

Vaccination Safety Standards Practiced in Selected Primary Health Centers in Jazan, KSA

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Abstract: Vaccine is a biological preparation that improves immunity to specific diseases. Morbidity and mortality declined where immunization are practiced. Vaccine safety is prime for community, manufacturer, immunization providers and recipient of vaccines. This study aims to contribute to the application of best practices on vaccine safety among nurses. After determining the vaccination safety standards observed, strategies and proposals to improve techniques in vaccination safety through education and training were offered. The quantitative-descriptive method was used. Data were supplied by 100 nurses who were in the Primary Health Care centers in Jazan City KSA. Questionnaire used was patterned from the tool on evaluating vaccination practices contained in the Quality Assurance in Primary Health Care Manual for Nurses in Saudi Arabia. Weighted Mean and Chi-Square test for a one-sample case were used to treat the data obtained. Result of the study showed that nurses' responses on vaccine safety standards practiced were significant but their responses on routine vaccine practice were not significant. Vaccination safety standards were observed and practiced along resources and structures, procedures in vaccination and immunization session guidelines while knowledge on routine vaccine practice was observed sometimes. Responses of the nurses showed correlation on resources and structures, procedures on vaccination and immunization guidelines but not on knowledge on routine vaccine practice. The strategies and proposals laid down may improve techniques in vaccination safety through education and training.

Keywords: Vaccine Safety, Children, Primary Health Care Centers

1. Introduction

Children are assumed to be frail since birth and throughout their entire childhood. With this, it is necessary that children's health should be given due importance. Besides, it is a general health practice that mothers should undergo regular ante-partum care to have knowledge and information about the growth and development of the child. When the child is born, again he is to be given neonatal care. This is provided to them through immunization or vaccination since immunization connotes protection. The most effective and safe way to protect children from contagious diseases is by vaccination [1]. There are five important reasons to vaccinate children [2]. These are: (a) it saves the life of the child; (b) it

is very safe and effective; (c) the family can save time and money; and immunization protects future generations.

In the Kingdom of Saudi Arabia, its health sector continues to develop as the government addresses long-term challenges. Among these is primary care delivered through the network of primary health care centers which are all run by the Ministry of Health (MOH) [3]. Hence, the MOH in the kingdom has also extended their services to give free vaccination of expatriates' children. This is served in the facility in their district [4].

This is collaborated by Rasoldeen [5] stating that the MOH has advised parents to give their children's vaccination on

time to avoid subsequent complications. The same report gave the statistics of patients who were given vaccination during the national flu vaccination campaign for 2016-2017 (1436-1437 H) against viruses. It stated that it served 41% of children, 78% of pregnant women, 83% of health workers, 85% of the elderly and 98% of people with chronic diseases.

It could be gleaned from the statements above the importance of vaccination. It is an accepted fact that immunizations are responsible for preventing death and disability from diseases. They are also among the most cost-effective and widely used public health interventions. However, it is also recognized that no vaccine is perfectly safe or effective. In the future, maintaining public support for immunization will be critical for preventing outbreaks of vaccine-preventable diseases. Corollary to this, Al-Mustafa, Mohammed and Al-Qatari [6] surveyed the adverse encounters following DPT vaccination and compared them with internationally published figures. This comparison served as an indicator for safety of the practice.

Primary health care in Saudi Arabia is undertaken by Primary Health Care Centers under the umbrella of the MOH. Despite the role of this health facility, little is known about the quality of primary care in this kingdom [7]. Through the 128 studies they were able to identify, components of quality were reviewed in terms of access and effectiveness for both clinical and interpersonal care. Good access and effective care were reported for certain services including immunization, maternal health care, and control of epidemic diseases. Poor access and effectiveness were reported for chronic disease management programs, prescribing patterns, health education, referral patterns, and some aspects of interpersonal care including those caused by language barriers. With these, they found out a need to improve management and organization of primary care services. Since nurses as health workers are in the frontline of immunization together with doctors, these nurses should have an adequate knowledge and skill about the practice. This may start from the time they are on their nursing education and training.

2. Objectives

(1) General

This study aims to contribute to the application of best practices on vaccine safety among nurses.

(2) Specific

- (a). To look into the practices observed on vaccination in Primary Health Care Centers.
- (b). To determine whether the responses of the nurses on the practices observed on vaccination show significant relationship.
- (c). To lay down strategies and proposals to improve techniques in vaccination safety through.

3. Subject and Methods

Research Design: The quantitative method of research was

used in this study, specifically the descriptive method.

Setting: The data were collected from five selected Primary Health Care Centers in Jazan, KSA.

Sample: Data were provided by 100 nurses in selected Primary Health Care Centers which were selected randomly in Jazan, KSA.

Tools of data collection: The data gathering tool used was the questionnaire. This was patterned from the tool on evaluating vaccination practices contained in the Quality Assurance in Primary Health Care Manual for Nurses in Saudi Arabia [8]. The questionnaire used a Likert 3-point scale. The scale used was as follows: 3 = Observed Practice; 2 = Sometimes Observed, 1 = Not Observed.

The questionnaire contained the following:

Socio-demographic data sheet

It includes the information about the study subject such as age and civil status.

Nurses Knowledge on routine vaccination sheet

This pertains to routine vaccination practice like informing mothers about the side effect of vaccine, educating the mothers about importance of vaccine, assessment of the child prior to vaccination, asking about the child's activities before vaccination, taking the vaccine vials out on arrival of the first baby and knowledge of managing shock when it occurs.

Nurses practices on Routine Vaccination sheet

This elicited responses about the nurses' practices regarding routine vaccination as to monitoring the previous vaccination before giving the 2nd dose, taking the vital signs, hand washing prior and after vaccination, using aspiration needles for vaccine in vials, reporting immediately when pricked by needles, monitoring signs of vaccine damage, not giving antiseptic immediately after vaccination, observing proper dosage of vaccine, practicing proper sterile technique, avoiding DPT, DT, Tetanus and Hepatitis vaccines coming in direct contact with ice and taking out vaccine vials on arrival of the first baby.

Standards of Resources and Structures on Facilities sheet

This part includes efficiently working refrigerator, efficiently working thermometer, temperature reading recorded, available special cold boxes, keeping enough stock of vaccine, special container for used vaccine, bottles with water on shelves, daily and annual vaccination records, updated child vaccination card, automatic electric generator, emergency equipment (oxygen and emergency medicine) and viral vaccine should be always in contact with ice.

Standards Procedures and Guidelines in Vaccination sheet

It includes well trained nurse in vaccination, well trained doctor, arranging and maintain vaccine supplies, disposing expired vaccines, disposing used vaccines and the end of the session, following-up defaulters, following proper procedure in vaccination (site, dose, method), observing the side effects of vaccine, observing the child for half an hour after vaccination, monitoring sign of vaccine damage, not giving antiseptic immediately after vaccination, proper dosage of vaccine, practicing proper sterile technique and providing neat and conducive vaccination room.

Operational Design

Ethical considerations

Personal communication was done with nurses to explain the purpose of the study and assure their best possible cooperation. The researchers emphasized to nurses their participation was voluntary and anonymous. Nurses had the full right to refuse to participate in the study or to withdraw at any time without giving any reason.

Pilot study

A pilot study was carried out among 20 nurses from selected Primary Health Care Centers. It was conducted to test clarity and simplicity of questions and to check the most common topics related to the study. Necessary modifications were done. Nurses who participated in the pilot study were excluded from main study sample.

Validity test

Face and content validity test were done by showing the questionnaire to three experts; two were from staff nurses in pediatric and community specialists, the other was Assistant Professor in the College of Nursing who is also teaching research.

Reliability test

Reliability was done by conducting the questionnaire to 20 nurses using test – retest and Pearson, coefficient factor was 90.8%. The scale was applied on them and retested after two weeks. The degree of Spearman Rank Correlation Coefficient was $r = 0.82$ which means that there was high correlation of results between the first and second administration of the questionnaire. With this r-value, a validity coefficient of 0.91 was obtained.

Fieldwork

- Preparation of data collection tools carried out over a period of three months from September 2016 to November 2016 after including experts' opinions, validity, and reliability test.
- Official permissions were obtained from the administrators of the health care centers.
- A pilot study was carried out to test clarity and simplicity of questions as well administrability of the questionnaire.

- Data collection was carried out over a period four months, two days/week (Mondays & Wednesdays). Assessment ranged from 3 to 5 children /day. Collection of accomplished questionnaires was done at the end of the day at the waiting area in the outpatient clinic after children were examined by physician.

Statistical Design

Data were verified prior to computerized entry. The Statistical Package for Social Science (SPSS), version 18.0 was used for that purpose, followed by data analysis and tabulation. Descriptive statistics were applied (e.g., Weighted Mean, standard deviation, frequency and percentage). Tests of significance were applied to test the study questions (i.e., paired t-test and Chi-square test in a one-sample case). A significant level value was considered when $p < 0.05$.

4. Results

Quantified results were placed in tabular form to facilitate analysis and discussion.

Table 1. Socio-Demographic data of the studied nurses (n = 100).

Attributes	Frequency
Age:	
20-25	75
26-29	20
30-above	$N = \frac{5}{100}$
Civil Status:	
Single	70
Married	25
Divorced	3
Widow	$N = \frac{2}{100}$

Table 1: This table shows that high percentage of nurses 75% have ages ranging from 20 to 25 years and about 20% of nurses have age ranging from 26 to 29 years and only 5% were 30 and above. Their civil status shows that about 70% of them are single, 25% are married, 3% are divorced and 2% are widowed.

Table 2. Nurses' Knowledge on Routine Vaccination.

No.	Standards	Observed and Practiced	Observed Sometimes	Not Observed	Wm	Interpretation
1	Mother to be informed about the side effect of vaccine.	48	31	21	2.27	Observed Sometimes
2	The mother to be educated about importance of vaccine.	50	30	20	2.30	Observed Sometimes
3	Child assessment prior to vaccination.	43	27	30	2.13	Observed Sometimes
4	Ask the child activities before vaccination.	43	32	25	2.18	Observed Sometimes
5	Vaccine vials are taken out on arrival of the first baby.	62	30	8	2.54	Observed and Practiced
6	Knowledgeable of managing shock when it occurs.	40	23	37	2.03	Observed Sometimes
Overall Mean					2.24	Observed Sometimes

Legend: 1.00-1.67- Not Observed; 1.68-2.33- Observed Sometimes; 2.34-3.00- Observed and Practiced

Table 2: This table shows that the nurses observed and practiced one indicator on knowledge on routine vaccination. This is on taking out on arrival of the first baby (wm = 2.54). The other five indicators show that they are observed

sometimes. Of this level, it can be seen that educating the mother about importance of vaccine (wm = 2.30) came as rank 2 while; informing the mother about the side effect of vaccine (wm = 2.27) was rank 3. The overall mean of nurses'

knowledge on routine vaccination was (wm = 2.24) which observed sometimes. means that nurses' knowledge on routine vaccination was

Table 3. Nurses' Practices on Routine Vaccination.

No.	Standards	Observed and Practiced	Observed Sometimes	Not Observed	Wm	Interpretation
1	To monitor the previous vaccination before giving the 2 nd dose.	47	23	30	2.17	Observed Sometimes
2	Taking the vital signs.	48	35	17	2.31	Observed Sometimes
3	Hand washing prior and after vaccination.	45	22	33	2.12	Observed Sometimes
4	Using aspiration needles for vaccine in vials.	55	32	13	2.42	Observed and Practiced
5	Report immediately when prick by needles.	35	31	34	2.01	Observed Sometimes
6	Monitor sign of vaccine damage.	41	31	28	2.13	Observed Sometimes
7	Antiseptic should not be given immediately after vaccination.	55	32	13	2.42	Observed and Practiced
8	Proper dosage of vaccine.	71	25	4	2.67	Observed and Practiced
9	Practicing proper sterile technique.	57	30	13	2.48	Observed and Practiced
Overall Mean					2.18	Observed Sometimes

Legend: 1.00-1.67- Not Observed; 1.68-2.33- Observed Sometimes; 2.34-3.00- Observed and Practiced

Table 3: This table shows that the studied samples were in agreement with four out of nine indicators that the nurses observe and practice standards on routine vaccination. These are using aspiration needles for vaccine vials (wm = 2.42); not giving antiseptic immediately after vaccination (wm = 2.42); proper dosage of vaccine (wm = 2.62) and practicing proper sterile technique (wm = 2.48). The other indicators were observed sometimes. With an overall mean of wm = 2.18, this means that the standards on routine vaccination were observed sometimes.

Table 4. Standards of Resources and Structures on Facilities.

No.	Standards	Observed and Practiced	Observed Sometimes	Not Observed	Wm	Interpretation
1	Efficiently working refrigerator.	80	18	2	2.78	Observed and Practiced
2	Efficiently working thermometer.	67	30	3	2.64	Observed and Practiced
3	Temperature reading recorded.	55	33	12	2.43	Observed Sometimes
4	Available special cold boxes.	37	25	3	1.99	Observed Sometimes
5	Keep enough stock of vaccine.	6	25	7	2.65	Observed and Practiced
6	Special container for used vaccine.	66	25	9	2.57	Observed and Practiced
7	Bottles with water on shelves.	47	19	34	2.13	Observed Sometimes
8	Daily and annual vaccination records.	6	23	9	2.59	Observed and Practiced
9	Updated child vaccination card.	55	28	17	2.38	Observed and Practiced
10	Automatic electric generator.	50	37	13	2.37	Observed and Practiced
11	Emergency equipment (oxygen and emergency medicine).	71	21	8	2.63	Observed and Practiced
12	Viral vaccine should be always in contact with ice.	47	30	23	2.24	Observed Sometimes
Overall Mean					2.64	Observed and Practiced

Legend: 1.00-1.67- Not Observed; 1.68-2.33- Observed Sometimes; 2.34-3.00- Observed and Practiced

Table 4: It can be noted from this table that the studied samples showed agreement that observe and practice eight out of twelve standard on resources and structures on facilities. These standards which they observe and practiced are on (a) efficiently working refrigerators (wm = 2.78); (b) efficiently working thermometer (wm = 2.64); (c) keeping enough stock of vaccine (wm = 2.65); (d) having special container for vaccine (wm = 2.57); (e) keeping daily and annual vaccination record (wm = 2.59); (f) keeping updated child vaccination card (wm = 2.38); (g) having automatic electric generator (wm = 2.37); and (h) having emergency equipment (oxygen and emergency medicine (wm = 2.63). The other four standards were found as sometimes practiced only by the nurses. The overall weighted mean value of wm = 2.64 shows that the standards for resources and structures on facilities are observed and practiced.

Table 5. Standards Procedures and Guidelines in Vaccination.

No.	Standards	Observed and Practiced	Observed Sometimes	Not Observed	Wm	Interpretation
1	Well trained nurse in vaccination.	76	19	5	2.71	Observed and Practiced
2	Well trained doctor.	61	29	10	2.51	Observed and Practiced
3	Arrange and maintain vaccine supplies.	67	27	6	2.61	Observed and Practiced
4	Dispose expired vaccines.	58	20	22	2.36	Observed and Practiced
5	Disposed used vaccines and the end of the session.	67	20	13	2.54	Observed and Practiced
6	Follow-up defaulters.	38	23	39	1.99	Observed Sometimes
7	Following proper procedure in vaccination (site, dose, method).	71	22	7	2.64	Observed and Practiced
8	Observe the side effects of vaccine.	43	31	26	1.92	Observed Sometimes
9	Observe the child for half an hour after vaccination.	31	29	40	1.91	Observed Sometimes

No.	Standards	Observed and Practiced	Observed Sometimes	Not Observed	Wm	Interpretation
10	Monitor sign of vaccine damage.	41	31	28	2.13	Observed Sometimes
11	Antiseptic should not be given immediately after vaccination.	55	32	13	2.42	Observed and Practiced
12	Proper dosage of vaccine.	71	25	4	2.67	Observed and Practiced
13	Practicing proper sterile technique.	57	30	13	2.48	Observed and Practiced
14	Providing neat and conducive vaccination room.	59	31	10	2.49	Observed and Practiced
Overall Mean					2.36	Observed and Practiced

Legend: 1.00-1.67- Not Observed; 1.68-2.33- Observed Sometimes; 2.34-3.00- Observed and Practiced

Table 5: This table shows that the nurses were in agreement that they observe and practice ten out of fourteen standards on procedures and guidelines in vaccination. These standards which they observe and practice are: (a) having well trained nurses (wm = 2.71); (b) having well trained doctors (wm = 2.51); (c) arranging and maintain vaccine supplies (wm = 2.61); (d) disposing expired vaccines (wm = 2.36); (e) disposing used vaccines at the end of the session (wm = 2.54); (f) following proper procedure in vaccination (wm = 2.64); (g) not giving antiseptic immediately after vaccination (wm = 2.42); (h) observing proper dosage of vaccine (wm = 2.67); (i) practicing proper sterile technique (wm = 2.48) and (j) providing neat and conducive vaccination room (wm = 2.49). With a weighted mean value of wm = 2.36, it means that the nurses observe and practice the standards on procedures and guidelines in vaccination.

5. Discussion

Immunization of children is very important to reduce incidence of vaccine-preventable diseases [9]. As such, PHCs must be equipped with standard resources and structures in order to operate and provide efficient and effective service to the community people. This is to enable them to feel that parents are confident about the safety of their children when given the necessary and required vaccination based on the maturity of the child. With the findings on standards of resources and structure as observed and practiced, this means that there is vaccination safety in PHCs. This would imply that many parents would bring their children to these centers. Thus, children's diseases would be reduced and also reducing possible mortality rate because children would have stronger resistance to fight off diseases which are viral, bacterial or fungal in origin.

This finding on the observed and practiced standards on resources and structures upgrades information now on the quality of PHCs in Saudi Arabia [7]. They said that there was variation in the quality of Saudi primary care services.

Standards of procedure in vaccination was also observed and practiced. This means that nurses and doctors who perform immunization follow the standards of vaccination safety procedures and guidelines. Since the setting where observation was done was in PHCs, therefore, all the standards were followed. Hence, there was safety. Cases of vaccine refusal were noted in the United States when it was carried out in school [10]. The refusal from vaccination emanate from parental concerns. Hence, they recommended that clinicians should discuss the risks of non vaccination.

Standards on immunization session guidelines were also observed and practiced in PHCs in Jazan City. This shows that the vaccines are always made safe for utilization. The standards being observed and practiced show that parents are responsive to immunization schedules of their children and that these standards for immunization sessions guidelines are properly followed. If immunization guidelines are practiced, children and babies are far from contacting diseases. This means that parents are aware of the benefits of immunization. The three standards/indicators which were found to be just observed sometimes may mean that some parents of children, particularly the mothers have still second thoughts of having their children to be immunized. Thus, the mother needs to be educated about importance of vaccines. Knowledge deficit of mothers about importance of vaccines may delay the child's immunization schedules. Hassan and Jan [11] pointed out that there are delays in primary vaccination of infants living in Western Saudi Arabia. Although they said it is uncommon, yet it continuously occurs in that region. Hence, they stressed the importance of parental education and timely scheduling of follow-up appointments can easily prevent delays.

The standards /indicators on knowledge on routine practice were sometimes observed by the student nurses. It was only on using vaccination needles for vaccine vials which was noticed to have been observed and practice by the student nurses. Those standards/indicators for knowledge on routine vaccine practice are actually being done by the nurses on duty. However, the student nurses have not always seen that those were practiced. It is because not all of them were assigned in the vaccination area of the center whenever they go for their clinical experience or duty.

In terms of the correlation of responses of the student nurses, it turned out that it was significant on standards of resources and facilities, procedures in vaccination (guidelines) and on immunization session guidelines. However, on the standards on routine vaccine practice, it turned out that there was no significant correlation of their responses. If there is a significant correlation of their responses, it means that the student nurses practically gave almost similar responses. This implies that the experiences they have had in the PHCs were also similar along those standards of vaccination safety. This is a good indication in the pre-service training of nurses. Vaccination safety is very important just like the vaccines themselves which are prepared to be extraordinarily safe.

6. Conclusion

The following conclusions were drawn from the findings:

- (a) Most children in Jazan, KSA are given vaccination which is safe because standards of resources and structures, standards of procedures in vaccination, and standards on immunization guidelines as contained in the Quality Assurance in Primary Health Care Manual for Nurses in Saudi Arabia are observed and practiced.
- (b) Significant correlation on response of the student nurses occurred on standards of resources and facilities, procedures in vaccination and on immunization guidelines. No significant correlation was noted on their responses on standards on routine vaccine practice.
- (c) Strategies laid down to improve techniques of vaccination safety were on education and training, health promotion in the community and film showing on vaccination safety procedures.

7. Strategies and Proposals to Improve Techniques of Vaccination Safety

The following strategies to improve techniques of vaccination safety:

- (a) Education and training. This is viewed to be the starting point to provide prospective nurses the best experience in vaccination safety. Lectures and return demonstration in the skills laboratory may not be enough. Rather, the nurses may be given additional and current information on vaccination safety through seminars. This is to enable them to be updated with recent practices on vaccination safety. In addition, this strategy should be reflected in the appropriate course specification in the nursing curriculum in order for this to be conducted regularly among the student nurses.
- (b) Health promotion in the community. This could be done as another activity of nurses during their clinical duty. Allowing them to conduct health promotion activities in the community will not only enable them to be acquainted with vaccination safety standards because they will discuss them with the parents, but consequently, may also increase vaccination rates and coverage. Thus, the parents in the community will be aware of the advantages of having their children undergo immunization as well as themselves as adults.
- (c) Film showing on vaccination safety procedures. Film

showing on vaccination safety procedures and application of standards in vaccination is a very practical strategy. This will enable the nurses to have a prior knowledge about the matter before they go for field experience. This may develop their confidence in facing the work and responsibilities during vaccination.

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