



Cupping Therapy (Al-Hijamah): Healthcare Professionals' Controversial Beliefs Before and After Training Program, Kingdom of Saudi Arabia

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Authors' contributions

This work was carried out in collaboration between all authors. Authors ATEO, AMAB, NAQ and TSA designed the study. Authors ATEO, MK and NAQ performed the statistical analysis. Authors ATEO and TSA wrote the protocol and the first draft of the manuscript. Authors AMAB, MAEO, AAH, ISE, MSA, MH, DSAD, SOS and NAQ managed the analyses of the study along with the literature searches. Author NAQ revised the paper a number of times in accordance to reviewers' comments. All authors read and approved the final manuscript.

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ABSTRACT

Background: Cupping is a complementary and alternative medicine (CAM) technique that has been widely used by healthcare professionals and the people since ancient times.

Objective: This study assessed controversial beliefs and conceptions concerning cupping (Al-Hijamah) among health professionals before and after training program.

Methods: Healthcare professionals (n=439, 226 physicians, 108 physiotherapists and 105 nurses) were exposed to an intensive training program conducted by National Center for Complementary and Alternative Medicine (NCCAM), Riyadh, Kingdom of Saudi Arabia (KSA). The participants completed a 23-item self-administered questionnaire before and after an intervention program. The questionnaire was reliable for the assessment of controversial beliefs and conceptions about cupping therapy.

Results: Male participants constituted 64.7% and Saudi subjects were 38.3%. The rest of the non-Saudi participants had 16 different nationalities. All participants stated one or more controversial beliefs before intervention (range = 1-16) and post-intervention (0-4) with a variable proportion of participants revealing inconsistent reduction or modifiability in controversial beliefs and conceptions about cupping therapy. A proportion of participants (65.2%) specified no controversial beliefs after intervention. The belief that improved most was "Hand washing is the key component of infection control" stated by 61.3% of participants.

Conclusion: Using targeted training programs, most of healthcare professionals' false beliefs about cupping (Al-Hijamah) therapy are modifiable. Further high quality research are needed to explore the false beliefs of cupping therapy among healthcare professionals and practitioners together with availability of standard clinical practice guidelines of cupping therapy at clinical settings around the world.

Keywords: False beliefs; cupping; Al-Hijamah; healthcare professionals; Saudi Arabia.

1. INTRODUCTION

Cupping is a traditional technique that has been passed down from generation to generation since ancient times and continues to be widely used by healthcare professionals and the public around the world [1-3]. Cupping therapy (Al-Hijamah) is related to complementary and alternative medicine in which a cupping practitioner puts a number of aseptic cups on the skin for a few minutes to create pressure for drawing toxic products found in the blood of ill patients. Cupping therapy tends to relieve pain and inflammation and streamlines blood flow and qi energy in the body. The use of cupping promotes health, well-being and relaxation. Currently wet cupping (Al-Hijamah in Arabic) and dry cupping do not differ in their effectiveness. Both practices are culture-based and are performed in many countries to meet the healthcare needs of chronic patients who do not benefit from conventional medicine [4,5]. Notably the controversial false beliefs and misconceptions associated with cupping therapy technique are attributed to a variety of factors including relative lack of mechanisms of action, poor knowledge of cupping practitioners and lack of integration of Complementary and Alternative Medicine (CAM) into mainstream curriculum of

medical schools around the world [6-11]. Evidently cupping (Al-Hijamah) therapy proponents believe that wet cupping removes harmful substances including heavy metals and toxins from the body to promote healing [12]. A study carried out on 24 healthy volunteers reported that wet cupping blood have higher level of heavy metals; aluminium, lead and mercury levels in the cupping blood were two, nine and eight times higher compared to venous blood, respectively. Furthermore there is converging evidence that these heavy metals along with oxidants and oxidative stress are potentially harmful to the body and cause a variety of diseases including joint pain, inflammation, cancer and neurodegenerative diseases [12,13,14]. Cupping therapy is relatively safe modality; however, it has some adverse effects and complications such as burning and scare formation, bruises, bleeding, infection, abscesses, and anemia which are mostly attributed to unqualified and inexperienced cupping therapists [7]. Despite several challenges and barriers, Complementary and Alternative Medicine curriculum is being increasingly incorporated in many universities of the world to teach medical students about CAM including cupping therapy [15,16]. Knowledge, attitude and practice having strong linkage with

belief system of medical students and healthcare professionals concerning CAM is relatively an old avenue for research in the Eastern world, though the western world has produced huge data on this particular perspective over few decades [17-19]. Nonetheless false beliefs and misconceptions relating to cupping therapy is an unexplored area that needs good quality research around the world [10].

Beliefs are defined as the state of mind in which a person thinks something to be the case, with or without there being empirical evidence to prove that something is the case with factual certainty. Another way of defining belief sees it as a mental representation of an attitude positively oriented towards the likelihood of something being true [20]. Controversial Beliefs where opinions of people differ concerning cupping therapy among Saudi population were studied by the NCCAM in KSA. The results reported 27 beliefs concerning tools used for cupping, color, type and amount of blood, scarification, preparations before and after cupping, infection control, indications of cupping and cupping practitioners [21]. This tentative study explored beliefs about cupping technique among healthcare professionals in KSA before and after a training intervention program. The significance of this pilot study is that it will guide Complementary and Alternative Medicine trainers about which false beliefs are modifiable and which are incorrigible, and accordingly develop other programs to effectively address the latter perspective. Furthermore, false beliefs concerning cupping therapy (Al-Hijama) associated with religious connotations need to be corrected among traditional and conventional practitioners around the world.

2. METHODS

2.1 Study Design

A pre- and post-training intervention study.

2.2 Setting

This study was conducted at National Center of Complementary and Alternative Medicine, Riyadh, Kingdom of Saudi Arabia. Briefly speaking, the regulation of clinical practice of healthcare professional concerning cupping therapy (Al-Hijamah) is mandatory in order to put right prevailing false beliefs, safeguard patients' rights and delivery of high quality services with

better outcome. The relevant health authorities in Kingdom of Saudi Arabia initiated regulatory measures directed towards professionals intending to practice cupping therapy since 2015. 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 along with an additional full session on cupping beliefs in Saudi culture [22]. Notably false controversial beliefs about cupping were assessed before and after the training intervention program which laid the foundation of the present study and other published research [10].

2.3 Sample

A convenient sample technique was used for including all those participants who attended one week training course, requested license for cupping practice (Al-Hijamah) and gave consent for participation in this research. Included healthcare professionals (226 physicians, 108 physiotherapists and 105 nurses) undertook one week intensive training course targeting Al-Hijamah therapy with a special focus on controversial false beliefs and conceptions. This training course was conducted by NCCAM at multiple times. This course was first organized in March 2015 and still continuing. There were 28 courses conducted at multiple points of time for 28 groups of participants (14 for physicians and 14 for allied healthcare workers). A total number of participants who attended all courses were 504. Although the primary investigator asked all trainees to participate, sixty five participants did not agree to do so. Therefore, the participants included in this research were 439.

2.4 Questionnaire

The steps of developing this reliable, self-administered questionnaire are described elsewhere [10]. This predesigned and pre-tested questionnaire consists of 19 false and 4 true statements (8, 10, 11 and 21) for the rigorous assessment of healthcare professionals' beliefs about cupping therapy. The same questionnaires were used before and after a training program. Each questionnaire takes approximately 15 to 20 minutes for completion.

In addition, a semistructured sociodemographic sheet was also developed with the following

variables; age, gender, nationality, specialty, and experience.

2.5 Training Course

A team of seven Al-Hijamah expert trainers from NCCAM developed a comprehensive training program on cupping therapy. The trainers with MDs included four Al-Hijamah experts, two Public Health and Community Medicine experts and one expert in medical education. This training course was approved through panel discussion with five Al-Hijamah experts and three community Medicine consultants. This training program was also submitted to a neutral cupping expert for revision, and finally 14 topics were retained in this program. These topics include the following; 1) overview of Complementary and Alternative Medicine, 2) history of cupping, 3) theories and mechanisms of cupping, 4) types and classifications of cupping, 5) cupping tools and equipment, 6) instructions before, during and after cupping session, 7) cupping procedures and skills, 8) side effects and complications of cupping, 9) precautions, indications and contraindications, 10) areas and points of cupping, 11) infection control and proper waste disposal, 12) medical and research ethics, 13) research and evidence-based cupping therapy and 14) false beliefs and misconceptions about cupping therapy (Al-Hijamah). In addition to individual topic of cupping false beliefs, controversial beliefs and misconceptions concerning several aspects of cupping therapy were highlighted during presentation of each topic and discussion of cupping therapy for correcting its false beliefs. Furthermore, a two hours special session directed towards controversial beliefs concerning cupping therapy (Al-Hijamah) was also added at the end of the course. The participants were encouraged to share in open discussion concerning the scientific bases and misconceptions underlying false beliefs about cupping therapy. Another reason for this session was the preliminary findings of an exploratory study that explored health professionals' controversial beliefs and conceptions about cupping (Al-Hijamah) technique [10].

2.6 Teaching Schedule

All the participants were exposed to an aforesaid intervention program. This training program with a specific timetable was implemented on a regular basis over a period of 18 months. There were 14 training courses for physicians and each

course with 7-hour/per day schedule for four days. Similar numbers of training courses were regularly scheduled for allied healthcare professionals including physiotherapists and nurses and each course with 7-hour/per day timeline for five days. Allied health participants were given more time for discussion of wrong beliefs, and additional practical sessions for acquiring considerable skills including infection control measures. Five days timeline for allied trainees also encompassed teaching anatomical and physiological points and a number of case studies. The maximum number of participants was 18 persons in each training course.

2.7 Teaching Methods

There were several teaching methods used by cupping expert trainers. These teaching methods were interactive lectures, power point presentations, small group discussion, seminars, role play, task assignments, daily practical sessions, self-learning and learning by doing. The participants were allowed to interrupt the trainer in case they asked an important question or needed clarification about poorly understood point including false beliefs during presentation. The trainers were advised to promptly clarify the raised points or answer the question from any participant. Overall, the trainers' presentations were supported by digital tools, and NCCAM administrators produced atmosphere in the teaching hall conducive for open and frank discussion and interactive learning.

2.8 Research Procedure

The first author (ATEO) distributed the 23-item self-administered questionnaires prior to training intervention to a group of participants. They were asked to fill out the questionnaire completely. Any query raised by the participant was quickly clarified by the first author or his assistant. All the questionnaires were collected by the first author (ATEO). 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.

2.9 Exclusion and Inclusion Criteria

Those healthcare professionals who gave oral or written consent for participation were included in this study. Conversely, those who refused to participate in this study were excluded from this research. Those who did not fill out the pre- and

post-test questionnaire completely were excluded from the study.

was used to analyze qualitative data. $P < 0.05$ is considered significant.

2.10 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 National Center of Complementary and Alternative Medicine, Riyadh, Saudi Arabia.

2.11 Data Management and Analysis

Data were analyzed using SPSS statistical package for windows version 20. Mean, standard deviation (SD), Students t-test and analysis of variance (ANOVA) were used to analyze quantitative data. Besides frequency distribution and calculation of percentages, chi square test

3. RESULTS

3.1 Sociodemographic Variables

There were 439 healthcare professionals (226 physicians (51.5%), 108 physiotherapists (24.6%) and 105 nurses (23.9%) who participated in the study. Twenty one health professional did not answer either the pretest or the posttest questionnaire completely were excluded from the study. The mean age of physicians, physiotherapists and nurses was 40.34 ± 10.92 , 32.3 ± 7.16 and 34.73 ± 8.64 years, respectively. The mean duration of experience concerning physicians, physiotherapists and nurses was 16.36 ± 10.93 , 10.29 ± 7.06 and 14.7 ± 8.56 years, respectively. A proportion of participants ($n=284$, 64.7%) were males and 39.0% ($n=171$) were Saudi (Table 1). All percentages unless specified were calculated from total number of participants.

The non-Saudi participants ($n=268$, 61.0%) had 16 different nationalities. Egyptians represented the maximum number of participants, ($n=168$, 38.3%) [Fig. 1].

Table 1. Sociodemographics of studied subjects

Variables	Physicians N=226 (51.5%)	Physiotherapists N=108 (24.6%)	Nurses N=105 (23.9%)	Total N=439 (100%)
Age				
Range	25-78	23-56	24-60	23-78
Mean	40.34	32.30	34.73	35.79
S.D.	10.92	7.16	8.64	8.91
	$F = 29.647, p = 0.000^*$			
Gender				
Male	164 (37.5)	73 (16.6)	47 (10.7)	284 (64.7%)
Female	62 (14.1)	35 (8.0)	58 (13.2)	155 (35.3%)
	$\chi^2 = 24.79, p = 0.000^*$			
Nationality				
Saudi	76 (17.3)	55 (12.5)	40 (9.1)	171 (39.0%)
Non-Saudi	150 (34.2)	53 (12.1)	65 (14.8)	268 (61.0%)
	$\chi^2 = 8.82, p = 0.012^*$			
Experience				
Range	1-53	2-33	3-40	1-53
Mean	16.36	10.29	14.7	13.78
S.D.	10.93	7.06	8.56	8.85
	$F = 14.808, p = 0.000^*$			

*Significant with exact p values.

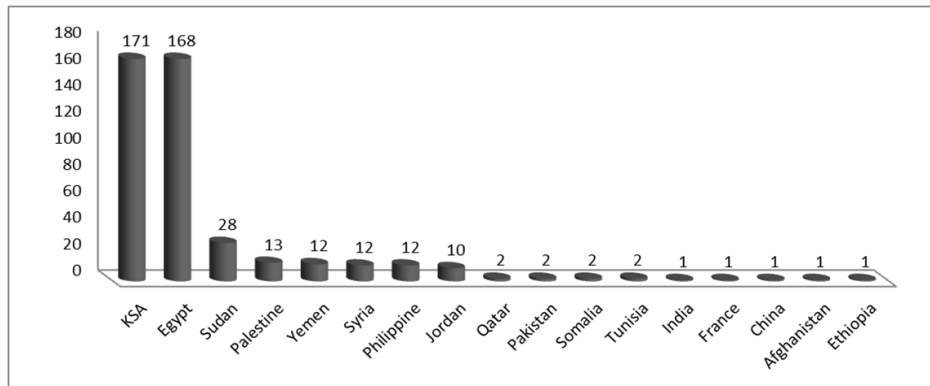


Fig. 1. Participants' country of origin

3.2 Participants' Pre- and Post-intervention Beliefs

All participants stated one or more belief before intervention (range 1-16) with a mean of 5.61 ± 2.82 (physicians), 6.61 ± 3.09 (physiotherapists) and 6.48 ± 2.96 (nurses) [Table 2].

After intervention, the participants reported considerable reduction in false beliefs (range 0-4) and a greater number of participants ($n=286$, 65.2%) stated no controversial beliefs. The mean number of beliefs concerning cupping therapy (Al-Hijamah) lowered significantly from 6.13 ± 2.95 before intervention to 0.66 ± 1.04 after intervention. There were no significant differences between different specialties and percentage of beliefs after intervention ($p=0.532$) (Table 3).

Concerning 23 beliefs, pre-and post-training program responses of participants are shown in Table 4. Pre-training intervention program, the commonest controversial belief present among 74.5% of participants was that "Al-Hijamah gets rid of bad blood". The second most common false belief stated by 48.3% of participants was about "Alkahel area (the back area from the base of the neck below the level of 7th cervical vertebra to 3rd thoracic vertebra) which is used for cupping all diseases". Other false beliefs stated by participants in decreasing frequency were "The color of blood inside the cup is indication of the severity of the disease" (43.7%), "The darker the cupping blood, the greater the severity of the disease" (38.7%), "You must put the cup after scarifications several times until yellow liquid out" (35.3%), "Al-Hijamah is absolutely safe" (34.6%), and "Al-Hijamah is effective in the treatment of all diseases" (34.4%).

Post-intervention training program five false beliefs (statements 19-23) were completely improved (or modified) as reflected by all participants. Six beliefs (statements 13-18) were imprecisely stated by less than 1% of participants. Four beliefs (statements 9-12) were incorrectly stated by less than 2% of participants. One belief "Hand washing is the key component of infection control" was refused by 7.1% of participants with 61.2% improvement after intervention. Fourteen beliefs improved by more than 95%, five beliefs improved by more than 90% and the remaining three beliefs improved by more than 83% after intervention (Table 4).

4. DISCUSSION

This pre- and post-design study concerning training intervention program assessed false beliefs of healthcare professionals in the Kingdom of Saudi Arabia. Cupping therapy (Al-Hijamah) with multiple clinical applications and acceptable efficacy in some diseases is indubitably a well-known complementary and alternative medicine practiced not only in Middle East and Asian countries but also worldwide [23,24]. However, some researchers in the western world are somewhat skeptical regarding the legitimacy of this traditional practice labeling it as pseudoscience [25,26]. Overall, this landscape about cupping therapy (Al-Hijamah) is rapidly changing around the world. This is attributed to basic researches revealing its mechanisms of action and effects [6,27,28]. Many randomized clinical trials, systematic reviews and meta-analyses concerning cupping therapy have reported good outcome results in many diseases and overall cupping therapy is a safe treatment modality [7,23,24,27,28].

Table 2. False beliefs of studied subjects: Pre- and post-intervention program

Variables	Physicians N=226		Physiotherapists N=108		Nurses N=105		Total N=439	
	Before	After	Before	After	Before	After	Before	After
Beliefs (N=23)								
Range	1-14	0 - 4	2-16	0 - 3	1-16	0 - 4	1-16	0 - 4
Mean	5.61	0.66	6.61	0.59	6.48	0.74	6.13	0.66
S.D.	2.82	1.11	3.09	0.91	2.96	1.10	2.95	1.04
CI	5.01-6.21	0.52-0.81	5.84-7.38	0.42-0.77	5.74-7.22	0.53-0.96	5.67-6.5	0.56-0.76
t-test	24.55, $p = 0.000^*$		19.42, $p = 0.000^*$		18.63, $p = 0.000^*$		36.64, $p = 0.000^*$	

**Significant means with exact p values*

Table 3. Number of beliefs after intervention program (% derived from subtotals, 226,108 and 105)

No. of beliefs	Physicians N=226 (%)	Physiotherapists N=108 (%)	Nurses N=105 (%)	Total N=439 (%)
0	152 (67.3)	70 (64.8)	64 (60.9)	286 (65.2)
1	30 (13.3)	17 (15.7)	17 (16.2)	64 (14.6)
2	19 (8.4)	16 (14.8)	14 (13.3)	49 (11.2)
3	19 (8.4)	5 (4.6)	7 (6.7)	31 (7.1)
4	6 (2.7)	0 (0.0)	3 (2.9)	9 (2.1)
Total with beliefs	74 (32.74)	38 (35.19)	41 (39.05)	153 (34.9)

χ^2 (those with vs without wrong beliefs among different specialties) = 1.262, $p = 0.532$, not significant

Table 4. Improvement of beliefs about Al-Hijamah after an intervention program

Beliefs	Before intervention		After intervention		% of improvement
	Number N=439	Percent 100%	Number N=439	Percent 100%	
1. Hand washing is not the key component of infection control measures	80	18.2	31	7.06	61.3
2. Alkahel area (the area from the base of the neck below the level of 7 th cervical vertebra to 3 rd thoracic vertebra) is used for cupping all diseases	212	48.3	22	5.01	89.6
3. There is no need to disinfect cups before cupping	133	30.3	22	5.01	83.5
4. Scarifications covering the entire area of the cup increase the effectiveness of cupping	140	31.9	12	2.73	91.4
5. Al-Hijamah gets rid of bad blood of the body	327	74.5	11	2.51	96.6
6. Al-Hijamah is absolutely safe	152	34.6	10	2.28	93.4
7. There is no need to cover areas of scarification with a medical dressing after Al-Hijamah	119	27.1	10	2.28	91.6
8. Cupping does not cause the transmission of infectious diseases	60	13.7	9	2.05	85.0
9. The color of blood inside the cup is an indication of the severity of the disease	192	43.7	6	1.37	96.9
10. Al-Hijamah is effective in the treatment of all diseases	151	34.4	6	1.37	96.0
11. The greater the number of cups the more effective cupping process/therapy	70	15.9	6	1.37	91.4
12. The more dark blood indicates more severe disease	170	38.7	5	1.14	97.5
13. If blood does not come out after scarification you should repeat it once again	105	23.9	4	0.91	96.2
14. Cupping is useful in emergency conditions	76	17.3	4	0.91	94.7
15. It is possible to perform wet cupping (Al-Hijamah) anywhere in the body	65	14.8	3	0.68	95.4
16. You must put the cup after scarifications several times until yellow liquid is out	155	35.3	2	0.46	98.7
17. The longer the cup is placed on the skin, the more effective cupping therapy is.	75	17.1	2	0.46	97.31
18. Cupping like blood donation is not different	45	10.3	2	0.46	95.5
19. The amount of blood inside the cup is a sign of the severity of a disease	109	24.8	0	0.0	100.0

Beliefs	Before intervention		After intervention		% of improvement
	Number	Percent	Number	Percent	
	N=439	100%	N=439	100%	
20. Shaving razors can be used for scarification for cupping	92	20.9	0	0.0	100.0
21. The amount of blood inside the cup indicates the degree of healing	67	15.3	0	0.0	100.0
22. Cupping can be used for all the patients and all diseases	59	13.4	0	0.0	100.0
23. The scarification of cupping must be deep	12	2.7	0	0.0	100.0

Exact p values concerning all 23-statements (before vs after intervention) = 0.000, significant

Each culture may have its own false controversial beliefs concerning cupping therapy. These controversial beliefs related to cupping might be due to a number of factors including absence of sufficient evidence-based data, lack of high quality educational facilities and limited academic teaching in medical schools worldwide. Furthermore, relative absence both of non-profit official cupping training centers and cupping clinical practice guidelines at clinical settings weaken healthcare professionals' cupping therapy belief system and by extension public at large [29]. Surprisingly, some practitioners view cupping therapy (Al-Hijamah) is not a science and not in need of research. According to some researchers, since ancient times cupping therapy is mostly practiced by unqualified traditional healers who created false beliefs over thousands of years. Ultimately, these beliefs tend to be transmitted to healthcare professionals trained by traditional healers who have no scientific sense of high quality training modules, research and clinical practice guidelines [30,31]. We feel positively that such clinical, research and training scenarios are dynamically changing around the world.

In general, false beliefs regarding traditional or any conventional technique tend to change after training program. According to this study, about two thirds of healthcare professionals specified no controversial beliefs concerning cupping therapy after intensive training. Furthermore, the rest of participants stated 1 to 4 controversial beliefs post-training. Nonetheless 2% of the participants were not at all convinced post-training that these beliefs were wrong. Most of them reported that they did have enough time to discuss the scientific explanations underlying the false controversial beliefs. Though the participants were free to clarify any false belief during the entire course, a special open session

for discussing false and controversial beliefs was further added to the timeline of training program. Five types of personalities described in the literature include innovators, early adopters, early majority, late majority and late adopters. Late adopters who resist any change even after education and training represent 2.5% of the population [32] and this finding matches with the present study results as 9 participants (2.1%) resisted any change in some controversial false beliefs. The implication of this finding is that the trainers need to identify late adopters early and develop specific training strategy for modifying their challenging controversial beliefs concerning cupping therapy.

International health organizations recommend proper hand washing for preventing transmission of infection in clinical settings. According to this study, "Hand washing is the key component of infection control" is a true statement rejected by 18.2% of healthcare workers prior to training while 7.1% of participants after intervention reflecting a significant improvement. Handwashing with soap and water is a sensible strategy for hand hygiene recommended by Centers for Disease Control. In general, adherence rate of healthcare workers to recommended hand hygiene procedures has been poor, about 40% [33]. Healthcare professionals have reported several factors for poor adherence to handwashing; handwashing materials induce irritation and dryness, sinks are inconveniently located, lack of soap and paper towels, time constraints, understaffing or overcrowding, and patients' priorities. Furthermore, lack of professionals' knowledge of protocols and evidence-based information concerning CAM, forgetfulness, and disagreement with the recommendations were other self-reported factors for poor adherence with hand hygiene [19,33,34]. Overall

handwashing is a fundamental recommended technique to be used by all healthcare professionals for controlling infection across healthcare settings around the world.

Adherence to infection control measures is an important global safety issue not only for healthcare users and public but also healthcare providers in healthcare settings. "You must disinfect the cups before use" is a true statement disagreed by 5% of participants after intervention program. The participants stated during open discussion that the cups are non-sterile but of course clean. Similarly, they informed that cupping is not a sterile technique. In addition, participants emphasized that they can use clean but not necessarily sterile gloves. Notably as they proposed that there is no need to disinfect the cups before using in cupping therapy. The participants' strong adherence to cupping false beliefs concerning aseptic measures may increase infection among highly susceptible patients with diabetes mellitus, cancer and other chronic diseases including patients on corticosteroids [35]. The implication of this finding is that the false beliefs concerning cupping sustained by healthcare professionals who use unscientific explanations need corrective measures. Overall prevention of infections across healthcare settings is of utmost importance for the safety of healthcare users, health providers and surrounding environment. Cupping practitioners should take notice of this important message.

Traditional practitioners need to know fairly about cupping points. "Alkahel area is used for cupping all diseases" was reported by 5% of participants after intervention which is wrong. This area is reported to have special features; brown adipose tissue related to main vessels carrying blood from the heart and the brain, passage of the thoracic duct, immediate proximity to sympathetic ganglia (stellate ganglia) and two important acupuncture meridians [36]. Notably cupping this area was mentioned by several traditional writers [37,38]. In a nutshell, Alkahel area is not a panacea for all diseases. Furthermore, it is wise to know that there is no one point or area recommended treating all diseases. There are certain rules to choose points, but definitely there is no single point for treating all human ailments.

Evidently, false controversial beliefs concerning cupping are modifiable after intensive training program. Notably, the majority of health professionals' (90%) beliefs (19 beliefs out of 23,

82.6%) were precisely changed after training intervention. This is considered as an excellent outcome of the intervention program. Therefore, scientific explanations of controversial false beliefs associated with Al-Hijamah therapy need to be regularly discussed with participants who take cupping training course conducted by National Center for Complementary and Alternative Medicine. These beliefs precisely understood and crystal clear to all health professionals would help in lowering incidence of malpractice, adverse effects, complications and ensure safety of patients intending to take cupping therapy.

Like any traditional treatment modality linked with complementary and alternative medicine, cupping (Al-Hijamah) therapy globally faces many challenges. These include but not limited to a relative lack of education and training for cupping therapy providers, lack of integration of CAM curriculum in medical schools, severe shortage of qualified cupping therapists, ongoing tension between opponents and proponents of Complementary and Alternative Medicine therapies, constraints concerning funding for CAM research including cupping therapy and the bureaucratic and governmental bottlenecks [39]. The concerned higher health authorities at national and international levels with the support of governments showing strong will must give attention to eliminate aforesaid and other cupping therapy challenges around the world. Al-Hijamah therapy has religious connotations and, therefore, all its related false beliefs need to be corrected and removed radically by targeted training program and campaigns around the world [10,28].

This preliminary study has some limitations. This pilot study only included physicians, physiotherapists and nurses. Other medical and allied healthcare professionals were not considered in this study, because in line with the regulatory measures in Saudi Arabia, they are not allowed to practice cupping therapy. Thus, the results of this study are not generalizable to all healthcare professionals across Saudi Arabia. Furthermore, lack of high quality studies on mechanism of action and effects, weak scientific basis and malpractice of cupping therapy complicated the whole issue of false controversial beliefs linked to this traditional modality. Although the questionnaire is reliable, it needs validity study in future. Whether or not post-training change in false beliefs will persist overtime is unknown at present and this

perspective may require further evaluation study involving same sample in different points of time.

This study has several strengths. The preliminary results of this research are very encouraging, because the controversial false beliefs concerning Al-Hijamah therapy are mostly modifiable among studied participants. From another perspective, the majority of the participants are from Middle East countries especially from Saudi Arabia and Egypt which have the same cultural traditions and customs. Thus the sample of this study is homogeneous and the results of this study may be generalizable to physicians, physiotherapists and nurses of these countries.

5. CONCLUSION

In summary, most of health professionals' controversial beliefs associated with cupping are modifiable. Al-Hijamah, a CAM modality needs further rigorous high quality scientific research for exploring its underlying false beliefs in diverse communities including medical around the world. Besides availability of local clinical practice guidelines of cupping therapy at all healthcare settings, standard methods for uniformly practicing cupping techniques need to be developed globally so that patients and public might get the utmost health promotion, well-being and therapeutic benefits from this CAM modality.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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