.18% of our sample out of these 80 parents were in the hesitancy spectrum. Hesitant, Late vaccinator, and Refusal were 70%, 25%, and 5% respectively, comparing these results to Australia's study 34%, 55%, and 11% (15). The current study finds that hesitancy was higher but late vaccinator and refusal of vaccination is lower than previous studies. The refusal in the Dutch parents' was 11% which is also higher than our results(14). In the study of USA (16) 71.7% of the parents had no vaccine doubt and 28.2% were in the vaccine doubt group.

Delaying the vaccination on the other hand accounted for 20.9% of parents which is relatively higher than USA's 13% (17). Immunization was delayed by 36.6% of Jordanian parents'(18). This can be related to either vaccine hesitancy, or parents' lack of commitment toward vaccinating their children. Lack of education about vaccination during visits seems to be the reason behind poor practice of vaccination and the possibility of vaccination delay.

Parents' behavior toward vaccine consisted of higher compliance than refusal. With the majority (94%) answered no when asked if they have ever chosen not to vaccinate one of their children for other causes than infection, a minority of 4.6% answered yes, and 1.1% were not sure. Comparing these results to a Canadian study (88%, 7%, 5%) (19), it was obvious that the Canadian parents' have relatively similar views to our sample parents. The non-medical exemption in USA reaches to 26% which is higher than our result (20). Two thirds and more (65.9%) considered, following the recommended vaccination schedule is for the benefit of the child. The study of Taif Saudi Arabia (21) reported higher figures (73.9%). In the study of Michigan 90% (22) of parents overwhelming contributed to the idea that vaccines are a perfect approach to protect their children from disease. Asking about shots preventing many of the illnesses, the answer was yes for 20.9% of the parents in the current study.

A study was conducted in Tennessee and California (23); the mothers were given vaccine information at screening and 92% showed a positive attitude toward vaccine preventing diseases. A study in India (24) showed 70% of mothers thought that vaccination prevented diseases. The low figure in our study is explained by lack of information about vaccination. In an overcrowded health center, the health worker doesn't have the time to give health messages about immunization to these hesitant parents.

Perception of sample parents that children currently get more shots than is good for them was 34%, slightly higher than American parents (29.7%) (25). About 16% of parents thought, becoming sick is better than immunization, comparatively similar to American parents (16.6%) (25). Another study in Atlanta reported a higher figure (24%). The parents agreed that the body protects itself without vaccines (26) or it could be due to brief visits, making

it difficult for the parents to request information about vaccine. Another explanation was that the immunization does not challenge other tasks inside the primary health care center. A study in Jordan also reported a higher figure (26.5%) than the current study (18).

In a study in Tennessee and California (23) 62% agreed that a child's immune system will be overloaded with multiple vaccines on one occasion. In a study in Malaysia (27) 93% agreed that a child is excessively immunized in the first two years of their life.

In our study 66.6% have no concern about vaccine safety, a lower figure (46%) was reported in the study of Tennessee and California (23) that has no concern about vaccine safety. Regarding routine immunization protecting children from communicable diseases and its fatal complications the answer was yes for 70% of parents; a study in Saudi Arabia (21) reported higher figures than our study (91%). In the study in Jordan (18) 90% agreed that the available vaccines are carefully checked for safety.

While perceived efficacy showed that 71% were not at all concerned or not too worried that vaccine might not protect the child from occurrence of diseases, was similar to USA's 72.7% (25) and lower than Canada's 86% (19), while a study that was done in Mosul city, Iraq reported that 80.4% of parents agreed about vaccine preventing diseases (28).

More than half (51.1%) of parents were not at all concerned or not too concerned that vaccine might be associated with serious side effects. Concerns from serious side effects of Immunization were reported by 41.8% of parents. In Saudi Arabia's study 57% (21) agreed on this statement. Assessing knowledge of parents' in Mosul, Iraq (28) revealed that 43% of them consider vaccination as harmful and causing side effects. Another study in Mosul (29) revealed that 23% of parents were concerned about side effect of vaccine. In the study among Canadian parents' 68% (19) were concerned. The study in the USA (25) showed that 61% were concerned about vaccine safety and efficacy. An internet based study in Germany showed that 12.2% were concerned about overloading the immune system, would be side effects of immunization (30).

In the current study 8.2% of parents do agree on vaccination before school entry. Trust in the information received about shots was shown by 83% of parents. In the study in Jordan (18) 63% of parents agreed on the importance of preschool immunization. The low figure in our study could be explained by lack of awareness about the immunization schedule. There are many causes behind parent's non-medical exemptions to vaccination before entry to school (18). However this issue has not been tackled here.

According to a Multiple indicator cluster survey, the proportion of children who were completely immunized at the age of twelve months is 45%, and 57% at any time before the survey was conducted (12). This figure is near to the figure reported in the current study (57.5%) among

the vaccine hesitant mothers. In the study of Mosul, Iraq, 54.2% completed vaccination (31). A study in Diayla, Iraq (32) showed that 70% were fully vaccinated, 24% partially vaccinated and 6% not vaccinated. In an Indian study (33), 86% of the children were found to be fully vaccinated for their age and 14% were partially vaccinated. Parents with lower PACV scores (the non-hesitant group), 99% of their children were fully immunized, with significant difference with parents who had higher scores (the hesitant group) ($p=0.0023$). The under immunization was explained by vaccine hesitancy. The Malaysian study reported similar findings (34).

A comprehensive approach is needed to provide accurate information to parents who are concerned about the safety and necessity of vaccines. Local population-based strategies need to be developed inside Erbil city, to direct provider-to-parents communication strategies and groups to assess the effectiveness of social media interfaces to address questions from vaccine-hesitant parents. The investigators believe that the current study provides another critical arm of this comprehensive approach in that it addresses several aspects identified by parents as important or challenging in this effort. The study can be implemented in other settings; the tool can address concerns in the first visit requiring vaccines, and the tool can be used in the clinic under the supervision of a health care providers.

The current study has several limitations. First, the study only targeted children younger than two in one center inside Erbil city, who may not represent all Kurdistan region children. The convenient sampling and cohort design further limited the generalization of the findings to the entire Erbil governorate.

Another limitation of our work is that parents' concerns about vaccine safety and parents' decisions to vaccinate their children were not measured continuously over the period during which children were administered vaccines. Therefore, our data cannot show whether parents' attitudes and beliefs will be modified over time to positively influence the vaccination status of their children.

Conclusion

The current study showed parents had some positive aspects related to vaccination and defects in other domains were recognized. Identifying these parents was important in order to implement the necessary measures to maintain and improve the vaccination coverage in this region. The investigator recommends an educational intervention study; to be conducted among vaccine hesitant parents to find if any changes occur in the measured parental attitudes toward vaccines.

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