

## Effectiveness of Health Education Program on Health Care Providers' Knowledge toward Immunization of Children at Primary Health Care Centers in Kirkuk City

فاعلية البرنامج التعليمي الصحي في معارف مقدمي العناية الصحية بإتجاه لقاحات الأطفال في المراكز الصحية الأولية في مدينة كركوك

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### المستخلص:

**الهدف:** تهدف الدراسة الى تقويم فاعلية البرنامج التعليمي الصحي في معارف مقدمي العناية الصحية بإتجاه لقاحات الأطفال في المراكز الصحية الأولية في مدينة كركوك.

**المنهجية:** أجريت دراسة شبه تجريبية لمجموعتان دراسيتان (اختبار قبلي، اختبار بعدي ١، اختبار بعدي ٢) تم إجراؤه في مراكز الرعاية الصحية الأولية بمدينة كركوك خلال الفترة من ٢٨ أكتوبر ٢٠١٩ إلى ١٠ أغسطس ٢٠٢٠. وذلك من خلال جمع (٥٠) عينة مقسمة إلى مجموعتين تحتوي كل واحدة على (25) مشارك من مقدمي العناية الصحية كمجموعة ضابطة ومجموعة دراسة. تعرضت مجموعة الدراسة لبرنامج التعليم الصحي بينما لم تتعرض مجموعة الضبط لبرنامج التعليم الصحي.

**النتائج:** اظهرت نتائج الدراسة اثراً إيجابياً واضحاً للبرنامج على معارف مقدمي العناية الصحية إزاء لقاحات الأطفال وأشارت نتائج الدراسة بوجود فروقات ذات دلالة معنوية عالية للمجموعة التجريبية بين الاختبار القبلي والاختبار البعدي في الجوانب الرئيسية التي لها علاقة بمعارف مقدمي العناية الصحية بإتجاه لقاحات الأطفال.

**التوصيات:** أوصت الدراسة الى ضرورة إجراء المحاضرات التعليمية وتحديثها بانتظام لمقدمي العناية الصحية حول لقاحات الأطفال لأولئك الذين يعملون في مجال اللقاح والأقسام الأخرى داخل مراكز الرعاية الصحية الأولية. كما أوصت الدراسة بإقامة المزيد من الدراسات البحثية على عينة أكثر وعدداً من المراكز الصحية الأولية في المحافظات الأخرى من العراق.

**الكلمات المفتاحية:** البرنامج التعليمي الصحي ، معارف ، لقاحات الأطفال

### Abstract:

**Objectives:** The study aims to evaluate effectiveness of health education program on health care providers' knowledge toward immunization of children at primary health care centers in Kirkuk city.

**Methodology:** A quasi –experimental study design two- group (pre-test, post-test 1 and post-test 2) conducted at primary health care centers in Kirkuk city during the period from 28 October 2019 to 10 August 2020. By collecting (50) samples divided into two groups, each one (25) participant as control & study group. The study group exposed to the education program only.

**Results:** Results showed a clear positive effect of the program on health care providers' knowledge towards child immunization. It indicated high significant differences for the study group between the pre-test and the post-test in the main aspects that have to do with the knowledge of health care providers' about child immunization.

**Recommendations:** An educational lectures should conducted & regularly updated for care providers' about child immunization for those working in the field of vaccine and other departments within primary care centers. It also recommended more research studies should conducted on a larger sample & more primary care centers in the rest of Iraqi governorates.

**Keywords:** Health Educational Program, Knowledge, children immunization.

## Introduction

Vaccination is most successful public health interventions has led to elimination & control of diseases. Vaccines defend our body against various pathogens & improve our body immunity against them. The adverse reactions produced by vaccines are commonly associated with the live vaccines as compared to inactivated vaccines. <sup>(1)</sup>

Prevention diseases reduces economic burden of diseases on society & considered effective in comparison to cure. Vaccines not only reduced the burden of vaccines preventable diseases, but it also has a worth mentioning role of decreasing antibiotic resistance, reduction in bioterrorism & promotion economic growth. Lack knowledge, low-level awareness & misperception regarding vaccines are the major barriers towards avoidance of vaccination. <sup>(2)</sup>

The goal of immunization system is to increase number or proportion of children who immunized by all vaccination doses under the context of child health care. The proportion fully child immunization related to the health clinic activities of primary care staff. <sup>(3)</sup>

In response to challenges in global immunization, World Health Organization and United Nations Children's Fund (UNICEF) developed the global immunization vision and strategy from 2006–2015. One of the set goals for this strategy for any country is to reach at least (90%) national vaccination coverage and at least (80%) vaccination coverage in every district or equivalent administrative unit. <sup>(4)</sup>

Community health workers (CHWs) comprise a diverse category of healthcare workers who commonly operate in communities outside of healthcare facilities. These workers typically receive some degree of formal training related to their roles and responsibilities, but do not possess professional or paraprofessional training, and are not required to hold a tertiary education degree. <sup>(5)</sup>

## Objective of the study

To determine the effectiveness of health educational program on health care providers' knowledge toward immunization of children at primary health care center in Kirkuk city.

## Methodology

A quasi-experimental study design two-study group (pre-test, post-test1 and post-test 2) used to guide this study to determine the effectiveness of health education program on health care providers' knowledge toward immunization of children.

A non-probability (purposive) sample of the study consisted from (50) health care providers' who were actually work at primary Health Care Centers selected for the purpose of this study. The sample (50) divided into two groups: (25) health care providers' as study group, which exposed to the health education program and (25) health care providers' who not exposed to the program, considered as the control group. Both group has made pre-test, post-test I, and post-test II in order to evaluate the effectiveness of health education program on health care providers' knowledge toward immunization of children.

## Study Instrument

The researcher construct a questionnaire format in order to reach the aims of the study and consists of (2) parts: (1) Self-administered questionnaire related to demographic characteristics such as (age, gender, education level, number of years of work in primary health care centers generally, number of years of works in the field of vaccination, and number of training cycles in the field of vaccines inside and outside of Iraq).

(2) Self-administered questionnaire related to health providers' knowledge toward immunization of children. It comprises (30) items that divided in to (4) sections: Section 1 consist of (8) items concerned with care providers' general information on immunization. Section 2 consist of (4) items concerned with care providers' knowledge on the schedule of vaccines. Section 3 comprises (11) items related to care providers' knowledge on amount of dose & route of administration of the vaccine. Section 4 consist of (7) items concerned with health care providers' knowledge about the false contraindications in the administration of vaccines.

### **Pilot Study**

The pilot study carried out on (10) health care providers', divided into two groups, five participant in each group (study and control groups) for checking the wording of questionnaire & estimate time needed for information accumulation.

### **Validity**

The validity of the program and the study instruments are determined by the panel of (12) experts, which have (8) years' and more experience in their field to investigate the content of the educational program and questionnaire about immunization of children.

### **Reliability**

Reliability of the questionnaire determined by test-retest approach obtained through evaluating (10) health care providers', and the interval period was two weeks. The result indicate that the questionnaire format is adequately reliable through the computation of Alpha

Correlation Coefficient (Cronbach's Alpha).

### **Statistical analysis**

The Coefficient Alpha used to determine the reliability of the present study instrument by application of Statistical Package for Social Science Program (SPSS).

### **Ethical Consideration**

The researcher familiarized the study participants to overall goal of the study & confirmed participants that the confidentiality of their data will safeguarded and securely sustained during and following study participation. The researcher further assured study participants that their names would remain unknown in the presentation, reporting, and/or any eventual publication of the study

### **Ethical considerations**

The Institutional Review Board (IRB) in college of nursing /university of Baghdad reviewed contents of program and questionnaire before conducting a study. Informed consent was taken orally before participating in the study. After that information regarding study title and objectives had been given. Two official requests were submitted through the College of Nursing / University of Baghdad to medical city directorate/ Ministry of Health (MOH) to take approval for data collection from Iraqi center for cardiac disease and Al-Karkh health directorate/ Ministry of Health (MOH) to take approval for data collection from Ibn-Albetar specialist center for cardiac surgery in Baghdad city.

**Result:****Table (1) Distribution of the Study and Control Group Sample by their Demographic Characteristics**

Variables		Control group		Study group	
		Freq.	%	Freq.	%
Age	(20 – 24)	-	-	3	12
	(25 – 29)	9	36.0	9	36
	(30 – 34)	11	44.0	9	36
	35 and more	5	20.0	4	16.0
	Total	25	100.0	25	100.0
Gender	Male	11	44.0	13	52.0
	Female	14	56.0	12	48.0
	Total	25	100.0	25	100.0
Level of education	Graduate College Of Nursing	5	20.0	8	32.0
	Graduate Technical College	6	24.0	4	16.0
	Graduate Nursing Institute	6	24.0	3	12.0
	Graduate Nursing High School	8	32.0	10	40.0
	Total	25	100.0	25	100.0
Years of working in primary health care centers generally	1-5	5	20.0	2	8
	6-10	4	16.0	5	20
	11-15	5	20.0	7	28
	16-20	6	24.0	7	28
	More than 20	5	20.0	4	16
	Total	25	100.0	25	100
Years of works in the field of vaccination	Did not work	16	64.0	18	72
	1-5	6	24.0	1	4
	6-10	3	12.0	4	16
	11-15	-	-	2	8
	Total	25	100.0	25	100.0
Participate in training at vaccination field	Yes	9	36.0	6	24.0
	No	16	64.0	19	76.0
	Total	25	100.0	25	100.0
No. of training cycles in the field of vaccines inside Iraq	Nor training cycle	16	64.0	19	76.0
	(1-2) training cycle	9	36.0	6	24.0
	(3- 4) training cycles	-	-	-	-
	5 training cycles & more	-	-	-	-
	Total	25	100.0	25	100.0
No. of training cycles in the field of vaccines outside Iraq	Nor training cycle	25	100.0	25	100.0
	(1-2) training cycle	-	-	-	-
	(3- 4) training cycles	-	-	-	-
	More than 5 training cycles	-	-	-	-
	Total	25	100.0	25	100.0

**Freq. = Frequencies, % = Percentages.**

Table (1) reveals 44% of control group is within (30-34) years while study group is 36 % for both (25-29) & (30-34) years. At control group (56%) were female & (52%) were male in study group. (32%) & (40%) is High School Nursing Graduate for control & study group respectively. Majority control group (24%) had (16-20) years' services, while (28%) of study group had (11-15) & (16-20) years at PHCs. Most sample in control group (64%) & study group (72%) had not working in vaccination field. (64%) of control and (76%) of the study group not participate in training course related to vaccination. Regarding to the training cycles at vaccination field inside Iraq, the largest control and study group have not training about (64%) & (76%) respectively.

**Table (2): Comparison among Three Periods (pre, post-I and post II tests) for Health Care Providers' Knowledge toward Immunization of Children to the Study Group**

Questions Related To Knowledge	Pre-Test		Post I Test		Post II Test		ANOVA		
	Mea n	Ev a.	Mea n	Ev a.	Mea n	Ev a.	F	P-value	C.S.
<b>General knowledge for health care providers' about vaccines</b>									
1-Vaccine is	1.28	L	1.92	H	1.92	H	28.1	.000	HS
2-Natural immunity means	1.16	L	1.96	H	1.96	H	72.7	.000	HS
3-To maintain the effectiveness of BCG vaccine	1.24	L	1.96	H	1.96	H	48	.000	HS
4-The poliovirus is transmitted by	1.16	L	1.96	H	1.96	H	72.7	.000	HS
5-The DPT vaccine provides protection from	1.28	L	1.92	H	1.96	H	33.4	.000	HS
6-The child who not vaccinated mean	1.20	L	1.36	M	1.44	M	1.68	.192	NS
7-Cases that prevent giving vaccine to a child include	1.12	L	1.96	H	2	H	123	.000	HS
8-measles incubation period	1.12	L	1.6	M	1.68	H	11.7	.000	HS
<b>knowledge of health care providers' about Schedule of vaccines</b>									
1-The number of oral polio vaccine doses given to a child under the age of five years within the National Immunization Program are	1.16	L	1.88	H	1.88	H	36	.000	HS
2-Duration between the first and the second dose of hepatitis B vaccine is	1.24	L	1.64	M	1.64	M	5.97	.004	HS
3-The second booster dose of the measles, mumps and rubella vaccine is given to a child at the age	1.24	L	1.68	H	1.76	H	9.69	.000	HS
4-Vitamin A (100,000 IU) is given according to the National Immunization Program	1.32	L	1.96	H	1.96	H	33.3	.000	HS
<b>Knowledge of health care providers about the amount of dose and method of administration</b>									
1-The first dose of polio vaccine	1.12	L	1.96	H	1.96	H	92.8	.000	HS
2-The dose amount of BCG vaccine	1.12	L	1.84	H	1.88	H	38.1	.000	HS

and its administration method is									
3-The dose amount of polio vaccine is	1.08	L	1.88	H	1.88	H	53.9	.000	HS
4-The dose amount of DPT vaccine (Diphtheria, Pertussis, Tetanus) is	1.08	L	1.80	H	1.84	H	35.7	.000	HS
5-(MMR vaccine, quaternary vaccine and polio vaccine) are given by age	1	L	1.72	H	1.72	H	30.8	.000	HS
6-The dose amount of measles vaccine is	1.2	L	1.56	M	1.6	M	5.4	.006	HS
7-The quintet vaccine includes	1.04	L	1.92	H	1.92	H	100	.000	HS
8-Compound vaccines are used to	1.08	L	1.96	H	1.96	H	123	.000	HS
9-Combined vaccines (DPT) destroy by	1.08	L	1.88	H	1.88	H	53.9	.000	HS
10-The number of BCG vaccine dosages amount in its glass container is	1.12	L	1.84	H	1.92	H	44.5	.000	HS
11-(0.5 ml) dose is for the vaccine	1.12	L	1.72	H	1.72	H	16.9	.000	HS
<b>Healthcare providers knowledge about the false contraindications in administering vaccines</b>									
1-conditions that do not mind giving the vaccine to a child are	1.04	L	1.64	M	1.72	H	21.1	.000	HS
2-Cases Postpone the vaccine given to the child is	1.24	L	1.88	H	1.92	H	28.9	.000	HS
3-Cases that the vaccine should not be given to a child are	1.16	L	1.92	H	1.92	H	49.2	.000	HS
4-During giving the vaccine to a child, it should	1.28	L	1.68	H	1.76	H	7.9	.001	HS
5-Vaccines that are in a liquid state when received from the vaccine depository should be used	1.04	L	1.76	H	1.80	H	34.5	.000	HS
6-Vaccines that are dissolved in the health center, such as measles and MMR, should be used during	1.16	L	1.64	M	1.68	H	10.3	.000	HS
7-When dissolving powdered vaccines such as BCG, measles, and MMR, you should	1.04	L	1.72	H	1.76	H	27.9	.000	HS

ANOVA= Analysis of Variance, Eva= evaluation, d.f= degree of freedom, F= F-test, p: probability, C.S.: Comparison, Significant, NS: Non Significant at  $P > 0.05$ , Eva. = evaluation level of mean score, L=low level (1-1.33), M=moderate level (1.34-1.67), H=high level (1.68-2).

Table (2) shows that there is significant difference between the mean of pre-test, the mean of post-test I and mean of post-test II for the Health Care Providers' Knowledge toward Immunization of Children Study Group for all items except the item (6) The child who not vaccinated mean, from the section one, when they are analyzed by ANOVA .

**Table (3): Comparison among Three Periods (pre, post-I and post II tests) for Health Care Providers' Knowledge toward Immunization of Children to the Control Group**

Questions Related To Knowledge	Pre-Test		Post I Test		Post II Test		ANOVA		
	Mean	Ev a.	Mean	Eva .	Mean	Ev a.	F	P. value	C. S.
General knowledge for health care providers' about vaccines									
1-Vaccine is	1.36	M	1.40	M	1.48	M	.37	.69	NS
2-Natural immunity means	1.32	L	1.32	L	1.36	M	.05	.94	NS
3-To maintain the effectiveness of BCG vaccine	1.12	L	1.16	L	1.28	L	1.13	.32	NS
4-The poliovirus is transmitted by	1.08	L	1.08	L	1.08	L	.00	1.0	NS
5-The DPT vaccine provides protection from	1.2	L	1.20	L	1.28	L	.29	.74	NS
6-The child who not vaccinated mean	1.04	L	1.08	L	1.12	L	.52	.59	NS
7-Cases that prevent giving vaccine to a child include	1.24	L	1.24	L	1.36	M	.58	.56	NS
8-measles incubation period	1.12	L	1.16	L	1.20	L	.28	.75	NS
knowledge of health care providers' about Schedule of vaccines									
1-The number of oral polio vaccine doses given to a child under the age of five years within the National Immunization Program are	1.16	L	1.20	L	1.24	L	.24	.78	NS
2-Duration between the first and the second dose of hepatitis B vaccine is	1.32	L	1.32	L	1.36	M	.058	.94	NS
3-The second booster dose of the measles, mumps and rubella vaccine is given to a child at the age	1.12	L	1.16	L	1.24	L	.63	.53	NS
4-Vitamin A (100,000 IU) is given according to the National Immunization Program	1.20	L	1.24	L	1.24	L	.073	.93	NS
knowledge of health care providers' about the amount of dose and method of administration									
1-The first dose of polio vaccine	1.2	L	1.20	L	1.24	L	.076	.92	NS
2-The dose amount of BCG vaccine and its administration method is	1.04	L	1.08	L	1.16	L	1.09	.34	NS
3-The dose amount of polio vaccine is	1.6	M	1.60	M	1.64	M	.054	.94	NS
4-The dose amount of DPT vaccine (Diphtheria, Pertussis, Tetanus) is	1.04	L	1.08	L	1.20	L	1.83	.16	NS
5-(MMR vaccine, quaternary vaccine and polio vaccine) are given by age	1.12	L	1.16	L	1.20	L	.28	.75	NS
6-The dose amount of measles vaccine is	1.04	L	1.08	L	1.16	L	1.09	.34	NS
7-The quintet vaccine includes	1.12	L	1.16	L	1.24	L	.63	.53	NS
8-Compound vaccines are used to	1.08	L	1.12	L	1.24	L	1.38	.25	NS
9-Combined vaccines (DPT) destroy by	1.12	L	1.16	L	1.16	L	.10	.90	NS
10-The number of BCG vaccine dosages amount in its glass container is	1.16	L	1.20	L	1.280	L	.54	.58	NS

11-(0.5 ml) dose is for the vaccine	1.12	L	1.16	L	1.200	L	.28	.75	NS
Healthcare providers knowledge about the false contraindications in administering vaccines									
1-conditions that do not mind giving the vaccine to a child are	1.32	L	1.28	L	1.48	M	1.2	.30	NS
2-Cases Postpone the vaccine given to the child is	1.12	L	1.16	L	1.2	L	.28	.75	NS
3-Cases that the vaccine should not be given to a child are	1.12	L	1.08	L	1.2	L	.79	.45	NS
4-During giving the vaccine to a child, it should	1.12	L	1.12	L	1.16	L	.11	.89	NS
5-Vaccines that are in a liquid state when received from the vaccine depository should be used	1.16	L	1.2	L	1.28	L	.54	.58	NS
6-Vaccines that are dissolved in the health center, such as measles and MMR, should be used during	1.2	L	1.12	L	1.28	L	.98	.37	NS
7-When dissolving powdered vaccines such as BCG, measles, and MMR, you should	1.16	L	1.04	L	1.4	M	2.7	.07	NS

ANOVA= Analysis of Variance, Eva= evaluation, d.f= degree of freedom, F= F-test, p: probability, C.S.: Comparison, Significant, NS: Non Significant at  $P > 0.05$ , Eva. = evaluation level of mean score, L=low level (1-1.33), M=moderate level (1.34-1.67), H=high level (1.68-2)

Table (3) shows that there is no significant difference between the mean of pre-test, post-test I and post-test II for the Health Care Providers' Knowledge toward Immunization of Children at the control Group for all items when they are analyzed by ANOVA.

**Table (4): Distribution the Health Care Providers' Knowledge toward Immunization of Children (Control and Study Group) Levels of Assessment through the "Mean of Score" Among the Period of the Program (Pre-test, Post- test I and post-test II).**

Period	Level of Assessment	Control group		Study group	
		Frequency	Percent	Frequency	Percent
Pre-test	Low (1-1.33)	25	100	25	100
	Moderate (1.34-1.67)	-	-	-	-
	High (1.68-2)	-	-	-	-
	Total	25	100	25	100
	$\bar{x} \mp S. D$	1.17 $\mp$ 0.081		1.15 $\mp$ 0.039	
Post-test I	Low (1-1.33)	25	100	-	-
	Moderate (1.34-1.67)	-	-	6	24
	High (1.68-2)	-	-	19	76
	Total	25	100	25	100
	$\bar{x} \mp S. D$	1.19 $\mp$ 0.082		1.8 $\mp$ 0.119	
Post-test II	Low (1-1.33)	21	84	-	-
	Moderate (1.34-1.67)	4	16	4	16
	High (1.68-2)	-	-	21	84
	Total	25	100	25	100
	$\bar{x} \mp S. D$	1.26 $\pm$ 0.156		1.83 $\pm$ 0.112	

= Arithmetic Mean ( $\bar{x}$ ) and Std. Dev. (S.D.)



Table (4) indicate low level of assessment of 25 (100%) for both control group and study group at level (1.00-1.33). At the pre-test, the mean of score and standard deviation are (1.17±0.081) for the control group (1.15±0.039) for the study group. In post-test I, there is low level of assessment of 25 (100%) of the control group at level (1.00-1.33), the mean of score and standard deviation are (1.19±0.082), while there is high level of assessment of 19 (76 %) of the study group at level (1.68-2), the mean of score and standard deviation are (1.8±0.119). Finally in the post-test II, there is low level of assessment of 21 (84%) of the control group at level (1.00-1.33), the mean of score and standard deviation are (1.26±0.156), but there is high level of assessment of 21 (84%) of the study group at level (1.68-2), the mean of score and standard deviation are (1.83±0.112).

## Discussion

**Table (1)** ensure equivalence in both groups & no significant alteration among study & control groups, excluding in the gender state. The majority of health care providers' at control group is female (56%) & (44%) male, whereas in the study group male (52%) & female (48%). The results reveals that majority of participant in control group is 11 (44%) aged (30-34) years, and in study group is 9 (36%) were aged (30-34) & (25-29) years. This study is consistent with a study in Egypt, were indicated that majority (37.8%) of study sample aged between (20-29) years old. <sup>(6)</sup>

Concerning with educational level, the majority of the study group both the control & the study group have graduates from nursing high school about (32 %) in control group, & (40%) in study group. These results supported by the study in Pakistan who reported that most of the sample were graduates from nursing high school about (55.6%) in the study group and (51.3%) in the control group. <sup>(7)</sup>

Related to working years in primary health care centers generally, the results revealed that majority care providers' in control group 6 (24 %) & study group 7(26 %) have (16 -20) Years of working at the primary care centers. This results is agree with the study in Minia who indicate majority (59.0 %) of the sample have (19-20) years of working at the primary care center. <sup>(8)</sup>

Most sample in control group (64%) & study group (72%) have not

working in the field of vaccination. This result incongruent with a study in Ibadan, Southwestern who indicated that the majority (40.0%) of the sample has experience and worked at vaccination field. <sup>(9)</sup>

Regarding the training course, only 6 (24%) of health care providers' in study group & 9 (36%) in control group have (1-2) time of training courses in the vaccination field inside Iraq. Majority 16 (64 %) of control group and 19 (76%) of study group displayed no attending any training session or conferences regarding knowledge related to child immunization. This agreed with the study in Kenya, which indicated that the majority (51.8%) of the sample have no training cycle in the field of vaccination. <sup>(10)</sup>

**Table (2)** indicated significant difference between mean of pre-test, post-test I & post-test II in knowledge of care providers' toward immunization at study group for all items. Except in item 6 from the section 1, which show no significant differences related to care providers' knowledge on general knowledge toward vaccines. This result supported by the study in Minia who concluded that the health education program was effective in improving health providers' knowledge in post-test program than before about general information of vaccines.

**Table (3)** no significant difference between the mean of two period over all items in comparing the knowledge between pre-test and post-test II, , except in the item (3) from section 1; item (4) &

(8) from the section 3 and item (1) from the section 4, which shows Significant at  $P < 0.05$ . Also showed no significant difference between the mean of posttest I and posttest II at control Group. Except in items of: (1); (6) & (7) from the section four were had showed a significant difference.

**Table (4)** indicate low level of assessment of 25 (100%) for both control group & study group at level (1.00-1.33). At the pre-test, the mean of score & standard deviation are (1.17±0.081) for control group & (1.15±0.039) for study group. In post-test I, there is low level of assessment of 25 (100%) of control group at level (1.00-1.33), the mean of score & standard deviation are (1.19±0.082), while high level of assessment of 19 (76 %) in study group at level (1.68-2), the mean of score and standard deviation are (1.8±0.119). This indicate improvement in study group after exposing them to the education program.

Finally in the post-test II, there is low level of assessment of 21 (84%) of control group at level (1.00-1.33) & (16.0%) of them at moderate level of assessment. The mean of score & standard deviation for the control group are (1.26±0.156), but there is high level of assessment of 21 (84%) in the study group at level (1.68-2), the mean of score and standard deviation are (1.83±0.112). The results is agree with study in Egypt. Which indicated that knowledge of health care providers' around vaccine was inadequate before educational program, and improved after participation in the program. <sup>(11)</sup>

### Recommendations

- 1- Educational & training cycles around childhood vaccine must developed & implemented at primary health care center to improve health providers' knowledge regarding child immunization.
- 2- Educational lectures must regularly done & updated for care providers', not only for those working at the vaccination field,

but also for other section at the primary health care centers.

- 3- Offer educational booklets for health care providers' to improve their knowledge.
- 4- Further research studies should conducted on a large sample size & more primary care centers in Kirkuk governorate instead of Kirkuk city in addition to the rest of Iraq Governorates.

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