

Applicability of Health Education Protocol on Childhood Vaccination for Nurses in Primary Health Care Facilities

Amel I. Ahmed

Community Health Nursing Department, Faculty of Nursing, Mansoura University, Egypt

*Corresponding author: Amel. I Ahmed

E. mail: amahmed.aa313@gmail.com

Abstract: Introduction: Vaccination is a cornerstone of health promotion strategy. Nurses have a crucial role in vaccination process that includes health education activity. The knowledge of nurses regarding vaccination issues and their ability to transform important key messages about childhood vaccination will significantly influence the vaccination coverage. A health education protocol will ensure the standardization of the delivered key messages in a proper way. The feedback of protocol users about its applicability is important for strengthening the using sustainability. Aim of the study: The study aimed at exploring the applicability of “childhood vaccination health education protocol” for nurses in primary health care. Research Design: Cross sectional study, design was used to accomplish this study. Setting: The study was carried out at 14 primary healthcare facilities at Mansour district, Dakahlia Governorate. Subjects and Sampling: The study recruited by using convenience sampling technique of 205 nurses working at the selected primary healthcare facilities and 383 mothers of children who receiving vaccination. Data Collection: Data was collected through: 1- Structured self- administered questionnaires for assessing the demographic and occupational characteristics of nurses as well as their knowledge and learning needs about vaccination health education. 2- Structured interview for assessing the mothers’ knowledge and learning needs about vaccination and their role in the vaccination process. 3- Vaccination health education protocol applicability checklist for obtaining the opinion of nurses regarding the applicability of this developed protocol. Results: The study revealed insufficient knowledge among nurses regarding topics of childhood vaccination health education and the principles of effective health education. Mothers showed lacking of knowledge regarding most of vaccination issues and their role in vaccination process. The “Childhood vaccination health education protocol” was developed based on the learning needs of nurses and mothers. Nurses found many items of the protocol content not applicable because of high burden of workload during vaccination sessions, in adequate knowledge of nurses about components of vaccination health education. Conclusion and recommendations: The study concluded that although nurses and mothers showed inadequate knowledge regarding the essential vaccination health education topics, nurses mentioned that many items of the developed protocol are not applicable. Nurses indicated that limited time and lack of resources are the main reasons of the infeasibility of several items of the vaccination health education protocol. The study recommended the necessity of disseminating the designed protocol for the authorized directorates in the Ministry of Health and population and conducting staff development program for nurses on vaccination health education. In addition to delivering health education messages by using information technology such as mobile application

Keywords: Vaccination, Health education protocol, Nurses.

I. INTRODUCTION

Vaccination is one of the primary health promotion measures that prevent major communicable and epidemic diseases. Usually, high level of vaccination coverage has been achieved based on the level of nurses' knowledge and standardized vaccination practices in primary health care settings [1]. According to the **WHO (2014)**, the obligatory vaccination program was one of the main reasons for establishing primary health care services in Egypt in order to save children's lives [2]. Egyptian childhood vaccination program has achieved remarkable successes several diseases such as diphtheria, tetanus, pertussis, measles and polio. An essential approach of Egyptian ministry of health is maintenance of high childhood vaccination coverage through scheduled vaccination and application of supplementary vaccination campaigns [3]. Egyptian ministry of health concerned with developing standards and protocols for enhancing primary health providers' performance [3].

The effective health education is significantly influence parents' decisions about whether or not giving vaccine to their children. Health education is a crucial element to overcome vaccine hesitancy by either refusal or delaying of vaccination. Healthcare providers should provide health education to parents about vaccination in every vaccination session by using the principles of health education [4]. Effective health education is main recommended strategy that used in fighting vaccine information confusion that leads to vaccine hesitancy [5].

The **National Health Services institute for innovation and improvement 2013** defined clinical protocols, as "they are the descriptions of the steps taken to care for, treat a patient or to provide service for a client" [6]. Protocols used to guide the management process of several healthcare conditions throughout the health continuum [7, 8, 9, 10]. Clinical protocol is providing a well-defined articulated strategy for healthcare providers that reduce variations in clinical practice and errors [11, 12].

Involvement of the staff responsible for hands-on delivery of care is mandatory of optimal and effective development and utilization of protocols. Thus, it requires involving clinical in developing and applying protocol [13]. The development, audit and review of protocols must follow a structured process. The protocol must be communicated to the relevant stakeholders to obtain their feedback of feasibility for safeguarding continuous improvement. The feedback must address any barriers to protocol implementation to enhance future application of the clinical protocol [14].

Aim of the study

The study aimed at exploring the applicability of health education protocol on childhood vaccination for nurses in primary health care.

The research questions were:

1. What is the level of nurses' knowledge regarding childhood vaccination health education?
2. What are the components of health education protocol on childhood vaccination that improve nurses' performance in the vaccination health education?
3. To which extent, health education protocol on childhood vaccination for nurses is applicable?

II. METHODOLOGY

Study design

A cross sectional design was used in the current study to evaluate the applicability of health education protocol on childhood vaccination for nurses.

Setting

This study was carried out at 14 different primary healthcare facilities of Mansoura district, Dakahlia Governorate that were selected randomly from 27 primary healthcare facilities that have the highest number of nursing workforce.

Sampling size and technique

The sample recruited in the present study was composed of primary nurse and mothers of children who received vaccination.

Sample size of vaccination nurses was calculated according to **Schaeffer et al., 1990**, [15], in which the minimum required nurses sample size was 205 nurses after adding 10% for non-respondents. The total number of vaccination nurses at Mansoura district was 365, the desired precision= 5%, expected frequency of correct knowledge about health education about childhood vaccination is 50% and design effect= 1 in confidence limit of 95%.

A convenient sample of nurses was recruited to obtain their learning needs in relation to vaccination health education before developing of the vaccination health education protocol and to obtain their feedback regarding the applicability of the protocol after it has been developed.

The total minimum required sample size of children' mothers, was 383 mothers when the population size = 128690 children aged under 5 years at Mansoura district. The desired precision= 5%, expected frequency of parents' expectations related to ideal management process of childhood vaccination is 50% and design effect= 1 in confidence limit of 95% (**Schaeffer et al., 1990**) [15]. Required sample size of mothers was recruited by using convenient sampling technique from 14 primary healthcare facilities.

Study tools

Four tools were used to collect data in the current study and they include:

Tool I: Nurses self-administrated demographic and occupational characteristics questionnaire

This questionnaire was used to assess demographic and occupational characteristics of nurses such as; age, sex, qualification, years of experience, number vaccination courses attended and type of training courses.

Tool II: Self-administrated nurses' knowledge and learning needs assessment questionnaire about vaccination health education

A questionnaire developed by the researcher was used to assess nurses' knowledge and learning needs about health education information that should be delivered for mothers and principles of health education. The questions included questions about pre and post vaccination session's health education and principles of effective health education. The questionnaire items and answer response of nurses were compared to the ideal information that should be delivered according to the related literature.

Tool III: Structured interview to assess mothers' knowledge regarding childhood vaccination

This interview was used to investigate mothers' knowledge regarding childhood vaccination to address their health education learning needs.

Tool IV: Vaccination health education protocol applicability checklist

The checklist was used to obtain opinions of nurses regarding to the applicability of content of the developed protocol. The checklist included all the items of the developed protocol and nurses asked to rate each statement as applicable or not applicable.

Testing tool validity

A jury that involved six experts in the field of community health nursing tested the content validity of the developed tools. A pilot study was conducted on 10 % of nurses (n= 21). Nurses of pilot study were selected from three different primary health facilities rather than those of conducted study. The pilot study tested the face validity of the developed tools in terms of clarity, and applicability, and time estimating for data collection. Accordingly, the necessary modifications were performed.

Implementation process of the study

Initial data collection

Nurses' knowledge about vaccination health education and principals of effective health education was assessed as well as mothers' health education needs about vaccination and their knowledge about vaccination and roles in vaccination process. The collected data was used to address learning needs of nurses and mothers for the purpose of developing the "vaccination health education protocol". The data collection was carried out at the selected primary healthcare centers.

Developing childhood vaccination health education protocol

The “childhood vaccination health education protocol” was developed according to the results of nurse's knowledge, regarding vaccination health education, along with mothers’ childhood vaccination health education needs. Five experts in community health nursing revised the content of the “childhood vaccination health education protocol” before testing of its applicability. The final version of the protocol was translated into the Arabic language.

Testing of applicability of the developed protocol:

The final version of the developed protocol was disseminated to the nurses at the selected primary healthcare centers. An orientation session about developed protocol, and nurses were asked to rate the applicability of each item of the protocol either to be applicable, or not applicable. They asked to give reasons for the not applicable items from their point of views.

Ethical considerations

Ethical approval was obtained from the Faculty of Nursing at Mansoura University, to conduct the present study. After that, an official request was submitted to the Ministry of Health and Population Directorate, Dakahlia Governorate to obtain an approval for conducting this study at the selected primary healthcare facilities. Informed oral consents were obtained from nurses and children’s mothers to participate in the study after illustrating its purpose.

Statistical analysis:

SPSS program was used to calculate the frequency and percentage the obtained data. The results were illustrated in simple frequency tables.

III. RESULTS

Table 1: shows the demographic and occupational characteristics of nurses. More than half of nurses (54.1%) were aged up to more than 50 years, and most of them were females (98.1%). Regarding to nurses’ qualification the majority (87.8%) of them had diploma of nursing and 64.4% had less than 10 years of experience. About two third of nurses (63.9%) attended two or more training courses in vaccination issues.

Table 1: Nurses’ demographic and occupational characteristics

Characteristics	N= 205	%
Age		
≤ 30	17	8.3
- 40	77	37.6
- 50 and more	111	54.1
Gender		
Male	4	1.9
Female	201	98.1
Qualification		
Diploma of nursing	180	87.8
Diploma of Technical Nursing Institute	22	10.7
Bachelor of nursing	3	1.5
Years of experience		
< 10	132	64.4
-20 years and more	73	35.6
Number of attended and training courses in vaccination issues		
None	38	18.5
Once	36	17.6
Twice and more	131	63.9

Table 2 illustrates the demographic characteristics of mothers, 53.3% of them were aged less than 25 years old, and the majority of them (88.3%) were educated. However, 62.7% of mothers were housewives.

Table 2: Mothers' demographic characteristics

Characteristics	N= 383	%
Age		
<25	204	53.3
- 35	170	44.4
- 40 and more	9	2.3
Level of education		
Illiterate	45	11.7
Educated	338	88.3
Occupation		
House wife	240	62.7
Worker	20	5.2
Clerk	106	27.7
Others	17	4.4

The majority of nurses emphasized the importance of explaining vaccinations minor side effects of vaccine and their managing measures 83.9% and 71.1%, respectively. While only 36.1% identified one item of effective health education principles (table 3).

Table 3: Correct knowledge of nurses about health education issues pre and post vaccination session as reported by nurses

Health education issues	N= 205	%
Health education topics		
Advise mother to seek medical advice if any adverse effects occur to the child.	41	20
Explain minor side effect of vaccine	172	83.9
Explain measure of managing minor side effect of vaccine	147	71.7
Inform about the next dose date	129	62.9
Principles of effective health education		
Use simple and understandable language	74	36.1

The mothers mentioned their educational needs regarding the basic information of the administrated vaccine including type, dose, site, and route of administration (74.9%) as illustrated in table 4. The majority of mothers reported their needs to know about vaccine side effect (81.5%) and measures of managing side effect 82.7%.

Table 4: Health education needs in relation to childhood vaccination as reported by mothers

Health education needs	N= 383	%
The administrated vaccine (type, dose, site, and route of administration)	287	74.9
The benefits of receiving vaccine and risks of not receiving the vaccines	137	35.7
The contraindications of the vaccines	176	45.9
Vaccine side effects	321	81.5
Measures of managing vaccine side effect.	317	82.7

Table 5 illustrated that more than half of the mothers reported correct information about childhood vaccination basic information. On the other hand, the majority of mothers showed correct information regarding their role in the vaccination process including. Most of mothers (93.9%) mentioned the importance of bringing child's vaccination card when attending a vaccination session. While 91.9% mentioned that necessities to keep child calm before and during vaccine administration, dress child easy managed clothes for vaccination session (78.8%), breast-feed child after vaccine administration (75.9%), give antipyretic in case of fever after vaccine administration (82.7%), and apply cold compresses at the site of administration (84.8%).

Table 5: Mothers' correct knowledge about childhood vaccination

Knowledge items	N= 383	%
Information about vaccine		
Types of vaccine	57	14.8
Vaccination schedule	172	44.9
Mode of administration	190	49.6
Vaccination contraindications	77	20.1
Vaccination side effect	103	26.8
Management of vaccination side effect	92	24
Mothers' role in vaccination process		
Bring child's vaccination card when attending a vaccination session	360	93.9
Keep child calm before and during vaccine administration	352	91.9
Give child antipyretic before vaccine administration	210	54.8
Dress child easy managed clothes for vaccination session	302	78.8
Breast feed child after vaccine administration	291	75.9
Consult a doctor in case fever up to 39 °C	245	63.9
Give antipyretic in case of fever after vaccine administration	317	82.7
Apply cold compresses at the site of administration	325	84.8
Dress child light clothes in case of fever	180	46.9

A summarized description of developed childhood vaccination education protocol was presented in **table 6 and 7** with information about protocol introduction, goal, objectives, intended users of the protocol and the protocol content.

Table 6: Description of developed childhood vaccination health education protocol

Language	English and Arabic
Introduction	Importance of providing vaccination health education
Goal	Provides instructions for nurses for improving their knowledge and performance in delivering health education about childhood vaccination
Objectives	- To identify the important childhood vaccination topics to mothers - To use appropriate health education methods in delivering health education about childhood vaccination for mothers
The intended users of the protocol	Nurses included in vaccination process management.
The developed protocol content	
Important childhood vaccination topics that should be explained for mothers	The most important childhood vaccination topics that should be explained to mothers during pre and post vaccination session
Principles of effective health education	A list of health education tips that should be used to deliver effective health education pre and post vaccination sessions

Table 7: Content of the developed childhood vaccination health education protocol

1. Health education topics
1.1. Pre -vaccination session
1.1.1 Essential vaccine information:
▪ The vaccine names
▪ Dose of the administrated vaccine
▪ Site of administration of the vaccine
▪ Route of administration of the vaccine
▪ Schedule of vaccination

- 1.1.2. Benefits of receiving the vaccine
- 1.1.3. Risks of not receiving the vaccine
- 1.1.4. Minor adverse effects (redness, swelling, pain)
- 1.1.5. Potential rare severe adverse events (as anaphylaxis)
- 1.1.6. Contraindications of the vaccine
- 1.1.7. Precautions of the vaccine
- 1.1.8. The recommended sources for more information about obligatory vaccines
- 1.2. Post vaccination session health education:**
- 1.2.1. The importance of reporting any adverse effects that may be occur after vaccination to the responsible nurse in the next session
- 1.2.2. Reactions of the vaccine their child received such as pain, swelling, rash and low-grade fever.
- 1.2.3. Measures of treating any possible reactions
- 1.2.4. Seek medical advice if any serious adverse event occurs to the child.
- 1.2.5. The importance of compilation of vaccination series
- 1.2.6. The time of the next dose and session and alternative dates and times if the determined date not suitable
- 1.2.7. Importance of bringing immunization cards to the health center or outreach session
- 1.2.8. Actions for missed some doses.
- 1.2.9. Times of any upcoming campaigns for of any National Immunization Days
- 2. Instructions of effective health education**
- 2.1. Welcome mothers
- 2.2. Establish an open dialogue that promotes a safe, trust-building environment in which mothers can freely ask questions.
- 2.3. Provide an opportunity to mothers to ask questions.
- 2.4. Use simple, easy and understandable language
- 2.5. Give health information in a clear and concise message
- 2.6. Explain the diseases the vaccines protect against it in simple terms
- 2.7. Use the chart on the immunization card as a guide, and congratulate the mother if the infant has completed the vaccination series.
- 2.8. Try to associate the date of next visit with a holiday or local event, to help them remember when to return.
- 2.9. Ask the mothers if they have any questions.
- 2.10. Repeat each of messages more than once if it seems necessary.
- 2.11. Provide appropriate material about the indicated vaccine for more understanding

Nurses' evaluation of the applicability of the developed protocol is illustrated in **table 6**. Nurses evaluated few items as being applicable which are; site of administered vaccine (79.02%) and schedule of vaccination (78.05%), minor side effects (52.2%), importance of bringing immunization cards to the health center or outreach session (80.49%) and use simple and understandable language while talking with child's mother/ care giver (100%). Unfortunately, the majority of protocol items were evaluated as inapplicable by the nurses.

Table 8: Applicability of vaccination health education protocol as evaluated by nurses

Health education issues	Number of vaccinator nurses= 205			
	Applicable		Not applicable	
	N	%	N	%
Pre –vaccine administration health education				
<i>Essential vaccine information</i>				
Name of vaccine	67	32.68	138	67.32
Dose of vaccine	69	33.66	136	66.34
Site of administered vaccine	162	79.02	43	20.98
Route of administration	164	80	41	20
Schedule of vaccination	160	78.05	45	21.95

Benefit of administered vaccine	68	33.17	137	66.83
Risks of not administering vaccine	54	26.34	151	73.66
Contraindication of the administered vaccine	52	25.37	153	74.63
Precaution of the administered vaccine	49	23.9	156	76.1
Minor side effects	107	52.2	98	47.8
Serious and rare side effects	90	43.9	115	56.1
Sources for more information about obligatory vaccines	50	24.39	155	75.61
Post –vaccine administration health education				
The importance of reporting any side effects to the responsible nurse	55	26.83	150	73.17
Reaction of the vaccine	54	26.34	151	73.66
Measures of treating any possible reactions	55	26.83	150	73.17
Seek medical advice if any serious adverse event occurs to the child	62	30.24	143	69.76
The importance of compilation of vaccination series	64	31.22	141	68.78
The time of the next dose and session and alternative dates and times if the determined date is not suitable	64	31.22	141	68.78
Importance of bringing immunization cards to the health center or outreach session	165	80.49	40	19.51
Actions for missed some doses	40	19.51	165	80.49
Times of any upcoming campaigns for of any “National Immunization Days”	35	17.07	160	78.05
Principles of effective health education				
Giving the child's mother/ care giver appropriate materials for more understanding	57	27.8	148	72.2
Given the chance for the mother/ care giver to ask any inquiry	58	28.29	147	71.71
Use simple and understandable language while talking with child's mother/ care giver	205	100	0	0.0
Answer any questions for the child's mother/ care giver	59	28.78	146	71.22

Table 9 shows the nurses’ reasons for protocol applicability limitations that mainly included over whelming workload (78.0%), mothers/ caregivers do not have time to receive health education (77.1%), there is no need to repeat information before and after administrating of vaccine (72.2%) and lack of knowledge about many items of health education (53.6%).

Table 9: Reasons of applicability limitations of childhood vaccination health education protocol

Limitations of applicability	N	%
Over whelming workload	160	78
Lack of knowledge about many items of health education	110	53.6
There is no need to repeat information before and after administrating of vaccine	148	72.2
Assuming that mothers/ care givers are knowledgeable about vaccination issues	84	40.9
Inappropriate health education place and materials	74	36.1
Mothers/ caregivers do not have time	158	77.1

IV. DISCUSSION

The achievement of vaccination program’s intended outcomes, it is important to ensure the efficiency of vaccinators’ knowledge and skills in relation to whole vaccination process [16]. Another important issue that enhances the quality of vaccination program is the awareness of the target vaccination group regarding the different aspects of vaccination. Literatures revealed that the number of complete vaccinated children would be increased by providing appropriate health education [17].

To accomplish the development of the clinical nursing protocol throughout the present study, it was important to explore vaccination nurses’ knowledge learning needs in relation to the vaccination health education. Moreover, it was essential to

assess the knowledge of the children's mothers regarding vaccination and their role in vaccination process to overcome the gap between the delivered and desired vaccination health education in the developed protocol.

The present study revealed that nurses showed insufficient knowledge regarding the most of health education topics that should be delivered for mothers. The majority of nurses mentioned only minor side effects of vaccines and their management measures as health education topics. Moreover, nurses were not able to identify the principles of effective health education except using of simple language as mentioned by approximately one third of them. These results in agreement with studies that indicated the inappropriate delivering of vaccination messages and the needs for educating nurses education to be able to provide vaccination health education [18, 19]. Lack of knowledge about the important key messages of vaccination that should be delivered to mothers as well as the insufficient knowledge regarding the principles of health education may be due to their demographic and qualification characteristics. The age of more than half of nurses the present study is 50 years and more, and most of them had diploma of nursing who are preferred to work at primary healthcare centers which have much less workload in comparison to hospitals.

At the same time, the current study found that the little number of mothers had knowledge about types of vaccines, contraindications and side effects of vaccines in addition to the management measures of vaccine side effects. Moreover, mothers expressed their needs for health education about the mentioned vaccination issues in addition to their role in vaccination process. These results are in the same line with other researches, which reported the necessities of providing health information for parents about childhood vaccination. Researches emphasized delivering key messages about vaccines' side effect and measures of management [17, 20, 21].

The present study enriched the content of the developed "childhood vaccination health education protocol" with the essential key messages that should be delivered to mothers during the vaccination session. The components of the protocol based on the knowledge requirements of nurses and mothers. In addition, the protocol included the basic principles of effective health education. The components of the current protocol are confirmed by many researchers, who emphasized the importance of integrating basic health education with effective key messages into primary healthcare activities to raise awareness about immunization [17, 21, 22].

Unfortunately, the present study indicated that nurses found most of key messages the included in this protocol not applicable. Nurses mentioned reasons for infeasibility of delivering key messages that were: overwhelmed workload during vaccination sessions, and lack of knowledge. In appropriate infrastructure of the healthcare centers was also reported as obstacles that hinder delivering health education properly. These obstacles were of inadequate space for health education and unavailability of health education materials. Furthermore, the majority of nurses found that key messages are not needed to be repeated and they assumed that mothers aware with them. These results are in the same line with other studies that reported lack of time and lack of knowledge among vaccinators to be the main causes of barriers providing the required vaccination health education [23, 24].

V. CONCLUSION AND RECOMMENDATIONS

The study concluded insufficient knowledge among nurses regarding topics of childhood vaccination health education. Mothers showed lacking of knowledge regarding most of vaccination issues and their role in vaccination process. Childhood vaccination health education protocol was developed based on the learning needs of nurses and mothers. However, nurses found many items of the protocol content not applicable because of high burden of workload during vaccination sessions, in adequate knowledge of nurses about components of vaccination health education.

Accordingly, the study recommended the following:

1. Disseminate the designed protocol for the authorized directorates in the Ministry of Health and population.
2. Conducting staff development program for nurses working in vaccination process specifically on vaccination health education
3. Delivering health education messages by using information technology such as mobile application may solve the problem of insufficient resources and limited time of both nurses and mothers.

International Journal of Novel Research in Education and Learning

 Vol. 6, Issue 4, pp: (16-26), Month: July - August 2019, Available at: www.noveltyjournals.com
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