



Evaluating the Effectiveness of Training Course toward Train-the-Trainer on Enhancing Healthcare Professionals' knowledge in Kurdistan Region- Iraq

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ABSTRACT

Background: Train the trainer programs are widely utilized in healthcare to disseminate knowledge and build capacity among professionals. In a field where resources are limited, healthcare professionals must address increasingly complex challenges. However, management-focused training is often absent from traditional university curricula, particularly in medicine, underscoring the need for specialized training programs.

Objectives: to assess healthcare professionals' knowledge and evaluate the impact of a train the trainers' course on their knowledge.

Methodology: A quantitative design, descriptive study was employed, using a non-probability purposive sample of 50 healthcare professionals. The instrument's reliability was determined through stability reliability, test-retest approach. Data were collected via checklist before and after a training course. A post-test was administered on the final day of training to measure outcomes.

Results: The majority of participants (aged 20–35 years) were government employees, with educational backgrounds from nursing institutes and colleges. About 64% were hospital employees, while others worked in healthcare centers. (60%) had 0–5 years of professional experience. (74%) had not previously attended a train the trainer course. Before the training course only (12%) of them had a high level of knowledge regarding train the trainer while after completing the training, (100%) of participants reported high level of knowledge.

Conclusion: This study confirms the effectiveness of train-the-trainer programs in significantly improving healthcare professionals' knowledge, particularly in management skills lacking in traditional education. The dramatic pre-to-post-test knowledge gains demonstrate these programs' value for workforce development in resource-limited settings, advocating for their wider implementation to strengthen healthcare systems.

Keywords: Evaluation, train-the-trainer, knowledge enhancement, healthcare professionals, training impact.

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Authors Contribution: ^{1,2,3,4} presented the training course for the participants; ⁵ Analyzed the results; ^{6,7,8,9,10} Wrote the manuscript

INTRODUCTION

Train – the – Trainer (TTT) Programs in Healthcare: Originating in the 1970s, TTT programs were pioneered by non-governmental organizations (NGOs) and universities to deliver cost-effective education to under-served populations in resource-limited settings (1, 2). These models capitalize on social capital within communities, employing local trainers familiar with language, culture, and socioeconomic contexts to educate peers (3). Over time, TTT has been implemented across disciplines and healthcare settings to update professionals' skills and support evidence-based practice adoption (4).

Train the trainer programs involve master trainers equipping selected professionals with expertise and tools, enabling them to train peers (Figure 1). Unlike traditional gatekeeper models, TTT fosters broad dissemination of knowledge, enhancing care quality and treatment outcomes through trainees' newly acquired skills (1). Peer trainers offer

critical support during the workday and insights into organizational barriers, facilitating practical knowledge application (5).

The model's advantages include improved clinical teamwork, increased job satisfaction, and reduced staff turnover, positioning it as a sustainable, cost-efficient alternative to direct trainer models (6). Recent studies highlight its effectiveness, particularly when using interactive and blended learning approaches, which have shown significant benefits for trainers' knowledge in healthcare and social care domains (7). However, further research is needed to explore long-term sustainability and the model's impact on trainees' knowledge—a key differentiate of TTT programs. Despite these insights, no systematic review has fully assessed TTT's potential to cascade knowledge from experts to trainees through its structured, stepwise approach (Figure 1) (8).

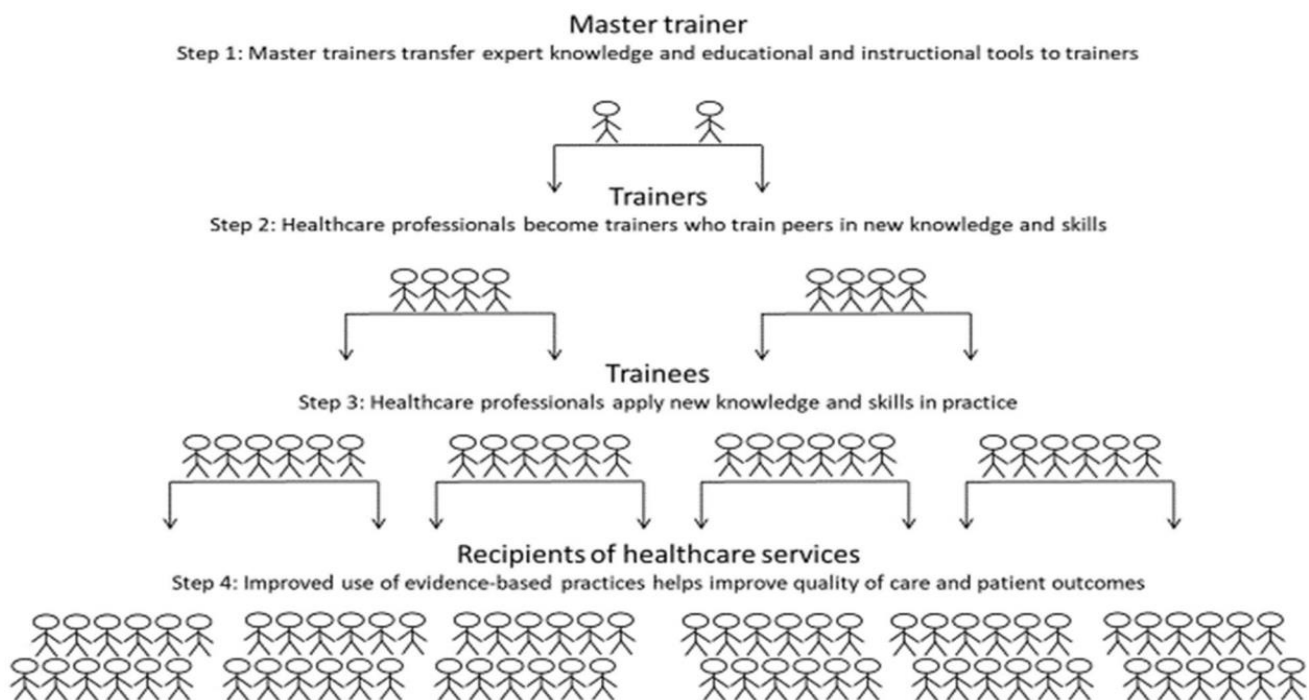


Figure 1. Key elements of train-the-trainer models in healthcare contexts (8).

The pressing demand to improve both the efficiency and quality of pre-service education and

continuing professional education (CPE) for the health workforce has become increasingly apparent

due to global resource limitations and a significant shortage of skilled healthcare professionals. Concurrently, the rapid proliferation of accessible information has prompted universities to explore and implement varied learning methodologies beyond conventional classroom settings. These advancements benefit not only the foundational training of health professionals but also their ongoing educational development (9).

AIMS OF THE STUDY

To assess healthcare professionals' knowledge and evaluate the impact of a train the trainers' course on their knowledge.

METHODOLOGY

Study Design:

A quantitative design, descriptive study has been conducted to assess to assess healthcare professionals' knowledge and evaluate the impact of a Train the trainer course on knowledge among 50 health care professionals in Sulaimani city during the period of 7th to 28th May 2024.

Administrative Approvals:

Ethical committee from the department of science in Health Development and training center / the Directorate of Sulimania Health Governorate, (Approval Number: 86) on April 29th , 2024. Written consent was obtained from all participants after they were informed about the study.

Setting of the Study:

The study was carried out across 17 locations, including 13 government hospitals, 4 centers in Sulaimani city. The study was conducted at Health development and training center in Sulaimani city which is a vital center for the training course for health care professionals in Sulaimani city. This center established in 2005.

Sample of the Study:

A non-probability (purposive) sample included 50 health care professionals from the hospitals and health centers in Sulaimani.

Inclusion Criteria:

- Both adult males and females, health care professionals who work in the hospitals and health centers who graduated from institute, Bachler, and those who hold master and doctorate degree on Biochemistry, Microbiology, Physiotherapist, Pharmacist, Dentist and Nursing specialist.
- Willingness to provide written informed consent to participate in the study.

Exclusion Criteria

- Those health care professionals who refused to participate in the study sample.

Study Instrument

The questionnaire consist of two main sections, first section describe socio- demographic characteristics such as (age, gender, level of education, residential area, type of work, work place, years of experience, participation in training course about TTT). Second section dealt with the knowledge of the health care professionals toward TTT before and after the training course.

Validity

Content validity was established by five experts who checked the questionnaire of this study and gave us their opinions, resulting in modifications for clarity and relevance. The final instrument was deemed valid for data collection.

Pilot Study

A pilot study was conducted with 5 health care professionals from the main study sample in 2nd May, 2024.

Reliability:

The reliability done regarding knowledge of the participants regarding TTT and it was determined through the use of the stability reliability (test- retest) approach and the Cronbach Alpha Correlation Coefficient. Yielding a high correlation coefficient ($r = 0.79$).

Methods of Data Collection:

The study selected 50 males and females health care professionals in all academic stages at hospitals and health centers of Sulaimani. Data were

collected through a checklist before and after the training course. The collection period started from 20th November 2023 to 15th June 2024. It was collected by two groups, the first group was consist of 25 health care professionals and they started from the period of (7 May to 16 May – 2024). The second group also consist of 25 health care professionals and they started from (20 May to 28 May-2024). The questionnaire was divided among the participants, and they answered it before and after the training course which took about 10 minutes for each one. The training course was presented and explained by PowerPoint slides toward the subject. (The first day of the training the pre-test performed, and the last day the post-test performed after the training course).

Rating and scoring:

For detecting level of knowledge before and after the training course, three points Likert scale (low, medium and high) level used, the researchers divided 12 questions about knowledge regarding TTT to three level; less than 4 represented low level, 4-7 represented medium level and 8-12 represented high level of knowledge regarding TTT.

Statistical Analysis:

The data were organized and coded into computer files using the statistical package of social science (SPSS), version 26. The data were performed through the computation of frequency and percentage, and inferential data analysis.

RESULTS

The findings indicate that the majority of participants were aged between 20 and 35 years, representing 46% of the study sample. The gender distribution was evenly split, with males and females each comprising 50% of the participants. Regarding educational qualifications, 66% held advanced degrees, such as MSc or PhD, or had graduated from specialized institutes, while 34% were college graduates. Most of the participants (86%) were employed in governmental positions, and 82% resided in Sulaimani city. In terms of professional

experience, 60% had between 0 and 15 years of experience, and 72% had been working in their current unit for 0–5 years. A significant proportion (74%) had not undergone train the trainer programs. When evaluating the training course, 60% of participants rated it as excellent, 14% as very good and 26% as good.

Before the implementation of the training course, participants primarily self-rated their knowledge regarding train the trainers' items between "Fair" and "Good," indicating a moderate level of familiarity or confidence in most areas. High ratings of "Excellent" were infrequent, while "Poor" ratings were more frequently observed in topics such as behavioral modification and the principles of adult learning.

Following the implementation of the training course, participants showed significant improvement across all areas, with most responses moving to higher categories such as "Very Good" and "Excellent." The increase in "Excellent" ratings became notably more frequent, highlighting the course's effectiveness in enhancing participants' knowledge and skills.

Figure (2) represented that the training course effectively enhanced participants' knowledge levels. Prior to the course, the majority of participants displayed medium knowledge, with smaller proportions showing either low or high levels of understanding. Following the completion of the course, all participants reached a high level of knowledge, indicating a substantial improvement in their learning outcomes.

DISCUSSION:

Socio-Demographic Characteristics

The primary age group among participants was between twenty and thirty-five years, accounting for nearly half of the total study population. The gender distribution was balanced, with males and females each comprising 50% of the cohort. These findings

contrast with the study by Giovanelli et al., 2024, conducted in Italy, where female participants outnumbered males, and the largest age group was between 40-49 years.

In terms of educational background, two-thirds of participants held advanced degrees, such as MSc or PhD, or had completed education at specialized institutes, while one-third were college graduates. The majority were employed in governmental positions, and resided in Sulaimani city. In terms of professional experience, almost more than half had between (0-15) years of experience, with more than two-thirds having worked in their current unit for (0-5) years. Additionally, nearly three-quarters had not participated in a train the trainers' program. Regarding the training course evaluation, more than half rated it as excellent, more than quarter as good, and less than quarter as very good.

Knowledge Assessment Before and After the Training Course:

Before the training course, participants primarily rated their knowledge as fair or Good, indicating moderate familiarity and confidence across most domains. High ratings of excellent were uncommon, while poor ratings were more frequently reported in areas such as behavioral modification and adult learning principles. After the course, a noticeable improvement was observed, with most ratings shifting to higher categories, such as very good and excellent. The proportion of excellent ratings increased significantly, highlighting the effectiveness of the program. Additionally, post-training knowledge levels, as depicted in Figure 1, shows a substantial improvement, with all participants reaching high knowledge levels after completing the course.

The effect directions reported in the included studies consistently suggest that TTT interventions have the potential to enhance knowledge. However, statistically significant improvements were observed only in knowledge transfer between trainers and trainees. Insufficient data were available to assess

the impact of TTT interventions on knowledge transfer from master trainers to trainers or for skills and practice⁽⁸⁾.

Our findings align with the systematic review by Pearce et al., 2012, through other reviews⁽¹¹⁾ did not differentiate between the distinct levels of the TTT program, such as knowledge dissemination from master trainer to trainer and from trainer to trainee.

Learning outcomes from TTT programs are often assessed using Kirkpatrick's framework⁽¹⁴⁾, which categorizes impacts into four levels: trainees' reactions (e.g., perceptions of the program), learning (e.g., knowledge, skills, attitudes), behavior (e.g., practical application and performance), and results (e.g., organizational benefits or patient outcomes). In our study, most evaluations focused on learning outcomes, with an emphasis on knowledge. This focus is likely due to the simplicity of measuring knowledge through self-reported questionnaires and the relatively short follow-up period required for such assessments⁽¹⁵⁾.

A narrative review found that TTT programs in 13 studies successfully increased knowledge, improved clinical behavior, and produced better patient outcomes. However, one study showed no effect, while three studies suggested possible effects, and one study found that a CD-ROM training method was more effective than TTT training in improving participants' knowledge. The ratings of these studies' methodologies indicated a moderate risk of bias, limiting the interpretation of the results⁽¹²⁾. The current training course has proven effective in enhancing healthcare professionals' knowledge. This aligns with 11 studies included in the analysis, collectively reporting 13 effect directions (standardized metrics), all demonstrating positive outcomes. These findings suggest that the TTT model effectively enhances knowledge, across all target groups identified⁽¹³⁾.

CONCLUSIONS:

This study demonstrates a significant improvement in healthcare professionals' knowledge following a structured train-the-trainer program, highlighting its effectiveness in addressing critical gaps in management-focused education within resource-limited healthcare systems. The findings reveal a dramatic increase in competency levels among participants, underscoring the program's potential to enhance workforce preparedness in complex clinical and administrative environments. Given the demonstrated success of this intervention, broader implementation of such training initiatives should be prioritized to strengthen institutional capacity, improve leadership skills among healthcare professionals, and ultimately optimize patient care delivery in challenging settings.

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CONFLICT AND FUNDING

The study was carried out without any financial or commercial ties that might be seen as a potential conflict of interest, according to the authors.

REFERENCES:

1. Orfaly, R. A., Frances, J. C., Campbell, P., Whittemore, B., Joly, B., & Koh, H. (2005). Train-the-trainer as an educational model in public health preparedness. *Journal of Public Health Management and Practice*, 11(6), S123-S127.
2. Anderson CR, Taira BR. The train the trainer model for the propagation of resuscitation knowledge in limited-resource settings: a systematic review. *Resuscitation*. 2018 Jun 1;127:1-7.
3. Knettel BA, Slifko SE, Inman AG, Silova I. Training community health workers: an evaluation of effectiveness, sustainable continuity, and cultural humility in an educational program in rural Haiti. *International Journal of Health Promotion and Education*. 2017 Jul 4;55(4):177-88.
4. Tufanaru C, Munn Z, Aromataris E, Campbell J, Hopp L. Systematic reviews of effectiveness. *Joanna Briggs Institute reviewer's manual*. 2017 Apr 19;3.
5. Balatti J, Falk I. Socioeconomic contributions of adult learning to community: A social capital perspective. *Adult education quarterly*. 2002 Aug;52(4):281-98.
6. Clancy CM, Tornberg DN. TeamSTEPPS: assuring optimal teamwork in clinical settings. *American Journal of Medical Quality*. 2007 May;22(3):214-7.
7. Poitras ME, Bélanger E, Vaillancourt VT, Kienlin S, Körner M, Godbout I, Bernard-Hamel J, O'Connor S, Blanchette P, Khadhraoui L, Sawadogo J. Interventions to improve trainers' learning and behaviors for educating health care professionals using train-the-trainer method: A systematic review and meta-analysis. *Journal of Continuing Education in the Health Professions*. 2021 Jul 1;41(3):202-9.
8. Nexø MA, Kingod NR, Eshøj SH, Kjærulff EM, Nørgaard O, Andersen TH. The impact of train-the-trainer programs on the continued professional development of nurses: a systematic review. *BMC Medical Education*. 2024 Jan 4;24(1):30.
9. Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, Fineberg H, Garcia P, Ke Y, Kelley P, Kistnasamy B. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *The lancet*. 2010 Dec 4;376(9756):1923-58.
10. Giovanelli L, Rotondo F, Fadda N. Management training programs in healthcare: effectiveness factors, challenges and outcomes. *BMC Health Services Research*. 2024 Aug 7;24(1):904.
11. Pearce J, Mann MK, Jones C, Van Buschbach S, Olf M, Bisson JI. The most effective way of delivering a Train-the-Trainers program: a systematic review.

Journal of Continuing Education in the Health Professions. 2012 Jun;32(3):215-26.

12. Anderson CR, Taira BR. The train the trainer model for the propagation of resuscitation knowledge in limited resource settings: a systematic review. *Resuscitation*. 2018 Jun 1;127:1-7.
13. Nyamathi A, Vatsa M, Khakha DC, McNeese-Smith D, Leake B, Fahey JL. HIV knowledge improvement among nurses in India: using a train-the-trainer

program. *Journal of the Association of Nurses in AIDS Care*. 2008 Nov 1;19(6):443-9.

14. Kirkpatrick JD, Kirkpatrick WK. Kirkpatrick's four levels of training evaluation. *Association for Talent Development*; 2016 Oct 1.
15. Walczak, J., Kaleta, A., Gabryś, E., Kloc, K., Thangaratinam, S., Barnfield, G., ... & Khan, K. S. (2010). How are "teaching the teachers" courses in evidence based medicine evaluated? A systematic review. *BMC medical education*, 10(1), 64.

TABLES & FIGURES:

Table (1): Distributions of the sample responses relating to the demographics data

No.	Socio- demographic data	Classification	Frequency	Percent
1.	Age	20-35	23	46.0
		36-45	22	44.0
		46-65	5	10.0
2.	Gender	Female	25	50.0
		Male	25	50.0
3.	level of Education	Institute	17	34.0
		Collage	16	32.0
		MSc & PhD	17	34.0
4.	Residential area	Inside the city	41	82.0
		Outside the city	9	18.0
5.	Type of work	Unemployed	4	8.0
		Contract	1	2.0
		Voluntary	2	4.0
		Governmental employee	43	86.0
6.	Work Place	Health sector	18	36.0
		Hospital	32	64.0
7.	Years of experience	0-15	30	60.0
		16-30	17	34.0
		more than 30	3	6.0
8.	How many years do you work in this unit?	0-5	36	72.0
		6-10	10	20.0
		More than 10	4	8.0
9.	Did you participate this course before?	No	37	74.0
		Yes	13	26.0
10.	How do you evaluate this course?	Good	13	26.0
		Very good	7	14.0
		Excellent	30	60.0

Table (2): Level of participants' knowledge before the training course

No.	Questions	Classifications	Frequency	Percentage
Knowledge Before Training Course				
1.	Knowledge in the principles of adult learning	Poor	15	30.0
		Fair	17	34.0
		Good	12	24.0
		Very good	5	10.0
		Excellent	1	2.0
2.	Familiarity with learning cycle	Poor	13	26.0
		Fair	14	28.0
		Good	16	32.0
		Very good	6	12.0
		Excellent	1	2.0
3.	Knowledgeable in training process	Poor	10	20.0
		Fair	19	38.0
		Good	13	26.0
		Very good	5	10.0
		Excellent	3	6.0
4.	Ability to assess training needs	Poor	6	12.0
		Fair	12	24.0
		Good	13	26.0
		Very good	15	30.0
		Excellent	4	8.0
5.	Capable of creating specific training objectives	Poor	6	12.0
		Fair	11	22.0
		Good	20	40.0
		Very good	11	22.0
		Excellent	2	4.0
6.	Understanding the role of TTT	Poor	4	8.0
		Fair	11	22.0
		Good	28	56.0
		Very good	4	8.0
		Excellent	3	6.0
7.	Aware on both verbal and non-verbal communication skills	Poor	8	16.0
		Fair	7	14.0
		Good	16	32.0
		Very good	15	30.0
		Excellent	4	8.0
8.	Understanding how to provide feedback	Poor	4	8.0
		Fair	14	28.0
		Good	21	42.0
		Very good	7	14.0
		Excellent	4	8.0
9.	Educated about the training techniques	Poor	11	22.0
		Fair	10	20.0
		Good	23	46.0

		Very good	3	6.0
		Excellent	3	6.0
10.	Skilful in evaluating training	Poor	8	16.0
		Fair	19	38.0
		Good	17	34.0
		Very good	5	10.0
		Excellent	1	2.0
11.	Experts in the process of behavioural modification	Poor	13	26.0
		Fair	16	32.0
		Good	9	18.0
		Very good	12	24.0
12.	Educate about using training aids	Poor	13	26.0
		Fair	11	22.0
		Good	19	38.0
		Very good	5	10.0
		Excellent	2	4.0

Table (3): Level of participants' knowledge after the training course

No.	Questions	Classifications	Frequency	Percentage
Knowledge After Training Course				
1.	Knowledge in the principles of adult learning	Good	15	30.0
		Very good	24	48.0
		Excellent	11	22.0
2.	Familiarity with learning cycle	Good	13	26.0
		Very good	28	56.0
		Excellent	9	18.0
3.	Knowledgeable in training process	Fair	1	2.0
		Good	10	20.0
		Very good	25	50.0
		Excellent	14	28.0
4.	Ability to assess training needs	Good	6	12.0
		Very good	30	60.0
		Excellent	14	28.0
5.	Capable of creating specific training objectives	Good	8	16.0
		Very good	23	46.0
		Excellent	19	38.0
6.	Understanding the role of TOT	Good	5	10.0
		Very good	23	46.0
		Excellent	22	44.0
7.	Aware on both verbal and non-verbal communication skills	Good	5	10.0
		Very good	24	48.0
		Excellent	21	42.0
8.	Understanding how to provide feedback	Good	3	6.0
		Very good	30	60.0
		Excellent	17	34.0
9.	Educated about the training techniques	Good	4	8.0

		Very good	34	68.0
		Excellent	12	24.0
10.	Skilful in evaluating training	Good	7	14.0
		Very good	26	52.0
		Excellent	17	34.0
11.	Experts in the process of behavioural modification	Good	5	10.0
		Very good	29	58.0
		Excellent	16	32.0
12.	Educate about using training aids	Good	3	6.0
		Very good	30	60.0
		Excellent	17	34.0

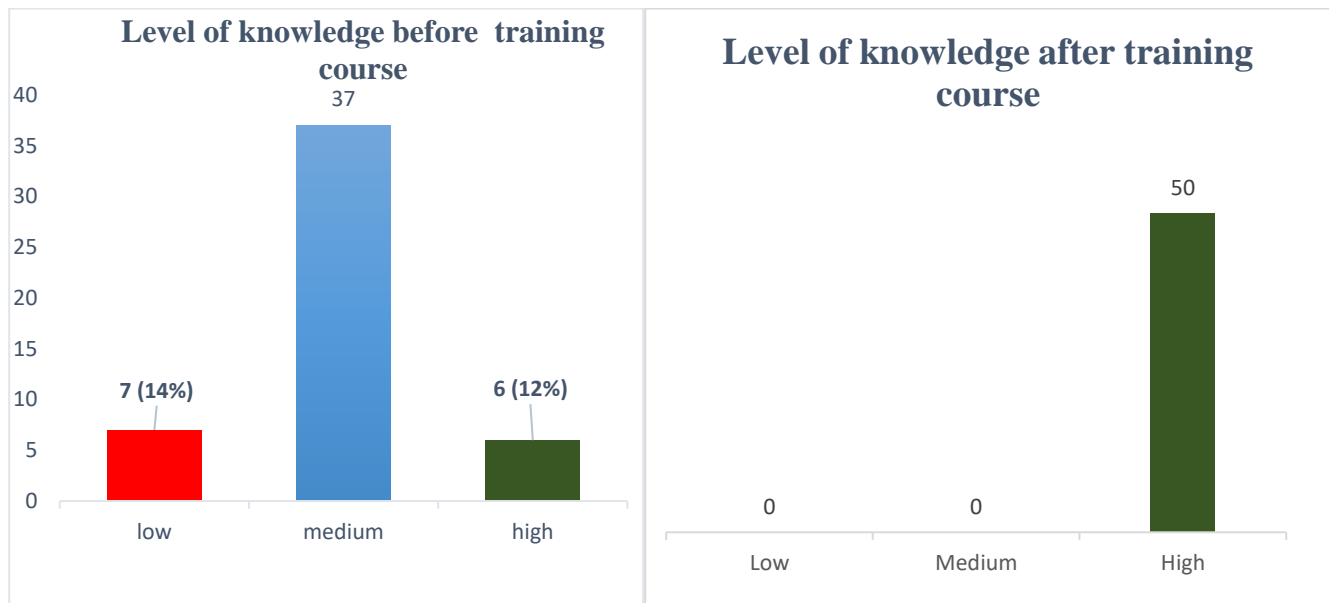


Figure (2): Level of Knowledge before and after training course