



Evaluation of Cupping Training Programs Directed towards Healthcare Professionals, Saudi Arabia

**Ahmed T. El-Olemy^{1,2}, Naseem A. Qureshi^{1*}, Abdullah M. Al-Bedah³,
Mohammed A. El-Olemy⁴, Asim A. Hussein¹, Ibrahim S. Elsubai^{1,2},
Tamer S. Aboushanab¹ and Saud M. Alsanad^{1,5}**

¹*National Center for Complementary and Alternative Medicine, Ministry of Health, Riyadh, Saudi Arabia.*

²*Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Egypt.*

³*National Center for Complementary and Alternative Medicine, Ministry of Health, Riyadh, Saudi Arabia.*

⁴*Faculty of Medicine, Tanta University, Egypt.*

⁵*College of Medicine, Al-Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia.*

Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Evaluation of training programs directed towards healthcare professionals mostly involves the collection of data from multiple sources using appropriate tools to ascertain their effectiveness and impact on trainees.

Objective: The aim of this study is to assess the short-term effectiveness of cupping therapy training programs conducted at National Center for Complementary and Alternative Medicine (NCCAM) for healthcare providers in the Kingdom of Saudi Arabia (KSA).

Methods: This study included all healthcare professionals who undertook a 5-day intensive training

*Corresponding author: E-mail: n.qureshi@nccam.gov.sa;

course concerning Al-Hijamah therapy. The evaluation of training programs was done in 3 ways that corresponds to level 1 to 3 of Kirkpatrick's paradigm. Reaction evaluations (level 1) were assessed through feedback forms to be filled out by the trainees. Improvement and retention of knowledge (level 2) were assessed by a pre- and post-test questionnaire. Improvements in skills (level 2) were assessed using a pre- and post-training practical evaluation. Behaviors of the trainees (level 3) were assessed through a pre- and post-training written examination.

Results: The included participants were physicians (n=258, 45.0%), physiotherapist (n=139, 24.3%), nurses (n=122, 21.3%), CAM practitioners (n=6, 1.1%) and other specialists (n=48, 8.4%). A majority of participants (97.5%) were satisfied with trainers, 82.2% with organization of training, 88.4% with content relevance, 89.3% with learning methods and 92.1% with achievement of objectives (level 1). Concerning pre-test course knowledge, 61.7% scored 70% and more and 10.65% scored 90% and more, whereas in post-test course knowledge 100.0% scored 90% and more, with a mean of 97.8 ± 2.34 (level 2). Regarding gaining skills, 64.8% trainees scored 70% and more and none of them scored 90% or more in pre-training skills performance. In post-training assessment, 100% scored 90% and more, with a mean of 98.9 ± 0.92 (level 2). Concerning behavior change, 45.6% scored less than 50% and only 2.2% scored 70% and more before training. After training, 72.89% trainees scored 70% and more related to behavior change, with a mean score of 47.79 ± 10.94 in pre-training and 76.83 ± 8.73 post-training (level 3).

Conclusion: Participants' reactions to most of the presented topics were very good, and the participants were satisfied, motivated and creative. The objectives of cupping therapy courses were robustly achieved. Furthermore, studies are suggested to objectively assess using standard tools the long-term impact of cupping therapy training programs on participants in future.

Keywords: Kirkpatrick model; effectiveness; cupping therapy; Al-Hijamah; training programs evaluation; healthcare professionals; Kingdom of Saudi Arabia.

1. INTRODUCTION

Evaluation, a dynamic process of establishing a worth of a program reflects a state of mind rather than a set of techniques. It gives fair feedback on the effectiveness of the training activities together with multiple insights into control over the provision of training programs and interventions into the organizational processes that positively affect training [1]. Monitoring and evaluation, an integral part of project management cycle tends to specifically provide feedback on how the implementation of a project has been progressing [2]. Overall evaluation is the process of collecting of pertinent information from multiple stakeholders to ascertain the effectiveness of the training programs. Ultimately evaluation process provides detailed data, which allow trainers to either "fine tune" or "carry out major repairs" to the training sessions and the course contents in future. Evaluation includes getting ongoing feedback from the learners, trainer, neutral observer and trainees' supervisor in order to improve the quality of the training and identify if the trainer and learner achieved the goals of the training program. The evaluation process also could be used to determine other multiple functions including effectiveness (or failure) of training program, achievements of program objectives, trainers individual performance,

impact on trainees' learning, and weaknesses and strengths of training programs. Notably, in the opinion of trainers' peers and trainees, trainers are accountable for their own actions and the results of their actions including impact of training activities on trainees [3]. Assessing the progress of trainees is another responsibility of a trainer. The best way to achieve this goal is to proactively integrate all assessment activities into the training plan for determining how effectively the training would progress. Although there are several methods to assess trainers' performance, none of them is seamless and each has its own advantages and disadvantages [4].

The evaluation of a major training program performed by a team is usually done after one-three year for proposing recommendations for improving overall program effectiveness, its contents, performance of trainers, and short- and long-term effects on trainees together with better learning outcomes and future strategies by program managers. In training projects, many items including the effectiveness of the training methods and materials used, the relevance of the training contents reflecting trainees' the background, the knowledge, attitudes and skills gained by the trainees, the types of health services delivered by the healer attendees, and changes in health behaviors of community

members. In a nutshell, the four main areas need to be integrated into the evaluation of a training project related to the training program, trainers, participants and the outcome [5,6].

The aim of this work is to evaluate comprehensively the cupping therapy (Al-Hijamah) training programs conducted at National Center for Complementary and Alternative Medicine (NCCAM), Riyadh, the Kingdom of Saudi Arabia (KSA). The evaluation will include the effectiveness of cupping therapy training on trainees' satisfaction, knowledge, attitudes, skills, and behavior. The significance of this study that it will reveal the strengths and weaknesses of cupping therapy training programs and accordingly their modification for better performance and presentation in future. Notably cupping (Al-Hijamah) is an ancient, holistic traditional method for the treatment of a variety of diseases. Cupping therapy is defined in several ways but a common element among its uses is the extraction of toxic substances from the body by creating negative pressure in the cup. Though the exact origin of cupping therapy is a matter of controversy, its use has been documented in early Egyptian and Chinese medical practices. However, subsequently diverse human civilizations have contributed to the historical development and continuation of cupping therapy, and its several aspects including definitions are comprehensively described elsewhere [7].

2. METHODS

2.1 Study Design

A cross-sectional analytic effectiveness study of cupping therapy training programs directed towards healthcare professionals in KSA.

2.2 Target Population

All healthcare professionals (n=573) attending training courses on cupping therapy conducted by NCCAM were the target subjects of this study. All trainees' feedbacks were used to evaluate the cupping therapy training programs

2.3 Sample

This study included all healthcare professionals (258 physicians, 139 physiotherapists, 122 nurses, 6 CAM practitioners and 48 other specialists) who undertook an intensive training course targeting Al-Hijamah (cupping) therapy. For this purpose, 35 cupping training courses

were conducted on multiple points of time. The number of participants ranged from 9 to 24 in each course. Notably all participants requested license for practicing cupping therapy (Al-Hijamah) in KSA.

2.4 Settings

This study was conducted at NCCAM, Riyadh KSA. Briefly speaking, the regulation of clinical practice of healthcare professional concerning cupping therapy (Al-Hijamah) is mandatory in KSA. The relevant health authorities in KSA initiated regulatory measures directed towards healthcare professionals intending to practice cupping therapy since 2015. Furthermore, health professionals practicing cupping must be exposed to an accredited training program before issuing license. This program, approved and implemented by NCCAM encompasses all relevant topics concerning cupping (Al-Hijamah) therapy [8].

2.5 Tools of Evaluation

The evaluation of the cupping therapy training program was done by Kirkpatrick's four levels of program evaluation criteria. Kirkpatrick's criteria are now considered highly valuable in training industry and professional communities. The Kirkpatrick's four levels are: level 1 concerning participants' reaction evaluation, i.e., how the health professionals who received training felt about and satisfied with training or learning experience which could be measured by using trainees' feedback forms, verbal reports or post training surveys. Level 2 regarding learning evaluation that reflects the measurement of trainees' pre- and post-training learning especially increase in their knowledge or intellectual capability attitudes. Level 3 concerns trainees' behavior evaluation which means learned skills and their application in changing the participants' behaviors in real world related to overall cupping practice. Level 4 concerns the evaluation of training programs results, which could be done immediately or after several months. Overall the evaluation of training program (S) has the effect on health facility, quality of services, and environment resulting from the improved performance of the trainees' behavior [9].

In this present study, the evaluation of cupping therapy training programs was done in three ways which correspond to levels 1, 2 and to some extent 3 of Kirkpatrick model. In order to assess

reaction evaluation (level 1), feedback forms were distributed among trainees to be filled by the trainees. The template consists of 5 sections, which includes evaluation of the trainer (1), organization of the training (2), content relevance (3), working and learning methods (4), and achievement of objectives (5) together with comments of the learners. Time allocated was 15 to 25 minutes. A pre- and post-test questionnaire was distributed among trainees in order to assess improvement in learning and retention in knowledge and attitude (level 2). The test questionnaire included 52 questions on knowledge and attitude towards cupping to be answered by marking true or false, and the time allocated was 15 to 25 minutes. To assess improvement in behavior and skills (level 3), a pre- and post- training assessment was done by giving them plastic cups, a pump, a surgical blade, an artificial skin and personal protective equipment (PPE). Participants were asked to do hand washing and practical demonstration of different types of cupping and PPE in the presence of an assessor. They were asked to mark on a check list concerning performance of skills, and time allotted was from 10 to 20 minutes. To assess behavior of the trainees, pre- and post-training written examinations were done that included multiple choice questions, case scenarios and problem solving. The examination covers all topics of the training program together with some anatomical and physiological perspectives concerning cupping therapy (Al-Hijamah). At the end of the training, evaluation forms were distributed among participants to gauge their overall impression about the cupping training program. The forms were also intended to determine how the training impacted the participants including their satisfaction, improved knowledge and skills. In addition, a semi-structured sociodemographic performa was also developed with the following variables; age, gender, nationality, specialty and work experience.

2.6 Research Procedure

The first author (ATEO) distributed the 52-item self-administered questionnaire prior to training among participants. The participants were asked to fill out the questionnaire completely. Any query raised by the participant was quickly clarified by the first author or his assistants who also collected filled out questionnaires. The same procedure was repeated post-training program and completed pre- and post-training

questionnaires of each participant were stapled together in order to assess before and after training responses of participants. Comprehensive evaluation form was distributed by the first author at the end of training and participants were requested to fill out it completely without writing their names. A written computer based exam including randomly selected 35 questions from a total of 220 questions which were answered by trainees before and after training. Oral comments, suggestions and recommendations of all participants concerning their impression about training and how to modify and improve it were noted after complete evaluation of the course.

2.7 Ethical Consideration

The participants were informed about the objectives and importance of this study in simple nontechnical language. They were also told that the non-participation in this study will not prevent them to take training course and the license for practicing Al-Hijamah therapy. They were also informed that this research is without any risk or injury. Answering the questionnaire was considered as an informed consent to participate in the study. In addition, all subjects gave the written consent to participate in this research. This study was approved by the internal Ethical Committee of the NCCAM. The Ethical Committee Registration Number is 224/19344, dated 23/02/2010.

2.8 Data Management and Analysis

Data were analyzed using SPSS statistical package for windows version 20. Mean, standard deviation (SD), and Students t-test were used to analyze quantitative data. To analyze qualitative data, frequency distribution and calculation of percentages were used. P value <0.05 was considered significant.

3. RESULTS

3.1 Sociodemographic Characteristics

There were 258 physicians (45.0%), 139 physiotherapists (24.3%), 122 nurses (21.3%), 6 CAM practitioners (1.1%) and 48 other specialists (8.38%). Two thirds of participants were males (n=372, 64.9%) and two fifths were Saudi (n=227, 39.6%). The mean age of participants was 36.11±10.03 years and their mean duration of experience was 13.26±10.3 years (Table 1).

3.2 Participants' Feedback

The feedback responses of the participants are shown in Table 2a-c. Majority of participants (from 82.2% to 97.5%) were fairly satisfied with trainers, organization of training, content relevance, working and learning methods and achievement of objectives.

Furthermore 94.8% of participants found the program meeting their expectations [Table 2c]. Participants' reaction to training program was clear: 98.9% of them were reported to say that they are the right person to attend the course [Table 2c]. In addition, 97.5% of subjects expressed that they will recommend to their colleagues to attend this course for their benefit [Table 2c]. Meanwhile, About 30% vis-à-vis 70% of participants reported hands-on training was not adequate (Table 2b and Fig. 1).

3.3 Trainees' Knowledge Concerning Cupping Therapy (Al-Hijamah)

The evaluation of participants' feedback showed that 61.8% were very satisfied with the new information taught during the sessions and 26.7% were just satisfied. In addition, the trainees (54.8%) were very satisfied with the amount of information which was enough to them and 32.6% were only satisfied. Furthermore the participants (72.2% vis-à-vis 21.6%) were very satisfied with the information delivered during the course which was important to them in their clinical work. The results of pre- and post-test questionnaire which assessed the improvement in knowledge were also fairly promising. In overall knowledge assessment, 61.7% scored 70% and more in pretest of the training course and 10.7% scored 90% and more, whereas in posttest 100.0% scored 90% and more with a mean of 97.8±2.34 (Table 3 and Fig. 2).

Table 1. Demographic characteristics of studied subjects(n=573)

| Sociodemographic variables | | Number (%) |
|----------------------------|------------------|-------------|
| Specialty | Physicians | 258 (45.0) |
| | Physiotherapists | 139(24.3) |
| | Nurses | 122(21.3) |
| | CAM | 6(1.1) |
| | Others | 48(8.4) |
| Gender | Male | 372(64.9) |
| | Female | 201(35.1) |
| Nationality | Saudi | 227(39.6) |
| | Non-Saudi | 346(60.4) |
| Age | Mean±SD* | 36.11±10.03 |
| Work experience | Mean±SD* | 13.26±10.3 |

*SD = standard deviation

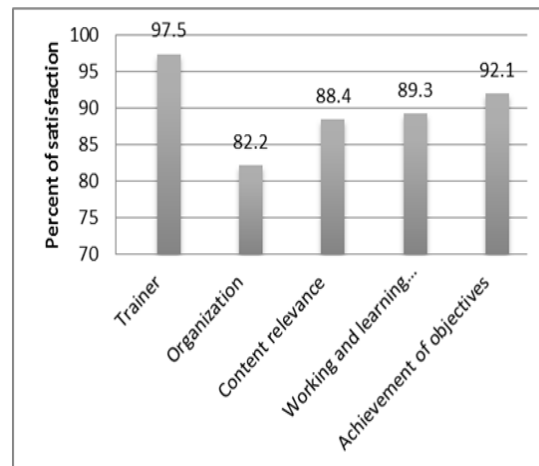


Fig. 1. Percentages of trainees' satisfaction with training program

Table 2a. Participants' evaluation of the training program

| | Very satisfactory | Satisfactory | Total satisfactory | Average | Unsatisfactory | Very unsatisfactory | Total unsatisfactory |
|--|--------------------------|---------------------|---------------------------|----------------|-----------------------|----------------------------|-----------------------------|
| 1. Trainer | | | | | | | |
| 1. Trainer knowledge of the training course. | 92.5 | 6.4 | 98.91 | 1.09 | 0.0 | 0.0 | 0.0 |
| 2. Trainer ability to clearly communicate information. | 88.8 | 9.7 | 98.47 | 1.54 | 0.0 | 0.0 | 0.0 |
| 3. Use of body language. | 81.7 | 15.1 | 96.74 | 2.8 | 0.5 | 0.0 | 0.5 |
| 4. Method of organizing the presentation (in terms of clarity and adequacy). | 75.4 | 20.6 | 95.94 | 3.43 | 0.6 | 0.0 | 0.6 |
| 5. Ability to explain the course contents. | 89.8 | 8.9 | 98.6 | 1.4 | 0.0 | 0.0 | 0.0 |
| 6. Extent of cooperation with trainees. | 91.3 | 7.0 | 98.28 | 1.4 | 0.3 | 0.0 | 0.3 |
| 7. The trainer ability to motivate participants to interact. | 82.4 | 13.9 | 96.3 | 1.69 | 0.3 | 0.2 | 0.5 |
| 8. The trainer ability to manage interventions and discussions | 81.4 | 14.9 | 96.28 | 2.94 | 0.5 | 0.3 | 0.8 |
| 9. Ability of the trainer to answer questions. | 85.2 | 12.3 | 97.5 | 1.87 | 0.0 | 0.6 | 0.6 |
| Overall evaluation of the trainers | 85.4 | 12.1 | 97.5 | 2.02 | 0.2 | 0.1 | 0.4 |
| 2. Organization | | | | | | | |
| Equipment and audiovisual aids used | 60.8 | 27.1 | 87.9 | 9.7 | 2.0 | 0.3 | 2.4 |
| Course duration | 46.7 | 29.2 | 75.9 | 15.0 | 7.2 | 1.9 | 9.1 |
| Place of the session | 58.5 | 24.5 | 82.7 | 9.5 | 5.9 | 1.9 | 7.8 |
| Daily schedule and time commitment | 71.3 | 21.9 | 93.1 | 4.7 | 1.3 | 0.9 | 2.2 |
| Type of meals | 46.7 | 24.4 | 71.1 | 15.5 | 7.4 | 6.0 | 13.4 |
| Overall evaluation of organization of the course | 56.8 | 25.4 | 82.2 | 10.9 | 4.8 | 2.2 | 7.0 |

Table 2b. Participants' evaluation of the training program

| 3. Content relevance | | | | | | | |
|---|--------------------------|---------------------|---------------------------|----------------|-----------------------|----------------------------|-----------------------------|
| | Very satisfactory | Satisfactory | Total satisfactory | Average | Unsatisfactory | Very unsatisfactory | Total unsatisfactory |
| The content of the training material. | 47.2 | 37.0 | 84.2 | 13.9 | 1.9 | 0.0 | 1.9 |
| Handouts distributed in the course. | 55.6 | 30.9 | 86.5 | 11.5 | 1.7 | 0.3 | 2.0 |
| Organization and easy grasp of scientific contents. | 63.0 | 28.1 | 91.1 | 7.2 | 1.6 | 0.2 | 1.7 |
| The information mentioned in the sessions was new to me. | 61.8 | 26.6 | 88.5 | 10.1 | 0.9 | 0.5 | 1.4 |
| The amount of information reported was enough for me. | 54.8 | 32.6 | 87.4 | 11.5 | 1.1 | 0.0 | 1.1 |
| The information mentioned in the course was important to me in my work. | 71.3 | 21.6 | 92.9 | 5.5 | 1.1 | 0.5 | 1.6 |
| Overall evaluation of the content relevance | 59.0 | 29.5 | 88.4 | 10.0 | 1.4 | 0.2 | 1.6 |
| 4. Working and learning methods | | | | | | | |
| Diversity of activities, exercises and explanatory materials used. | 72.4 | 20.6 | 93.0 | 6.1 | 0.9 | 0.0 | 0.9 |
| Hands-on training was adequate. | 41.2 | 29.1 | 70.3 | 17.3 | 9.3 | 3.1 | 12.4 |
| Working groups were helpful. | 59.1 | 28.7 | 87.8 | 10.5 | 1.6 | 0.2 | 1.7 |
| Role play was effective | 82.5 | 11.1 | 93.5 | 5.5 | 0.5 | 0.5 | 0.9 |
| Case studies were beneficial | 89.8 | 6.4 | 96.1 | 3.6 | 0.3 | 0.0 | 0.3 |
| Simulation was satisfactory | 85.2 | 9.7 | 94.9 | 4.7 | 0.5 | 0.0 | 0.5 |
| Overall evaluation of working and learning methods | 71.7 | 17.6 | 89.3 | 8.0 | 2.2 | 0.6 | 2.8 |

Table 2c. Participants' evaluation of the training program

| 5. Achievement of objectives | | | | | | | |
|--|-----------------------|--------------|--------------------|----------------|-----------------|--------------------------|-----------------------|
| | Strongly agree | Agree | Total agree | Neutral | Disagree | Strongly disagree | Total disagree |
| Achieving the objectives of the course. | 69.5 | 26.7 | 96.3 | 3.6 | 0.2 | 0.0 | 0.2 |
| The course changed my concept of cupping completely. | 69.1 | 20.3 | 89.4 | 7.5 | 2.7 | 0.5 | 3.1 |
| The course provided me with new skills. | 76.9 | 18.2 | 95.1 | 3.6 | 1.3 | 0.0 | 0.3 |
| The course helped me develop my skills in cupping. | 74.2 | 18.7 | 92.9 | 5.2 | 1.9 | 0.3 | 2.0 |
| I became professional and able to train others in an ideal way. | 54.1 | 32.6 | 86.7 | 9.2 | 3.0 | 1.2 | 4.1 |
| Overall evaluation of achievement of objectives | 68.8 | 23.3 | 92.1 | 5.8 | 1.7 | 0.34 | 2.1 |
| 6. Other Items | | | | | | | |
| 1. The program satisfy your expectations | 68.6 | 26.2 | 94.8 | 1.68 | 0.5 | 0.0 | 0.5 |
| 2. I am the right person to attend the course. | 92.5 | 6.4 | 98.9 | 0.62 | 0.5 | 0.49 | 1.1 |
| 3. I recommend to my colleagues to attend the course for their benefit | 91.3 | 6.2 | 97.5 | 2.02 | 0.5 | 0.0 | 0.5 |

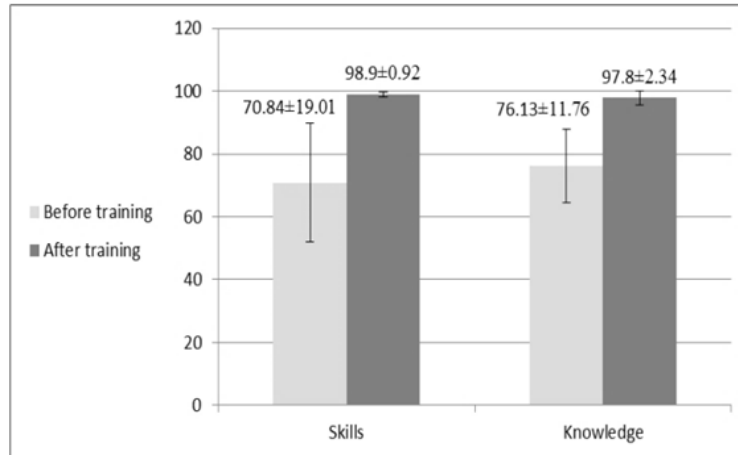


Fig. 2. Knowledge and skills before and after cupping therapy training.

3.4 Trainees' Skills Regarding Cupping Therapy (Al-Hijamah)

In assessment of participants' skills, approximately three fourths of trainees (74%) strongly agreed and another one fifth (19%) just agreed that the course helped them develop their skills in cupping therapy (Al-Hijamah) and they gained new skills (Table 2).

Concerning pre- and post-test questionnaire assessment of participants' skills, results showed that 64.8% trainees scored 70% and more and none of them scored 90% or more in pre-training skills performance. In post training assessment, 100% scored 90% and more. Mean score was 70.84±19.01 in pre-training assessment and

98.9±0.92 in post-training assessment (Table 3 and Fig. 2).

3.5 Trainees' Behavior Concerning Cupping Therapy Training

Before- and after-training written examination of participants, the assessment of knowledge gained, skills acquired and behavior changed significantly. Results demonstrated that 45.6% trainees scored less than 50% and only 2.2% scored 70% and more before training. After training, 72.9% trainees scored 70% and more. The mean scores were 47.79±10.94 and 76.83±8.73 in pre- and post-training, respectively (Table 4).

Table 3. Assessment of trainees' knowledge and skills before and after cupping therapy training

| Category (grading) % | Before training n=483 | After training n=522 | t-test value | p |
|--|-----------------------|----------------------|--------------|-------|
| Overall assessment of Knowledge | | | | |
| - 50% | 7.0 | 0.0 | | |
| - 70% | 27.8 | 0.0 | | |
| - 90% | 61.5 | 0.0 | | |
| 90 + | 3.7 | 100.0 | | |
| Total | 100.0 | 100.0 | | |
| Mean±SD* | 76.13±11.76 | 97.8±2.34 | 41.23 | 0.000 |
| Overall assessment of skills | | | | |
| - 50% | 3.3 | 0.0 | | |
| - 70% | 31.9 | 0.0 | | |
| - 90% | 64.8 | 0.0 | | |
| 90 + | 0.0 | 100.0 | | |
| Total | 100.0 | 100.0 | | |
| Mean±SD* | 70.84±19.01 | 98.9±0.92 | 33.68 | 0.000 |

*SD = standard deviation

Table 4. Results of written examination before and after training

| Category (%) | Pre-training | Post-training | t-test value | P |
|--------------|--------------|---------------|--------------|-------|
| - 50% | 45.6 | 0.4 | | |
| - 70% | 52.3 | 26.7 | | |
| - 90% | 1.8 | 69.2 | | |
| 90 + | 0.3 | 3.7 | | |
| Total | 100.0 | 100.0 | | |
| Mean±SD | 47.79±10.94 | 76.83±8.73 | 41.34 | 0.000 |

4. DISCUSSION

The present study evaluated cupping therapy training programs conducted at National Center for Complementary and Alternative Medicine, Riyadh, Saudi Arabia. Like the present study, the evaluation an important phase of any project or training program is usually done in the last as also found in the ADDIE (analysis, design, development, implementation, and evaluation) model of instructional design (or systematic training) [9]. However, some critics suggested that the evaluation need to be started during the implementation phase in order to encompass both the continuing activities of the trainer and the results of the training as it nears an end [10]. Evaluation in fact reflects getting ongoing feedback from the learner, trainer and learner's supervisor to improve the quality of the training and training program. In addition, evaluation process tends to identify if both the learner and trainer achieved the goals of the training program [10]. Evidently there is a dearth of evaluation studies that examine the effectiveness of the training and its methods in practical, clinical settings. This is of heuristic value because quite often healthcare executives and managers need to keep abreast about the potential benefits of training programs. Thus, it is obligatory that researchers continue to bridge the gaps in the research and provide evaluation data as an evidence of training program's effectiveness [11,12].

There are many advantages of training programs evaluation [9]. It provides useful information to multiple stakeholders and improves quality of training activities together with multiple competencies of trainees. Furthermore by designing a robust training evaluation process, an organization tends to obtain the relevant information needed to improve both the training program delivery and business performance. Ultimately, opportunities for continuous organizational improvement along with capacity building are created [9,13]. Besides

evaluation helps in sharply defining the learning outcomes, remove unnecessary training contents, and ensure that the training and teaching methods meet the training needs of the learners and consequently of the training industry [9], here concerning cupping therapy (Al-Hijamah). The effectiveness results and their continuing improved reshaping is contingent on short- and long-term retention (and evaluation) and application by learners in clinical settings [13]. In consonance with aforesaid themes underlying evaluation, the present study successfully assessed the effectiveness of cupping therapy training programs that targeted healthcare professionals in Saudi Arabia.

In general the training program improves knowledge and skills of attendees. According to this study, interactive intervention, diverse activities, exercises and explanatory materials and methods, working groups, role play, case studies, problem-based learning, simulation and hands-on training resulted in improvement in trainees' knowledge and skills concerning cupping therapy. Consequently majority of participants fairly agreed that the training program satisfied their expectations and they would recommend their colleagues to attend this course for their substantial benefits. At the same time, majority of trainees observed improvements in their knowledge and skills with the exception of about two percent. Overall practically all the participants were satisfied with the cupping therapy training programs including teaching methods which might boost the confidence and morale of training team as well as the participants. The training team should find out solutions to those participants who were not satisfied with this training course on cupping therapy (Al-Hijamah).

According to this study, majority of participants strongly agreed regarding working and learning methods and, in addition, they themselves expressed to be the trained professionals to train

other healthcare workers in the best possible way. Furthermore, a large number of participants viewed about the data mentioned in the course were new and important to them in their work. In addition, pre- and post- training assessment tool which is objective, reliable and free of bias found significant improvements in knowledge following training program (post-test, 100.0% scored $\geq 90\%$ marks). Similar results were found in majority of participants' skills assessment (post-test, 100% scored $\geq 90\%$ marks). In a nutshell, these training findings clearly indicate a positive impact on the learning of the trainees and, by extension, the achievements of the study objectives.

Notably initial evidence of immediate behavioral change effects and the transfer of knowledge from the training course to the clinical setting were suggested by several comments; majority of participants expressed to use the newly added knowledge and skills at their health facilities; most of trainees expressed that the training course created a sense of engagement and participation in the decision-making process concerning benefits, evidence base, cupping techniques and point selection. In a systemic review of 217 evaluation studies from high income countries, only 8% had a longterm followup component while 92% studies carried out evaluation at a single point of time (post intervention) and some of these research used pre- and post-intervention evaluation [14]. Evidently like the present study most of training evaluation studies reported to focus on knowledge, attitude, personal development and learning skills and behavior change of trainees and found improvements in trainees' satisfaction, knowledge, attitudes, skills and behavior changes [3,9]. In another development, Pakistan Demographic and Health Survey suggested that "hands on skill based" training should be included in continuous medical education in order to meet the targets set by millennium development goals [15]. This form of training should start from medical schools where young doctors can attain skill based competency before exposure to actual patient care. Similarly training workshops should be an integral part of their curriculum for developing their skills along with theoretical knowledge. The present study supported these notions [3,9,14-15] concerning with modernizing of medical careers [16]. As discussed earlier, most evaluation studies [3,9,14] did not focus on the long-term effects and identification of confounding factors concerning training courses and, hence, future

studies should evaluate these two perspectives of cupping therapy training programs around the world. In general there is a dearth of literature on evaluation studies on cupping therapy training courses in the Eastern world; our research team took initiative to assess effectiveness of using simulation in cupping therapy training course for fourth year undergraduate medical students enrolled in Dar Al Uloom University, Riyadh, Saudi Arabia. This study found that the simulation could be a robust training method to impact the trainees' knowledge, confidence and clinical skills development concerning cupping therapy [17].

To achieve this goal, one of the methods is to carry out clinical audits at multiple points of time to assess the improvement in healthcare, compliance with proper cupping therapy procedures, decrease in adverse effects and complications. Another method is to evaluate the same trained healthcare professionals after six months or so using the same tools utilized in the present study. Furthermore the trained healthcare professionals in cupping therapy need continuous supervision and cupping therapy training courses regularly for updating their knowledge and skills and improving their clinical acumen. In another related development, community education to antagonize wrong beliefs and misconceptions associated with cupping therapy and to recognize malpractice and move the patient with complications earlier than is now often the case are critical responsibilities of healthcare workers [18]. This study has some limitations. The present study evaluated only the immediate effects of cupping therapy training programs. The impact of such training programs on trainees in real world settings yet to be evaluated. This component of evaluation process is highly important and needs to be considered in future studies. Another caveat is that one training course of short duration, i.e., 4 or 5 days is not enough for the participants to take a closer look into a modality, i.e., cupping therapy with complex mechanisms of action and used for the prevention and treatment of diverse diseases. Hence, the cupping therapy training program needs to be of longer duration, a minimum of two weeks.

5. CONCLUSION

In summary, this evaluation study of cupping therapy training programs using Kirkpatrick module and multiple measurement tools and

designs found out that majority of participants post-training intervention were satisfied with the training course along with enhanced motivation and creativity, developed advanced knowledge, favorable attitudes, skills and behavior change. This study recommends long-term evaluation research concerning cupping therapy or other training programs using the Kirkpatrick model and/or trainees' feedback module together with regular refreshing courses combined with seminars, case studies and hands on skill development for assessing the sustained effects of cupping therapy training programs on trainees' clinical behavior at work settings and updating their knowledge, attitude, skills and clinical acumen in cupping therapy, respectively.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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