Effect of Applying Performance Improvement Model on Ante-Natal Care Nurses Performance in Family Heath Centers in Qena City

Faten Ezz El-din Fikry[1], Mahassen Ahmed Abd E-wahed[1] Fathia Khamis Kassem[1], Nagda Abou Hashima Dyab[2]

[1]Community Health Nursing, Faculty of Nursing, Alexandria University, Egypt.
[2]Community Health Nursing, Faculty of Nursing, South Valley University, Egypt.
hsherbini@gmail.com

Abstract: **Background**: Pregnancy is one of the most important periods in the life of a woman, her family and the society. Therefore extraordinary attention is given to antenatal care. In recent years, emphasis on improving the quality of care provided by the nation's health setting has increased significantly. Nurses are integral to patients' care, they are also pivotal in nation's efforts to improve quality. **Objective**: identifying the effect of applying performance improvement model on antenatal care nurses' performance in family health centers. Setting: The study was carried out in 5 family health centers in Qena city. Subject: the subjects of the study were all nurses providing ante- natal care in the previously selected settings (37nurses). **Tools**: Three tools were developed for data collection. The first one was a structured questionnaire sheet which assessed: personal and socio demographic data about nurses, nurses' knowledge regarding antenatal care and the most common problems facing nurses at their work. The second tool was an observation checklist to observe actual nursing performance in ante-natal care clinic. The third tool was an observation check list to observe the family health center environment. **Results**: Findings of the present study revealed that more than three quarters (78.4) of nurses had poor knowledge regarding ante-natal care and 83.3% of them had poor performance of ante natal care preprogram. There was a significant improvement in nurses' knowledge and performance immediately after program implementation and three months after program implementation. **Conclusion**: Implementing performance improvement model on ante natal care nurses upgraded their knowledge and performance. **Recommendation**: periodic educational training programs to improve knowledge and performance of nurses about antenatal care as well as to improve maternal and perinatal outcomes, Clear job description should be made for nurses working in family health centers generally and in antenatal clinic specifically.
[Faten Ezz El-din Fikry, Mahassen Ahmed Abd E-wahed, Fathia Khamis Kassem, Nagda Abou Hashima Dyab. **Effect of Applying Performance Improvement Model on Ante-Natal Care Nurses Performance in Family Heath Centers in Qena City interaction.** *J Am Sci* 2015;11(7):169-180]. (ISSN: 1545-1003). http://www.jofamericanscience.org. 22

Key wards: Ante-natal care, performance improvement, standard of care in Family health center

1. Introduction

Maternal health is the health of women during pregnancy, childbirth, and the postpartum period. [1, 2] The fifth Millennium Developmental Goal (MDG5) aims at improving maternal health with the targets of reducing Maternal Mortality Ratio (MMR) by 75% of 2009 rate by 2015 and achieving universal access to reproductive health services [2, 3]. MMR is still high in most developing countries even though there is an overall decrease in MMR worldwide [4-6]. It is estimated that in 2013 MMR in developing countries were 14 times than that of developed countries. Globally there were an estimated 289 000 maternal deaths in 2013, the sub-Saharan Africa region alone accounted for 62% (179 000) of global deaths followed by Southern Asia at 24% (69 000) [7]. In Egypt MMR for 2011 is 41 per 100 thousand live births compared to 195 in 1990 and 74 in 2000 [8-10]. Complications due to pregnancy and child bearing are among the leading causes of death and disability among women of child bearing age in developing countries [11].

United Nation Population Fund Agency (UNFPA) considered maternal health as a public health goal which determines the health of the next generation and can help predict future public health challenges for families, communities, and the health care system [2, 3, 12].

Maternal health services include all services given to a woman during pregnancy, during delivery, immediately after giving birth and contraception methods. It includes medical and dental assessment, health and nutrition education, psychosocial screening and referral, care coordination, assistance with plans for delivery and postpartum home visiting [13-15].

Effective ante natal care can improve the health of the mother and give chance to deliver a healthy baby [16]. Regular monitoring during pregnancy can help detect complications at an early stage before they become life-threatening emergencies. However, one must realize that even with the most effective screening tools currently available, one cannot predict which woman will develop pregnancy related complications [4, 17, 18]. Moreover, good ante natal care

does more than just deal with the complications of pregnancy. It provides an opportunity to establish a birth plan, promotes a healthy lifestyle that improves long-term health outcomes for the woman, her unborn child and possibly her family [19-23].

The most common challenges affecting antenatal care utilization as one of important aspects of maternal health could be related to the services as following; availability, accessibility, affordability, and characteristics of healthcare services, quality of maternal health services or related to the clients such as following; women's position in the household and society as well as knowledge, attitudes, culture and beliefs [24-27].

Poor quality of care may result from variety of factors including insufficient and unqualified staff; clinical mismanagement of patients; insensitive treatment of patients by health staff; chronic lack of essential equipment, supplies, drugs, and blood for transfusion; inadequate management of health facilities; as well as from inadequate functioning of referral systems substandard care contributes to maternal health outcomes [28-31].

Today, performance improvement is the key to ensuring high-quality care and a performance improvement philosophy pervades leading healthcare organizations [32-35,1]. To contribute to personal and organizational success one must commit to participate in performance improvement.

The performance quality improvement process has achieved through process that considers the institutional context, describes desired performance, identifies the gaps between desired and actual performance, identify root causes and selects intervention to close performances gap. Therefore PQI process was designed to assist organizations in achieving desired institutional and individual performance. The MNH Program's PQI approach follows the steps in the performance improvement process model adopted by JHPIEGO (Figure -1-) [36].

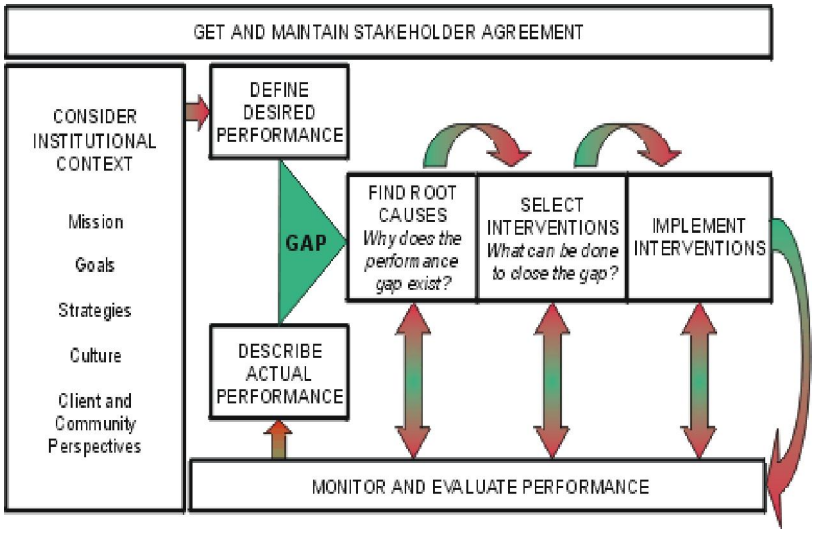

Figure (1): Performance Improvement Framework
Source: This process is based on the performance improvement framework developed by the Performance improvement Consultative Group, a collaborative group of representatives of USAID and USAID funded cooperating agencies.2003

Aim of the study

The aim of the study is to:

Identify the effect of applying performance Improvement model on antenatal care nurses' performance in family health centers in Qena city.

Research questions

What is the knowledge and practice of ante natal care nurses, regarding antenatal care services in family health centers?

What is the effect of applying performance Improvement model on antenatal care nurses' performance?

2. Material and Methods

Material

Research design:

A quasi experimental design was adopted to carry out this study.

Setting:

The study was conducted in 5 family health centers affiliated to Ministry of Health and Population in Qena city.

Subjects:

All nurses providing antenatal care in the 5 selected family health centers were included in the study (37 nurses).

Tools:

In order to collect the necessary data for the study, the following tools were used:

Tool (I): Antenatal care nurses' knowledge questionnaire:

It was developed by the researcher to collect the necessary data from the nurses. It included the following parts:

Part one: Nurses' socio demographic data

It includes; age, marital status, position, years of experience, qualification and attendance of training program related to antenatal care.

Part two: Nurses knowledge about antenatal care

It was designed to assess nurses' knowledge regarding the following items; policy and regulations of the center, strategy of antenatal care clinic, goal of antenatal care, and components of initial and return visits for antenatal care.

Part three: Common work problems

This part was designed to identify the most common problems facing nurses on their work either environmental, administrative or financial. It also identified nurses' suggestions to solve these problems.

Tool (II): Nurses' performance observation checklist:

An observation checklist was developed by the researcher based on the national policy of nursing standards in family health centers (Ministry of Health and Population, June. 2010), It was used to observe the actual nursing performance in antenatal clinic such as; history taking, physical examination (general or local), guiding pregnant women for all routine investigations, dental assessment, tetanus toxoid administration and client education.

Tool (III): Environment observation checklist:

This checklist was developed by the researcher to assess availability of services, facilities and equipments.

Methods:

-Approval of the responsible authorities was obtained through official letter from faculty of Nursing to the director of MHP in Qena to collect the necessary data from the 5 selected family health centers.

-After reviewing the recent literature Tools I, II, and III were developed by the researcher. It was validated by juries of five experts in the field of Community Health Nursing.Their suggestions and recommendations were taken into consideration.

-Reliability test was carried out using Gronbach Alpha Coefficient test (r=0.88).

-A pilot study was carried out on five nurses in order to evaluate the clarity and applicability of a research tool.

-Applying Performance Improvement model:

The Performance Improvement process based on the frame work shown in figure (1).This process comprises of five steps.

A-Analyze performance

It was conducted to identify the gaps existing between actual and desired performance using tool I and II.Each nurse was interviewed individually for 3 times to describe their actual performance in different situations. Desired performance was defined based on National standards and protocols of family health centers (MOHP).

B-Find root causes

Root causes analysis was conducted after gathering information from nurses, and checking the environment to identify the causes of poor performance using tool I, II& III analysis of root causes had been done by the researcher through identifying different problems that face nurses during their work and checking the environment.

C-Select intervention

According to the analysis of root causes of poor performance, obvious gaps between desired and actual performance were noticed. Therefore training program about antenatal care was selected and designed to overcome these gaps. [273-276]

Program objectives:

1-General objectives: To improve the knowledge and performance of nurses -regarding antenatal care.

2-Specific objectives: At the end of the program, nurses will be able to;

- Recognize the family health center policy and regulations.
- Identify the center's mission and vision.
- Recognize the strategy of antenatal care clinic.
- Discuss the nurse's job description regarding antenatal clinic.
- List the goals of antenatal care.
- Discuss the different services provided by antenatal clinic.

-Identify the physiological changes during pregnancy.

-Analyze the role of nurse during pregnant initial and return visit to the center.

-Demonstrate the main procedures provided to pregnant woman in each visit to the center either initial or return visit.

-Identify the high risk pregnancy.

-Apply infection control measures.

D-Implement intervention

The place and time of performing the program was arranged with the family health centers directors to avoid any interference with staff work. The nurses were divided into five groups; each group consists of seven to nine nurses according to working condition in family health center. The training sessions were arranged over four days a week from 8 A.M to 1 P.M.

E-Evaluation of performance

The impact of intervention on overcoming the performance gaps was done through comparing the actual performance with desired performance using tool (I) and (II). The evaluation was done twice; immediately after implementing the program and three months later.

Ethical considerations for the study:

-Informed consent of the participants in the study was obtained after explaining the aim and procedure of the study.

- Stressed on confidentiality for participants involved in the study.

- Privacy was insured for all subjects.

-Data were collected during the period from10/2013 to 03/2014.

Statistical analysis of the data:

1- Collected data were first coded and scored by researcher then, total score was calculated and converted into percent score as follows;

a) Nurses' knowledge about antenatal care were scored by giving 2 scores for the complete correct answer, 1score for the incomplete correct answer and zero for the wrong answer or un responded. The total score (66)obtained was classified into:

- Poor knowledge = <50%.
- Fair knowledge = 50 % - < 75%.
- Good knowledge = 75% -100%.

b) Nurses' performance in antenatal care clinic were scored by giving 1 score for the complete correct performance and zero for the incomplete correct performance or wrong performance.

The total score (160) obtained was classified into:

- Poor performance = < 50%.
- Fair performance = 50 - >65.
- Good performance = 65 - >80.
- Very good performance = 80 - >90.
- Excellent performance = 90 -10.

-The statistical package for social science (SPSS version 19) was used for both data presentation and statistical analysis of the results. The level of significance selected for the study was P equal to or less than 0.05.

3. Results

Table (I) illustrates the distribution of the nurses according to their characteristics. The total number of nurses included in this study was 37. Their ages ranged from twenty to more than thirty years with a mean age of 27.6+5.4 years. All of them had a secondary nursing education.

As regards to nurses' years of experience, it was ranged from less than five to more than ten years of experience with a mean of 11.13 +2.73 years.

The same table also shows that only more than one tenth (13.3%) of the nurses had attended training programs related to antenatal care. However more than half (59.5%) of the nurses didn't attend any previous training program related to antenatal care compared to nearly two fifth (40.5%) who attended different training programs.

Table (II) illustrates the number and percent distribution of the study nurses according to their knowledge about ante natal care. Approximately three quarters (75.7%) of them were aware about components of antenatal visits either initial or return visits showing good level of knowledge. while 89.2% of the study nurses were un aware about appropriate health education that should be given to pregnant women in each trimester showing poor level of knowledge. Followed by 86.5% and 83.8% who hadn't correct knowledge about policy and regulation of the center and vaccination given during pregnancy.

Figure (I) represents the total score of nurses 'knowledge regarding antenatal care preprogram. It is observed from the figure that more than three quarters (78.4%) of nurses had poor level of knowledge regarding antenatal care, while 16.2% of them had fair level of knowledge and only 5.4% of them had good level of knowledge.

Table (III) illustrates the distribution of the nurses according to their performance during antenatal care in the center. The majority of nurses (86.5%) had poor performance regarding to recording specific information during return visit. The near percent (83.8%) of them had poor performance regarding physical examination during return visit and physical examination in initial visit. On the other hand 13.5% of nurses had very good performance regarding record keeping.

Figure (II) shows nurses' performance total scores in ante natal care clinic; it represents that the majority (83.8%) of nurses had poor performance during antenatal care, while only one nurse (2.7%) had very good performance. Less than one tenth (8.1%) of them had fair performance and very few (5.4%) had good performance in antenatal care.

Table (IV) represents the relation between nurses' knowledge regarding antenatal care and their performance in antenatal clinic. The table reveals that more than three quarters (78.4%) of the study nurses had poor knowledge as well as poor performance. No significant difference was found between nurses' knowledge and their performance (x^2=7.6, x^2=0.289, x^2=3.137).

Table (V) portrays the number and percent distribution of the nurses according to their work problems. Just more than three quarters (75.7%) of nurses had faced many problems at the center. All of them complained from low salaries. Moreover they

faced many environmental problems such as leakage of sewage system as mentioned by more than half (53.6%) of nurses.Another problem was presence of insects which reported by less than half (46.4%) of nurses. This table also shows nurses' suggestions to solve these problems, among these suggestions were; providing more supplies, enhance nurses training, and provide financial support (64.9%, 51.4% and, 43.2% respectively).

Table (VI) Shows the effect of program implementation on nurses' knowledge regarding antenatal care before program, immediately after program implementation and three months after program implementation. It demonstrates that the majority of nurses (91.9%) had good level of knowledge immediately after the program implementation compared to 5.5% of them before program with a success rate of 86.5%. More than three quarters (78.4%) of them also had good knowledge after three months evaluation with a success rate of 72.9%. It is interesting to note that the percent of nurses who attained fair and poor knowledge had decreased from 16.2% and78.3% before program to 5.4% and 2.7% immediately after program implementation but further increase was noted to (13.5% and 8.1%) after three months evaluation. A statistically significant differences were observed between nurses' knowledge (fair& poor) before program, immediately after program implementation and after three months of program implementation where (χ^2=6.804, P=0.036 and χ^2=9.528, P=0.009) respectively.

Table (VII) represents that the effect of program implementation on nurses' performance during antenatal care preprogram, immediately after program implementation and three months later. It demonstrates that more than three quarters of nurses (81.1%) had excellent performance immediately after program implementation compared to none (zero) of them preprogram with a rate of success of 81.1%. and 64.9% after three months evaluation.

It is observed also from the table that, only one nurse (2.7%) had very good performance before preprogram implementation and one (2.7%) immediately after program implementation, this percent was increased to 8.1% after three months evaluation with a statically significant difference χ2=12.554 and P=0.002. In addition the table shows that, 5.5% of nurses had good performance before program implementation compared to 8.1% immediately after program implementation and 5.4% after three months with a statically significant difference χ2=10.630 and P=0.002.

It is interesting to note also that the percent of nurses who had fair and poor performance decreased from 8.1% and 83.7% preprogram to 5.4%, 2.7% immediately after program implementation. Slight increase was noted (13.5%, 8.1%) after three months evaluation with a statistically significant difference. (χ2=14.942, P=0.001 and χ2=21.347, P=0.001).

Table (I): Distribution of nurses according to their characteristics

Characteristics	N =37	
	No.	%
Age		
20 –	7	18.9
25-	4	10.8
30 +	26	70.3
X+SD 27.6+5.4		
Marital status		
Married	34	91.9
Divorced	3	8.1
Years of Experience		
1-	8	21.6
5-	6	16.2
10+	23	62.2
X+SD 11.13+2.73		
Attendance of previous training		
Yes	15	40.5
No	22	59.5
Type of training; N=15		
Family health	8	53.3
Antenatal care	2	13.3
Infection control	3	20.1
Other	2	13.3
Date of the last training; N=15		
<1 year	2	13.3
1-	3	20.0
3-	3	20.0
5+	7	46.7

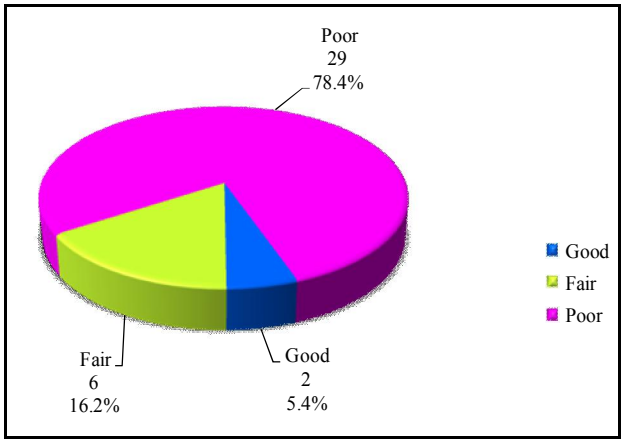

Figure (1): Total score of nurses' knowledge about antenatal care (pre-program)

Table (II): Distribution of nurses according to their knowledge about antenatal care preprogram (n = 37)

Items	Good		Fair		Poor	
	NO.	%	NO.	%	NO.	%
Policy and Regulations of the Center	2	5.4	3	8.1	32	86.5
Components of Initial visit	28	75.7	6	16.2	3	8.1
Components of Return Visits	28	75.7	6	16.2	3	8.1
Vaccination during pregnancy	2	5.4	4	10.8	31	83.8
High risk pregnancy	6	16.2	6	16.2	25	67.6
Health Education	1	2.7	3	8.1	33	89.2
Home visits done by nurses to pregnant women	2	5.4	7	18.9	28	75.7

Knowledge Score: Good = 75% -100%; Fair =50 %< 75%; Poor =<50%

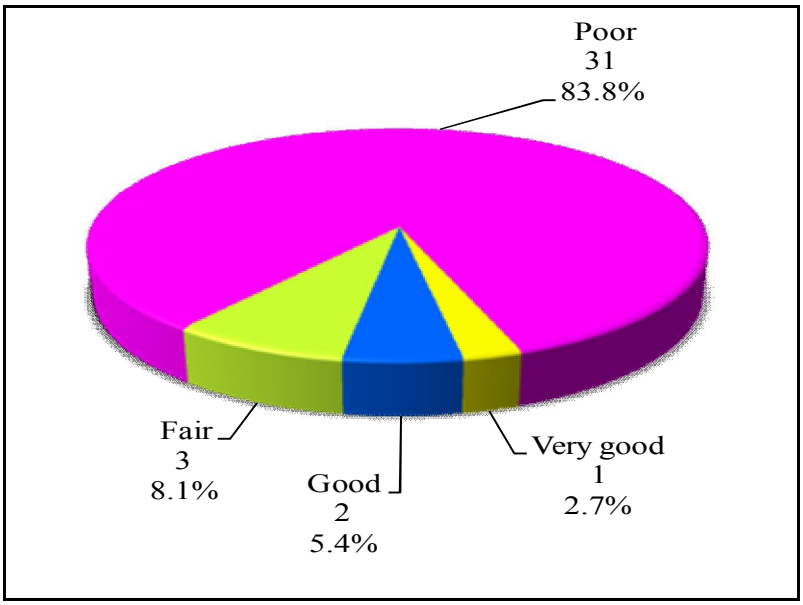

Figure (2): Total score of nurses' performance in antenatal care clinic (pre-program)

Table (III): Distribution of nurses according to their performance during antenatal care in the center preprogram (n = 37)

Items	Very good		Good		Fair		Poor	
	No.	%	No.	%	No.	%	No.	%
I-Initial visit 1.Interpersonal communication	4	10.8	3	8.1	1	2.7	29	78.4
2. Recording & History taking	4	10.8	4	10.8	1	2.7	28	75.7
3.Referral for all routine investigations	4	10.8	4	10.8	3	8.1	26	70.3
4.Physical Examination	1	2.7	2	5.4	3	8.1	31	83.8
5.Tetanus Toxoid administration	1	2.7	4	10.8	2	5.4	30	81.1
6.Dental Assessment	5	13.5	4	10.8	3	8.1	25	67.6
II- Return visit 1-Recrding specific information	1	2.7	2	5.4	2	5.4	32	86.5
2. Perform limited physical examination	1	2.7	2	5.4	3	8.1	31	83.8
3. Client Education	1	2.7	7	18.9	4	10.8	25	67.6
4. Set date for next follow-up visit	2	5.4	2	5.4	3	8.1	30	81.1
5. Recordkeeping	5	13.5	7	18.9	9	24.3	16	43.3

Performance Score: Excellent 90-100; Very good 80>90; Good 65>80; Fair 50>65; Poor >50

Table (IV): The relation between nurses' knowledge about antenatal care and their performance in antenatal clinic.

Nurses' knowledge	Nurses' Performance (N=37)								Test of significant
	Very good		Good		Fair		Poor		
	No.	%	No.	%	No.	%	No.	%	
Good	1	2.7	1	2.7	0	00.0	0	00.0	$\chi 2 = 7.6$ $P=0.234$
Fair	0	00.0	1	2.7	3	8.1	2	5.4	$\chi 2 = 0.289$ P=3.446
Poor	0	00.0	0	00.0	0	00.0	29	78.4	$\chi 2 = 3.137$ $P=0.20$

$\chi 2$: Chi square test *: Statistically significant at $p \leq 0.05$

Table (V): Distribution of nurses according to their work problems.

Items	N=37	
	No.	%
Problems and obstacles that face them at work		
Yes	28	75.7
No	9	24.3
Type of problems*		
A-Environmental problems		
Leakage of sewage system	15	53.6
Lot of insects	13	46.4
B-Administrative problems		
Lack of equipment and supplies	4	12.3
Shortage of staff	9	32.1
Work overload	7	27
Lack of training courses	8	28.6
C-Financial problems		
Low salary	28	100
Nurses suggestions to solve these problems *		
Suggestions :	**35**	**94.5**
Provide more supplies	24	64.9
Enhance nurses training	19	51.4
Provide financial support for nurses	16	43.2
Plan for having more nursing staff	8	21.6
Provide plan for more supervision for center maintenance	2	5.4

More than one answer were given*

Table (VI): Effect of program implementation on nurses' knowledge regarding antenatal care. (Preprogram, immediately after program implementation &after 3 months)

knowledge / Evaluation	Pre-program (n = 37)		Immediate Evaluation (n=37)		Late Evaluation (3 months later) (n=37)		Test of Sig.
	No.	%	No.	%	No.	%	
Good	2	5.5	34	91.9	29	78.4	$\chi 2=16.828$ $P=<0.001^*$
Fair	6	16.2	2	5.4	5	13.5	$\chi 2=6.804$ $P=0.036^*$
Poor	29	78.3	1	2.7	3	8.1	$\chi 2=9.528$ $P=0.009^*$

$\chi 2$: Chi square test
*: Statistically significant at $p \leq 0.05$

Table (VII): Effect of program implementation on nurses' performance during antenatal care.(Preprogram, immediately after program implementation &after three months)

Performance / Evaluation	Pre-program (n = 37)		Immediate evaluation (n=37)		3 months evaluation (n=37)		Test of Sig.
	No.	%	No.	%	No.	%	
Excellent	0	00.0	30	81.1	24	64.9	$\chi2$=9.831 P =0.003*
Very good	1	2.7	1	2.7	3	8.1	$\chi2$=12.554 P =0.002*
Good	2	5.5	3	8.1	2	5.4	$\chi2$=10.630 P =0.002*
Fair	3	8.1	2	5.4	5	13.5	$\chi2$=14.942 P =0.001*
Poor	31	83.7	1	2.7	3	8.1	$\chi2$=21.347 P =0.001*

$\chi2$: Chi square test
*: Statistically significant at $p \leq 0.05$

4. Discussion

Antenatal care is a key strategy for reducing maternal and neonatal morbidity and mortality rate through integration of programs and availability of health care providers with a wide range of skills in order to be able to provide high quality of patient or client care [37].

Quality of care that provided by nurses in primary health center/family health centers or maternity centers depend on their training and the wider health system in which they are working. Using unqualified staff can worsen many obstetric complications. In many regions, especially rural areas, training opportunities are sparse and of poor quality. WHO at 2013 reported that "countries where progress towards MDG 5 has been achieved are those where maternity nursing as well as medicine is highly professionalized and well-recognized, including at government level [38-40].

The performance improvement process is crucial for health care leaders to improve outcomes and adapt to change as well as to deliver cost effective and high quality patient care [41-43].This study will help to focus the light on the gap between the desired and actual nurses' performance regarding antenatal care and identifying causes of this gap. Additionally, results of the current study can assist the concerned authorities and policy makers in identifying the root causes of nurses' poor performance in antenatal clinic and to take a corrective action based on the previous identified causes.

The findings of the current study revealed that all studied nurses were females and their age ranged from twenty to more than thirty years, more than two thirds of them their age was 30 years old and more.

It is amazing to note that although about two thirds of nurses spent 10 years and more in their present work, they had a general low level of knowledge and poor performance regarding antenatal care prior to program implementation. This could be related to many reasons such as; unavailability of job description regarding nurses role in antenatal care, work overload and shortage of nursing staff and lack of refreshing training courses for the staff regarding antenatal care either theoretical or clinical.

Regarding the previous training of the nursing staff included in the current study, it was apparent that more than half of them did not attend any training program, this may be due to the fact that the Ministry of Health give more priority to hospital nurses than family health center staff for training programs or may be due to lack of supervisors' of family health centers awareness regarding identification of subordinate's training needs. These results are in agreement with Todd *et al*. 2007, Hamilton, 2005, Tanner, 2008 and Laschinger *et al.* 2009and Hagbaghery *et al.* 2010 [44-48].

American Association of Colleges of Nursing and World Health Organization (2012) reported that 54.3% of nurses working in governmental hospitals of developing countries complained of shortage of staff and work overload. [49,50] This is in agreement with the current result which reveals that the second problem faced nurses at their work and affected their performance was shortage of staff and this problem could followed by work overload because of many assignments performed by one nurse at the same time.

Looking from the nurses' perspective that their performance could be affected by many problems at their work; the main one was low salaries. This result was matched with a survey conducted by the

American Nurses Association which found that 68.8 percent of registered nurses complained of low salaries and four out of ten nurses (39.2%) would not choose nursing again as a career [49]. On the other hand, the contrast was obtained by Omar at 2010 who reported that the majority of nurses in maternal and child health centers in Riyadh were satisfied regarding their salaries [51].

Furthermore, environmental problems such as a lot of insects and sewage leakage were reported by more than three quarters of the current study nurses. These problems may be due to lack of maintenance, supervision and deficit budget. This result was contradicted with many research findings as Javed, 2008, Ibnouf, 2009 and Ghobashi, 2011 [52,53]. On the other hand there are many researches supported the current study which mentioned that the majority of nurses complained of environmental problems at their work in maternal and child health [54,55].

Knowledge of health care professionals is important to improve clients care as professional nurse is in a key position to take accurate decision. She must has knowledge, skills and sense of responsibility to perform any task adequately and to reach level of competency that permits independent functioning [55].

Concerning nurses' knowledge regarding antenatal care, findings drawn from the current study revealed that the majority of nurses had poor knowledge about policy and center regulations, the components of initial and return visits, vaccination given during pregnancy, high risk pregnancy, health education in each trimester and home visits done by nurses during pregnancy before program implementation compared to minority of them had poor knowledge about the same items immediately after program implementation. The obvious lack of knowledge about policy and regulation of the center may be due to the neglecance of the administrative authority to orient recruited nurses with the policy and regulation of the center, in addition to unavailability of the center strategy booklet. Nurses' knowledge about policy and regulation of the center had been improved immediately after program implementation from 8.1% pre-training to 89.2% post-training. This result was in accordance with the finding reported by, McClure *et al.,* 2007) [56].

Poor knowledge of nurses regarding antenatal care goals, physical examination, vaccination given during pregnancy, high risk pregnancy, health education in each trimester and home visits done by nurses during pregnancy may be due to unavailability of job description regarding the nurses' role in antenatal care clinic and absence of continuous evaluation of nurses' knowledge and practice regarding antenatal care. This result was in agreement with Bajpayee *et al.* 2012 and Lutwama *et al.* 2012 [57,58].

Additionally, other researches' findings were contradicting with the current results which found that majority of the skilled birth attendance had knowledge about various aspects of antenatal, intranatal, postnatal and infection control practices. The reason for this could be because the government of South Nigeria, 2010 had committed to ensure universal coverage of all births with skilled attendance in antenatal care and enhancing training courses that integrated into the nurse's job profile [59]. On the other hand this finding were contradicting with Ordinioha *et al*. 2010 and Onyenaporo *et al.* 2010 [60].

Demonstrating quality and improving performance are the definitive keys to success in the health care industry's mission to provide high quality care. In many studies, performance is considered to be a combination of staff knowledge and skills, productive and responsive. Although inadequate health workers' performance has been widely described, determinants of poor performance are not fully understood. In many studies national guidelines serve to assess observed health workers' performance during patient consultations [61-63].

In this respect, the present study revealed that the majority of nurses had also poor performance during antenatal care while only one nurse had very good performance and none of them had an excellent level in performing antenatal care. This unexpected result may be attributed to many factors. Among these factors are lack of knowledge on antenatal care as well as lack of training, lack of motivation and reinforcement for self-learning or continuous education, deficit resources, unsuitable work environment, besides; work dissatisfaction due to low salaries, shortage of nursing staff and work overload.

Performance of nurses in the current study during initial and return visits was particularly poor. This was consistent with previous studies of Sarker *et al.* in the Rufiji District at 2010, Walker *et al.* in the Kilombero Valley at 2012 and Eltomy *et al.* in Egypt at 2013. They mentioned that the quality of ANC services provided by nurses in different health centers was poor [64-66].

The present findings clearly showed that the majority of nurses had poor performance during establishing inter personnel relationship with pregnant women, recording and history taking, referral for investigations, physical examination, and tetanus toxoid administration. This result reflects not only a critical shortage of skilled health work force, but also raises questions about the implementation of the family health guidelines. This finding ties in with insights of Rowe *et al.*, 2009 and Walter *et al.*, 2010 [67, 68].

The findings of the present study showed that more than three quarters of the study nurses had poor knowledge as well as poor performance. Additionally there was an obvious positive correlation between nurses' knowledge and performance. This finding is in line with Romanian CH *et al.*, 2004, and Zaruhi *et al.*, 2009 [69,70].

Moreover, the present study showed that the program significantly upgraded the nurses knowledge and performance either immediately after program implementation or after three months, this means that nurses to a great extent had benefited from the program this finding is in line with Bajpayee in Kanataka, 2012, Ariff *et al.* in the USA at 2013 and El-Megeed *et al.* in Egypt at 2008. [71, 72, 73]

To sum up, the study shows that educational program had a highly significant effect on the nurses' knowledge and performance which is essential for providing high quality of patient /client care.

Conclusion and recommendation

Based upon the results of the present study it could be concluded that applying the performance improvement model shed the light on the importance of continuous periodic in-service training program as a selected intervention to fill the gaps between the desired and actual performance of nurses in antenatal care. It also highlighted the most common problem faced nurses at their work such as low salaries, environmental problems, shortage of nursing staff and lack of educational training. The present study also concluded that this program had a highly significant effect on nurses' knowledge and performance regarding antenatal care.

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

1. There is an urgent need to design periodic educational training programs to improve knowledge and performance of nurses about antenatal care as well as to improve maternal and perinatal outcomes.
2. Clear job description should be made for nurses working in family health centers generally and in antenatal clinic specifically.
3. There is a need to provide enough supplies, equipment and furnishing to overcome clinical problems that faced nurses at their work.
4. There is a need for providing clinical guidelines for nurses based on family health center protocol.
5. Facilitate different administrative policies to ensure the possibility of growth and motivation of nurses.
6. Further studies needs to be conducted to evaluate nurses' performance in different health settings in Upper Egypt (Qena city).
7. Using different improvement models in different health settings to identify the root causes of poor nursing performance and to improve their performance in different health settings.

References

1. World Health Organization (WHO).Women and health: today's evidence tomorrow agenda. Geneva: WHO: 2009.
2. United Nations Population Fund (UNFPA). Looking back, moving forward results and recommendations from the ICPDat-15 process. New York, USA: UNFPA; 2010.
3. United Nations. The millennium development goals report 2011. New York, USA: United Nations; 2011.
4. Mushi D, Mpembeni R, Jahn A. Effectiveness of community based Safe Motherhood promoters in improving the utilization of obstetric care. The case of Mtwara Rural District in Tanzania. BMC Pregnancy Childbirth 2010; 10(14): 1471-2393.
5. Singh D, Newburn M. Access to maternity information and support; the experiences and needs of women before and after giving support. London: National Childbirth Trust; 2010.
6. Ronsmans C. Severe acute maternal morbidity in low-income countries. Best Pract Res Clin Obstet Gynaecol 2009; 23:305-16.
7. United Nations. The millennium development goals report 2014. New York, USA: United Nations; 2014.
8. Roberts M, Redman C. Pre-eclampsia: more than pregnancy-induced hypertension. Lancet 2003; 341:1447–51.
9. Barton J, Brien M, Bergauer K, Jacques L, Sibai M. Mild gestational hypertension remote from term: progression and outcome. Am J Obstet Gynaecol 2001; 184:979–83.
10. Greer A. Hypertension. In: Dunlop W, Calder A (eds). High risk pregnancy. Oxford: Butterworth Heinemann; 2009. 30–93.
11. Lawn J, Lee A, Kinney M, Sibley L, Carlo W, Paul V. Two million intrapartum-related stillbirths and neonatal deaths: where, why, and what can be done? Int J Gynaecol Obstet 2009; 107(1):S5- 19.
12. Nolan M, Hicks C. Aims, processes and problems of antenatal education as identified by three groups of childbirth teachers. Midwifery 2012;13:179–88.
13. Salam I. Ministry of Health and Population (ARE), Healthy Egyptian 2010 initiative, Healthy Egyptians in Healthy Communities. UNCIEF Tech Rep Ser, Geneva 2000; 18-24.
14. Luxemburger C, McGready R, Kham A, Morison L, Cho T, Chongsuphi T. Effects of malaria during pregnancy on infant mortality in an area of low malaria transition. Am J Epidemiol 2014;15(4):459–65.
15. Chandler C, Jones C, Boniface G, Juma K, Reyburn H, Whitty C. Guidelines and mindlines: why do clinical staff over-diagnose malaria in Tanzania? a qualitative study. Epidemiol J 2008;14(7):153-60.

16. Paranjothy S, Thomas J. National sentinel caesarean section audit. MIDIRS Midwifery Digest 2001;11:(2):125-34.
17. National Institute for Clinical Excellence (NICA). Information for national collaborating centres and guideline development groups. Guideline development process series 3. London: Oaktree Press; 2008.
18. Titaley C.et al. Factors associated with underutilization of antenatal care services in Indonsia:results of Indonsia Demographic and Health Survey 2003 and 2007. BMC Puplic Health 2010;10:485.
19. Ashford L. Hidden suffering: disabilities from pregnancy and childbirth in less developed countries: policy brief. Washington: Population Reference Bureau, Measure Communication; 2002.
20. Bastian H, Keirse M, Lancaster P. Primary maternity services in Australia: a framework for implementation. Australia: Australian Health Ministers, Advisory Council; 2008.
21. Tracey S, Sullivan E, Dahlen H, Black D, Wang Y, Tracy M. Does size matter? A population-based study of birth in lower volume maternity hospitals for low risk women. Br J Obstet Gynaecol 2006; 113: 86-96.
22. Martin J, Hamilton B, Sutton P, Ventura S, Menacker F. Births: Final data for 2006. National Vital Statistics Reports 2009; 57(7): 1-102.
23. Ye Y, Yoshida Y, Harun-Or-Rashid M, Sakamoto J. Factors affecting the utilization of antenatal care services among women in Kham District, Xiengkhouang province, Lao PDR. Nagoya J Med Sci 2010;72(1-2):23-33.
24. World Health Organization (WHO). Monitoring emergency obstetric care: a handbook. Geneva: WHO; 2009.
25. Borges G, Lopez-Cervantes M, Medina-Mora M, Tapia-Conyer R, Garrido F. Alcohol consumption, low birth weight, and preterm delivery in the national addiction survey (Mexico). Int J Addict 2009;28(4):355–68.
26. Lehrman J. Nurse-midwifery practice: a descriptive study of prenatal care. J Nurse Midwifery 2001;26(3):27-41.
27. North A, Taylor R, Schellenberg C. Evaluation of a definition of pre-eclampsia. Br J Obstet Gynaecol 2007;106:767–73.
28. Boucar M, Bucagu, M, Djibrira S. Safe motherhood studies: results from Rwanda. Bethesda: Quality Assurance Project; 2004.
29. UNICEF global databases, 2014, based on Multiple Indicator Cluster Surveys (MICS), Demographic and Health Surveys (DHS) and other nationally representative sources. Available from: http://www.DHS/reports/report.php3 [Retrived on: Ogust, 2014].
30. Taylor J. The epidemiology of hypertension during pregnancy. In: Rubin PC (ed). Hypertension in pregnancy. Amsterdam: Elsevier Science; 2008. 223–40.
31. Salonen-Ros H, Lichtenstein P, Lipworth W. Genetic effects on the liability of developing pre-eclampsia and gestational hypertension. Am J Med Genet 2010;91 :256–60.
32. Pannu P, Giglia R, Binns C, Scott J, Oddy W. The effectiveness of health promotion materials and activities on pregnancy out come outcomes. Acta Paediatrica 2011; 100(4): 534-7.
33. Villar J, Khan-Neelofur D. Patterns of routine antenatal care for low–risk pregnancy. Cochrane Database Syst Rev 2008; 1: 1-68.
34. Royal College of Obstetricians and Gynaecologists. Periconceptual folic acid and food fortification in the prevention of neural tube defects. Scientific Advisory Committee Opinion Paper No. 4, London: RCOG; 2008.
35. Ijadunola T, Ijadunola Y, Esimai A, Abiona C. New paradigm old thinking: the case for emergency obstetric care in the prevention of maternal mortality in Nigeria. BMC Women's Health 2010, 10:6.
36. Using performance and quality improvement to strengthen skilled attendance 2003 by JHPIEGO. Available from: http://www.JHPIEGO.orgn retrieved on 24-1- 2012.
37. Littleton-Gibbs L, Engebretson J. Maternal, neonatal and women's health nursing, 4th ed. New York: Cengage Learning; 2009.
38. World Health Organization (WHO). Health statistics and information systems. Geneva: WHO; 2012.
39. Bustreo F, Hunt P. Women's and children's health annual report: evidence of impact of human rights. Geneva: WHO; 2013.
40. Nay Pyi Taw, Lozano R, Wang H, Foreman J, Rajaratnam K, Naghavi M, Marcus JR et al. Progress towards millennium development goals 4 and 5 on maternal and child mortality: an updated systematic analysis. Lancet 2011; 378: 1139-65.
41. Yengo M. Nurses' perception about the implementation of focused antenatal care services in District facilities of Eastern Uganda. South Africa: University of South Africa; 2012.
42. Siega-Riz A, Adair L, Hobel C. Maternal underweight status and inadequate rate of weight gain during the third trimester of pregnancy increases the risk of preterm delivery. J Nutr 2006;126:146–53.
43. Murila F, Obimbo-Madadi M, Musoke R. Assessment of knowledge on neonatal resuscitation amongst health care providers in Kenya. Pan Afr Med J 2012;11:78.
44. Todd C, Howlett M, Mackay M, Lawson B. Family practice/primary health care nurses in Nova Scotia. Can Nurse 2007;103(6):23-7.
45. Hamilton R. Nurses knowledge and skill retention following training: a review of the literature. J Adv Nurs 2005; 51(3):288.
46. Tanner S. A population in transition: health, culture change, and intestinal parasitism among the Tsimane' of lowland Bolivia. PhD Dissertation. University of Michigan, Ann Arbor; 2008.
47. Laschinger, Zhao C, Wang X, Xv Y, Shi L, Wang Y. Effectiveness of an intervention on uptake of maternal care in four counties in Ningxia China. Trop Med Int Health 2009; 17(12) 1441-8.
48. Hagbaghery M, Salsali M, Ahmadi F. The factors facilitating and inhibiting effective clinical decision-

making in nursing: a qualitative study. BMC Nursing 2010; 3:2.
49. American Association of Colleges of Nursing, The New Gercy College 2005.Available from: http://www.midwife.org.nz › Home › For Women. [Retrieved on: july, 2012].
50. WHO. Regional Committee for Africa, Reducing Maternal Mortality: A Challenge for the 21st Century. Ouagadougou, Burkina Faso, 28 August - 2 September 2000. Available from: http://www.afro.who.int/index.php [Retrieved on: Nove, 2012].
51. Omar AL- Badran. Staff satisfaction in maternal and child health centers in Riyadh. EMHJ 2010;10(3): 268-76.
52. Javed A. Health workers' satisfaction towards family health centers services in Pakistan, Islamabad. Master Thesis. Faculty of Graduate Studies, Mahidol University; 2008.
53. Ghobashi M, Khandekar R. work environment and health workers in antenatal care services in the musandam region of Oman. Sultan Qaboos Univ Med J 2011; 8(3): 325-32.
54. Khamis F.Overcoming Biological Hazards By using Performance Improvement Model in Maternal And Child Health Center unpublished Doctoral Dissertation, Faculty of Nursing, Alexandria Universiety; 2009.
55. Dehlendorf C, Levy K, Ruskin R, Steinauer J. Health care providers' knowledge about a barrier to quality maternal health services qualityof care. 2010; 81(4): 292–8.
56. McClure M, Carlo A, Wright L, Chomba E, Uxa F, Lincetto O, *et al.* Evaluation of the educational impact of the WHO Basic Antenatal Care course in Zambia. BMC Health Serv Res 2007; 96(8):1135-8.
57. Bajpayee D, Raju M. Evaluation of SBA training programme in Karnataka. BMC Proceedings 2012; 6(Suppl 5):1-2.
58. Lutwama W, Roos H, Dolamo L. A descriptive study on health workforce performance after decentralisation of health services in Uganda. Hum Resour Health 2012; 10(1):41.
59. Turan J, Tesfagiorghis M, Polan M. Evaluation of a community intervention for promotion of safe motherhood in Eritrea. J Midwifery Womens Health 2011;56(1):8-17.
60. Ordinioha B, Onyenaporo C. Experience with the use of community health extension workers in primary care, in a private rural health care institution in South Nigeria. Ann Afr Med 2010, 9:240–5.
61. Vickers A. Can performance have specific effects on health? A systematic review of antenatal care approaches. J R Soc Med 2006;89:303–11.
62. Sipsma L, Curry A, Kakoma J, Linnander L, Bradley H. Identifying characteristics associated with performing recommended practices in maternal and newborn care among health facilities in Rwanda: a cross-sectional study. Hum Resour Health 2012, 10(1):13.
63. Harvey S, Ayabaca P, Bucagu M. Skilled birth attendant competence: an initial assessment in four countries, and implications for the safe motherhood movement. Int J Gynaecol Obstet 2004; 87: 203–10.
64. Sarkar M,Gallo M, Au W, Pietrzak K, Comas B, Smith M, *et al.* Pregnancy outcome following gestational exposure to Echinacea: a prospective controlled study. Arch Intern Med 2010;160:3141–3.
65. Walker L, Gilson L. We are better but we are satisfied: nurses as street-level bureaucrats in Kilombero valley South Africa. Soc Sci Med 2012; 59:1251-61.
66. Eltomy M, Saboula N, Hussein A. Barriers affecting utilization of family planning services among rural Egyptian women. East Mediterr Health J 2013;19(5):400-8.
67. Rowe A, Lama M, Onikpo F, Deming M. Health worker perceptions of how being observed influences their practices during consultations with high risk pregnancy. Tropical Doc 2009; 32:166-7.
68. Walter N, Lyimo T, Skarbinski J, Metta E, Kahigwa E, Flannery B, *et al.* Why first-level health workers fail to follow guidelines for managing pregnancy in the Coast Region, the United Republic of Tanzania. Bull World Health Organ 2010; 87:99-107.
69. Romanian C. Can skilled attendance at maternity services reduce maternal morbidity in developing countries? In: De Brouwere V, van Lerberghe W (eds). Safe motherhood strategies: a review of the evidence. Belgium: ITG Press, Studies in Health Services Organization and Policy; 2004. 91–131.
70. Zaruhi A, Walters J, Nicholl P, Thomas J, Kirkham M. assessment of health care facilities to promote informed choice in maternity care: randomised controlled trial in everyday practice. Br Med J 2009;324:643..
71. El-Megeed F, Keshk L. Improving knowledge and skills for nurses working in MCH centers in Egypt to enhance women awareness regarding Antenatal care. J Am Sci 2012;8(2):283-90.
72. Bajpayee D, Raju M. Evaluation of SBA training programme in Karnataka. BMC Proceedings 2012; 6(Suppl 5):1-2.
73. Ariff S, Soofi S, Sadiq K, Feroze A, Khan S, Jafarey S, *et al.* Evaluation of health workforce competence in maternal and neonatal issues in public health sector of Pakistan: an assessment of their training needs. USA, BMC Health Serv Res 2013; 10:319.