Knowledge and practices of childhood immunization among primary health care providers in Riyadh City: Part I: Handling and administration of vaccines

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Abstract

The knowledge and practice of physicians and nurses with regard to immunization has been assessed. A self-administered questionnaire with 50 statements related to knowledge and practice of vaccination was distributed among workers in 50 MOH PHCs in Riyadh city.

506 questionnaires were returned, 479 were analysed. A response rate of almost 70%. For most of the statements cited a correct response of knowledge & practice was obtained from more than 80% of the sample. However for few others, correct response has dropped to 40% or less. Experience in dealing with vaccination, and a formal training in vaccination were not significantly associated with the responses of both physicians and nurses.

Inspite of the limitations of this study it could be fairly concluded that the overall knowledge and practices of childhood immunizations among the primary care providers surveyed was good. Significant gaps still exist. This highlights the need for continuous training and supervision of health care providers dealing with children immunization.

Introduction

Vaccination has proved to be one of the most cost-effective part of health promotion [1]. The WHO estimates that current immunization programs save more than 3.2 million lives each year and full utilization of existing vaccines could save an additional 1.7 million lives per year [2]. The WHO through its expanded program on immunization (EPI) launched in 1974 and “Health for All” by the year 2000 programme has significantly contributed towards increasing levels of immunization coverage in many parts of the world [3]. However despite these impressive advances, still some three million children die each year from vaccine preventable diseases and another three million are permanently disabled [3,4].

Saudi Arabia is one of the developing countries that accelerated its immunization programme to reach full coverage by 1990. Since 1984 the EPI has been implemented as an essential and integral element of primary health care [5]. Over the last twenty years reports from the Kingdom have correlated the marked decline in the incidence of vaccine preventable diseases with high rates of immunization coverage among infants and preschool children in most parts of the kingdom. At the present time more than 90% of school age children are completely immunized and the incidence rates of vaccine preventable diseases had decreased by more than 90% [2]. Other factors like improvements in the socioeconomic status of the population and increase in education levels have certainly played an important role for this decline.

In addition to tight legislations and public health education which help to maintain high rate of immunization coverage one has to make sure of a high level of knowledge and appropriate standard of immunization practices among health care providers to achieve high level of seroconversion [1,5,6,7,8].

This is the first report of a study to assess how much those who administer vaccines in the primary health care centres of the Ministry of Health in Riyadh are aware of the proper handling, administering of vaccines in addition to side effects, complications and contraindications of vaccines, to determine to what extent these practices and knowledge of primary health care providers meets the standard practices of immunization and whether the duration of experience or attendance of a training course on vaccinations has any significant effect on the knowledge and practices of immunization. This first report is concerned with the handling and administration of vaccines. The second report will be devoted for knowledge of contraindication to vaccinations.

Methods

A selfadministered questionnaire in Arabic and English of almost 50 items encompassing knowledge and practices of storage and handling, administration, scheduling, doses, routes, contraindications, side effects and complications of the nine vaccines included in the Kingdom Vaccination Schedule (MMR, DPT, BCG, OPV, & HBV) was distributed among 50 out of 59 Ministry of Health (MOH) Primary Health Care Centres in Riyadh City, personally by the investigator.

The study was conducted just before addition of Haemophilus Influenzae vaccine to the National Vaccination Schedule. The questionnaire was piloted on a sample of twenty nurses and physicians dealing with vaccination before final approval. The study was explained in detail to the most senior worker(s) available in each center at the time of distribution and queries were answered.

The points of honest, sincere response to the questionnaire was stressed to all health care providers hoping to get an overall response reflecting the actual knowledge and practice of the responders. More than 70% of the target population responded to the questionnaire.

The data has been entered in MS Excel and analyzed using the SPSS Pc+ statistical software. The descriptive statistics (proportions) was calculated for the positive responses of all outcome variables. Further, all the responses (correct/ incorrect) of physicians and nurses were used to observe the association with their expereinces in dealing with vaccination (<5 years / > 5 years) and formal training on vaccination (yes / no). Chi-square test was used to observe the statistical association between two categorical variables. A p-value of <0.05 was considered as statistically significant.

Results

Among 479 respondents 189 (39.4%) were physicians, 290 (60.5%) were nurses (including midwives). Of the physicians 51% were males and 49% were females. Only 8.3% of them were Saudis. Of the nurses 66.2% were Saudi nationals. 72.9% of physicians and 39.2% of nurses indicated that they were working in the field of vaccination for more than 3 years. 46.8% of physicians and 77.7% of nurses indicated that they attended at least one training course on vaccine practices during their work in the Kingdom.

Table I indicates the knowledge of vaccine handling among respondents. It is evident that the right response was indicated by more than 80% of the candidates to all but one of the items.

Table II shows the response of candidates when asked few questions about handling of vaccines which reflects their actual practice.

Again it is evident that more than 90% of the respondents comply with the standard practice of vaccine handling.

Table III depicts knowledge of vaccine administration among respondents. Again more than 80% seems to have the right knowledge.

Table IV represents the report of the care providers when asked about their practice or knowledge of response nine miscellaneous items during vaccination. For 2 of the 9 items only 40% or less indicated a complying with the standard

practice. When asked whether mothers should not breastfeed their children for 20 minutes after OPV administration, surprisingly 66.6% of the respondents agreed to this incorrect statement. Likewise 68.1% agreed to the false statement that vaccination of preterm babies hould be delayed to compensate for prematurity. No statistically significant association was found between the responses of both physicians and nurses, with their experience in dealing with vaccination and having a formal training on vaccination.

Table I: Knowledge of Vaccine Handling

Statement	Correct Answer	Correct Responses	
		Physicians % & (No.) Total = 189	Nurses* % & (No.) Total = 290
Vaccines should be stored in the refrigerator at a temperature between 10-12°C.	False	90% (160/177)	90% (233/258)
No harm if vials of dried MMR vaccine are stored in the freezer.	True	38.8% (68/175)	48% (120/257)
Diluent for dried vaccines should not be frozen.	True	92.6% (162/175)	85% (230/270)
MMR vaccine should be discarded after 8 hours of reconstitution.	True	89% (152/171)	88% (235/268)
Opened vaccine vials could be stored in the refrigerator for next day's session.	False	98% (180/183)	97% (267/276)
DPT, DT, Tetanus and Hepatitis B vaccine vials should not be in direct contact with ice.	True	86% (144/168)	86.5% (230/266)
BCG and measles vaccines should not be exposed to direct sunlight.	True	99% (178/180)	95.6% (261/273)
Vaccines vials should be taken out from the refrigerator only at the arrival of the first child for that immunization session.	True	88% (159/181)	86.6% (239/276)

* Includes midwives and paramedics

Table II: Practice of Vaccine Handling

Statement	Correct Practice	Correct Responses	
		Physicians %	Nurses* %

		& (No.) Total = 189	& (No.) Total = 290
I keep food, drinks and medicines in the vaccine refrigerator.	No	98% (181/184)	97% (265/273)
I keep vaccines in the door shelf of the refrigerator.	No	98% (161/169)	94% (255/270)
I check for signs of vaccine damage (change of color, precipitate, etc.)	Yes	97% (172/177)	99% (263/265)
I check the expiry date of vaccines before opening them.	Yes	98% (181/184)	100% (281/281)

*Includes midwives and paramedics.

Table III: Knowledge of Vaccine Administration

Statement	Correct Answer	Correct Responses	
		Physicians % & (No.) Total = 189	Nurses* % & (No.) Total = 290
According to the local national immunization schedule the first dose of DPT should be given at 3 months of age.	False	95% (173/182)	83% (232/278)
MMR, DTP and OPV can be safely given simultaneously to the same child.	True	78% (136/175)	87% (227/262)
Children who suffered inconsolable crying for more than 3 hours after previous full DTP dose should be given half of the usualDTP dose.	False	94% (134/143)	95% (230/243)
If a child misses the 2nd dose of DTP and OPV for more than 2 months, vaccination schedule should be restarted again from 1st dose.	False	85% (146/171)	93% (248/267)
Preterm babies should receive half the dose of vaccine given to term babies.	False	98% (164/168)	91% (232/256)
According to the national immunization schedule the MMRvaccine is given at 12month of age.	True	99% (181/183)	94% (257/273)

BCG must be given intradermally in the upper third of the left arm.	True	97% (172/178)	96% (266/276)
Five drops of OPV are given to children whose weight is above 20 kg.	False	94% (169/179)	91% (247/272)
Injectable vaccines should be given preferably in the anterolateral aspect of the thigh or in the deltoid muscle.	True	94% (170/180)	94.5% (260/275)
Separate injection sites should be used to administer more than one injectable vaccine at the same time.	True	98% (180/184)	96% (265/275)

*Includes midwives and paramedics

Table IV: Miscellaneous Immunization Practices

Statement	Correct Practice / Answer	Correct Responses	
		Physicians % & (No.) Total = 189	Nurses* % & (No.) Total = 290
I read the package insert (manufacturer's instructions) before giving any vaccine.	Yes	98% (142/145)	99% (208/209)
I advise parents to give regular antipyretics e.g. Adol afterDTP vaccine.	Yes	79% (66/83)	92% (206/223)
I ask children to wait for 15-20 minutes in the centre after vaccination	Yes	92% (107/116)	81% (146/180)
I record the date, name of the patient, type of vaccine for every child in the immunization record book of the centre.	Yes	97% (181/186)	97.5% (277/284)
I record the Batch no. of the vaccine used in the immunization record book of the centre.	Yes	90% (139/155)	91% (220/241)
I check immunization record of every preschooler who attends the centre.	Yes	96% (148/154)	95% (234/246)
I call dropout children for	Yes	97% (150/155)	99.6%

completion of missed vaccination.			(258/259)
Mothers should not breastfeed their children for 20 minutes after administration of oral poliovirus vaccine.	False	40% (69/182)	30% (81/267)
Vaccination of preterm baby should be delayed to compensate for their prematurity.	False	40% (67/172)	31% (81/262)

* Includes midwifes and paramedics

Discussion

Majority of respondents (66%) supported the false statement that mothers should not breast-feed their children for 20 minutes after oral poliovirus vaccine (OPV). This advice is strongly rejected by scientific evidence of enhancement of immunity to vaccines in breast-fed babies [9]. The justification for such advise by some health workers is to avoid loss of vaccine absorption if the child vomits during or immediately after vaccination, moreover, crying may induce vomiting, if the child had an injectable vaccine given simultaneously with the OPV. Breast-feeding does not interfere with successful immunization with OPV. Although high concentrations of antipoliovirus antibody in milk of some mothers theoretically could interfere with the immunogenicity of OPV, no such association has been demonstrated. Infants should be immunized according to the recommended schedule regardless of the infant's mode of feeding [10].

Similarly, respondents (68.1%) indicated that vaccination of premature babies should be delayed to compensate for their prematurity. This is not in accordance with the recommendation that the appropriate age for initiating most immunizations in the prematurely born infant is the usual recommended chronologic age. Vaccine doses should not be reduced for preterm infants [10].

Insufficient knowledge, inadequate training and less enthusiasm about immunizations by health professionals have a heavy negative impact on the quality of immunization services for children. Health professionals' perceptions of immunization against vaccine-preventable diseases must inevitably be transmitted to parents, and parents can be perplexed by the confusing and contradictory messages they may receive from health professionals [6]. Strong professional commitment is the key to improved immunization uptake [1].

In the Kingdom two legislation's have played a major role towards a higher rate of immunization in children. One is the Royal Decree of 1979 which made basic immunization mandatory for obtaining the birth certificate at the end of the first year of life. The other is that requiring parents to provide proof of completed immunization as a prerequisite for school entry. Such legislation has been found to be effective in improving immunization coverage and reducing the incidence of vaccinepreventable diseases in a number of countries [13]. However in the study by Al-Shammari et al only 1.8% of parents interviewed said they immunized their children to obtain the birth certificate, a fact that led the authors to conclude that birth certificate was only a minor motive for immunizing children [8]. It may be reasonable to state that for some vaccination contribute more towards a higher level of vaccine coverage than other measures do.

Lapreiato, et al, in their "Assessment of Immunization compliance among children in the department of defense health care system" found that immunization delay was primarily the result of failure to track patients and notify parents of immunizations due [11]. It is encouraging to know from our study that more than 90% of the respondents claimed that they always call vaccination dropouts.

The fact that there are gaps in the knowledge and practice among the health care providers in our study is not singled out. Many studies addressing beliefs and practices of providers regarding vaccine administration have found them not in compliance with current immunization recommendations [7]. England, et al, in their study of pediatric residents beliefs and practices of immunization concluded that during residency many patients visits are underutilized for vaccination purposes and that contra-indications are not always appropriately followed [7].

In their report of 1991 National Immunization Coverage Survey in the Kingdom, M.K. Farag, et al, had found that the percentage of children partially immunized is considerably high (14%). This was partially due to failure of health workers to pay attention to the time schedule of immunization. This emphasizes provision and maintenance of basic and refreshing training programmes for both medical and paramedical personnel. In addition, much more attention should be paid to the quality of immunization activities in the primary health care settings [12]. In our study almost 35% of respondents denied any previous training in immunization. This highlights the need for training of health care providers dealing with children immunization a fact which has been pointed out by health care authorities worldwide [1].

Potential limitations of our study include: 1) around 30% nonresponse rate and 2) self-report format. It is of course impossible to know to what extent if any of the nonrespondents differ with regard to their knowledge, attitudes and practices concerning childhood immunizations. In spite of the limitations of studies based on self-administered questionnaires, it remains sometimes the only means of gathering objective information. Generalizations from our study are obviously limited to the survey's target population; primary care providers who see moderate to large numbers of preschool children.

Conclusion

It is concluded from the study that the knowledge of the health care providers at the primary health care centres in Riyadh City about immunization is good and their reported practice is mostly in compliance with the current immunization recommendations. However, there are significant gaps in knowledge and noncompliance in some practices. It may not be easy to extrapolate from this study how much this practice may have contributed to the present level of immunization coverage. The training received by majority is apparently not adequate. This highlights the need for more efficient training and continuous education of primary health care providers in the field of immunization practices.

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