The Effect of Nursing Performance on Quality of Care for Infant / Children Vaccination

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Abstract

Background: The diseases that vaccines prevent can be dangerous, or even deadly, especially in infants and young children. **Aim:** assess the Effect of Nursing Performance on Quality of Care for Infant / Children Vaccination. **Design:** descriptive research design was used in this study. **Setting**: The study was carried out in all family medical centers at Giza city. **Subject**: A purposive sample was used to choose nurses and mothers that equal 135 for everyone. **Tools**: Interviewing questionnaire divided to two parts as Socio-demographic characteristic, and nurses' knowledge. The second tool: Observational checklist to assess nurses performance and the third tool that divided to two parts; Mothers' satisfaction, and Mothers perception regarding nurses' quality of care **Results:** This study showed that 52.6% of nurses had poor total level of Knowledge, 91.9% of nurses their total level of Performance was ranged between poor and average and 48,9% of mothers had agree satisfaction about children vaccination. **Conclusion**: Statistically, significant positive correlations were detected between nurses performance, mothers satisfaction, and mothers perception regarding quality of care about children vaccination. **Recommendation:** Developing an educational program that would help nurses to improve knowledge and performance about vaccination.

Keywords: Children/infant, Vaccination, Nurses' Performance and Quality of Care.

Introduction

Children and infant are the future of our society special gifts of the world, their overall health has improved, and rates of death and illness in some areas have decreased. But we still focus on children's health particularly: Children represent an important highly vulnerable group of the population. AS children and infant are vulnerable of malnutrition and infectious diseases, many of which can be effectively prevented or treated **(UNICEF, 2019).**

In fact, 30 million infants worldwide are still not immunized with even basic vaccines. In any countries, immunization services disproportionately miss the poorest and most excluded populations. Even when services are available, a substantial number of caregivers still fail to complete the immunization schedule. Without the protection from immunization, these diseases could be imported and quickly spread through population causing epidemics **(AAP, 2015).**

The diseases that vaccines prevent can be dangerous, or even deadly, especially in infants and young children. Vaccination is one of the best ways parents can protect their children from 14 diseases before the age of two. Vaccination is the administration of a vaccine to help the immune system develop protection from a disease. Vaccines contain a microorganism or virus in a weakened or killed state, or proteins or toxins from the organism. In stimulating the body's adaptive immunity, they help prevent sickness from an infectious disease **(Atkinson et al., 2018)**.

Vaccinations prevent squeal associated with the naturally occurring disease. These diseases may cause brain damage as a result of meningitis, paralysis, deafness, birth defects, blindness, lung damage, cancer of the liver, and death. There is a far greater chance for permanent damage to a child as a result of disease than from a vaccine **(Fox, 2017).**

Significance of the study:

In Egypt the children under 5 years represent 7% from total population. The infants and children under five years are the group who need the immunization and vaccination program which include vaccines against six disease: polio, measles, neonatal tetanus, diphtheria, pertussis, and tuberculosis. Recently many countries have introduced other vaccines (hepatitis B, yellow fever, Haemophilus influenza type B) based on several considerations such as the prevalence of specific disease, the availability of new vaccines, and additional financial resources **(WHO, 2018).**

Smith et al. (2016) mentioned that in conjunction with the Healthy people 2010 objectives, community health nurses (CHN) should strive to increase vaccination rates by expanding education programs on the need for vaccination, identifying and targeting risk groups, and improving access to vaccination through public and privately financed efforts. She educates parents of children as well as other susceptible individuals about the importance of vaccination and supplies vaccinations-through clinic-facilities. Nurses should be especially diligent to ensure that vaccinations for all clients are up to date.

Aim of the study

The aim of this study is to assess the effect of Nursing Performance on quality of care for infant / child vaccination through:

- Assessing nurse's knowledge toward infant / child vaccination.
- Assessing nurse's performance toward vaccine administration.
- Assessing nursing quality of care for infant / child vaccination.

Research Question:

- Is there a relation between nurse's knowledge and nurse's performance toward vaccine administration?
- Is there a relation between nurse's performance and quality of care for infant / child vaccination?
- Is there a relation between nurse's knowledge and quality of care for infant / child vaccination?

Subject and Methods

The subjects and methods of the current study were discussed under the following designs:

- ❖ Technical design.
- ❖ Operational design.
- ❖ Administrative design.
- ❖ Statistical design.

❖ **Technical design:**

The technical design used for the study includes three main categories: Research design, setting, sampling of the study as well as tools of the data collection.

Study Design

A descriptive design was utilized for this study as a research methodology; such design fits the nature of the research questions under investigation.

Setting of the Study

The study was carried out in all family medical centers at Giza city at the nearest quadrant to Cairo governorate. Total numbers of family medical centers = 15 centers include the following:

Giza, Kafrnasar, Monshaat Elbakary, Nahia, Kerdasa, Kombakar, Altalbia, Kafrelgagal, Albotran, Kafrataty, Kabish, Al-Noor, Banymagdool, Nazlet EL seman, Al Omrania.

Sampling

Type: A purposive sample

Size: all nurses and mothers that fulfill criteria in all family medical centers at Giza city at the nearest quadrant to Cairo governorate equal 135 nurses and mothers.

Sampling technique:

The technique of the sample was carried out as follows:

All the subjects who were met the set of inclusive criteria and attending, the pre-mentioned family medical centers at Giza city, were only involved in this works. The researcher completes the data collection format

from subject after explaining the ain of this study and once completed went to the next one till the end of the working day.

Data Collection Tools

❖ **The first tool: Interviewing questionnaire** was developed by the investigator based on the recent related literature review, experts' opinion and researcher experience and was written in the simple Arabic language to assess:

- **Part I:** Socio-demographic characteristic for the nurses as age, qualification, years of experience, monthly salary, distance between home and workplace, social status, have children, No. of children, if taking a training program.
- **Part II:** Nurses' knowledge about vaccines such as vaccination meaning, importance, types of vaccines, types of human immunity, the obligatory vaccines, cooling chain and storage of vaccines, vaccines placement inside the refrigerator, contraindication, precautions, side effects, and complications of vaccinations.

❖ **Scoring system of nurses' knowledge:**

For each of the knowledge items about vaccination for from 0-2, complete and correct knowledge was scored 2, incomplete knowledge was scored 1 and incorrect one was scored 0, these scores were summed up and converted into percent scores for each area of knowledge.

The total score for all items related to the nurses knowledge categorized into 3 levels as the followings:

- ✓ >85% was considered good
- ✓ 60%: <85% is considered average
- ✓ 0: <60% is considered poor.

The second tool: Observational checklist according to **WHO ,2016 vaccination guidelines** to evaluate nurses' performance toward the vaccine administration, observe nurse during the conducting of vaccine as: Packing of the refrigerator for vaccines, preparation for vaccine session, according to their vaccination session, packing vaccine cold box for children giving- BCG a vaccine, giving- oral polio vaccine, giving- a DPT and HB vaccine, giving MMR vaccines, and health education about children vaccination.

❖ **Scoring system for nursing performance**

For each of the performance items about vaccination procedure, each observed item, scored as either done = 1 or not done = zero. The sum of the total practices was calculated and transferred to percentage.

The total score for performance calculated as the following: all performance items were summed up and the total divided by the number of the items and categorized into 2 levels as following:

- ✓ 0: <70% is considered as poor practices.
- ✓ 75%: <85% was considered average practices.
- ✓ >85% was considered **good**

The third tool: that divided to two parts as the following:

a. **Mothers' satisfaction sheet by Rashid, & Amina, 2014** to assess mothers' satisfaction level about the nurse's performance in conducting vaccine for their children.

❖ **Scoring system for mothers' satisfaction**

For each of the satisfaction items about nurses' performance of child vaccination from 0-2 years, the answers agree was scored 2, uncertain was scored 1 and disagree one was scored 0, these scores were summed up and concerted into percentage scores for each area of items.

The total score for all items related to the satisfaction of mothers categorized into 3 levels as the followings:

- ✓ >75% was considered agree
- ✓ 50%: <75% is considered uncertain
- ✓ 0: < 50% is considered disagree.

b. Mothers perception regarding nurses quality of care

❖ **Scoring system of mothers' perception according to Anne and Stephen (1995), who design the scale;**

For each of the perception items about nurses' performance regarding child vaccination from 0-2 years, the answers agree was scored 2, uncertain was scored 1 and disagree one was scored 0, these scores were summed up and converted into mean ad SD for each area of items.

Content Validity and reliability:

Content and face validity were performed by 5 expertise, 3 of them were professors of Community Health Nursing and 2 of them specialized in Pediatric Nursing, Faculty of Nursing, were affiliated to Ain Shams University.

Operational design:

This design includes the preparatory phase, pilot study, and fieldwork.

Preparatory phase:

A review of literature was done regarding current and past available literature, covering the various aspects of the problem, using textbooks, articles, magazines and internet sites through research gate.

Pilot Study:

A pilot study was carried out on 12 nurses approximately 10% of the study sample to assess the feasibility of the study and the applicability of the tools.

Fieldwork:

Official permission was obtained to perform the study. The actual process of data collection was carried out in the period from the beginning of Data collection time was 3 months from September 2018 to November 2018, according to the vaccination schedule of each center, Data were collected 2 days / week starting from 10 am to1 pm in order to collect the total sample.

The interviewing Arabic questionnaire sheets were distributed after explaining the way to fill it within (20-30 minutes) to assess total knowledge of nurses regarding child vaccination, quality of care for nurses ,the investigator was present all time to respond to any question. The filled forms were collected and checked for completeness.

The observational checklist for vaccination procedure was completed within (20-30) minutes, each of other checklists for all vaccination procedure. The investigator repeated the previous steps until finished predetermined numbers of total study sample (135) nurses.

Administrative design:

Before conducting the study, official steps were taken to get the official approvals from nurses' authorities. This was done through letters addressed from the Dean of the Faculty of Nursing, Ain-Shams University to the administration of the Medical and Health affairs in Giza governate involved. Then, the investigator met with the directors of the selected family medical centers to clarify the aim of the study, take their approvals, and arrange for data collection.

Ethical considerations:

Approval of the study protocol was secured from the investigator ethics committee in the Faculty of Nursing at Ain-shams University. and no foreseen hazards were anticipated.

Statistical Design:

Data were coded, scored, tabulated, and analyzed by using Microsoft office excel 2007, while statistical analysis was done using the Statistical Package for Social Sciences (SPSS), version 19.0. Quality control was done at the stages of coding and data entry. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables. Qualitative variables were compared using Chi-square test (X^2).

Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones.

The significance of the results was considered as not significant*, if $P > 0.05$; significant**, if $P < 0.05$; and highly significant***, if $P < 0.001$

Results:

Table (1-a): reveals that, 54.8% of studied nurses their age ranged between 24- 30

years. Also 43.7% of Nurses have Technical Health Nursing Diploma, followed by 36,3% of them have Secondary Nursing Diploma and 20.0% of them have Technical Nursing Institute. The same table shows that 51.8% of them their income ranged from 1000- 2000 pound. As well as 59.3% of them their Years of Experience ranged from3-5 years.

Table (1.b): illustrates that, 65.9% of nurses their distance between home and workplace was near. Also 68.9% of them were married and 68.1% of them have children and 66.3% of them have 1-3 child.

Figure (1): illustrates that, 33.3% of nurses had a training program about vaccination, 44.5% out of them had been trained about vaccine administration and infection control during vaccination and 55.5% of them taking training about storing and cold chain, while 50.4% never having any training program.

Figure (2): clears that 48.9% of mothers their total degree of satisfaction about children vaccination was agree as compared to 21.5% of them reported disagree satisfaction and 29.6% of them reported that uncertain satisfaction.

Table (2): emphasis that a positive correlation between mothers' satisfaction regarding nurses' performance about children vaccination. P=0.00**

Table (3): emphasis that, a highly significant correlation between mothers' satisfaction regarding nurses' knowledge about children vaccination where P= 0.00.

Part I: Socio demographic characteristics of the study sample of nurses

Table (1.a): Distribution of Nurses according to their Socio demographic characteristics (n=135).

Socio demographic characteristics	No	%
Age		
20 —23	25	18.5
24- 30	74	54.8
Over 30	36	26.7
Qualification		
Secondary Nursing Diploma	49	36.3
Technical Health Nursing Diploma	59	43.7
Technical Nursing Institute	27	20
Years of Experience		
Less than 3 years	39	28.9
3-5	80	59.3
Over 5	16	11.8
Monthly Salary		
1000- 2000	70	51.8
Over 2000	65	48.2

Table (1.b): Distribution of studied Nurses according to their Socio demographic characteristics (n=135)

Socio demographic characteristics	No	%
Distance between home and workplace		
Near	89	65.9
Far	46	34.1
Social Status		
Married	93	68.9
Single	42	31.1
Have children		
Yes	92	68.1
No	43	31.9
No. of children N=92		
1-3	61	66.3
4-5	26	28.3
Over 5	5	5.4

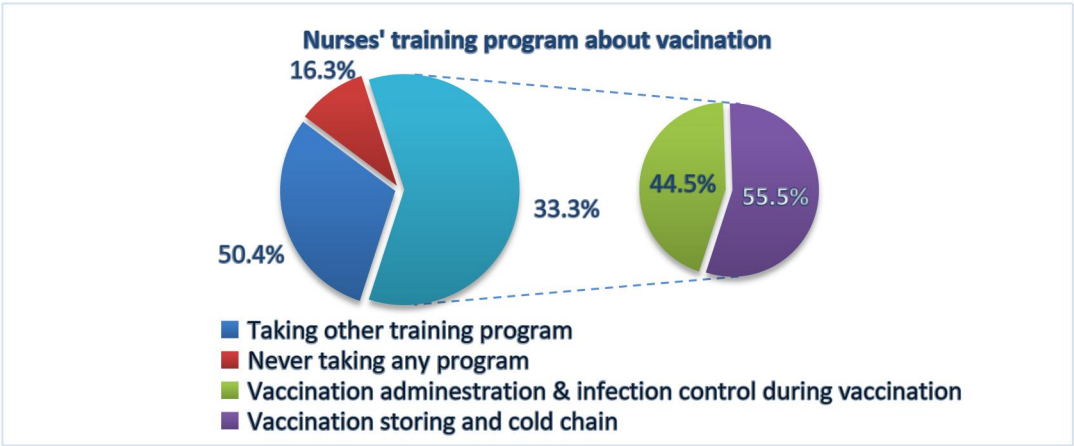

Figure (1): Distribution of Nurses according to taking a training program (n=135).

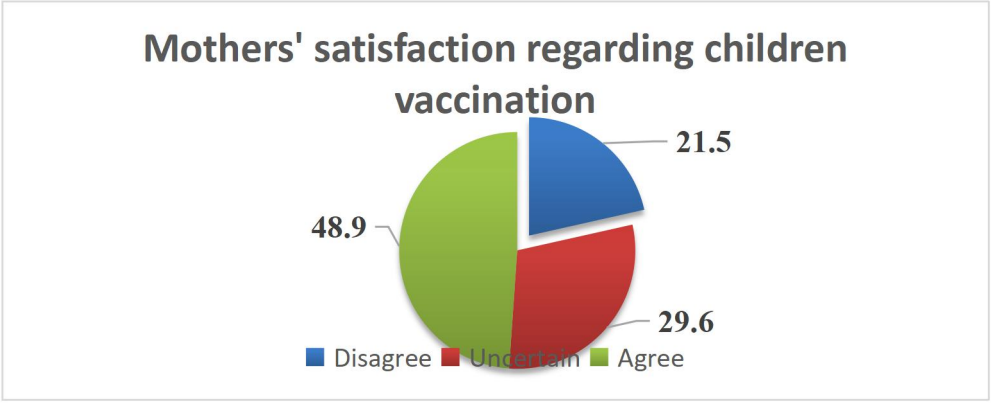

Figure (2): Distribution of mothers according to their total degree of satisfaction about children vaccination (n=135).

Table (2): Correlation between total level of nurses' performance about children vaccination and their total degree of mother's satisfaction.

Total level of nurses' performance about children vaccination	Total No	Total degree of mother's satisfaction			r-Test
		Disagree n=29 No	Uncertain n=40 No	Agree n=66 No	
Poor	71	24	29	18	
Average	53	5	8	40	0.00 **
Good	11	0	3	8	

*** correlation is significant at the 0.05 level** ****correlation is significant at the 0.01 level**

Table (3): Correlation between total level of nurses' knowledge about children vaccination and their total degree of mothers' satisfaction (n=135).

Total level of nurses' knowledge about children vaccination	Total No	Total degree of mothers' satisfaction			r-Test
		Disagree n=29 No	Uncertain n=40 No	Agree n=66 No	
Poor	71	23	30	18	
Average	52	5	8	39	0.00**
Good	12	1	2	9	

Discussion

Vaccination is one of the most effective and efficient public health interventions. The impact of immunization on childhood morbidity and mortality has been great, full potential, has not yet been reached. Still now, thousands of children die from vaccine preventable diseases each year ***(Haneef et al., 2014).***

Vaccination today saves more than three million lives a year. However, millions of children still do not have access to basic immunization and die from diseases that can be prevented by available vaccines. Nurses knowledge, attitude and practices play a major role in achieving complete child immunization. An estimated 2.1 million children around the world died in 2014 of diseases preventable by widely used vaccines ***(Al-lela et al., 2014).***

Regarding to socio demographic characteristics of nurses the current study revealed that the slightly more than half of the nurses ages were ranged between 24 - 30 years, less than half of them had technical health nursing diploma and more than half of the nurses had the years of experience from 3-5 years ***(Table 1-a).*** These results agree with ***Abdulla et al. (2020),*** Qatar titled in "Assessing primary health care nurses' knowledge toward immunizations: A quantitative study" who found that nurses ages ranged from 25 to 33 years old, (63.6%) of the participants' duration of work in PHCC ranged from one to five ears and Forty-seven percent of the respondents graduated from the nursing school for five to ten years.

Also agree with ***Fahim et al., 2011, and Mohammed, (2010)*** who reported that 64.4% and 54.6% of nurses respectively had not attend any training courses related to universal precautions who study tittle Nurses practices regarding to infection control during vaccination in children at el- minia and reported that 100 nurses aged from 20-50 years more than half of them 52% were having 10:20 years of experience in nursing. Regarding attending training courses about infection control and vaccination it was found that 66% of nurses didn't attend.

The present study results illustrates that majority of nurses their knowledge about vaccination were incomplete correct in many items as selecting the suitable type vaccines related to each disease, toxoid bacteria vaccine and what Anti- toxins are these results agree with ***Pelly et al. (2010),*** Canadian who study tittle "THE VAXED PROJECT: an assessment of immunization education in Canadian health professional programs", who reported that 49% ,46% and 40% respectively of the study participants incorrectly answered question and

wrongly answered question regarding immunization.

Also the results of the present study showed that majority of nurses their knowledge about vaccination were incomplete correct regarding vaccine gives acquired negative immunity and name the immunities a child gets from his mother at birth these results agree with ***Seale et al. (2015)*** in Yogyakarta Indonesia **in tittle "**Knowledge and attitudes towards rotavirus diarrhea and the vaccine amongst healthcare providers in Yogyakarta Indonesia" whom reported that health care provider had defect in knowledge items about vaccine gives acquired negative immunity and name the immunities a child gets from his mother at birth.

Also incorrect knowledge regarding the effect of measles infection and its vaccine on children, MMR vaccines and polio vaccines, side effects and complications respectively, knowing when vaccines get ruined.

These results agree with ***Strohfus et al. (2013)*** in Idaho, USA. Who study tittle "Health care providers' knowledge assessment of measles, mumps, and rubella vaccine" who reported lack of knowledge in immunization handling, storage and route of administration of measles mumps and rubella was identified among health care personnel. Also agree with ***Pamela et al. (2013),*** who study "Health care providers' knowledge assessment of measles, mumps, and rubella vaccine" and demonstrated Knowledge deficits were revealed among health care personnel, physicians, and other providers in immunization administration and handling of the MMR vaccine.

Majority of nurses had incomplete correct knowledge about the dose of vaccines. These results were agreement with ***Abdulla et al. (2020),*** who reported a significant number of participants demonstrated a lack of immunization knowledge.

Finally, the study results revealed that, more than half of nurses had poor level regarding total level of Knowledge about children vaccination, as compared to fewer of them had good knowledge regarding vaccination ***(Figure 2).*** This result agreement with ***Nilsen et al. (2017)*** Northern Norway who study tittle "knowledge and attitudes among public health nurses and general practitioners in Northern Norway " and reported that after introduction of the vaccine in the school-based vaccination Programme knowledge gaps and negative attitude of public health nurses.

Also with the result of study performed by ***Nikula et al. (2011)*** in Finland who study tittle **"**Vaccination competence of graduating public health nurse students "and reported gaps in knowledge were identified in a study carried out to evaluate the vaccination skills of nurses and participants who were interested in receiving updates on the subject. In addition these results agree with ***Riccò et al. (2017)*** Northern Italy who study tittle Knowledge, attitudes and practices (KAP) towards vaccinations in the school settings: an explorative survey and reports suggesting a significant knowledge gap in school nurses.

From the researcher point of view Immunization knowledge deficit among nurses result from inadequate training and indicated a need for a carefully developed, routinely repeated training and educational program.

As regarding to nurses performance regarding packing of the refrigerator of vaccine, the present study showed that nearly two third of them done proper place and position of the refrigerator, store vaccine at temperature between 0c and +8c. the newest vaccine placed on the right and the oldest vaccine placed on the left, keep ices pack in the freezer, place containers of colored water in the bottom of the refrigerator, put a thermometer inside the refrigerator, check the thermometer of the refrigerator twice daily, when start work in the morning and when leave in the afternoon) and record it on the refrigerator temperature ***(Table 9).***

These results agreement with ***Cattani et al. (2017)*** North-Eastern Italy who study "Knowledge, attitudes, beliefs and practices of Occupational health care workers towards seasonal influenza vaccination: a cross-sectional study from North-Eastern Italy" and reported that 65% from participant had done practices towered vaccination storage.

These results agreed with ***Pulcini et al. (2014)*** in southeastern France who study "Knowledge, attitudes, beliefs and practices of

general nurses towards measles and MMR vaccination in 2012" and reported that some nurses also had malpractice regarding preparation for vaccine session.

Also ***(Kamal, 2014)*** who observed that 33.3% of nurses' had poor practice among hand washing procedure. In addition, the result of the current study revealed that only 45% of the sample did this procedure but only at the beginning of the administration of vaccine not between each child. This agreed with ***El-Shenawi, (2012)*** who found that none of the nurses in all intensive care units washed their hands at the beginning of the shift before procedures of patients care.

Concerning nurses performance regarding packing vaccine in cold box, giving BCG ,polio vaccine, DPT and HB vaccine respectively ,nearly two third of them had done practice about practices sub items. But regarding health education nearly half of study sample giving health education to children's mothers, these results agree with ***Fahim et al. (2011)*** who found that all nurses had checked the dosage of oral polio, used dropper provided and document vaccine administration in child's medical record, while the majority of them didn't read the label of vaccine or wash hand.

Regarding mothers satisfaction the present study clears that, nearly half of mothers their total degree of satisfaction about children vaccination was agree as compared to nearly satisfaction and nearly one third of them reported that uncertain satisfaction these results agree ***with Abbas et al. (2014)*** Egypt study title maternal satisfaction about childhood immunization in primary health care center, Egypt and showed that the vaccination services rendered by the center had succeeded in generating satisfaction among majority of the studied sample.

Also the same results agree with The ***Henok et al. (2019)*** who study tittle quality of care with nursing care in Ethiopia: a systematic review and meta-analysis and reported that estimated pooled level of patient satisfaction with nursing care in Ethiopia was 55.15%.

In accordance with ***Salmani et al. (2015)*** who study tittle The process of quality of care with nursing care in parents of hospitalized children: a grounded theory study and ***Ammo et al. (2014)*** who study tittle Determinants of quality of care at tertiary care centers in Lebanon and reported that patient satisfaction with nursing care provided reached to nearly half.

Also these results agree with ***Sarkar et al. (2015)*** who study tittle Satisfaction of Mothers Attending Immunization Clinic in a Slum Area of North Kolkata: A Cross-Sectional Study and the results of this study reveal that the immunization clinic is managing to keep its clients mostly satisfied Satisfaction of Mothers Attending Immunization Clinic in a Slum Area of North Kolkata: A Cross-Sectional Study.

Presents that; 84.4% of nurses had good quality of care about children vaccination regarding 2 items" Nurses spent enough time and Nurses shared decision making" Also, the same table reveals that, 17.8% had average quality of care about children vaccination in some items" Nurses treat with respect the way nurses treat their patients".

These results agree with ***Teshome et al. (2019)*** who study tittle Patients' perception of quality of nursing care; a tertiary center experience from Ethiopia and reported that Patients perceived low quality of physical care, education and preparation for home care but better nurse-physician relation and nursing administration. However the overall quality measure was neither satisfying nor dissatisfying. This calls for an action from the health care administrators, educators and other stakeholders to improve the patient perception of quality nursing care.

Incongruent with ***Manije et al. (2016)*** who study tittle "Mothers' Perception of Quality of Services from Health Centers" and reported that One theme and six main categories were developed, and they indicated the mothers' experiences and understandings of the quality of service received. The major theme was 'dissatisfaction with the quality of care received.

Concerning relation between nurses performance and their demographic the present study shows that, there was highly statistically significant relation between nurses' total performance about vaccination with their age, qualification of nurses, their years of experience,

and taking training program about vaccination where P value = 0.000. These results agree with ***Gamal, (2010)*** **and** ***Ali, (2010)***, ***Abolwafa, (2009)*** and ***Fahim et al. (2011)*** who founded that significant relation between nurses knowledge and performance with their demographic characteristics as age, experience years and taking training program.

Epitomizes statistically, significant positive correlations were detected between nurses performance and quality of care about children vaccination scores P=0.000) agreement with ***Karim et al. (2015)*** who study tittle "Identifying influence of perceived quality and satisfaction on the utilization status of the community clinic services" and reported that client's perception and satisfaction played significant role in community clinic service utilization. Provider's perception of service quality should be studied.

The present study emphasis that, a highly significant correlation between quality of care and nurses' knowledge about children vaccination where P= 0.00 and that results disagree with ***Abbas et al. (2014)*** who study shows that there was no statistically significant relation between quality of care with childhood immunization services and knowledge score.

Conclusion

Based on the study findings and research question it can be concluded that:

The results of the study showed that, the study sample of nurses who assigned to implement children vaccination their qualifications were Technical Health Nursing Diploma for less than half of them and one third of them attended a training program about vaccination.

In addition, the study results supported the question of the study, as there was highly statistically significant relation between nurses' total knowledge regarding to vaccination and their total performance also, there were highly statistically significant relations between nurses' total knowledge & total performance and quality of care regarding vaccination.

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- Continuous training program for nursing staff through on- job training and online courses for nurses in different community centers
- Distribution of immunization booklets which include the importance of vaccination, precautions, side effects, and contraindications and how to manage its, obligatory vaccine schedule and non-obligatory vaccine schedule in family medical and MCH centers.

Recommendations for further research directions:

Developing an educational program that would help nurses to improve knowledge and performance about complication of vaccination.

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