

## EDUCATIONAL PROGRAM FOR WOMEN ABOUT NEWBORN UMBILICAL CORD CARE AT AL-HODEIDA GOVERNORATE (YEMEN)

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### Abstract

**Background:** Clean cord care is one of the essential priorities of newborn care. Despite this, cord infections are still prevalent in developing countries because of high rates of unhygienic cord care. **This study aims to** improve the knowledge of women about the newborn's umbilical cord care. **Methods:** quasi-experimental research design was utilized in this study. A convenient sample recruited 135 women from six health facilities in Al-Hodeida governorate-Yemen. **Results:** The current study shows that 43% of the studied women know the importance of cleaning and sterilizing the instruments before cutting the cord in pre-test. It is improved to 100 in post-test and decline to 67.4% in follow up. There was a statistical significant difference between women's knowledge and their residence and parity in pre, post and follow up tests with  $p=0.040$ ,  $0.010$  and  $0.012$ . **Conclusion:** The Studied women had unsatisfactory total score knowledge about umbilical cord in pre-test. But their knowledge had improved in immediately post-test among most of them and they had satisfactory knowledge. Also, some decline occurs in follow up test but it is still better than pre-test. **Recommendations:** Essential newborn care information as cord care should be provided to women during antenatal. Moreover, we must increase health awareness campaigns on essential newborn care which is required for the women to improve maternal knowledge about cord care.

**Keywords:** Newborn, Educational Program, Umbilical Cord, & Knowledge

### Introduction:

Umbilical cord care is the chain of steps that need to be applied immediately care after the delivery of newborn and if not caring carefully, it will contribute significantly to neonatal' risk of infection and mortality (Rennie, & Kendall 2013). Many studies conducted in developing countries mentioned to unsatisfactory of cord care knowledge among the studied women, which may increase the risk of infections and mortality in the newborn period (Abhulimhen-Iyoha & Ibadin, 2012 and Monebenimp, et al 2013). World Health Organization recommended

and advocated the importance of leaving dry umbilical cord care and to application of ointments (4% chlorhexidine) or other topical antiseptics in conditions where hygienic care is poor or the infection rates are high (WHO, 2013).

Globally, four million newborns die every year before they reach one month of age. The neonatal period is only 28 days, yet it accounts for 38% of all deaths under 5 years of age. Three quarters of neonatal deaths happen in the first week after birth. The average neonatal mortality rate in developing countries is over eight times

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than that prevailing in developed countries (Gul et al, 2014).

Concerning the newborn and child mortality in Yemen, although 43% of deaths under 5 years occur in the neonatal period in Yemen, most of deaths occur in the post-neonatal period. The equal focus should be given to addressing deaths in both periods of life (WHO, et al 2016).

The umbilical cord is a rope-like structure connecting the fetus to the placenta that supplies the fetus with oxygen and nutrients from the women's circulation with a mean length of 63.86cm (Unmesh & Ashok ,2012).

Parents were once instructed to swab the stump with rubbing alcohol after every diaper change. Researchers now claim that the stump might heal faster if left alone. If the stump becomes dirty or sticky, clean it with plain water then dry it by holding a clean, absorbent cloth around the stump or fanning it with a piece of paper. Parents must expose the stump to air to help dry out the base. Sponge baths might be most practical during the healing process (Palazzi ,2017).

During the healing process, it's normal to see a little blood near the stump. Much like a scab, when the cord stump falls off, a little bleeding might occur. However, parents must contact the baby's doctor if the umbilical area ooze pus or the surrounding skin becomes red and swollen. If the baby has an umbilical cord infection, prompt treatment is needed to stop the infection from spreading (Jana & Shu, 2015).

#### **Significance of the study:**

According to the Ministry of Public Health and Population in Yemen, the newborns' care is very weakly managed and absent in some areas due to the shortage of staff and equipments. In Al-Hodeida governorate, children deaths under five are considered very high; 29/1000, and infant 49/1000 (MoPHP-Yemen; 2011).

#### **Aim of the study:**

The study aimed to improve the knowledge of women about the newborn's umbilical cord care.

#### **Subject and methods:**

##### **Hypothesis:**

1. Lack of women's knowledge about newborn umbilical cord care.
2. Improvement of women's knowledge toward umbilical cord care after implementing a health educational program.

##### **Research Design:**

The quasi-experimental research design was utilized in this study.

##### **Settings of the study:**

*This study was conducted in three different districts (Al-Hok, Biat-Alfaqi, and Al-Mrawah) at Al-Hodeida governorate. It included 3 out of 10, (30%) of urban health centers and 3 out of 30, (10%) of rural health units. The current study was carried out in the East, South of Al-Hodeida governorate and at Al-Hodeida city.*

##### **Sampling and Sample Size**

The districts, urban health centers, and rural health units were selected randomly. Also, the convenient sample used in choosing women was according to who of them agreed to participate in this study. The total number of the study sample was 135 women.

##### **Inclusive criteria:**

Pregnant women should be during third trimester.

All Pregnant women who attended to units, centers and hospitals for antenatal care and who agreed to participate in the study.

##### **Tool of the study:**

The tool of the current study was an interview questionnaire sheet which was developed by the researcher based on the review of relevant literature. It included two parts:

Part (1): personal characteristics including: age, level of education of participant

women, residence, number of gravidities, and number of parity.

Part (2): Designed to assess the knowledge of women related to newborn care, it includes safe cord care and hand washing. This part is used three times: the first time is before the application of the educational program, the second time is immediately after the application of the educational program and third time is in follow up after women delivery (pre/post and follow up).

**The Scoring System** was developed for knowledge as follows: zero grades for the incorrect answer and one grade for the correct answer. Then, the researcher sums the correct answer and converted it into percentage. The total knowledge score was determined by taking points as the score is divided into:

Satisfactory >50%

Un satisfactory <50%

**The Validity of the tool:** The tool was reviewed to ascertain its validity by the panel of five experts from community health nursing staff at Assiut University, who reviewed the tool for its clarity, relevance, and comprehensiveness, understanding, and applicability. Modifications were done according to the directions of the experts committee.

**Reliability Test:**

Reliability is applied by the researchers for testing the internal of the tool, by administration of the same tools to the same subjects under similar conditions two times 15 days apart. Cronbach's Alpha reliability value for knowledge was 7.81.

**Methods:**

**I-Administrative Phase:**

An official approval letter was obtained from the Dean of the Faculty of Nursing and the Chairman of Community Health Nursing Department, Assiut University to Ministry of Health in Al-Hodeida governorate-Yemen, and to health districts authorities and directors

of the health facilities to carry out this study. The letter included a brief explanation of the objectives and a permission to carry out the study.

**Pilot study:**

A pilot study was carried out before starting of data collection on 10% of the pregnant women for testing the clarity and the feasibility of the tools and to estimate the required time to fill the questionnaire sheet.

**Data Collection Phase:**

The researcher started to collect pre-test data from women before the implementation of the educational program. The data were collected during the period from 10th of January till the 30th of April 2016.

Every month, about 30-35 sheets were finished; this was according to the response of women. The interviews administered by the researcher and co-researchers. A face to face interview was conducted individually with each woman in a separate room at health facilities. The researcher collected data 3 days per week. Almost (2 -3) women were interviewed per the day. Every interview took from 30-35 minutes according to the availability of women in antenatal visit in health facilities. The researcher selected pregnant women who fulfilled and meet the criteria and explained the nature of the study to each participant who agreed to participate in this study.

**The educational program:**

The program has been developed by the researchers based on the review of relevant literature, available resources, and revisions from supervisors. The researchers prepared an educational booklet which was used as a handout for studied women. The educational booklet included information about two parts of essential newborn care (umbilical cord care, and hand washing). The booklet was distributed to all women after pre-test. Also, ten copies were given for each

health facility as a gift and thank for their helping and supporting and the copies were distributed immediately after the program.

**After completing this program; the women will be able to:**

Perform hand -washing in correct way

Apply umbilical cord care properly.

**The program's phases:**

**1.Assessment phases:** Based on the pretest assessment of women's knowledge about newborn umbilical cord care, the educational program was designed.

**2.Planning phase:**

The arrangement of conducting the program was done during this stage: The arrangement includes the following steps:

1.Oral consent of women who participated in the present study and their household leaders (Fathers or husbands) was taken during the preparation phase before starting the pre-test.

2.Women were divided into 12 groups; each group consists of 10 to 12 participants.

**Methods of teaching:**

**Teaching method:** it included; lectures, discussions, and brainstorming.

**Media used:** pictures and booklet as handout for participants.

**Teaching time:** the time of teaching was decided according to the women's available time, particularly in rural areas.

**Teaching place:** the program was conducted in a training room in all selected health facilities, except in two rural areas (Al-A'awadar and Al-Saeed health units), the program was implemented in villages to save time and make the participants feel comfortable.

**3.The Implementation phase:**

The educational program was carried out by the researcher in the period from

20th of February to 30th of April 2016. It started after collecting the pre-test for each group. There were six sessions, divided into orientation and one session in the first day and in the last day there was one session and a post-test. In the rest of the other three days, there two sessions per day. All the sessions were carried out through five days per week for each group. Every session required from 30-45 minutes and 15 minutes as a break between sessions. Women were informed about the time and the place of sessions.

**Follow up:** After that a follow up was done after women gave birth using the same questionnaire.

**4.Evaluation stage:**

The evaluation was done by an immediate post-test and a follow up test (after birth).

**Ethical consideration:**

The proposal of the research was approved by the Ethical Committee in the Faculty of Nursing at Assiut University. There is no risk for the study's subject during the application of the research. The women were informed about the objectives of the study and they were free to either accept or refuse to participate in the current study. Oral consent was obtained from the target women. Confidentiality of the obtained information was assured as the obtained information was used only for the purpose of the study.

**Statistical analysis:**

The obtained data were reviewed, prepared for computer entry, coded, analyzed and tabulated to evaluate the differences between the groups participating in this study. Descriptive statistics as the percentage, mean and standard deviation were done using computer program SPSS version (21). Chi-square test was used. It is considered significant when P-value less than 0.05.

**Results of the study:**

**Table (1):** illustrates the distribution of

personal characteristics of the studied women. It was clear that the age of the participants ranged from 16 to 45 years old, and more than two-fifths of the studied women were under the age of 25 years old. The mean age score =  $26.79 \pm 6.61$ . Also, the table showed that 50.4% of the studied women were from rural areas and 40.7% of them were illiterate/write and read. Moreover, the table showed that 57.7% of women had 2 to 4 pregnancies.

**Table (2):** shows the knowledge of women about the importance of the cleaning and the sterilization of instruments of umbilical cord cutting in pre, post and follow up tests. It revealed that 65.2%, 73.3% and 77% respectively of women referred to use Scissor to cut the umbilical cord in pre, post and follow up tests. While only 43% of women pointed to the importance of cleaning and sterilizing instruments before cutting umbilical cord, this result reported in the pre-test. But their knowledge had improved after the implementation of the educational program to 100%, all of them were in the post-test and decline to 67.4% in the follow up test, but still better than pre-test.

Regarding the substances used to clean and sterilize the instruments before cutting umbilical cord, the current study stated that 50% of women referred to use water and soap in the pre-test. But immediately in the post-test, their knowledge had improved; where all of them (100%) pointed to use boiling water and spirit/ alcohol as substances to clean and sterilize the instruments and their knowledge was declined in the follow up test to 65.9% and 95.6% respectively.

**Table (3):** illustrates the knowledge of women about the medical substances needed to clean the umbilical cord stump. It was obvious that only 46.7% of women said that they knew it is a must to put substance on umbilical cord stump. Of those, 65.1% referred to substances as eyes-liner-kohl. These results were recorded in the pre-test.

On the post-test, all women (100%) referred to use medical substance

on cord stump, and 94.1% out of them pointed to use substances as ointment (4% chlorhexidine). On the other hand, women' knowledge declined to 66.7% and 92.2% respectively in the follow up test.

**Table (4):** Shows the Knowledge of women about inflammation of newborn's umbilical cord and its management. It was clear that 64.4%, 57%, and 9.6% respectively of women indicted to pus, red and blood as the signs of umbilical cord inflammation in the pre-test, but their knowledge improved in the post-test, to 100%, 94.8% and 86.7% respectively. Previous results were declined in the follow up test to become 77.8%, 74.1 and 66.7% respectively.

**Table (5):** Views the relation between the personal characteristic and the total score of knowledge of women about the newborn's umbilical care in pre, post and follow up tests. It was found that there were statistically significant differences between women's knowledge and their residence and parity in pre-post and follow up test with  $p= 0.040, 0.010$  and  $0.012$  respectively. While there was a statistically significant difference between women's knowledge and their age in pre-test with  $p=0.000^*$ .

**Figure (1):** Illustrates that only 12.6% of the studied women mentioned that hand washing is very important before caring umbilical cord. This result was reported in the pre-test, and it changed after implementing the educational programs, to 97% in both post test and follow up test.

**Figure (2):** Shows that 41.2% of the studied women mentioned that they use water and soap in hand washing before umbilical cord care in the pre-test, and their knowledge had improved after the implementation of the educational program to 97 % in post-test and follow up test.

**Figure (3):** Illustrates that 88.1% of the studied mothers had unsatisfactory total score of knowledge about umbilical cord care in pre test. But it had improved to 91.1% immediately in the post-test and some decline occurs to 64.4% in follow up test.

**Table (1):** Distribution of personal characteristics of women in Al-Hodeida government, Yemen 2017(n= 135)

Items	No. (n= 135)	
		%
<b>Age: (years)</b>		
<25	58	43.0
25-30	39	28.9
>30	38	28.1
<b>Mean ± SD</b>	26.79 ± 6.61	
<b>Range</b>	16.0 – 45.0	
<b>Residence:</b>		
Rural	68	50.4
Urban	67	49.6
<b>Women educational level</b>		
Illiterate/Read & write	55	40.7
Basic education	49	36.3
Secondary/ University	31	23.0
<b>Gravidity:</b>		
Primary gravidity	26	19.2
2 – 4	78	57.7
5 or more	31	23.1
<b>Parity:</b>		
None	26	19.2
Once	16	11.9
2 – 4	62	45.9
5 or more	31	23.0

**Table (2):**The Knowledge of the studied women about the importance of cleaning and sterilizing the instruments before cutting the umbilical cord in pre, post and follow up tests at Al-Hodeida government, Yemen 2017 (n=135)

Items of knowledge	N=(135)						P-value <sup>1</sup>	P-value <sup>2</sup>
	Pre-test		Post-test		Follow-up			
	No.	%	No.	%	No.	%		
<b># Cord cutting instruments</b>								
Razor blade	56	34.8	47	34.8	50	37.0	0.234	0.248
Scissor	88	65.2	99	73.3	104	77.0		
<b>Clean and sterilize cord cutting instrument.</b>							0.000	0.000*
Yes	58	43.0	135	100.0	91	67.4		
No	77	57.0	0	0	44	32.6		
<b>#Substance used to clean cord cutting instrument</b>							0.000*	0.000*
Boiling Water	11	19.0	135	100.0	60	65.9		
Water and soap	29	50.0	0	0.0	10	10.9		
Spirit and Alcohol	18	31.0	135	100.0	87	95.6		

\*Statistical significant difference

The test of significant used Chi-square

P<sup>1</sup>: P-value between Pre-test and Post-test.

P<sup>2</sup>: P-value between Pre-test and follow up-test

# More than one answer

**Table (3):** The Knowledge of the studied women about medical substance use to clean the umbilical cord stump in pre, post and follow up tests at Al-Hodeida government, Yemen 2017 (n=135)

Items of knowledge	N=(135)						P-value <sup>1</sup>	P-value <sup>2</sup>
	Pre-test		Post-test		Follow-up			
	No.	%	No.	%	No.	%		
<b>Used medical substance on cord stump:</b>								
Yes	63	46.7	135	100.0	90	66.7	0.000*	0.001*
No	72	53.3	0	0.0	45	33.3		
<b>#Type of Medical substance used on the stump:</b>								
Spirit/Alcohol	24	38.1	36	26.7	26	28.9	0.000*	0.000*
Eyes-liner-Kohl	41	65.1	5	3.7	4	4.4		
4% chlorhexidine	12	19.0	127	94.1	83	92.2		

\*Statistical significant difference

The test of significant used Chi-square

P<sup>1</sup>: P-value between Pre-test and Post-test.

P<sup>2</sup>: P-value between Pre-test and follow up-test

# More than one answer

**Table (4):** The Knowledge of women about inflammation of umbilical cord stump in pre, post and follow up tests at Al-Hodeida government, Yemen 2017 (n=135)

Items of knowledge	N= (135)						P-value <sup>1</sup>	P-value <sup>2</sup>
	Pre-test		Post-test		Follow-up			
	No.	%	No.	%	No.	%		
<b>#Signs of umbilical cord stump inflammation:</b>								
Red	77	57.0	135	100.0	105	77.8	0.000*	0.000*
Pus	87	64.4	128	94.8	100	74.1		
Blood	13	9.6	117	86.7	90	66.7		
<b>#Management of umbilical cord infected and discharge</b>								
Take baby to health center	42	31.2	85	63.0	57	42.2	0.000*	0.050
Take baby to pediatric clinic	33	24.4	81	60.0	46	34.1		
Treat baby at home	60	44.4	0	0.0	45	33.3		

\*Statistical significant difference

The test of significant used Chi-square

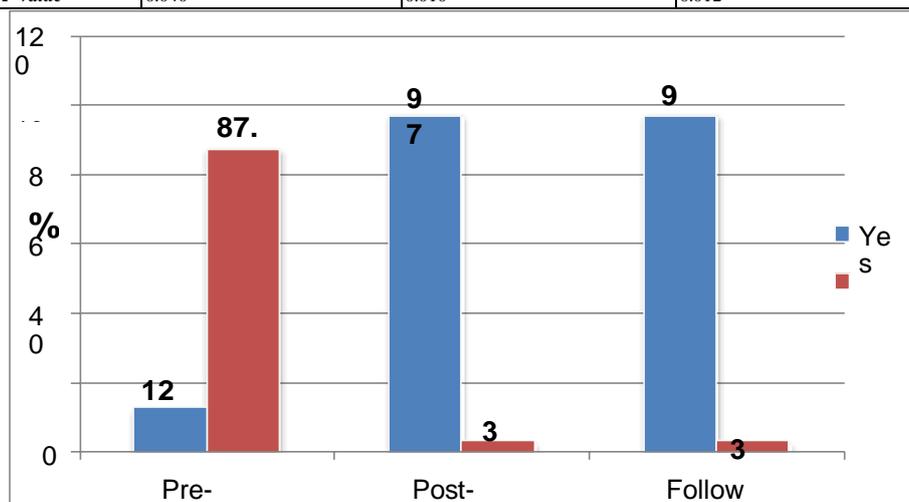
P<sup>1</sup>: P-value between Pre-test and Post-test.

P<sup>2</sup>: P-value between Pre-test and follow up-test

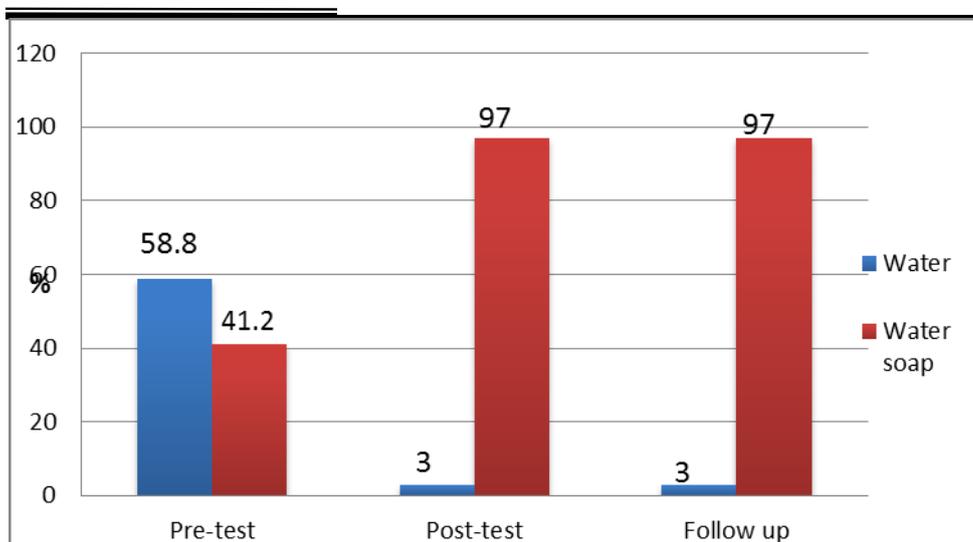
# More than one answer

**Table (5):** The relation between the personal characteristic and the total score of knowledge for women about newborn's umbilical cord care (pre, post and follow up tests) at Al-Hodeida government, Yemen 2017 (n=135)

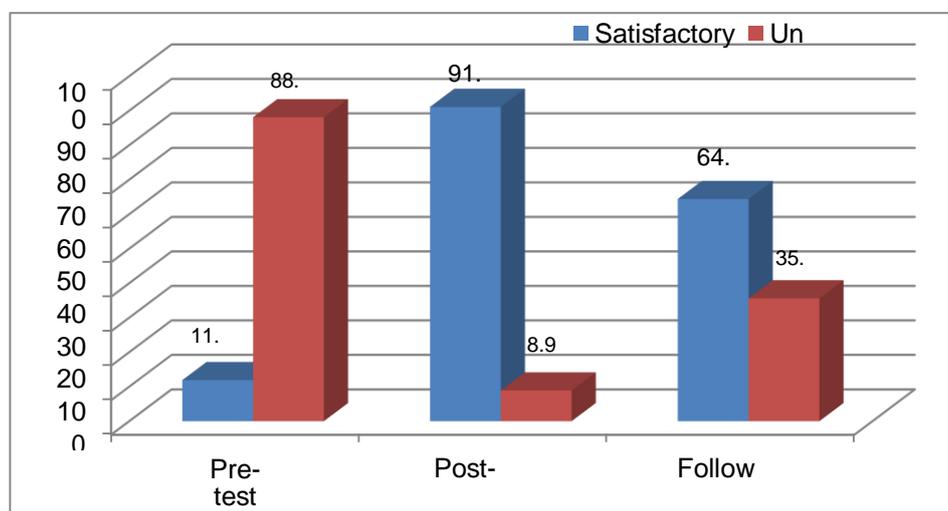
Items	Pre-test				Post-test				Follow-up			
	Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Age:</b>												
< 25	54	45.4	4	25.0	4	33.3	54	43.9	17	35.4	41	47.1
25 - 30	38	31.9	1	6.3	4	33.3	35	28.5	16	33.3	23	26.4
> 30	27	22.7	11	68.8	4	33.3	34	27.6	15	31.3	23	26.4
<b>P-value</b>	0.000*				0.779				0.417			
<b>Residence:</b>												
Rural	55	46.2	13	81.3	9	75.0	59	48.0	29	60.4	39	44.8
Urban	64	53.8	3	18.8	3	25.0	64	52.0	19	39.6	48	55.2
<b>P-value</b>	0.009*				0.074				0.083			
<b>Women educational:</b>												
Illiterate/ Read & write	48	40.3	7	43.8	7	58.3	48	39.0	23	47.9	32	36.8
Basic educational	41	34.5	8	50.0	5	41.7	44	35.8	18	37.5	31	35.6
Secondary/ university	30	25.2	1	6.3	0	0.0	31	25.2	7	14.6	24	27.6
<b>P-value</b>	0.203				0.127				0.197			
<b>Gravidity:</b>												
PG	25	21.0	1	6.3	2	16.7	24	19.5	10	20.8	16	18.4
2 - 4	65	54.6	13	81.3	8	66.7	70	56.9	24	50.0	54	62.1
5 or more	29	24.4	2	12.5	2	16.7	29	23.6	14	29.2	17	19.5
<b>P-value</b>	0.123				0.797				0.346			
<b>Parity:</b>												
None	25	21.0	1	6.3	2	16.7	24	19.5	10	20.8	16	18.4
Once	11	9.2	5	31.3	5	41.7	11	8.9	10	20.8	6	6.9
2 - 4	54	45.4	8	50.0	3	25.0	59	48.0	14	29.2	48	55.2
5 or more	29	24.4	2	12.5	2	16.7	29	23.6	14	29.2	17	19.5
<b>P-value</b>	0.040*				0.010*				0.012*			



**Figure (1):** Distribution of women' knowledge about the importance of hand washing before caring umbilical cord in pre, post and follow up tests, Al-Hodiedah government ,Yemen 2017 (n=135).



**Figure (2):** knowledge of women about substances used in hand washing before umbilical cord care in pre, post and follow up tests at Al-Hodiedah government ,Yemen 2017 (n=135).



**Figure (3):** Total score of women' knowledge about newborn's umbilical cord care in pre, post and follow up tests at Al-Hodiedah government, Yemen 2017 (n=135)

**Discussion:**

In the present study, more than two fifths of the studied women aged less than 25 years with mean±SD 26.79±6.61. These results were supported by **Lilungulu, et al 2016**, who conducted a study in Tanzania about "Reported

Knowledge, Attitude and Practice of Antenatal Care Services among Women in Dodoma Municipal, Tanzania". They reported that slightly less than three fifths of the studied participants aged from 19-25 years with mean±SD age 25.5±3.1 years.

The present study showed that two fifths of women were illiterate or writes and read, while more than one third of them had basic educational level. These results may be related to poor socioeconomic status and cultural boundaries. These results disagreed with **Amolo et al, 2017** who revealed that 45.5% of women had received tertiary education, 48.2% of them received secondary education and only 3.9% of them received primary education. Also, the present study disagrees with **Gul et al, 2014** who reported that 44.7% of the participated women had secondary or higher educational.

Regarding parity, more than half of women had from 2 to 4 births. This result disagrees with **Lilungulu, et al 2016**, who found that (20.2%) of women have more than three children.

Regarding to women' knowledge on cord cutting instruments, the present study found that two third of women used Scissor. These results disagree with **Opara et al, 2012** who reported that more than one third of studied women referred to the use of razor blade. Also, the present study disagrees with **Nepal & Thapa, 2017** who reported that 64.2% of women stated that they used a sterile blade. Also, in present study, slightly more than two fifths of them mentioned that they clean and sterilize the instruments before cutting umbilical cord. Also, half of them, mentioned that they use water and soap to clean instruments.

On the contrary, the participants' knowledge increased after the implementation of the educational program to (100%). All of them pointed to clean instrument with boiling water or use spirit and alcohol.

Regarding the women' knowledge about the medical substances used on cord stump, the Pre-test revealed that more than two fifths of women recorded that they had sufficient knowledge about using the proper medical substance on cord stump. Of these, slightly less than two thirds of the participants mentioned to apply eyes-liner-kohl on cord stump, 38.1% of them mentioned spirit/alcohol and one fifth of

them pointed to ointment (4% chorhexidine). These results are in disagreement with **Meseka et al, 2017** who reported that three quarters of women said that they clean cord stump by water, and one quarter of them apply alcohol or spirit. While more than one third of women mentioned (incorrectly) that substances could be applied to the umbilical cord stump. Of these women, slightly more than two fifth referred to powder, 14.4% pointed to ashes, 2.8% referred to oil and 2.8% alcohol.

The post-test of present of study revealed that all of women (100%) indicted to use medical substances on cord stump. Of these, the majority of them motioned to apply ointment (4% chorhexidine). Al-Hodeida governorate has a very hot weather in Yemen, and due to the lack of hygiene, women were educated to use the medical substances on newborn umbilical cord stump to prevent infectious diseases. On the follow up test slightly decline was noted in women's knowledge, to become 92.2%.

Regarding the women' knowledge about the inflammation of cord stump, it was clear that more than half, and slightly less than two fifths of them respectively indicted to signs of inflammation of cord stump as : red and pus. Of these, more than two fifths said that they treat their babies at home, while less than one third mention to take babies to health centers. These results were reported on the pre-test. In the present study, the post-test revealed that the majority of women mentioned to signs of cord stump inflammation as: red, pus and blood. Moreover, three fifths of them recorded that they usually treat newborn with inflammation cord in health centers or in pediatric clinical. These results declined on the follow up test because women forget knowledge due to the length of time between the post-test and the follow up test.

The present study found that there was a statistically significant difference between women 'age and their knowledge about cord care in the pre-test. This result was supported by **Osuchukwu et al,2017**

who reported that there was a statistically significant difference between women and their age regarding to umbilical cord care.

Moreover, the present study shows that there was a statistical significant difference between women's knowledge and residences regarding to umbilical cord care in pre, post and follow up test. This difference is because those women from rural areas had low education, and they don't follow up information from different resources as health cadres, or media regarding to their babies health.

Also, the present study shows that there was a statistical significant difference between women's knowledge and the number of parity in pre, post and follow up. These differences are due to the primary parity women are less experienced and they had less knowledge about umbilical cord care. In addition, there are varieties in the target group's regarding to the educational level and residence. These results were in agreement with **Amolo et al, 2017** who reported that women from primiparous had significant poorer knowledge compared to women from multiparous and there wasn't a statistical significant difference between women's knowledge and their educational level.

The present study revealed that the majority of women had unsatisfactory knowledge about cord care in the pre-test. This result was supported by **Osuchukwu et al, 2017** who reported that three fifths of the studied women had poor knowledge of umbilical cord care. Also, these results disagree with **Abhulimhen-Iyoha & Ibadin, 2012** who reported that less than half of the studied women had good knowledge on postnatal cord care. Other study carried out by **Meseka et al, 2017** reported that majority of the women had inadequate knowledge on cord care, as well as another study conducted by, **Castalino et al, 2014, & Amolo, 2014** who found that the knowledge of women was inadequate in areas of umbilical cord care. Also, **Nepal & Thapa, 2017** reported that one-third of respondents had lacking knowledge on umbilicus cord care.

On the other hand, participants' knowledge in the present study had

improved after the implementation of the educational program, where the vast majority of them had *satisfactory knowledge*. It declined to become less than two third in the follow-up test. This decline happened due to the long period of time and because women don't follow information.

**Conclusion:**

Based on the results of the present study, it can be concluded that; studied women had unsatisfactory total score knowledge about umbilical cord in pre-test. But their knowledge improved in immediately posttest among most of them had satisfactory knowledge. Also, some decline occurs in follow up test but still better than pre-test.

**Recommendations:**

*Based on the results of the present study it is recommended that:*

1. Essential newborn care information as cord care should be provided to women during antenatal care.

Increase health awareness campaigns on essential newborn care are required for the women to improve the maternal knowledge about cord care.

**References:**

1. **Abhulimhen-Iyoha, B. I., & Ibadin, M. O. (2012)**. Determinants of cord care practices among women in Benin City, Edo State, Nigeria. *Nigerian journal of clinical practice, 15(2)*, 210-213.
2. **Abhulimhen-Iyoha, B. I., & Ibadin, M. O. (2012)**. Determinants of cord care practices among women in Benin City, Edo State, Nigeria. *Nigerian journal of clinical practice, 15(2)*, 210-213.
3. **Amolo, L., Irimu, G., Njai, D., & Wasunna, A. (2014)**. Knowledge and attitude of postnatal women on essential newborn care practices at Kenyatta National Hospital. *MB. Ch. B UON*.
4. **Amolo, L., & Irimu, G., and Njai, D. (2017)**. Knowledge of postnatal women on essential newborn care practices at the Kenyatta National Hospital: a cross sectional study, *Pan Afr Med J. 2017; 28: 97*.
5. **Castalino, F., Nayak, B. S., & D'souza, A. (2014)**. Knowledge and

- practices of postnatal women on newborn care in Tertiary care hospital of Udipi District. *Nitte University Journal of Health Science*, 4(2), 98.
- Rennie, J. M., & Kendall, G. (2013).** *A Manual of Neonatal Intensive Care Fifth Edition.* CRC Press.
- 6. Gul, S., Khalil, R., Yousafzai, M. T., & Shoukat, F. (2014).** Newborn care knowledge and practices among women attending pediatric outpatient clinic of a hospital in Karachi, Pakistan. *International journal of health sciences*, 8(2), 167.
- 7. Jana, L. A., & Shu, J. (2015).** Heading home with your newborn. *American Academy of Pediatrics*.
- 8. Kudachi, Y. P., Prabhu, M., & Angolkar, M. B (2017).** Impact of Health Education on Knowledge of Newborn Care among Expectant Women in Urban Area of Belagavi, India: Pre and Post Study. *Religion*, 30(35), 7.
- 9. Lilungulu, A. G., Matovelo, D., & Gesase, A. (2016).** Reported knowledge, attitude and practice of antenatal care services among women in Dodoma municipal. Tanzania. *Journal of Pediatrics and Neonatal Care*, 4(1), 8.
- 10. Lilungulu, A. G., Matovelo, D., & Gesase, A. (2016).** Reported knowledge, attitude and practice of antenatal care services among women in Dodoma municipal. Tanzania. *Journal of Pediatrics and Neonatal Care*, 4(1), 8.
- 11. Meseke L, Mungai L & Musoke .R., (2017).** Women' knowledge on essential newborn care at Juba Teaching Hospital, South Sudan, South Sudan Medical Journal, Vol 10. No 3Pp56-59.
- 12. Monebenimp, F., MONGO, M. E., CHELO, D., FOUMANE, P., Kamta, C., & KUABAN, C. (2013).** Women 'knowledge and practice on essential newborn care at health facilities in garoua city, cameroon. *health sciences and diseases*, 14(2).
- 13. Nepal. S., & Thapa S., (2017).** Knowledge and Practice of Newborn Care Among Women of Infants in Kavrepalanchok District, *International Annals of Medicine*. 2017;1(4)
- 14. Opara, P. I., Jaja, T., Dotimi, D. A., & Alex-Hart, B. A. (2012).** Newborn Cord Care Practices amongst Women in Yenagoa Local Government Area, Bayelsa State, Nigeria. *International Journal of Clinical Medicine*. 3(1), 22.
- 15. Osuchukwu, E., Ezeruigbo C& Eko. J. (2017):** Knowledge of Standard Umbilical Cord Management among Women in Calabar South Local Government Area, Cross River State, Nigeria, *International Journal of Nursing Science* 2017, 7(3): 57-62
- 16. Palazzi D (2017):**Care of the umbilicus and management of umbilical disorders. <https://www.uptodate.com/contents/search>.
- 17. Rennie, J. M., & Kendall, G. (2013).** *A Manual of Neonatal Intensive Care Fifth Edition.* CRC Press.
- 18. Reshma, R., & Sujatha, R. (2014).** Cultural practices and beliefs on newborn care among womens in a selected hospital of Mangalore taluk. *Nitte Univ Health Sci*, 4(2).
- 19. Saaka M , and Iddrisu M.(2014).** Patterns and Determinants of Essential Newborn Care Practices in Rural Areas of Northern Ghana. *International Journal of Population Research*; 2014
- 20. Unmesh, B. N. and Ashok, S. M. (2012).** The Journal of Obstetrics and Gynaecology of India; Study of Length of Umbilical Cord and Foetal Outcome: A Study of 1,000 Deliveries Vol. 62 (5) pg. 520–52.
- 21. World Health Organization. (2016).** *World Health Statistics 2016: Monitoring Health for the SDGs Sustainable Development Goals.* World Health Organization.
- 22. World Health Organization.(2013).** *Technical Consultation on Postpartum and Postnatal Care.* Department of Making Pregnancy Safer.