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Information for Authors

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Psychotherapy as epigenetic medicine: How to change the memes

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Editorial

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Psychological disorders can be considered as evolutionary deficits. These evolutionary problems can include, on the one hand, the insufficient genetically programmed neural pathways, especially between the limbic system and prefrontal cortex, and on the other hand, maladaptive cultural codes that change behaviors. Stress and relaxation responses and related dysregulations are not only biological circuits, but also social constructs that lead to our attention, interpretations, and consequently, our behaviors.

The effects that the environment has on its own genes are not only chemophysical, but can also be through cultural or symbolic codes; namely memes. Memes are pieces of information that include behavior patterns, printed words, melodies, rhythm, facial expressions, touch, spoken words, TV, phone call, radio, letters, etc. During development, especially in critical periods in early life, genes are turned off or on depending on stress, and lifestyle, thus giving rise to vulnerability to stress in later life (Leigh, 2010).

Dawkins defines these symbolic replicators, the memes, and their similarities to the biological replicators or genes:

" Just as genes propagate themselves in the gene pool by leaping from body to body via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation". (1981: 143)

Stress memes interact with residence memes in the brain and they can cause the replication of stress memes. The host immune response is to turn off the stress response if the protective memes are active and abundant. Nevertheless, it is possible that stress memes be activated by input stress, especially when the protective memes have been weakened. Chronic stress causes a disconnection between new memes and residence

protective memes that are commonly dominant and it weakens memory function.

In the study of culture, it is understood that psychiatric syndromes are formed based on different cultural values and traditional ideas are considered as a core of culture (Gopalkrishnan & Babacan, 2015). In childhood, cultural memes are heavily potentiated and repeatedly introduced during a period of time in which the filtration system for meme initiation is immature. Ultimately, existing memes that may be in conflict with pre-existing potentiated memes are filtered. Therefore, during psychotherapy, clients need to be self-aware of cultural and individual memes.

Stress memes tend to disconnect perceptual or incoming memes from the memory memes. Thus, with the growth of individual consciousness and the conscious change of memes, we can close the gap between incoming memes and memory memes, and thus, reduce the distance between experiencing the self and memorizing the self. The coherence of memes is the key to healing and health.

From this point of view, psychotherapy is considered as a systematic deconstruction of stress memes through editing maladaptive schemas and dysfunctional beliefs, developing protective memes by making the psychological capital more accessible, and integrating perceptual and memory memes through mindfulness-based practices.

Many experimental and clinical trials have shown epigenetic changes after an effective course of psychotherapy (e.g., Stahl, 2012). Our neural functions and gene expressions are bounded by language and other symbolic codes. Thus, we can consider psychotherapy as microsurgery and epigenetic medicine which can moderate our emotions, behavior, and even psychoneuroimmunological responses.

Having such a systemic view in practice facilitates a psychosomatic approach to analyzing, treating, and educating patients, it can lead to the creation of more integrative and effective protocols, and can make psychology discourse and practice more critical in health and medicine.

Conflict of Interests

Authors have no conflict of interests.

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International Journal of Body, Mind and Culture

Action Research: The National Festival of CORONAREVAYAT (Corona Narrative) in Iran; An Experience Report and Analysis

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Qualitative Study

Abstract

The national festival of CORONAREVAYAT (Corona Narrative) took place in the Iran Medical Council during the first peak of Covid-19 and lasted about a year, from April 26, 2020 to March 17, 2021. The festival was designed to provide a platform for networking between artists and health professionals, and to promote documentation in the field of public health. Weakness in epidemic documentation has deep roots in Iran. Thus, CORONAREVAYAT was conducted in the context of the *public participation paradigm* to increase the social sensitivity regarding documentation in the health sphere, through running a *media campaign*. Registration of 1022 works in the festival, publication of 10 volumes of books containing the selected works, attracting the professional support of 28 national organizations and the financial support of a private sector, participating in 3 international film festivals and 1 international painting festival, introducing some less-known concepts (e.g., health humanities and narrative medicine) to the public, and networking between artists and therapists can be considered as the most valuable achievements of CORONAREVAYAT, which outweigh its weaknesses (especially organizational bureaucratization). The predominance of image over text can be observed in scrutinizing the works registered in the festival, and can be attributed both to the ease of preparing image-based works with modern digital tools (especially cellphones) and to the greater desire of social media users to share photos and videos compared to text and articles. The least participation was observed in the research section of the festival, in this regard it can be stated that it seems that some concepts (e.g., research) have become so academically entrenched that academics are reluctant to engage in a public media campaign. The ambiguity in the definition of applied research and the negligence of universities in the field of science communication add to the complexity of this issue.

Keywords: Covid-19; Pandemic; Health; Media; Campaign; Communication; documentation

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Introduction

The national festival of CORONAREVAYAT was launched in April 26, 2020, concurrent with the first peak of Covid-19 in Iran, and lasted about a year, until March 17, 2021. The goal was to record the lasting moments of facing the pandemic all over the country, from the health professionals' commitment to the public's patience in sanctions, economic hardship, and the Covid-19 crisis. The initial idea came from the experience of the head of the Iran Medical Council, Dr. Mohammadreza Zafarghandi, who himself had witnessed that many unprecedented medical martial scenes had been overlooked during the eight-year Iran-Iraq war (1980-1988), without any trace of them today. From the very beginning of the pandemic, it was decided that a project be designed and developed to prevent similar negligence, so that the lasting moments of facing Covid-19 would be recorded and archived in various formats (Tasnim News, 2020).

Although Iran has gone through many ups and downs (from coups and assassinations to revolutions and wars) and a variety of events that are suitable subjects for documentarians, the weakness in documentation (especially in the field of health and epidemics) has deep roots in this country. Its most obvious sign is the lack of accurate documentation despite the numerous epidemics (e.g., cholera, plague, tuberculosis, smallpox, leprosy, typhoid, malaria, and influenza) in Iran throughout history. The few surviving documents from the Qajar era are non-specific. For example, Mohammad Hassan Sania al-Dawla (nicknamed Etemad al-Saltanah), who was one of the courtiers of Nasser al-Din Shah, recorded the most important events of the country in the last 15 years of his life, from 1298 to 1313 AH (1880-1895 AD). He has also referred to the epidemics of that time (Sania al-Dawla, 2011). More scholarly books which have dealt with this subject more specifically, such as "Study of Epidemics in Iran", have been written decades later and naturally have a retrospective view of the story (Talaei, Rajabnejad, & Tajmiri, 2017).

This shortcoming, of course, is not limited to Iran. Weakness in medical documentation seems to be a pandemic phenomenon, especially in the context of pandemics. Evidence of this claim is the dramatic ignorance of the Spanish flu pandemic (1918) around the world. According to Mark Honigsbaum (2019), no trace of the Spanish flu can be found in the Encyclopedia Britannica (1925), which was published only 7 years after the deadly pandemic. Even on the 100th anniversary of that pandemic in 2018, nothing more than a few brief commemorations were reported in several local cemeteries (Honigsbaum, 2019). It is as if a desire and tension in our subconscious lead us to forget painful traumas (e.g., pandemics) that lead to the death and mourning of many human beings. Paul Ricoeur draws our attention to this point in his book "Forgiveness, Forgetfulness, and Memory" (Hung, 2020).

Similarly, in Iran, despite the details we know about the history of the establishment and development of Dār ul-Funun, the Academy of Sciences and the School of Medicine (Raeisnia, 2020), when we want to know about bitter events such as epidemics which according to Ricoeur symbolize the wounds of the past (Hung, 2020), we are left empty-handed. It is as if there is less sensitivity in recording these unpleasant events, and this negligence can be seen at different levels of society, from health professionals to artists and even the people whose exposure to these epidemics is somehow, willingly or unwillingly, becoming part of their lives.

Given this historical mindset, when it came to documenting the Covid-19 epidemic in Iran, we first decided to increase society's sensitivity to the issue. In other

words, in the sense used in "science communication", we decided to run our project in the context of the *public participation paradigm*, not the *information dissemination paradigm*. In the former, the transfer of content takes place actively, horizontally, and participatory, that is, the audience is not merely the receiver of information, but the target audience, like other stakeholders, is involved in the communication process. In contrast, in the latter, the transfer of content takes place unilaterally and vertically, that is, scientists and experts (e.g., physicians and health professionals) use media as a tool to convey their scientific and health-oriented teachings to the general public. This approach is very similar to the traditional method of teaching in schools and universities. In this approach, the role intended for the audience is merely the receiver of information (Claessens, 2007). Based on this, in the first step, we decided to define and design our project in the context of the *public participation paradigm* (Table 1).

On the other hand, to convey our message to both the public and target audience, we found it more appropriate to use a *media campaign* model. However, we were not only focused on informing the target audience, but also on trying to attract broad-spectrum participation in recording and sharing experiences of dealing with the pandemic, and trying to familiarize our public and target audiences with some less-known concepts in the health sphere (e.g., narrative medicine and health humanities). Hence, something more than a media campaign was needed. As Richard Thomas points out in the book "Health Communication" (2006), when we are confronted with a multi-faceted health-oriented problem that involves a diverse range of audiences that need to receive different messages and at the same time we want to attract their participation, we cannot simply take a one-dimensional approach, and an integrated communication using multiple communication channels is necessary (Thomas, 2006). It was the same necessity that led us to engage extensively in partnership with 28 national organizations, including public, private, and non-governmental organizations before the formal launch of the festival (cf. "Method").

A look at the history of "health communication" also shows that the further back we go, the more convergence we observe between health communication and active institutions in the fields of cinema, literature, and media. The evolution of this nascent interdisciplinary field shows that, from 1961 when the term "health communication" was first used to 2014 when the Public Health Film Society (PHFS) was established and numerous health film festivals began to work around the world, this interdisciplinary field has always had a participatory approach to dealing with other active institutions in the public sphere (Thompson, 2014).

Methods

To achieve the aforementioned goals, form a network between the artists and health professionals, and encourage the public and target audiences to record the lasting moments they have faced in the pandemic, CORONAREVAYAT went through the following steps:

Table 1. Comparison of the two paradigms commonly used in science communication

Paradigm	Approach	Style	Method	Audience
Information dissemination paradigm	One-sided, vertical	Traditional	Non-participatory & non-interactive	Passive: only receives data
Public participation paradigm	Bilateral, horizontal	Modern	Participatory & interactive	Active: Participates in data sharing

In-depth study and interviews to achieve a comprehensive plan

The experience we had already gained from setting up health film festivals and managing public health journals led us to 12 semi-structured in-depth interviews with media experts, public health officials, and well-known interdisciplinary figures to develop a comprehensive plan. The design of CORONAREVAYAT was the result of those interviews defined in the context of the 'public participation paradigm' using the maximum participation of the audiences (public and target) and institutions (public and private) through running a media campaign and taking advantage of the innovative model of integrated communication to record the lasting moments of facing the pandemic in 10 different sections (Table 2).

Attracting organizational and professional support

To attract organizational support, the vision and goals of CORONAREVAYAT were presented to the head of the Iran Medical Council in a PowerPoint presentation, and after gaining his approval, it was supported by the executive elements of the council. Thus, the implementation stages of the festival, especially at the beginning of the process, took place more quickly and easily.

Due to the history of cooperation with the secretaries of 3 Iran International Film Festivals, cinematic support for this project was obtained quickly. They accepted and announced that a special part will be dedicated to CORONAREVAYAT films in the 3 festivals that would be held by their secretary:

- Iran International Documentary Film Festival: Cinema Verité (ISNA, 2020)
- Tehran International Short Film Festival (Mehr News Agency, 2020a)
- International Film Festival for Children and Youth (Astan News, 2022)

This led to widespread participation of filmmakers with CORONAREVAYAT, and the registration of many films in different forms after the announcement. Furthermore, after the agreement with Farabi Cinema Foundation (FCF), its CEO declared that some films will be made with the support of FCF through a selection of videos and narratives submitted to CORONAREVAYAT. In addition, the head of the International Festival of Paintings for Pediatric Patients (IFFPP) acknowledged and announced that this year's festival will be held with the participation of CORONAREVAYAT (Mehr News Agency, 2020b).

Formation of a policy council and launching the secretariat

After obtaining medical and cinematic support, the first meeting of the policy council was held in the Iran Medical Council attended by the head and deputies of the council, Iran International Film Festival secretaries, and several interdisciplinary experts of media, cinema, health, humanities, etc.

Table 2. CORONAREVAYAT: Corona Narrative plan; Recording the lasting moments of confronting Covid-19 in 10 sections

Sections	Forms
Corona according to the image	Photo, poster, cartoon, calligraphy, painting
Corona according to cinema	Documentary, short film, web series, animation, video clip
Corona according to the literature	Poem, short story, novel, narration
Corona according to self-sacrifice (Health Martyrs)	Any form is accepted in this section
Corona according to public education	Video, photo, poster, pamphlet
Corona according to social responsibility	Health donors, active volunteers
Corona according to media	Reports, notes, interviews
Corona according to radio and television	Any form is accepted in this section
Corona according to health humanities	Any form is accepted in medical ethics, medical philosophy, medical education, and medical sociology
Corona according to research	Research article (in Persian and English)

During the meeting, discussions were held regarding the implementation of the festival and criteria selection for the judging process and operational details of the festival (Medical Council of the Islamic Republic of Iran, 2020a). Finally, it was decided that the secretariat be established at the Medical Council and the call be announced as soon as possible to inform the public and target audience that CORONAREVAYAT is going to record the lasting moments of facing Covid-19 in 10 sections.

Information dissemination among the public and target audience

Following the announcement of the CORONAREVAYAT call in the press, news agencies, and TV, the possibility of environmental advertising was provided to the festival with the assistance of city managers .Then, in a meeting with some managers of the Ministry of Health, it was agreed that the ministry's public relations would invite medical universities across the country through official letters to cooperate fully with the festival. In this way, the public relations of medical universities across the country and the hospitals under their auspices worked as the public relations arms of CORONAREVAYAT, publishing the news and announcements of the festival and increasing the participation of health professionals in the project.

Moreover, public relations of the film festivals cooperating with CORONAREVAYAT accompanied the project in publishing the news and announcements. Furthermore, several infographics were printed on the cover of Covid-19 personal protection boxes (including masks, shields, etc.) sent to hospitals across the country by the medical council to invite health professionals to share memories and stories of their exposure to Covid-19.

Attracting support and companionship of 28 national organizations and financial support of a private company

In addition to attracting professional support and companionship of 28 national organizations (including governmental, non-profit, private, and public institutions), the festival tried to cover its costs by attracting the financial support of a private company (Medical Council of the Islamic Republic of Iran, 2020b). Due to the distinct situation of Iran under sanctions and to support domestic production, this company was selected from among Iranian manufacturers.

Hacoupian Company which has a long history in the field of clothing production and supply agreed to provide financial support for the festival. At first glance, this company seems unrelated to the field of healthcare, but its interest and motivation to participate in the field of health are not new and it has previously collaborated with health-oriented projects and, during the Covid-19 pandemic, in addition to financial support for this festival, Hacoupian also produced masks and shields with the health sector.

Table 3 shows CORONAREVAYAT companions and supporters; Name and type of the organizations and the cooperation model.

Results

At the end of the registration period (75 days), 7,743 works were registered in the CORONAREVAYAT registration system (IRIB News Agency, 2020). Moreover, 2,141 raw films were delivered to the secretariat. In addition, after the registration deadline, 2,279 works reached the festival, which increased the total number of CORONAREVAYAT works to 10,022. At the discretion of the Policy Council, it was decided that those works would also be included in the selection and judging process to include a more comprehensive and diverse treasure trove of works in the final products of CORONAREVAYAT. The frequency of works in the 10 sections of the festival is presented in table 4.

Table 3. CORONAREVAYAT companions and supporters; Name and type of the organizations and the cooperation model

Name of organization	Type of organization and organizational affiliation	The model of cooperation
Public Relations of the Health Ministry	Governmental: Ministry of Health and Medical Education	Involving medical universities across the country through official correspondence
National Corona Management Headquarters in the country	Governmental: Ministry of Health and Medical Education	Involving the health sector (in addition to the treatment sector) throughout the country and presenting a collection of educational works produced at the National Corona Headquarters
National Corona Management Headquarters in Tehran	Governmental: Ministry of Health and Medical Education	Presenting a collection of related works in accordance with the 10 sections of the festival
Salamat IRIB Channel (TV Health Network)	Governmental: Health Policy Council of the Islamic Republic of Iran Broadcasting (IRIB)	Broadcasting TV commercials about the festival to attract public participation, in addition to categorizing and presenting related TV, works produced in provincial capitals
Mostanad IRIB Channel (TV Documentary Network)	Governmental: IRIB	Broadcasting TV commercials about the festival to attract public and documentarians' participation, in addition to categorizing and presenting related TV documentaries produced in provincial capitals
Radio Salamat (Audio Health Network)	Governmental: Health Policy Council of the Islamic Republic of Iran Broadcasting (IRIB)	Broadcasting radio advertisements about the festival to attract public and radio programmers' participation, in addition to categorizing and presenting the best radio programs produced in provincial capitals
Documentary & Experimental Film Center	Governmental: Cinema Organization of the Ministry of Culture and Islamic Guidance	Inviting documentarians to accompany the festival, launching a special corona section at the Iran International Documentary Film Festival (Cinema Verité) in 2020
Farabi Cinema Foundation	Governmental: Cinema Organization of the Ministry of Culture and Islamic Guidance	Inviting filmmakers to take part in the festival, setting up a special corona section at the Iran International Film Festival for Children and Youth in 2020
Iranian Youth Cinema Society	Governmental: Cinema Organization of the Ministry of Culture and Islamic Guidance	Inviting filmmakers to take part in the festival, setting up a special corona section at the Tehran International Short Film Festival in 2020
Iranian Artists Forum	Governmental: Tehran Municipality	Holding a virtual exhibition as a "Memorial to Health Martyrs" in partnership with the festival, from Doctor's National Day (September 10, 2020) to September 17, 2020
Iranian National Commission for UNESCO	Governmental: Ministry of Culture and Islamic Guidance	Presenting a collection of related and compiled works by UNESCO, in accordance with the 10 sections of the festival
Iranian Red Crescent Society	Non-governmental Humanitarian Organization	Presenting a collection of related and compiled works of the Red Crescent Society, in accordance with the 10 sections of the festival; Especially in the sections "Corona according to public education" and "Corona according to social responsibility"
Health Headquarters in Tehran Municipality	Governmental: The Deputy of Social and Cultural Affairs of Tehran Municipality	The festival's environmental advertisement in the form of billboards and banners in the city, inviting different sections of the municipality to submit related and compiled works
National Library of Iran	Governmental: Presidential Organization	Formal and national registration of the festival process and products at the National Library of Iran
Tehran University of Medical Sciences	Governmental: Ministry of Health and Medical Education	Presenting a collection of related works in accordance with the 10 sections of CORONAREVAYAT, inviting hospitals under the auspices of Tehran University of Medical Sciences to accompany the festival

Table 3. CORONAREVAYAT companions and supporters; Name and type of the organizations and the cooperation model (continue)

Name of organization	Type of organization and organizational affiliation	The model of cooperation
Shahid Beheshti University of Medical Sciences	Governmental: Ministry of Health and Medical Education	Presenting a collection of related works in accordance with the 10 sections of CORONAREVAYAT, inviting hospitals under the auspices of Shahid Beheshti University of Medical Sciences to accompany the festival
Iran University of Medical Sciences	Governmental: Ministry of Health and Medical Education	Presenting a collection of related works in accordance with the 10 sections of CORONAREVAYAT, inviting hospitals under the auspices of Iran University of Medical Sciences to accompany the festival
Academic Center for Education, Culture, and Research	Governmental: Tehran University of Medical Sciences	Publishing a collection of CORONAREVAYAT books (10 volumes of printed books)
Scinito	Private	Publishing a collection of CORONAREVAYAT books (10 volumes of electronic books: ePUB3)
Nursing Organization of the Islamic Republic of Iran	Trade union organization	Inviting the nursing community to take part in the festival, presenting a collection of related works in accordance with the 10 sections of the festival, and providing an approved list of nurses who lost their lives because of Covid-19 to include them in the book "Corona according to health martyrs"
Hacoupian	Private	Sponsorship of the festival and funding special awards for the selected works and winners
Medical Ethics Association	A non-governmental organization (NGO)	Accompanying and participating in the festival, especially in the section "Corona according to Health Humanities"
Institute for Humanities and Cultural Studies	University of Tehran : Academic Center for Education, Culture, and Research	Accompanying and participating in the festival, especially in the section "Corona according to Health Humanities"
Scientific Olympiad of Iranian medical students	Governmental: Talent Organization of the Ministry of Health and Medical Education	Introducing the subject of "Corona Narrative" as the focus of the "Health Humanities" section in the Scientific Olympiad of Iranian medical students to include the selected works in the book "Corona according to health humanities"
Iran MS Society	The non-governmental organization (NGO)	Inviting members of the Iran MS Society to record and submit personal challenges and experiences of dealing with Covid-19 in accordance with the 10 sections of the festival
Iran Autism Association	The non-governmental organization (NGO)	Inviting members of the Iran Autism Association to record and submit personal challenges and experiences of dealing with Covid-19 in accordance with the 10 sections of the festival
Iranian National Museum of Medical Sciences History	Governmental: Tehran University of Medical Sciences	Accompanying the festival in holding special meetings and events, in addition to presenting related works, especially in the field of medical history
Food and Drug Administration	Governmental: Ministry of Health and Medical Education	Inviting subdivisions of the organization to take part in the festival and to submit related works in different sections of the festival

Participation with 3 international film festivals and 1 international painting festival

In addition to providing films for the special Corona section of the 3 Iran International Film Festivals (cf. "Attracting organizational and professional support"), CORONAREVAYAT also supervised the selection and judging process of films in the special Corona section of these festivals.

Table 4. Frequency of works in the 10 sections of CORONAREVAYAT

Section	Number of works in each section	Percentage of works in each section
Corona according to image	3361	33.53
Corona according to cinema	315	3.14
Corona according to literature	1458	14.54
Corona according to self-sacrifice (Health Martyrs)	189	1.88
Corona according to public education	2564	25.58
Corona according to social responsibility	198	1.97
Corona according to media	394	3.99
Corona according to radio and television	1396	13.92
Corona according to health humanities	116	1.15
Corona according to research	31	0.3

CORONAREVAYAT submitted 58 documentaries (IRNA, 2020b), 123 short films (Medical Council of the Islamic Republic of Iran, 2020c), and 134 films and animations (Cinema Press, 2020) to each of the 3 aforementioned festivals, respectively, and participated in their closing ceremonies for award prizes to the best films (Table 5).

CORONAREVAYAT also participated similarly in the International Festival of Paintings for Pediatric Patients (IFPPP), and some of its managers attended the closing ceremony of IFPPP to honor the winners (Medical Council of the Islamic Republic of Iran, 2021d).

Preparing and publishing 10 volumes of CORONAREVAYAT books

From the 10 sections of CORONAREVAYAT, the selected works of 9 sections (all but "Corona according to research") were collected and compiled in the form of 9 volumes. In addition to the printed version, the electronic version of these 9 books was also prepared and published. In the middle of the project, at the discretion of the policy council, the preparation of the book "Corona according to research" was removed from the agenda, and was replaced by the book "Corona according to the managers of Iran Medical Council".

Table 5. CORONAREVAYAT Cinematic Contributions; Number and subject of the selected films in the Corona section of festivals partnered with CORONAREVAYAT

The name of the film festival partnered with CORONAREVAYAT	Number of works submitted by CORONAREVAYAT to the Film Festival	Name of the best film(s) awarded in the special Corona section of the Film Festival	The subject of the best film(s) awarded in the special Corona section of the Film Festival
Iran International Documentary Film Festival: Cinema Verité	58	1- First Prize: Pesqeleh 2- Second Prize: The 19th Segment 3- Third Prize: Narrow Breath 4- Special Award: Dawn is there	1- Self-sacrifice of medical staff in Yazd 2- Accompanying the voluntary burial of the patients who have died of Covid-19 3- How did Corona start in Qom 4- Special Award: A nurse's mobile film about nursing and filmmaking simultaneously
Iran International Film Festival for Children and Youth	134	The Last Visit	A look at the life story of the first doctor who died of Covid-19 in Kashan
Tehran International Short Film Festival	123	Unseen	The Impact of the Covid-19 Epidemic on Interpersonal Relationships

The electronic version of the CORONAREVAYAT book collection has been prepared in ePUB3 format, which in addition to texts and photos, also contains videos, podcasts, links, and interactive content to form multimedia books (Academic Center for Education, Culture and Research, 2021), and can be updated even after the closing ceremony of this event (Table 6).

Organizing 2 independent events and participating in 7 national events

In addition to the closing ceremony of CORONAREVAYAT held on March 2021, in which the winners of the various sections were introduced and honored (Tasnim News, 2021), the festival also held an independent ceremony to unveil its first book (Corona according to the image) (Mehr News Agency, 2020c).

The virtual exhibition of the "Memorial of Health Martyrs" was another event that the festival held with the participation of the Iranian Artists Forum. The exhibition started on National Doctor's Day (September 10, 2020) and lasted for 7 days, displaying portraits of the physicians and nurses who lost their lives to Covid-19, which was donated to the festival by a painter (IRNA, 2020a).

Unveiling the book "Corona according to health humanities" in the "8th Annual Congress of Iranian Medical Ethics" (Medical Ethics and History of Medicine Research Center, 2020) and unveiling the book "Corona according to media" in the press office of the Ministry of Culture (Medical Council of the Islamic Republic of Iran, 2020) were 2 other participatory events hosted by CORONAREVAYAT. Moreover, the closing ceremony of the 3 film festivals and 1 painting festival mentioned above is included in the subcategory of CORONAREVAYAT participatory events.

Attracting the support and companionship of artists and organizations

The announcement of the readiness of several filmmakers to take part in CORONAREVAYAT and the use of the works collected in this project to produce films and television programs were other outcomes of the CORONAREVAYAT event.

Table 6. CORONAREVAYAT Books; Name, type, and chapters of each book

Book Name	Book type	Book chapters
Corona according to the image	Both print and electronic version	Photos, designs, organizations, children's paintings, and calligraphy
Corona according to cinema	Both print and electronic version	Documentary, short film, and children and youth films (documentaries, short films, animations, web series)
Corona according to the literature	Both print and electronic version	Narratives, short stories, novels, and poems
Corona according to self-sacrifice (Health Martyrs)	Both print and electronic version	List of health martyrs, health martyrs according to film, health martyrs according to media, health martyrs according to literature, and portrait of health martyrs
Corona according to public education	Both print and electronic version	Videos, posters, infographics, and pamphlets
Corona according to social responsibility	Both print and electronic version	Reports of Iranian universities of medical sciences, contributions at a glance, and attachment
Corona according to media	Both print and electronic version	Reports, interviews, and notes
Corona according to television	Both print and electronic version	TV reports, news reports, combination programs, clips, short films, TV documentaries, University section, and the special section
Corona according to radio	Electronic version only	Combined programs, trailers, shows, narratives, dialogues, podcasts, and the special section
Corona according to health humanities	Both print and electronic version	Essays, interviews, translations, libraries, webinars, and conferences
Corona according to the managers of the Iran Medical Council	Electronic version only	10 video interviews with 10 managers of the Iran Medical Council

In this regard, a prominent Iranian filmmaker made a short film on the subject of "health martyrs" and donated it to the festival on National Doctor's Day. The CORONAREVAYAT teaser was made by another filmmaker and was donated to the festival (Medical Council of the Islamic Republic of Iran, 2020).

Attracting the cooperation and support of governmental institutions (cf. Table 3) was among the other achievements of the festival. Obtaining the financial support of a private company (Hacoupian) for the project was another contribution of CORONAREVAYAT, which accelerated and facilitated the festival process (Medical Council of the Islamic Republic of Iran, 2020).

Discussion

CORONAREVAYAT was formed in the context of the *public participation paradigm*, an interactive approach to science communication that considers a role beyond the receiver of information for the audience, in a way that engages the audience like other stakeholders in a communication process (Claessens, 2007). Using an innovative form of the *media campaign* in the context of integrated communication, CORONAREVAYAT not only obtained significant contributions from health professionals and artists, but was also able to gain the attendance and support of the public. The quantity and quality of the works registered in the festival show that its effort in a *fusion of horizons* (Vessey, 2009) is relatively fruitful and its primary products (such as the narratives collected in the ten-volume book collection) can be considered as the raw materials for the formation of secondary products (such as feature films and TV series). In this regard, after the publication of CORONAREVAYAT books, several requests have been made to the festival secretariat by filmmakers and producers.

A review of the statistics available in table 4 indicates that the image-oriented sections of the festival were better received than the text-oriented sections, in a way that "Corona according to image", with 33.53%, has the highest number of works. The section "Corona according to public education", which is the second best received section in terms of frequency, with 25.58% of works, is mainly image-oriented. As shown in table 6, three of the four chapters of the book "Corona according to public education" consist of image-oriented sections (videos, posters, and infographics) and only one part of it (pamphlets) is text-oriented. This image-to-text dominance is an important finding obtained from table 4, which can be attributed, on the one hand, to the ease of preparing image-based works with modern digital tools (especially cellphones) and, on the other hand, to the greater desire of social media users to receive and share photos and videos compared to text and articles.

As can be seen in table 5, another evidence of the ease and importance of creating image-based works with modern digital devices is that among the selected documentaries in the festival "Cinema Verité", the special jury award was given to a mobile film prepared by a nurse while serving as a health professional in the Corona section of a hospital. The jury said in a statement that documentation during the pandemic requires the minimal use of persons and tools of filmmaking to avoid endangering their own and the others' health, and since the aforementioned mobile film has observed this point well, it deserves the special jury award.

Furthermore, a look at the bottom of table 4 shows that the least participation was seen in the most academic and article-oriented sections of the festival, that is, health humanities (1.15%) and research (0.30%). However, the comparison of these two sections is also worth considering because the rate of participation in the health

humanities section was 3.8 times the rate of participation in the research section. However, the former, contrary to the latter, is not a concept that the public and many of the target audiences of the festival are familiar with, and one of the sub-goals of CORONAREVAYAT has been to introduce this concept to its audience.

The relationship between health and humanities is as old as medicine. There are many philosophers, logicians, and ethicists who are interested in health, illness, and sickness, and there are many physicians with a love for literature and philosophy. Nevertheless, health humanities as an interdisciplinary field refers to a methodological, critical, epistemological, and integrated effort that combines health and humanities through an integrative approach, and not only putting them together through an additive approach. The pandemic was such that many could not wait for their opinions and ideas to become academic articles. Therefore, we do not encounter such articles in the book "Corona according to health humanities", but what has been collected includes the dialogue of humanities with subjects related to the pandemic and health.

The fact that the section "Corona according to research" had the least participation can be viewed from another perspective. It seems some concepts (such as research) have become so academically entrenched that academics are not eager for them to be associated with a media campaign in the public sphere. The ambiguity in the definition of applied research also adds to the complexity of this issue. This finding may to some extent reveal the inability of universities in the field of science communication. While pure research works are rarely included in this project, interdisciplinarians and professionals, who are usually in a more precarious position at universities, have been more involved with the festival.

Narrative medicine, like health humanities, was one of the concepts that CORONAREVAYAT sought to help identify in the context of the pandemic. In narrative medicine, we are confronted with medicine as narrative, and the art of the physician is to be able to enter the patient's story (i.e., narrative) and empathize with him or her. This ability is more prominent in physicians who are more familiar with art and literature. Accreditation of this sort of empathy via narrative medicine helped CORONAREVAYAT promote the culture of narrative medicine in the public sphere. The reflection of these teachings is evident in the written and illustrated narratives that have reached the secretariat. In this way, the festival tried to keep its distance from two of the project's biggest threats - infodemic and health anxiety. Of course, CORONAREVAYAT's first preparation to avoid these threats was to prefer the "public participation" paradigm to the "information dissemination" paradigm in the project blueprint, otherwise, there was the risk that with the dominance of the "information dissemination" paradigm through a direct vertical training (from top to bottom), CORONAREVAYAT, like many others, would exacerbate the infodemic and health anxiety during the pandemic.

A comparison of tables 2 and 6 shows several differences between the sections of each narrative (Table 2) and the chapters of each book (Table 6). This difference is a weakness of the festival from one point of view and its strength from another point of view. It is a weakness as it indicates inaccuracy in announcing the call and shows that there has not been enough scrutiny and accuracy in compiling the parts of each section. However, it is a strength because it shows the flexibility and dynamism of the project. In other words, due to the novelty and unpredictability of the project, managers, and judges of different sections of the festival, in full coordination with the secretary, monitored the registered works regularly and corrected the operational defects of the project in proportion to receipts and feedbacks. This point can be

explained more concretely by mentioning a few examples.

For instance, it was observed that more than 90% of the posters registered in the "Corona according to image" section had educational content. Thus, the project secretary, in a meeting with the managers of the "Corona according to public education" and "Corona according to image" sections, concluded that the "poster" should be considered as one of the sections in "Corona according to public education" and the few posters that do not contain educational content should be included and judged in the "Design" chapter of the "Corona according to Image" collection. It was through the same coordination and daily monitoring of the received works that the "feature film" chapter was removed from "Corona according to Cinema" or the "Novel" chapter was added to the "Corona according to Literature" section. Similar minor modifications were made in the reorganization of the sections "Corona according to public education", "Corona according to radio and television", "Corona according to health humanities", and "Corona according to self-sacrifice" through the same coordination and daily monitoring of the received works. It provided a good standard for categorizing the 10-volume CORONAREVAYAT book collection and judging the works separately in each of these sections.

A review of table 3 shows the cooperation of organizations, some of which have rarely collaborated with peer and partner institutions. Providing the right environment for the formation of participatory partnerships in these 28 organizations was one of the most important strengths of CORONAREVAYAT, which made many of the festival's weaknesses go unseen. For example, the responsibility of reporting the project was primarily assigned to the public relations of the Medical Council, but along the way, challenges and disagreements arose between the festival secretary and the Council's public relations. In a way, the festival news coverage process was interrupted for a short time. However, since ministerial, academic, cinematic, and media arms were added to the festival news body (cf. "informing the public and target audience"), this internal conflict was not seen in the public sphere, and the festival's news and actions disseminated through the communication channels accompanying the festival.

Conclusion

Limitation: Since our action research was conducted during the pandemic period, we faced several limitations, especially at the beginning of the research, when achieving a comprehensive plan required in-depth interviews with interdisciplinary health and media experts (cf. Method: In-depth study and interviews to achieve a comprehensive plan). The first limitation was that it became very difficult to conduct lengthy face-to-face interviews. To overcome this limitation, we used video calls in some interviews to turn this threat into an opportunity to find out the opinions of some well-known Iranian figures in the fields of health and media - who lived outside the geographical borders of Iran - to learn how the fields of media and health interact in other countries during the pandemic period.

Another limitation of this action research was the organizational culture of the medical council, which institutionally narrowed the field to extracurricular activities. As CORONAREVAYAT was a media campaign with a public participation nature, it required a certain agility that is essential to the dynamism of media activities, especially in the age of modern media. However, due to extra-organizational bureaucratization and intra-organizational parallelism, the medical council, willingly or unwillingly, repeatedly broke the festival dynamism and made the project

difficult. However, the slow and continuous networking that CORONAREVAYAT formed between art institutions (especially cinematic organizations) and the medical council resolved this problem. In a way, many of CORONAREVAYAT's works were done by artists who volunteered in the festival, for example, producing and distributing the festival's teasers, designing and producing posters and advertisements, making and publishing video clips donated to the festival on various occasions (such as National Doctor's Day), painting portraits of health martyrs and donating them to the festival, and setting up a virtual exhibition in "The memorial of health martyrs" in the Iranian Artists Forum are evidences of this networking that can be referred to as "invisible hands" to overcome internal barriers.

It was the same networking that helped the festival overcome the constraints resulting from the Covid-19 pandemic. Since the media campaign was linked to holding some events and face-to-face encounters, and the pandemic did not allow such meetings to be held, and the medical council, due to its position, was also opposed to such measures, the responsibility for such events was given to accompanying festivals to hold events to keep CORONAREVAYAT's name and message alive throughout the year.

Although the pandemic affected the whole world, including cinema, none of the world-renowned film festivals dedicated a separate section to Covid-related films. Under these circumstances, CORONAREVAYAT persuaded 3 Iran International Film Festivals (Cinema Verité, Tehran Short Film, and International film festival for children and youth) to dedicate a special section to "Corona" films and to participate in organizing, selecting, and judging the works of this section.

The achievements of CORONAREVAYAT revealed that the health sector, by benefiting from social and artistic participation in different communities, can solve many multi-faceted health-oriented problems that have roots outside of the health field. This integrated interdisciplinary approach can be suggested to health policymakers for facing multi-faceted health-oriented challenges, especially in low-income and middle-income countries.

Conflict of Interests

Authors have no conflict of interests.

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Psychometric Evaluation of the Brief Illness Perception Questionnaire among Iraqi Patients with Type II Diabetes

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Quantitative Study

Abstract

Background: The Brief Illness Perception Questionnaire (B-IPQ) is one of the most widely used measures of emotional and cognitive representations of illness. The B-IPQ has been translated and adapted into many languages. However, the scale has not been translated into Iraqi Arabic in patients with type II diabetes. The main purpose of the present study was to investigate psychometric properties of the B-IPQ among Iraqi patients with type II diabetes.

Methods: In this quantitative study, the Arabic Version of the B-IPQ was given to 192 Iraqi patients with type II diabetes. The participants were randomly selected from 5 hospitals and a diabetes society in Baghdad, Iraq. The participants included individuals diagnosed at least 1 year before this research. Using WINSTEPS computer program, the Rating Scale Model (RSM) was employed as a polytomous extension of the Rasch model (RM) to evaluate the scale in terms of unidimensionality, local independence, item statistics, and rating structures.

Results: The results indicated that the values of infit and oufit mean square (MNSQ) are within the ideal range of 0.60 and 1.40, suggesting that the items of the scale fit to the RM. The data was found to be unidimensional because the first factor explains 5.5% of the unexplained variance with an eigenvalue of 1.5 (< 2). The results also showed that items

are locally independent, and both persons and items have high Rasch separation reliability indices. More importantly, the response options or categories of the scale work optimally because with the increase in category values, observed averages also increased.
Conclusion: The overall findings showed that the Arabic version of the B-IPQ is a valid and reliable instrument and can be employed to assess illness perceptions among Iraqi patients with type II diabetes.
Keywords: Illness perception; Arabic translation; Type II diabetes; B-IPQ; Rasch rating scale model

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Introduction

Type II diabetes, formerly known as adult-onset diabetes, is a kind of diabetes in which the body does not properly use insulin which, in turn, causes unusual blood sugar levels. Inexplicable weight loss, increased thirst and hunger, frequent urination, sores, and fatigue are the most prevalent symptoms of type II diabetes. Research has demonstrated that illness perceptions of patients can explain outcomes and functioning of disease (de Raaij, Schroder, Maissan, Pool, & Wittink, 2012). For example, illness representations have been shown to remarkably impact physical exercise, dietary management, foot care, medication adherence, self-monitoring of blood glucose, smoking cessation, and appointment attendance (Hudson, Bundy, Coventry, & Dickens, 2014). In fact, there is a relationship between cognitive illness representations and emotional health. Patients with strong beliefs that their diabetes is chronic and has serious effects reported poor emotional health and self-care; however, patients with positive attitude toward their treatment reported higher emotional health and self-care (Broadbent, Wilkes, Koschwanez, Weinman, Norton, & Petrie, 2015; Hudson et al., 2014; Petricek, Vrcic-Keglevic, Vuletic, Cerovecki, Ozvacic, & Murgic, 2009).

Over the last few decades, a great deal of attention has been paid to the way individuals with different diseases perceive their illnesses and understand their situation. Illness perception is defined as the personal beliefs patients have about their illnesses (Broadbent et al., 2015). For the analysis of illness perceptions, Leventhal, Nerenz, and Steele (1984) and Bazzazian and Besharat (2010) developed a self-regulatory model to describe in what ways patients generate their representations of illness perceptions. The five critical dimensions of the model are identity of the illness, causes of the illness, its consequences, the timeline of the illness, and the way the illness can be controlled or cured (Petrie & Weinman, 2012). The model indicates how the patients construct their views or internal representations about an illness with respect to previous experience, causes, symptoms, and expectations.

Early research assessing patients' illness perceptions used open-ended interviews; however, with the increasing use of Leventhal's self-regulatory model, more objective scales have been developed to aid assessment, including the Illness Perception Questionnaire (IPQ; Weinman, Petrie, Moss-Morris, & Horne, 1996), the Illness Perception Questionnaire-Revised (IPQ-R; Moss-Morris, Weinman, Petrie, Horne, Cameron, & Buick, 2002), and the Brief Illness Perception Questionnaire (B-IPQ; Broadbent, Petrie, Main, & Weinman, 2006). Among these measures, the B-IPQ is more widely used to measure the emotional and cognitive representations of illness. The B-IPQ has already been translated and adapted into various languages, such as Arabic, Dutch, French, German, Persian, Polish, Swedish, Turkish, and Vietnamese, to name a few. The B-IPQ was also subjected to further examinations of its validity and reliability (Bazzazian & Besharat, 2010; Shim, Jeong, Song, Lee, Kim, & Hahm, 2020; van Oort, Schroder, & French, 2011; see Broadbent et al., 2015, for more information on the translation, adaptation, and further analysis of the B-IPQ). Previous studies have shown the good psychometric properties of the B-IPQ based on the methods and standards of Classical Test Theory (CTT). However, a more robust psychometric analysis of the B-IPQ based on Item Response Theory (IRT) is required.

To the best of the authors' knowledge, psychometric properties of the B-IPQ have not been analyzed in patients with type II diabetes, especially among Iraqi patients. Therefore, the main purpose of the present study was to, first, translate and adapt the B-IPQ into Iraqi Arabic in patients with type II diabetes, and then, investigate the

psychometric qualities of the translated scale using Rasch Rating Scale Model (RSM; Andrich, 1978) as a polytomous IRT model.

Methods

Participants: For the goal of this quantitative study, the Arabic translation of the B-IPQ was administered to 192 Iraqi patients with type II diabetes. The participants were randomly selected from among patients in 5 hospitals and a diabetes society in Baghdad, Iraq. The participants included individuals diagnosed at least 1 year before this research. The sample consisted of 110 men and 82 women. Their age ranged from 46 to 79 years (Mean ± SD = 62.34 ± 5.49). Respondents were instructed to read each question and rate their perception. As each item is scored on a 0-10 ordinal scale, a total score of 0-80 was possible, and higher scores showed higher negative illness representation of disease for ethical considerations, participants were assured all of their personal information would be kept confidential and used only for research purposes.

Translation Procedure: The Brief Illness Perception Questionnaire (B-IPQ; Broadbent et al., 2006) was translated into Iraqi Arabic by an expert committee composed of the researchers and a psychologist according to principles for the translation and cross-cultural adaptation process for patient-reported measures (Epstein, Santo, & Guillemin, 2015; Wild et al., 2005). The B-IPQ consists of 8 items designed to provide a rapid assessment of the cognitive and emotional representations of illness. In this questionnaire, 5 items assess cognitive illness representations: consequences (Item 1), timeline (Item 2), personal control (Item 3), treatment control (Item 4), and identity (Item 5), 2 items assess emotional representations: concern (Item 6) and emotions (Item 8), and 1 item assesses illness comprehensibility (Item 7). Items are rated on a scale ranging from 0 to 10. The psychometric qualities of the original English version of the instrument have been previously supported (Broadbent et al., 2006). After translating the scale, the translated measure was meticulously examined by a bilingual psychologist. The proposed modifications were applied. The final version of the Iraqi Arabic measure of the B-IPQ was back-translated into English by another bilingual psychologist. Finally, during a session with the expert committee and 11 patients with type II diabetes, the scale was reviewed and compared with the original version of the scale.

Data Analysis: WINSTEPS computer program (version 5.2.2) (Linacre, 2022) and SPSS (version 23; IBM Corp., Armonk NY, USA) were used to analyze the data using the Rasch RSM (Andrich, 1978). The RSM is an extension of the Rasch model (RM; Rasch, 1960/1980) for analyzing polytomous responses to several items. In the RSM, the same structural response format is assumed for all the items, that is, all the items have the same number of response categories. According to Linacre (1994), the sample size (n = 192) used in this study is large enough for RM analysis. The fit of data to the RM can be considered as evidence that a single latent trait explains the covariation among the items, that is, item performances can be described by the expected latent trait, which shows the unidimensionality of the scale (Baghaei & Tabatabaee Yazdi, 2016; Baghaei, 2019).

Results

Item Characteristics: Table 1 illustrates item difficulty (endorsability) estimates, standard error of measurement, mean square (MNSQ) statistics, and point-measure correlations. The item difficulties explained in logits indicate the item locations on the latent trait continuum, and the error of measurement shows the precision of item difficulty estimates.

Table 1. Item characteristics and fit statistics for the Arabic version of the Brief Illness Perception Questionnaire

Items	Item Difficulty	Standard Error of Measurement	Infit MNSQ	Outfit MNSQ	Point-measure Correlation
1	-0.71	0.05	1.01	1.03	0.74
2	-0.74	0.05	1.26	1.20	0.76
3	0.55	0.05	0.86	0.86	0.82
4	0.75	0.05	0.92	0.92	0.79
5	-0.50	0.05	1.09	1.08	0.78
6	-0.36	0.05	0.79	0.84	0.77
7	10.10	0.05	1.03	1.04	0.70
8	-0.07	0.05	0.87	0.86	0.79

MNSQ: Mean square

As can be seen, item difficulties range from -0.74 to 10.10 logits with a separation reliability of 0.99. Item 7 was the hardest item (10.10 logits), and items 2 and 1 were the easiest items with -0.74 and -0.71 logits, respectively. Person parameters, as measures of unobservable latent traits, also ranged from -1.89 to 3.94 with a separation reliability of 0.90. Separation reliability shows the degree to which the individual and item parameters are discriminated upon the measurement of the construct (Linacre, 2009) and refers to the ratio of true score variance to observed variance for the elements of the facet, that is, to what extent the ordering of the measures are reproducible (Linacre, 2009). Separation reliability is used for both person and item parameters. Separation reliability is the Rasch equivalent of the KR-20 or Cronbach's Alpha which shows how reproducible is the ordering of the parameters (Linacre, 2009).

To assess the quality of the items or how well items fit the RM, infit and outfit MNSQs were analyzed. According to Linacre (2002), infit MNSQ is defined as "an information-weighted fit statistic, which is more sensitive to unexpected behavior affecting responses to items near the person's measure level", whereas outfit MNSQ is "an outlier-sensitive fit statistic, more sensitive to unexpected behavior by persons on items far from the person's measure level" (pp. 331-332). The appealing properties of the Rasch model will be attained if the data fit the model (Baghaei, Yanagida, & Heene, 2017) As demonstrated in table 1, the values of infit and oufit MNSQ are within the ideal range of 0.60 and 1.40 (Bond & Fox, 2001; Linacre, 2002).

Point-measure correlations for all the items were further estimated which refer to the correlations between the items and person ability measures. A higher value of point-measure correlation represents higher discrimination for the items. The values of the point-measure correlations in this study showed that all correlations are high, suggesting the conformity of item difficulty patterns to the expectations of the RM.

Unidimensionality and Local Independence: Unidimensionality and local item independence are two important assumptions in IRT and the RM. Unidimensionality indicates that all the items of a scale should measure a single latent trait, and local item independence indicates that items should be independent regarding a certain level of the latent trait intended to be measured. In other words, after conditioning out the latent trait effect, items should be uncorrelated. We examined the unidimensionality of the scale through principal component analysis (PCA) of standardized residuals. As there is not a perfect match between items and the RM, residuals are defined as the differences between the expectations of the RM and observed scores, so they are the part of the data that the model cannot explain. Residuals are expected to have random distributions and be uncorrelated (Baghaei &

Cassady, 2014; Linacre, 2009). PCA is typically used to determine whether the data is unidimensional or not. No extra factor or component should be extracted if the data is unidimensional. The size of eigenvalues is examined to determine if the factor (or contrast) derived from residuals can be ignored. Eigenvalues above 2 suggest that a peripheral factor which jeopardizes the unidimensionality of the measure is at work (Linacre, 2009), and the data do not fit the RM. The results of PCA showed that the measures account for 70.4% of the variance; persons explain 26.1% and items explain 44.3%. However, 29.6% of the variance remains unexplained. The first factor explains 5.5% of the unexplained variance with an eigenvalue of 1.5 (< 2), which is an indication of the unidimensionality of the data.

Figure 1 depicts the distribution of item difficulty estimates and persons, known as the Wright map. Each hash mark (#) denotes 3 persons, and each dot mark (.) shows 1 to 2 persons. On both side of the continuum line, *M* denotes the mean, and *S* and *T* indicate 1 and 2 standard deviations from the mean, respectively. Persons at the upper part of the continuum are those with higher negative illness representation of disease, and persons at the lower part of the continuum are those with lower negative illness representation of disease. Although items cover a wide range of the latent trait continuum, a few difficult items are required to be inserted into the scale to cover the upper part of the scale.

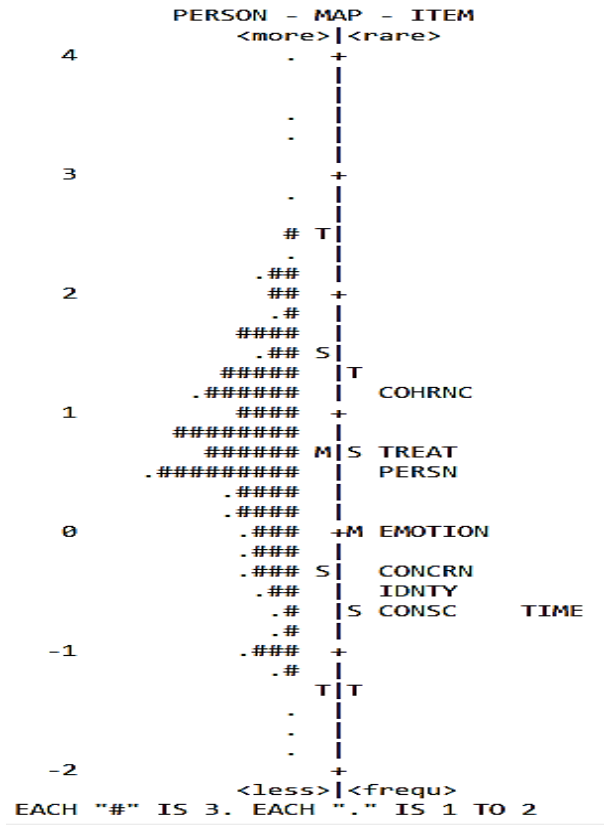

Figure 1. Distributions of items and persons on the latent trait

We also checked the Pearson correlations of linearized Rasch residuals to identify dependent items. When there are high correlations between the residuals of two item pairs, it is an indication of "how much locally easier or harder that item was than expected" (Wright, 1996, p. 510). Correlations higher than 0.70 represent local dependency (Linacre, 2009). In the present study, all correlations were negative and fell between -0.17 and -0.28, indicating that the local independence holds.

Rating Scale Analyses: Table 2 displays the characteristics of the rating scale structure for the Arabic version of the B-IPQ. The first column presents the number of categories which range from 0 to 10. The second column shows the observed count and percentage of each category. A large number of respondents selected categories 5, 7, 6, 4, and 8, respectively, suggesting their negative illness representation of the disease. Column 3 demonstrates observed averages of categories. This is the mean of all respondents in the data who endorsed the categories. As category values increase, observed averages are expected to increase as well. Apart from category 1, shown with an asterisk in the table, the rest of the categories have satisfied the category ordering. The fourth and fifth columns show the average of the infit and outfit MNSQ related to responses in each category level. As can be seen, except for category 0 which is problematic, the values of infit and outfit MNSQ for the other categories are within the ideal boundary of 0.40 to 1.40 (Bond & Fox, 2001; Linacre, 2002). The last column provides the Andrich threshold for each category. This indicates the equal probability between two adjacent categories (Lincacre, 2009, p. 519). The first response option does not have any priori category. With higher response options, threshold estimates should increase. Disordered thresholds indicate that the category "occupies a narrow interval on the latent variable", and that there are substantive problems with the category (Lincacre, 2009, p. 336). In fact, respondents cannot make a distinction between various response options (Bond & Fox, 2001). A suitable strategy is to reduce or merge 2 adjacent categories (Bond & Fox, 2001; Linacre, 2009). For the scale used in this study, threshold estimates represent the ordering of thresholds.

Discussion

This study was performed to translate into Iraqi Arabic and adapt the B-IPQ (Broadbent et al., 2006), and then, investigate the psychometric properties of the Arabic version of the scale in a sample of Iraqi patients with type II diabetes. For the purpose of validation, the RSM (Andrich, 1978) was utilized as a kind of polytomous IRT model for analyzing (ordinal) polytomous items.

Table 2. Characteristics of the rating scale structure for the Arabic version of the Brief Illness Perception Questionnaire

Category	Observed Count (%)	Observed Average	Infit MNSQ	Outfit MNSQ	Andrich Threshold
0	16(1)	-1.18	2.01	1.83	-
1	43(2)	-1.23*	1.33	1.30	-2.61
2	98(5)	-1.05	0.98	0.97	-2.02
3	173(8)	-0.64	0.99	1.03	-1.33
4	258(12)	-0.15	0.98	0.98	-0.73
5	335(16)	0.29	0.98	0.98	-0.19
6	264(13)	0.64	0.95	0.94	0.71
7	272(13)	1.02	0.81	0.76	0.82
8	244(12)	1.40	1.01	1.03	1.32
9	209(10)	1.78	0.97	0.99	1.74
10	160(8)	2.38	0.79	0.85	2.30

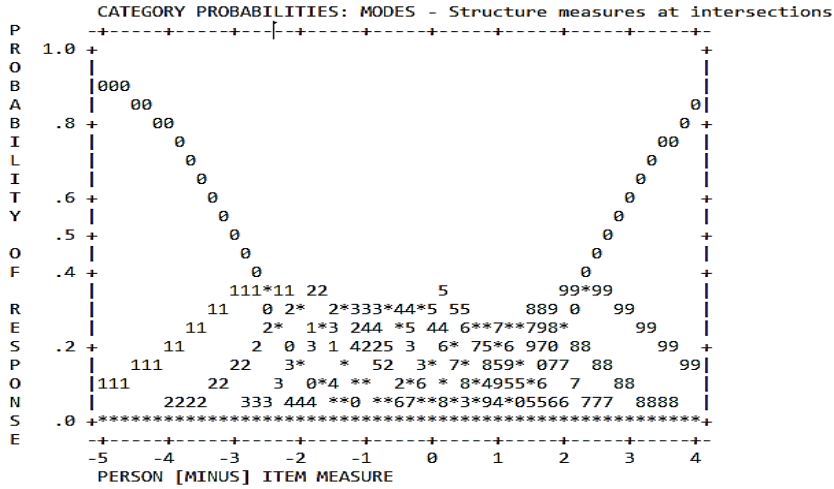

Figure 2. Category probability curves for the Arabic version of the Brief Illness Perception Questionnaire

The B-IPQ consists of 8 items which measure patients' cognitive and emotional representations of their illness including consequences, timeline, personal control, treatment control, identity, coherence, concern, emotional response, and causes (Broadbent et al., 2006, p. 635). A variety of statistics were evaluated to investigate the fit of the data to the RSM. The results of fit statistics, item characteristics, and point-measure correlations were analyzed, and their results showed conformity between the observed data and the RM expectations. The values of item and person separation reliability were satisfactory.

The results of unidimensionality, furthermore, revealed that the scale can provide an effective unidimensional measure of illness perceptions. Using principle component analysis of standardized residuals, the unidimensionality of the scale was checked. The analysis showed that the eigenvalue for the first factor accounts for 70.4% of the observed variance with an eigenvalue of 1.5, indicating the unidimensionality of the scale. The Wright map distributions of the persons and items showed that the items of the scale cover a broad range of the continuum, although more difficult items are suggested to be added to the scale. The analysis of local dependency also confirmed that local independence holds.

More importantly, the rating scale diagnostics showed the effectiveness, sufficiency, and distinctiveness of each response option or category in the scale because observed averages increase with higher response options. This can be considered as evidence for the ordering of thresholds and the ability of respondents to differentiate the categories. Overall, the results of the study support the psychometric property of the Iraqi Arabic version of the B-IPQ in the sample of Iraqi patients with type II diabetes.

Conclusion

Limitations: The present study had some limitations which should be taken into consideration. First, the sample used for analysis in the current study only included patients with type II diabetes. Future research can use other groups of patients with

different illnesses or chronic conditions in various clinical settings to not only investigate the psychometric qualities of the scale, but also support the findings of the study.

Second, as the sample size was not large enough to separate respondents into different smaller subpopulations, we did not examine differential item functioning (DIF) for the items of the scale across different subgroups. Small sample sizes for analyzing DIF would not provide reliable estimates. Future studies with larger sample sizes can determine whether items of this scale are biased against certain groups or work invariably across smaller subgroups.

Conflict of Interests

Authors have no conflict of interests.

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None.

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The Effects of a Culture-Based Sexual Health Training Course on Knowledge, Attitude, Performance, and Self-Efficacy of Midwives in Providing Sexual Health Services

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Quantitative Study

Abstract

Background: Sexual health is one of the major aspects of health that is formed under the influence of various biological, social, psychological, and cultural factors. This study was conducted with the aim to determine the effects of a culture-based sexual health training course on the knowledge, attitude, performance, and self-efficacy of midwives in providing sexual health services.

Methods: The present study was performed with a pretest-posttest design and follow-up. In total, 32 midwives were included in the online sexual health training course via the census sampling method. Accordingly, the knowledge, attitude, performance, and self-efficacy of the midwives were assessed using a researcher-made questionnaire before, immediately after, and 4 weeks after the intervention. Moreover, repeated measures ANOVA was used to determine the effects of the intervention.

Results: Comparing the results of pretest and posttest indicated that the training course significantly increased the midwives' mean scores of knowledge (from 17.12 to 23.87), attitude (from 39.40 to 50.18), performance (from 36.18 to 46.15), and self-efficacy (from 27.31 to 39.28)..

Conclusion: This study indicated that running a culture-based training course on sexual health would be likely to improve professional capacity building in providing sexual health services. Given the importance of cultural and social issues in sexual health education, this course could play an effective role in helping midwives face and solve their clients' problems.

Keywords: Transcranial direct current stimulation; Craving; Overweight

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Introduction

Sexual health is a major aspect of individual health and a basic component of human life. In fact, it is formed under the influence of various biological, social, psychological, cultural, economic, political, moral, legal, historical, and spiritual factors passed down from generation to generation (Evangelista, Moreira, Freitas, Val, Diniz, & Azevedo, 2019; World Health Organization, 2010). Providing counseling on sexual health and improving clients' quality of life (QOL) through promoting sexual health (Sung, Huang, & Lin, 2015) are among the major roles of healthcare professionals. However, few of them play this role correctly in clinical environments (Bal & Sahiner, 2015; Dyer & das Nair, 2013; Jaarsma et al., 2010; Oren, Zengin, Yazici, & Akinci, 2018).

In most cases, sexual health services and sexual counseling are not provided as expected due to various organizational and structural factors (Bal & Sahiner, 2015; Baker-Green, 2017, Grewal et al., 2014) and factors related to personal characteristics of staff and clients (Bal & Sahiner, 2015, Grewal et al., 2014; Papaharitou, Nakopoulou, Moraitou, Tsimtsiou, Konstantinidou, & Hatzichristou, 2008; Percat & Elmerstig, 2017; Rostamkhani, Jafari, Ozgoli, & Shakeri, 2015). However, evidence suggests that one of the main reasons for shortcomings in this field is the lack of correct training in sexual health for health workers, which necessitates specialized training in this field (Bal & Sahiner, 2015; Jaarsma et al., 2010; Percat & Elmerstig, 2017; Magnan, Reynolds, & Galvin, 2005; Nakopoulou, Papaharitou, & Hatzichristou, 2009; Sung, Jiang, Chen, & Chao, 2016). In many cases, despite the patient's willingness to talk in this regard, the staff are not capable of giving due attention to their clients' sexual health for various reasons, including discomfort, time limitations, fear of insufficient personal knowledge and skills, lack of adequate knowledge of treatment, and in general lack of training in this field (Sung et al., 2016; Ford, Barnes, Rompalo, & Hook, 2013) Accordingly, they avoid talking about and addressing their clients' sexual issues.

Talking about sexual issues is a taboo in many countries, including Iran (Rostamkhani et al., 2015; Çuhadaroðlu, 2017). These factors cause sexual problems to remain unresolved despite their prevalence and considerable importance (Rostamkhani et al., 2015). All societies need culture-sensitive sex education, of which Iran is no exception. No doubt, there is a great need for the development of sexual health training courses based on the Iranian culture in the education curricula (Karimian et al., 2018). Due to the sensitivity of sexual issues, cultural training of health care professionals is important.

Since most reproductive and sexual health services and sexual counseling in Iran are provided by midwives at comprehensive health service centers, they play a significant role in this regard. Midwives are at the front line of providing counseling on sexual problems, and provide easy and cost-effective access to such services (Farnam, Janghorbani, Raisi, & Merghati-Khoei, 2014; Karimian, 2016; Khadivzadeh, Ardaghi, Mirzaii, & Mazloum, 2016). However, according to previous researches, lack of education and self-confidence are often the main barriers to the initiation of sexual discussions and provision of sexual health services by midwives (Jaarsma et al., 2010; Percat & Elmerstig, 2017; Rostamkhani et al., 2015; Khadivzadeh, Ghazanfarpour, & Latifnejad, 2018). Despite being faced with numerous sexual questions and concerns in various areas of their career, midwives are not adequately skilled in this field (Percat & Elmerstig, 2017; Karimian, 2016; Khadivzadeh et al.,

2016; Evcili & Demirel, 2018; Walker & Davis, 2014). Therefore, to promote the professional capacity of health care providers, a culturally adaptive course with clear and valid content seems to be necessary.

Training midwives in a sociocultural manner can play an effective role in enabling them to address sexual health challenges, with this training being regarded as a key step in providing appropriate and accessible sexual health services to all women. In view of the foregoing, the present study was conducted with the aim to examine the effects of a sexual health training course on knowledge, attitude, performance, and self-efficacy of midwives in providing sexual health services.

Methods

This interventional study had a pretest-posttest and follow-up design. The participants of this study were all midwives (34 people) of comprehensive health service centers in Rafsanjan County, Iran. They entered the present study via a census. The inclusion criteria were having a bachelor's degree or higher and at least 1 year of work experience. Unwillingness to complete the training course for any reasons and attending another training program on sexual health were the exclusion criteria. In total, 32 midwives participated in the present study. The initial training course was designed to be face-to-face, yet due to the COVID-19 pandemic, the 4 training program sessions were held online in 3-hour sessions over 2 weeks (2 days per week). The content of the sexual health training course was designed based on the review of previous studies, the structure of the modules presented by Karimian (2016), as well as educational need assessment results of midwives. The intervention included teaching communication skills, principles of sexual counseling, principles of obtaining a sexual history, understanding cultural beliefs and values about sexual issues and concepts, sexual dysfunctions in women, and the way to evaluate such disorders. To this end, the educational content was reviewed and verified by 10 faculty members of medical universities. Online training sessions were held through Skyroom and Adobe Connect in the form of lectures, questions and answers, brainstorming, and case reports. At the end of each session, 15 minutes was allocated to answering questions. Before running the training course, a short 2-hour face-to-face session was held to explain the objectives and method of the training course, and to perform the pretest in accordance with health protocols upon the permission of Rafsanjan University of Medical Sciences, Iran. To this end, data collection was performed using a researcher-made questionnaire. After passing the online training course, the participants received the data collected at the posttest and follow-up (4 weeks) via email.

To evaluate the effects of sexual education on the knowledge, attitude, performance, and self-efficacy of midwives in providing sexual health services, a researcher-made questionnaire was used, which was based on the content of the culture-based sexual education course and created by reviewing previous texts and researches (Sung et al., 2016; Karimian, 2016; Sung & Lin, 2013). The questionnaire includes 60 questions in 5 sections. Section 1 covers demographic characteristics, including age, marital status, work experience, place of work, level of academic education in sexual health, self-assessment of one's level of general information about sexual counseling, and availability of suitable conditions for providing sexual health services to clients at the health centers. Section 2 consists of questions about sexual knowledge, including 25 questions about midwives' knowledge of appropriate communication with clients, counseling principles, principles of obtaining a sexual

history, and evaluation of women's sexual disorders and their treatment. These questions were designed as true/false questions (true: score 1; false or I do not know: score 0), with the total score of each section ranging from 0 to 25. Section 3 includes 13 questions regarding attitude. This section includes cultural aspects of the midwives' attitudes toward the importance of sexuality, comfort in sexual counseling, job roles and responsibilities, and providing sexual health services to clients. To avoid bias, questions 2, 5, 6, 8, and 10 are reverse scored. Moreover, the questions are scored on a 5-point Likert scale ranging from strongly agree (5) to strongly disagree (1). Higher scores indicate a better attitude. Section 4 is related to the midwives' performance in terms of providing sexual healthcare services, and includes 12 questions. Similarly, these questions are scored on a 5-point Likert scale ranging from always (5) to never (1). Section 5 of the questionnaire is related to the self-efficacy of the midwives in providing sexual services. Accordingly, this section measures their ability to provide services with 10 questions scores on a 5-point Likert scale ranging from strongly agree (5) to strongly disagree (1).

The validity of the questionnaire was verified using the quantitative and qualitative content validity methods. To control the validity of the qualitative content, the questionnaire was reviewed by 10 experts and revised based on their corrective and supplementary opinions. In terms of quantitative content validity, the content validity ratio (CVR) and the content validity index (CVI) were measured. Furthermore, to determine the reliability of the questionnaire, a test-retest method was used. Accordingly, the questionnaire was completed by 15 midwives other than those working at the comprehensive health service centers. The Cronbach's alpha coefficient values of the attitude, performance, and self-efficacy subscales were 0.72, 0.75, and 0.88, respectively. In addition, the Kuder-Richardson reliability coefficient of the knowledge subscale was 0.76. Additionally, the stability coefficient [intra-class correlation (ICC)] for 2 replications was 0.85, 0.86, and 0.83 for the attitude, performance, and self-efficacy subscales, respectively, and 0.93 for the knowledge subscale. Data were analyzed using SPSS software (version 22.0; IBM Corp., Armonk, NY, USA). Moreover, data were evaluated using descriptive tests and repeated measures ANOVA. The significance level of the study was set at 0.05 ($P < 0.05$).

Ethical considerations: To perform the study, the code of ethics was received from the Ethics Committee of Shahid Beheshti University of Medical Sciences, Iran. In addition, the necessary permissions were obtained from Rafsanjan University of Medical Sciences. Before the intervention, the participants were briefed on the objectives and process of the study. Next, Written informed consent was obtained from all participants for participation in the study. Moreover, they were assured that their information would be kept confidential. Additionally, adequate explanations were given about the possibility of withdrawal from the study at any stage of the research.

Results

Based on the results, the midwives in the present study were 27-53 years old with a mean age of 38.47 ± 7.13 years. In addition, their work experience varied from 1 to 30 years with an average of 12.56 ± 8.22 years (Table 1). As many as 23 midwives (71.9%) stated that little or very little attention had been paid to sexual health in their academic midwifery trainings. A total of 17 midwives (53.1%) considered their own level of knowledge of sexual health and sexual counseling low or very low, especially in terms of its sociocultural aspects.

Only 14 midwives (43.8%) stated that they had moderate knowledge in this field.

Table 1. The demographic characteristics of midwives (N = 32)

Variable		n (%)
Age (year)	25-34	14 (43.8)
	35-44	10 (31.3)
	45-54	8 (25.0)
Work experience (year)	1-10	19 (59.4)
	11-20	7 (21.9)
	21-30	6 (18.8)
Education	BSc	29 (90.63)
	MSc	3 (9.37)
Marital status	Married	25 (78.13)
	Single	7 (21.87)

Moreover, a total of 19 midwives (59.4%) announced that they had frequently or very frequently met clients with sexual concerns and problems in the workplace. In addition, as many as 27 midwives (84.4%) admitted that there were no suitable conditions for providing sexual health services to their clients in the workplace.

The Kolmogorov-Smirnov test was used to control the normality, which showed the variables had a normal distribution ($P > 0.05$). Mauchly's test of sphericity showed that the assumption of homogeneity is also valid ($P > 0.05$) (Table 2). Table 3 presents the mean scores of knowledge, attitude, performance, and self-efficacy among the midwives in providing sexual health services. According to table 4, the results of the Bonferroni post hoc test and the pairwise comparison of knowledge, attitude, performance, and self-efficacy scores at different times showed a significant difference between the scores before and after the educational intervention ($P < 0.01$); however, there was no difference between the posttest and follow-up (1 month after the intervention) scores. Thus, it can be concluded that the provided training played a significant role in increasing knowledge and improving attitude, performance, and self-efficacy among the midwives in providing the required sexual health services.

Discussion

Sex has often been one of the most sensitive topics for discussion in most countries where sexual education in schools and universities either does not exist, or its content is not satisfactory (Tabatabaie, 2015).

According to the results of the present study, the majority of midwives stated that they had acquired little knowledge of sexual health during their academic studies. These results indicate that the inadequacy of sexual courses during midwifery education and the lack of in-service training courses in this field have led to a lack of knowledge and information about sexual issues among the midwives. In their study, Oren, Zengin, Yazici, and Akinci (2018) reported that although midwifery students were aware of the significance of sexual counseling, they were not educated in this regard, and over half of them, at best, had moderate knowledge of sexual counseling (Jaarsma et al., 2010).

Table 2. Results of repeated measures analysis of variance and Mauchly's test of Sphericity

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	P*	Parameters		
					Mean Square	F	P**
Knowledge	0.872	3.758	2	.171	429.510	109.898	< 0.001
Attitude	0.886	3.639	2	.162	1258.073	38.835	< 0.001
Performance	0.923	3.138	2	.188	1545.969	31.378	< 0.001
Self-efficacy	0.963	1.137	2	.566	1474.198	68.571	< 0.001

df: Degree of freedom

Table 3. Mean scores of knowledge, attitude, performance, and self-efficacy among the midwives in providing sexual health services over time

Dependent variable	Pretest (Mean ± SD)	Posttest (Mean ± SD)	Follow-up (Mean ± SD)	P*
Knowledge (0-25)	17.12 ± 2.83	23.87 ± 1.45	22.96 ± 1.78	< 0.001
Attitude (13-65)	39.40 ± 6.81	50.18 ± 5.22	50.34 ± 5.64	< 0.001
Performance (12-60)	36.18 ± 4.72	46.15 ± 5.19	49.56 ± 10.59	< 0.001
Self-efficacy (10-50)	27.31 ± 3.30	39.28 ± 5.86	38.84 ±4.75	< 0.001

*Repeated measures ANOVA

In the same vein, in another study by Karimian (2016), midwives provided unprincipled counseling or used their own personal experiences in providing counseling due to their lack of sufficient skills and training in this field. The results of the study by McIntosh, Fraser, Stephen, and Avis (2013) showed that there was an inconsistency between what midwifery students thought they needed to know to act as a confident midwife and what they were taught at the university. Moreover, these results were in line with several other studies stating that healthcare providers lack the required knowledge and skills to face sexual problems, and this prevents them from performing sexual assessments in practice (Sung et al., 2016; McIntosh et al., 2013; Helland, Garratt, Kjeken, Kvien, & Dagfinrud, 2013).

The results of this study indicated that the culture-based sexual health training program was associated with a significant improvement in the midwives' knowledge and awareness of sexual health. One of the reasons for the significant effect of the training program could be the large number of the midwives' clients in this field and their essential needs. Accordingly, over half of the midwives (59.4%) admitted that they would deal with numerous clients with sexual concerns and problems in their clinical environments. In a study conducted by Walker and Davis (2014), midwives with clinical work experience were more likely to express their need for training in this field. These findings were in line with those of the studies by Sung et al. (2016), Sung and Lin (2013), and Nicolai et al. (2013).

As sexual issues are a taboo in Iran (Rostamkhani et al., 2015), a sociocultural change of midwives' attitudes toward providing desirable sexual health services is very important and effective. As Arab and Jannati, 2016 stated sexual counseling in the social, cultural, and religious context in health centers is necessary. Our culture-based training improved midwives' attitudes toward providing sexual health.

Table 4. Changes in knowledge, attitude, performance, and self-efficacy of midwives (pairwise comparison) over time

Dependent variable	Time	Mean score	SE	P* (Pairwise comparison)
Knowledge	pretest and posttest	-6.75	0.58	< 0.001
	pretest and follow-up	-5.84	0.51	< 0.001
	posttest and follow-up	0.91	0.37	0.062
Attitude	pretest and posttest	-10.78	1.65	< 0.001
	pretest and follow-up	-10.94	1.31	< 0.001
	posttest and follow-up	-0.16	1.28	0.99
Performance	pretest and posttest	-9.97	1.21	< 0.001
	pretest and follow-up	-13.38	1.98	< 0.001
	posttest and follow-up	-3.41	1.96	0.278
Self-efficacy	pretest and posttest	-11.97	1.24	< 0.001
	pretest and follow-up	-11.53	1.05	< 0.001
	posttest and follow-up	0.44	1.19	0.99

* Bonferroni post-hoc test
SE: Standard error

Quinn and Happell (2013) reported that, after a brief educational intervention using

the BETTER Model as a guide to action, all healthcare professionals were willing to address patients' sexual issues. However, most of the studies stress that the knowledge of sexual health significantly improves attitudes towards sexual issues, thereby resulting in a higher level of confidence in discussing sexual care and providing the related information. Some studies indicate that the effect of increased knowledge on attitude improvement is exaggerated (Evangelista et al., 2019).

Moreover, the results of the present study were in line with those of other studies indicating the effectiveness of educational programs in improving the self-efficacy and performance of midwives and other healthcare providers in providing sexual health services (Sung et al., 2016; Khadivzadeh et al., 2016; Sung & Lin, 2013; Quinn & Happell, 2013; Pieters, Kedde, & Bender, 2018). However, in the study conducted by Sung et al. (2016), although self-efficacy in providing sexual healthcare services improved over time in the intervention group, it was not significantly different from that in the control group. In this study, comparing the results obtained immediately after the training course with those obtained 1 month after the intervention showed the durability of the training effect. Other studies reported similar results (Sung et al., 2016; Sung & Lin, 2013; Pieters et al., 2018), yet due to the short duration of the follow-up assessment, the effect of time on the durability of the training effect might not have been demonstrated well. However, as shown in many studies on health behavior change, it would be difficult to predict if this behavior persists over time. This is mainly owing to the fact that different clinical environments result in different experiences of the provision of sexual health services to individuals (Tugut & Golbasi, 2017). The main strengths of the present study included the extensive dimensions of sexual health issues and the consistency of the training with the midwives' needs. The present interventional study was conducted on all midwives working at comprehensive health service centers in Rafsanjan County, which covered our target community in the best way possible. In addition, it was helpful in proving the effectiveness of online in-service training that has been very common during the COVID-19 pandemic. The limitations of the present study included the small number of the samples and the absence of a control group. Another limitation was that the study was conducted in a small town, in which due to the taboo nature of sexuality, sexual health training was inevitably affected by sociocultural issues. It is suggested that further research be conducted with a larger sample size, a control group, and a longer follow-up period.

Conclusion

The present study showed that culture-based sexual health training programs could have positive effects on increasing midwives' knowledge and awareness in the field of sexual healthcare. Moreover, it helped change their sociocultural attitudes, increased their willingness to actively address patients' sexual concerns, and positively affected their performance and self-efficacy in providing sexual health services to their clients. Accordingly, midwifery managers and planners are expected to pay due attention to this field in educational planning and policymaking so that midwifery staff can play an effective role in promoting their clients' sexual health status.

Conflict of Interests

Authors have no conflict of interests.

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Effectiveness of Acceptance and Commitment Therapy on COVID-19 Induced Anxiety among Worried People

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Quantitative Study

Abstract

Background: The current research was conducted with the aim to examine the effectiveness of acceptance and commitment therapy (ACT) on COVID-19 induced anxiety among worried people in Ahvaz, Iran.

Methods: This semi-experimental research was performed with experimental and control groups and a pretest-posttest design. The statistical sample of the research included all people worried due to COVID-19 in Ahvaz from among whom 30 were recruited using convenience sampling method and were randomly divided into the experimental or control groups. The subjects completed the Corona Disease Anxiety Scale (CDAS) designed by Alipour et al. in 2020. The experimental group received 8 sessions of ACT while the control group received no treatment. The data were analyzed using ANOVA in SPSS software.

Results: The results showed that after controlling for the pretest, the experimental group showed significant reduction in their anxiety score in comparison with the control group ($P < 0.01$).

Conclusion: The results of the research indicated that ACT effectively decreased subjects' COVID-19 induced anxiety through promoting psychological flexibility, decreasing struggle and control, and increasing mindfulness.

Keywords: Acceptance and commitment therapy; Corona; COVID-19; Anxiety

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Introduction

Coronavirus disease is a virus similar to SARS and Mercury and was named Corona because of the similarity of the surface of the virus to the corona of the sun. The disease is probably caused by a bat and has been transmitted to humans through a mammalian host as an unknown mediator (Phelan, Katz, & Gostin, 2020). COVID-19 is the name provided by the World Health Organization (WHO) on February 11, 2020 for the disease caused by the new SARS-CoV2-2 corona. The signs and symptoms of COVID-19 fall into the three categories of fever, dry cough and boredom (most common symptoms), more or less sore throat, diarrhea, conjunctivitis, headache, loss of taste or smell and grain on the skin or discoloration of the fingers or legs (less common symptoms), and finally, difficulty in breathing or shortness of breath, pain or pressure on the chest, and loss of speech or movement (severe symptoms) (World Health Organization, 2020). The disease first initiated in Wuhan, China, in late 2019 and has spread around the world. Covid-19 stands for Coronavirus 2019. As of early May 2021, more than 147,700,000 cases and more than 3,100,000 deaths have been reported worldwide, and more than 2.3 million cases and 69,000 deaths in Iran due to COVID-19 (Worldometers, 2020).

Many macro-to-micro measures have been taken to prevent the spread of Coronavirus disease. At the macro level, short and long term quarantines, social distancing, traffic plans, environmental disinfections, etc. can be performed, and at the micro level, staying at home, keeping a safe distance, frequent hand washing, and wearing a mask and gloves can be pointed out. These public health measures that are designed to slow down and prevent the spread of COVID-19 have drastically changed our lifestyles and are threatening our physical and mental health (Santabarbara et al., 2021). However, during this epidemic period in which our lives have changed completely (Nikcevic, Marino, Kolubinski, Leach, & Spada, 2021), a fundamental issue caused and increased by the epidemic is the psychological distress associated with the epidemic including fear (Ahorsu, Lin, Imani, Saffari, Griffiths, & Pakpour, 2020), anxiety (Lee, 2020), stress (Taylor, Landry, Paluszek, Fergus, McKay, & Asmundson, 2020), depression (Bueno-Notivol, Gracia-Garcia, Olaya, Lasheras, Lopez-Anton, & Santabarbara, 2021) and an anxiety syndrome characterized by avoidance, examination, worry, and monitoring (Nikcevic & Spada, 2020). The existence of a disease which has caused a global epidemic and requires great precautions causes a great deal of anxiety among individuals (Lima et al., 2020). Anxiety is a common symptom among both COVID-19 patients and others who are directly (such as health care workers) or indirectly (such as patients' families or ordinary people living in high-risk areas) affected by this disease and it can reduce their quality of life (QOL) (Alipour, Ghadami, Alipour, & Abdollahzadeh, 2020). It seems that the lack of knowledge about this disease and the fear of the unknown, which can reduce the perception of immunity in humans, can be the causes of high anxiety due to COVID-19 disease (Bajema et al., 2020). In times of crisis, the structure of life is greatly disturbed. During quarantine and care, the routine of life is disrupted and the individual is less able to predict and plan for his/her future. This uncertainty and concern about the future on the one hand, and the fear of getting infected, the fear of death, the fear of infecting loved ones, etc. on the other hand, can cause anxiety (Saffarinia, 2020). Anxiety can weaken the immune system and increase vulnerability to the disease, and can negatively affect the quality of decision-making and planning. Therefore, overcoming this obstacle and teaching the individual how to deal with a crisis is more important than ever. Acceptance and Commitment Therapy (ACT) was developed by Steven Hayes in the

1980s as a third wave therapy. ACT uses processes of acceptance, awareness, and values for psychological resilience, which is the ability of value-based actions in the presence of thoughts and emotions (Manchon, Quiles, Leon, & Lopez-Roig, 2020). Moreover, with the aim of educating people to perform effectively in the face of challenging events (Little, Tarbox, & Alzaabi, 2020), various studies have shown that ACT is effective on the treatment of anxiety (Rezapour Mirsaleh, Esmaeelbeigi, & Salari, 2019; Valizade, Manshaee, & Kareshki, 2018). O'Hayer, O'Loughlin, Nurse, Smith, and Stephen (2021) conducted a study on the treatment of symptoms of anxiety and depression in 28 people with cystic fibrosis through 6 sessions of ACT and follow-up 3 months before and after treatment. They found that ACT treatment improves anxiety and depressive symptoms, increases psychological flexibility, and reduces psychosocial distress. Dober, Mikocka-Walus, Evans, Beswick, Emerson, and Olive (2021) conducted a study on 19 patients with inflammatory bowel disease in an ACT-based exploratory intervention method. The research indicated that ACT treatment increases psychological flexibility and relieves anxiety in inflammatory bowel patients. Furthermore, Ritzert, Berghoff, Tifft, and Forsyth (2020) performed an online survey on participants from around the world using Ad 503, self-help method, and book therapy for anxiety; they found that ACT had an effect on anxiety, depression, and mental illness. In a study conducted by de Almeida Sampaio et al. (2020) on 92 people with generalized anxiety disorder (GAD), who were randomly selected in 10 sessions of group behavior therapy based on acceptance-based behavior therapy (ABBT) admission and nondirective supportive therapy (NDST) with 3-month follow-up, it was found that the group ACT participants recovered faster than the group NDST participants. Generally, studies have shown that ACT is one of the most effective treatments for reducing the psychological problems of people with physical illnesses or critical situations. COVID-19 is an unknown and difficult disease, and there are a limited number of studies with data on anxiety and COVID-19 in the general population; since 2007, there has only been one study on Covid-19 (Fardin, 2020), and two Chinese studies in the general population (Rajkumar, 2020), which were published in July 2020 in a systematic review and meta-analysis (Salari et al., 2020). Accordingly, the present study was conducted with the aim to evaluate the effectiveness of ACT on reducing anxiety caused by COVID-19 in worried people in Ahvaz, Iran.

Methods

The present study was a quasi-experimental research with experimental and control groups and a pretest- posttest design. The statistical population included all people worried about COVID-19 in Ahvaz during 2020-2021. From among them, 20 people were selected through convenience sampling method and were evenly matched in the experimental and control groups based on pretest scores.

Instrument

Corona Disease Anxiety Scale (CDAS): The Corona Disease Anxiety Scale (CDAS) was created by Alipour et al. (2020) and includes 18 items and the 2 factors of psychological symptoms (items 1 to 9) and physical symptoms (items 10 to 18). The items of the CDAS are scored on a 4-point Likert scale ranging from 0 (never) to 3 (always). The total score of this scale ranges from 0 to 54, with higher scores indicating greater anxiety associated with coronavirus disease. A score between 0 and 16, 17 and 29, and 30 and 54 indicates lack of anxiety or mild anxiety, moderate anxiety, and high anxiety, respectively. Alipour et al. (2020) reported the Cronbach's alpha coefficients of the first and second factors and the whole scale to be 0.88, 0.87, and 0.92, respectively. The criterion validity of this scale was found to be 0.483, 0.507,

0.418, 0.333, and 0.269 by calculating its correlation with the total score of the General Health Questionnaire (GHQ-28) and the components of anxiety, physical symptoms, social dysfunction, and depression, which were all significant ($P < 0.01$).

Procedure

To select a research sample, 50 people were selected from among the people who had contacted the counseling centers of Ahvaz city for psychological counseling about coronavirus disease, and were invited to participate in the research. All subjects completed the CDAS (pretest) and 20 were selected completely randomly from among those with a score higher than 17. Then, the experimental and control group subjects were matched based on the scores obtained in the pretest. To observe hygienic items including keeping distance, providing disposable gloves and masks, and disinfecting tools and equipment (such as chairs, door handles, etc.), 10 people were considered for each group. Then, 8 weekly 90-minute ACT sessions were performed in the experimental group, while the control group did not receive any treatment during this period. At the end of the treatment sessions, a posttest was performed.

The acceptance and commitment treatment guide is summarized in Table 1.

Data analysis: Multivariate analysis of covariance (MANCOVA) and non-variable analysis (ANCOVA) were used to analyze the data. The analyses were performed using SPSS software (version 26; IBM Corp., Armonk, NY, USA). An acceptable level of significance of $P < 0.05$ was considered to confirm the statistical hypotheses.

Results

Among the 20 participants, 10 (50%) were men and 10 (50%) were women. Moreover, the participants' educational levels were diploma and lower (13.33%), associate degree (11.43%), bachelor's degree (49.52%), and master's degree and higher (25.72%). Furthermore, 35.02% of the participants were in the age range of 30-40 years, 32.85% were in the age range of 41-50 years, and 32.13% were 51-60 years. The results of mean and standard deviation of coronary heart disease anxiety and its components are shown in Table 2.

Table 1. Acceptance and Commitment Treatment Guide

Session	Treatment content
1	Introducing subjects to each other, expressing problems, stating expectations of treatment, explaining ethical principles and confidentiality, providing written consent to participate in the research, introducing acceptance and commitment treatment
2	Linking anxiety, illness, and mood, introducing the concept of creative helplessness, introducing the concept of values, using metaphors
3	Addressing the acceptance of anxiety, explaining the relationship between moods and acceptance of suffering and anxiety, explaining the relationship between mood and behavior using examples from the subjects' lives
4	Distinguishing between values and goals, clarifying values, introducing the concept of failure of depressing thoughts and feelings, using metaphors
5	Reviewing assignments and standardizing activities, practicing mindfulness, distinguishing self-observer from self as context
6	Clarification of values versus ambiguity of values, using metaphors
7	Commitment versus passivity, the presentation of a task according to the nature of behavioral activation in the form of committing the subject to specific activities that are marked by larger goals and values
8	Clarifying values, training the subjects to be their own therapist, and addressing the subjects' concerns about termination of treatment

Table 2. Mean and standard deviation of coronavirus disease anxiety and its components

Variables	Statistical indicators	Experimental group (mean ± SD)	Control group (mean ± SD)
Psychological symptoms	Pretest	21.76 ± 3.89	22.01 ± 2.36
	Posttest	8.29 ± 5.11	21.39 ± 3.79
Physical symptoms	Pretest	5.75 ± 1.65	5.66 ± 1.61
	Posttest	1.77 ± 0.60	5.91 ± 1.44
Total score	Pretest	37.51 ± 4.26	27.67 ± 4.10
	Posttest	10.06 ± 3.48	27.3 ± 5.69

SD: Standard deviation

The significance level of Kolmogorov-Smirnov test for the components of psychological symptoms (z = 0.142; P <0.05), physical symptoms (z = 0.163; P < 0.05) and total CDAS score (z = 0.139; P < 0.05) was greater than 0.05; therefore, the assumption of normal distribution of variables is observed. The results of Levene's test in psychological symptoms (F = 2.73; P < 0.05), physical symptoms (F = 3.127; P < 0.05) and total CDAS score (F = 0.702; P < 0.05) were not significant. As a result, the assumption of homogeneity of variances for all variables was confirmed. The results of Box's M test showed that the assumption of variance-covariance homogeneity equality was observed (Box's M = 2.627; F = 0.808; P = 0.489).

Table 3 indicates MANCOVA results for Corona pandemy post-test mean comparsion and its details.

As shown, the significant levels of Wilks' lambda test indicate that there is a significant difference between subjects in the experimental and control groups at the posttest stage in at least one of the dependent variables (coronavirus disease and component of anxiety). (Wilks' lambda: 0.01; P < 0.01; F = 180.142). To determine the difference, 3 ANCOVA tests were performed in MANCOVA text. According to the calculated effect size, 97.3% of the total variances of the experimental and control groups are due to the effect of the independent variable. Additionally, the statistical power of the test is equal to 1.00, indicating that the test was able to reject the null hypothesis with 100% power.

ANCOVA results are shown in Table 4 in the MANCOVA text on the energy consumption of sports viruses and their components.

As shown, F values for the total score of coronavirus anxiety, psychological symptoms, and physical symptoms were 137.43, 202.24, and 42.19, respectively, which were significant at the level of P < 0.01. As a result, according to the means presented in table 2, coronavirus disease anxiety and the components of psychological symptoms and physical symptoms were significantly reduced in the experimental group. In other words, it can be said that ACT has reduced anxiety caused by Covid-19 disease in people in Ahvaz.

Table 3. Multivariate analysis of covariance results on posttest means of coronavirus disease and its components

Test name	Statistical index						
	Value	F	Degree of hypothesis freedom	Degree of Hypothesis error	Significance level	Effect size	Statistical power
Wilks' Lambda	0.014	18.42	4	8	0.001	0.972	1.00

Table 4. Analysis of covariance results in the multivariate analysis of covariance text on coronavirus anxiety variables and its components

Variables	Statistical index				
	SS	df	MS	F	P-value
Total coronavirus heart disease anxiety score	198.36	1	198.36	137.46	0.001
Psychological symptoms	86.39	1	86.39	202.24	0.001
Physical symptoms	46.17	1	46.17	42.19	0.0001

SS: Sum of Squaer; df: Degree of freedom; MS: Mean of Squaer

Discussion

As mentioned, the present study was conducted with the aim to evaluate the effectiveness of ACT on reducing anxiety caused by Covid-19 disease in worried people in Ahvaz. The results of the present study showed that ACT was able to significantly reduce coronavirus disease anxiety and people's concern about the psychological and physical symptoms of this disease.

The cause of psychological symptoms on the CDAS refers to the constant mental occupation of a person with coronavirus disease and obsessive thinking. The cause of physical symptoms refers to the extent to which thinking about coronavirus disease has a negative effect on physical activity and health (including sleep, appetite, social relationships, headaches, palpitations, etc.). To date, no research has been conducted to evaluate the effectiveness of ACT in patients with Covid-19 or coronavirus anxiety disorder. However, the findings of previous studies on the effectiveness of ACT on reducing anxiety support the findings of the present study (Rostami, Keykhosrovani, Poladi Rishehri, & Bahrani, 2020; Rezapour Mirsaleh et al., 2019; Valizade et al., 2018; Tamimi, Soleymani Zadeh, Eftekhari, & Nemati, 2020; Foroutan, Heidari, Askari, Naderi, & Ebrahimi Moghaddam, 2018).

ACT intervention uses the skills of mindfulness, acceptance, and cognitive failure to increase psychological flexibility, and the result of psychological flexibility is nothing but increased ability of clients to connect with their experience in the present and what is possible for them in the moment. Furthermore, they act in a way that aligns with their chosen values. This experience can help clients experience their current situation as it is, and not as scary and dangerous as the mind makes it. In fact, individuals reduce their levels of stress and anxiety and deal effectively and constructively with the environment through providing adaptive and resilient responses to life events in the presence of threatening thoughts and feelings. Moreover, ACT can lead to appropriate thinking and train people to recognize their irrational and unreasonable assessments; thus, it empowers people to deal with the problems ahead, to be hopeful, and to move on with life. According to Foroutan et al. (2018), moving towards the values of life that are associated with pain and problems seems to reduce anxiety in the long run. Therefore, dealing with pain in the path of values, or in other words, acceptance instead of empirical avoidance, has an important role in achieving empowerment and reducing the level of anxiety. In addition, in ACT, cognitive techniques including living a worthwhile life, using metaphor, commitment, cognitive failure, mindfulness and enlightenment, presence in the present moment, coping practice, and active acceptance help people reduce their anxiety (Valizade et al., 2018).

Conclusion

ACT therapists use the concepts of commitment to teach the individual that commitment is, at its most basic level, the performance of behavior that align with

one's values, and not only the approval of the performance. Commitment may also be the determination of activities to achieve one's goals. Following this planning, the individual commits to using mindfulness strategies when faced with cognitive and emotional barriers. Once values are clarified and determined, subjects are instructed to focus on addressing the new learned behaviors.

Any research that is performed undoubtedly has its limitations.

This study was performed on cancer patients in Isfahan Province; therefore, decisions about extending results to other individuals and communities should be made with caution. In this study, changes in individuals were determined based on the self-report scale that was completed only by them and some of the patient's companions. Some limitations of this research include the lack of follow-up stage due to time constraints and lack of suitable cooperation between hospitals and clinics to conduct research.

Finally, it is worth noting that due to the high prevalence of COVID-19 disease at the time of the study (March 2017) in the country, it was not possible to use a larger sample and a follow-up test. For this reason, it is suggested that a larger and more diverse sample be used in future research. In addition, the role of obsessive-compulsive disorder (OCD) in COVID-19 disease and its association with anxiety, coping styles, and self-protection should be investigated.

Conflict of Interests

Authors have no conflict of interests.

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Comparison of Emotion Regulation Strategies in Individuals with Migraine, Tension, and Normal Headaches

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Quantitative Study

Abstract

Background: Headaches are a major focus of public health efforts. As stress and emotional disturbances play a role in various forms of headaches, emotion regulation can be thought of as a factor in adaptation and successful management of this illness. The effectiveness of cognitive emotion management strategies in women and men with migraine headaches and tension headaches, and healthy people was investigated in this study.

Methods: This research was a causal-comparative research. In the first 6 months of 2020, 60 patients with migraine tension headaches were studied in the neurology clinic of the Abdi Waluyo Hospital in Jakarta. Positive techniques (vision formation, positive refocus, positive appraisal, and planning) and negative strategies (self-blame, blaming others, rumination, and catastrophic perception and acceptance) in emotion regulation were obtained using the Emotion Regulation Questionnaire. In addition, multivariate analysis of variance (MANOVA) and Tukey's range test were used.

Results: According to the findings, individuals with migraines employ fewer positive techniques in the cognitive management of their emotions than people without migraines (group factor effect: $P = 0.36$). Moreover, the findings revealed a significant difference in the usage of positive methods by women and men in both groups, with women employing more positive tactics (gender*group effect: $P < 0.05$).

Conclusion: In conclusion, the findings of this study suggest that self-regulation is a component that can cause headaches in patients. The clinical applications of this study

include how people with headaches use cognitive emotion regulation strategies in the etiology and design of therapeutic interventions.

Keywords: Cognitive regulation of emotion; Migraine; Multivariate analysis of variance

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Introduction

Pain is a sensory and emotional experience of discomfort that is usually associated with actual or threatening tissue damage (Khazraee, Omidi, Daneshvar Kakhki, Zanjani, & Sehat, 2018; Shahsavani, Mashhadi, & Bigdeli, 2020). In 1991, pain was defined as unpleasant sensory experience with actual or potential tissue damage by the International Association for the Study of Pain (IASP) (Hosini, Khormaee, Asar Zadegan, Hesami, Taghavi, & Mohammadi, 2014). Pain can be divided into the categories of acute and chronic. Acute pain is usually adaptive and alerts the person to avoid further injury. However, chronic pain is treatment-resistant pain that lasts longer than the period expected (Zebardast & Shafieetabar, 2019). In clinical activities and in non-cancerous pain, a choice of 3 months is appropriate for distinguishing between acute and chronic pain, but for research purposes, it is better to consider a period of 6 months as a criterion for diagnosing pain (Migliore et al., 2020). Various psychological and environmental factors play a significant role in chronic pain, and the role of these factors in acute pain is less (Wolf, Danno, Takeshima, Vancleef, Yoshikawa, & Gaul, 2020; Haratian et al., 2020).

Acute pain is usually helpful because it alerts the person to actions that are wrong and leads them to seek health care. In contrast, chronic pain has no biological advantage and often imposes severe emotional, physical, economic, and social pressure on the patient and his/her family and results from a unique mental experience that depends on the complex interaction of individual cognitions, emotions, and individual and cultural factors (Vernieri et al., 2020). Psychological factors play a central role in the experience of pain (Natalucci, Faedda, Baglioni, & Guidetti, 2020). Therefore, for the treatment of chronic pain and pain management, a multifaceted approach is needed that includes all the effective factors in pain, including physical, emotional, cognitive, etc. Living with chronic pain results in considerable emotional stress. Living with chronic pain results in considerable emotional pressure. Pain reduces a person's emotional abilities (Izadikhah, Ansari Shahidi, Rezayi Jamalui, & Haghayegh, 2020). Pain management is a multidisciplinary approach that has received much attention in recent years. This approach involves addressing different aspects of pain and has been developed as an integrated model to encourage active participation and increase coping capacity to control pain. Managing chronic pain requires a long-term relationship and investment beyond that required in acute pain (Parsapour & Raeisi, 2019). Pain management usually involves medication, corrective activities, or a combination of the two. It is not possible for the pain to go away completely. However, an effective pain management program can reduce the severity of the pain (Mohammadi Zeidi, Seifpour, Morshedi, & Alizadeh, 2020).

Stress tolerance and the presence of a level of physical and genetic vulnerability make a person more susceptible to psychosomatic disorders. One of the psychiatric disorders closely related to stress and strain is headache (Rains & Poceta, 2006). Headache is the most common pain syndrome. Severe headaches can affect the way people work and live their personal and social lives and, in the long run, can have a negative impact on their quality of life (QOL) (Liossi & Schoth, 2016). Migraines and headaches increase a person's risk of heart disease, obstruction, and high blood pressure. Migraine causes a great deal of stress and pressure in people, which directly affects heart rate and blood pressure. Psychological problems are also very common among patients with chronic headaches (Kemper, Heyer, Pakalnis, &

Binkley, 2016). A large percentage of patients with migraine headaches and tension headaches have depression and anxiety disorders. There is a significant association between headaches that begin in childhood or adolescence and the onset of depression in later years. Tension and migraine headaches together make up two-thirds of the different types of headaches (Gunn, Fairchild, Verster, & Adams, 2021). This complication is the ninth reason to see a doctor. These studies confirm the relationship between psychological and personality factors in patients with headaches.

The main factor reported as a trigger for headaches in patients with migraine and tension headaches is psychological stress. Emotions play an important role in dealing with stressful life events (Bottiroli et al., 2019). Since every person in life is faced with threatening and stressful events, is important and necessary to know how to regulate emotions in these situations (Doustkam et al., 2022). Emotion regulation refers to the processes or methods that people use to regulate their emotions when faced with a negative situation. Appropriate emotion regulation skills are associated with healthier relationships, better job and academic performance, and overall physical health. In contrast, dysfunctional emotion regulation skills are associated with mental illness (Ghassemi, Vahedi, Tabatabaei, & Alivandi-Vaf, 2020). Cognitive emotion regulation strategies are actions that indicate the ways a person copes with stressful situations or unfortunate events (Tayyebi, 2020). In the face of stressful experiences and situations, people use a variety of cognitive strategies to maintain their mental and emotional health (Sadat, Mansour, Mekkaoui, & Merzougui, 2020). Therefore, when emotional information cannot be perceived and evaluated in the process of cognitive processing, the person becomes emotionally and cognitively disturbed and helpless (Sharbafchizadeh & Sadeghi, 2021). This disability disrupts the organization of a person's emotions and cognitions. Regarding the effect of emotions on pain regulation, many studies have shown that pain fluctuations are easily affected by emotions. Pleasant emotions generally reduce pain. While unpleasant emotions increase the intensity of pain. These effects are partly due to the descending pain pathway (Faedda, Natalucci, Baglioni, Giannotti, Cerutti, & Guidetti, 2019).

Research shows that people with tension headaches and migraines are different from healthy people in terms of their use of cognitive emotion regulation strategies (Latifian, Tajeri, Shah Nazari, Meschi, & Baseri, 2020). In addition, due to the relationship between stress and emotional disturbances in the incidence of headaches, it seems necessary to study the styles and strategies of cognitive emotion regulation in people with migraines and tension headaches (Keshvari, Jenaabadi, & Karbalaei, 2021). Therefore, the use of the method reveals non-pharmaceutical drugs in the form of therapeutic supplements more than before. Moreover, such strategies enable patients to play an active role in their care and treatment and leads to more effective disease control. Therefore, the issue of emotion regulation can be considered as a factor in the adaptation and effective control of this disorder. The aim of this study was to evaluate and compare emotion regulation strategies among men and women with migraine headaches, tension headaches, and normal headaches.

Methods

This research was a causal-comparative research. The study population included all patients with migraine and tension headache referred to the neurology clinic of Abdi Waluyo Hospital in Jakarta in the first 6 months of 2020. The subjects were selected through convenience sampling. This sample consisted of 2 groups of 60 patients with migraine tension headache, which were matched with the normal headache group in

terms of age, sex, and lack of mental illness. All individuals completed a demographic information form and a cognitive Emotion Regulation Questionnaire. This questionnaire with 36 items and 9 factors is designed to assess how people think after experiencing life-threatening or stressful events (Keshvari et al., 2021). Each individual was assured that all of their information would be kept confidential and used only for research purposes. The participants' names were not recorded for privacy reasons. The patients provided informed consent in accordance with the procedures outlined by the institutional review board; they were informed that they could withdraw from the experiment at any time.

In the second factor analysis on the primary factors of the Emotion Regulation Questionnaire, the 2 general factors of positive strategies (vision development, positive refocus, positive evaluation, and planning) and negative strategies (self-blame, blaming others, rumination, and catastrophic perception and acceptance) were achieved in emotion regulation (Garnefski, Kraaij, Spinhoven, 2002). In the present study, these 2 factors were studied. The reliability of this questionnaire was obtained in the range of 0.82-0.94 using Cronbach's alpha coefficient. The reliability of the subscales of this questionnaire was reported to be within the range of 0.60-0.93 using Cronbach's alpha method from 62 (Kunzler et al., 2020). According to its purpose, i.e., comparing cognitive emotion regulation strategies based on gender, this study was divided into 3 groups of patients with migraine headaches, tension headaches, and normal headaches (Liossi & Schoth, 2016).

After identifying the subjects, the objectives of the research were explained to them, and they were assured that their answers were purely research-oriented and would remain confidential. After collecting the questionnaires and discarding the distorted items, the other items were entered into the analysis. In addition, multivariate analysis of variance (MANOVA) and Tukey's range test were used.

Results

The average age of all subjects was 35.64 ± 7.08 years, with a range of 17-50 years. The mean age of men was 36.01 years, and the mean age of women was 34.56 years. In addition, the level of education of the subjects in this research is shown in figure 1.

The descriptive components of the variables studied in this study are presented in groups in table 1.

The test results of cognitive emotion regulation strategies with Roy's largest root F = 4.21 showed a significant difference between the groups. The ANOVA results (Table 2) show that the 3 groups had significant differences in terms of positive cognitive emotion regulation strategies.

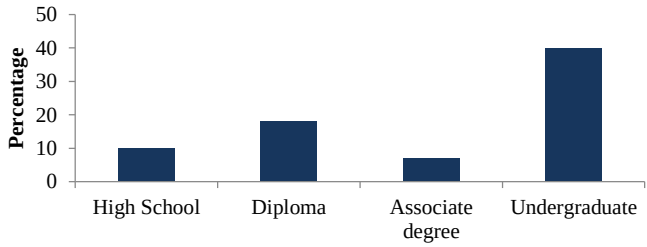

Figure 1. Level of education of the subjects

Table 1. Descriptive components of positive and negative strategies in people with migraine, tension, and normal headaches

Variables	Migraine headache	Tension headache	Normal headache
	Mean ± SD	Mean ± SD	Mean ± SD
Positive strategies	48.12 ± 1.72	50.18 ± 1.56	58.27 ± 1.07
Negative strategies	53.61 ± 1.29	51.92 ± 2.69	53.12 ± 1.86

SD: Standard Deviation

The interaction between gender and groups was also significant. These differences in Tukey's range test showed lower scores in the component of positive strategies in the migraine group compared to the normal headache group.

Table 3 shows the mean differences in gender interaction and groups. According to the results presented in table 3, it is inferred that women and men with migraines have fewer positive strategies than the normal headache group. Women with migraines scored higher on positive strategies than men with migraines. The normal headache group of women scored higher on positive strategies than the normal headache group of men.

Discussion

This study examined cognitive emotion regulation strategies among men and women with tension headaches, migraines, and normal headaches. People with migraines use fewer positive strategies in the cognitive regulation of their emotions than people with normal headaches. These results are consistent with the findings of Freitag (2007). Freitag (2007) reported that using less effective coping strategies in the interval between headache attacks predicted the likelihood of an attack 2 weeks later and that migraines were associated with emotional disturbances that disrupted people's social and professional lives. In addition, people with headaches are more likely to use maladaptive strategies such as withdrawal, avoidance, and self-criticism (Domaradzka & Fajkowska, 2018). These people are more likely to find the painkiller catastrophic. Moreover, there are a number of personality components for migraine headaches that can be used to explain the use of less positive cognitive emotion regulation strategies in people with migraine headaches. These personality traits include introspection, trying to control emotions too much, obsessive and aggressive personality, and perfectionism. Given the existence of these personality traits in migraine sufferers and the severity of dysfunction that headache attacks cause in this group, it can be concluded that migraine sufferers use fewer positive strategies in dealing with their headaches (Peng et al., 2021).

Based on the present study findings, there is a significant difference between women and men in using positive strategies in both groups, and women use more positive strategies. Women scored higher than men in negative strategies. Women scored higher than men in positive, negative, and general cognitive strategies (Tamir, Halperin, Porat, Bigman, & Hasson, 2019). To explain this, we can point to the physiological differences between the brains of men and women.

Table 2. Results of analysis of variance test differences in components of cognitive emotion regulation strategies between migraine, stress, and normal headache groups

	Index	SS	MS	F	P-value
Groups	Positive strategies	1200.01	600.01	4.08	0.012 (P < 0.05)
	Negative strategies	102.6	51.30	0.33	0.56
Gender and groups interaction	Positive strategies	1021.75	510.88	4.12	0.029 (P < 0.05)
	Negative strategies	691.56	345.78	3.79	0.037 (P < 0.05)

SS: Sum of squares; MS: Mean of squares

Table 3. Mean differences related to gender interaction and groups

		Migraine headache	Tension headache	Normal headache
Positive strategies	Men	50.41	55.16	51.20
	Women	52.02	43.31	57.15
Negative strategies	Men	50.16	49.98	54.54
	Women	55.12	52.62	50.29

In fact, men use a downward adjustment in dealing with negative emotions, thereby slightly reducing the intensity of their negative emotions. However, women qualitatively neutralize their negative emotions by increasing positive emotions; women produce an amplitude of positive emotions to reduce the intensity of their negative emotions (Ongen, 2010). For example, women use humor as a strategy to regulate their negative emotions. Therefore, based on the differences between the brains of men and women, it can be expected that men do less work on them when faced with negative emotions and achieve self-regulation more quickly.

Based on the results of the present study, self-regulation may play an important role in causing headaches in patients. By regulating their emotions through the connection between pain and emotion, people with headaches will be able to prevent bias in information processing that leads to experiencing negative emotions and adapt more effectively to their illness. Catalano, Holloway, and Mpofu (2018) have pointed out that the ability of individuals to self-regulate their emotions may be the key difference in their tolerance of pain through which individuals can separate the experience of pain from emotional reactions to pain.

Among the limitations of this research are the limitations of sampling and lack of access to a high number of samples. It is suggested that in future research, larger clinical samples be used and that teaching positive cognitive emotion regulation strategies be used along with drug therapy to control more headache attacks and improve patients' QOL. Emotion regulation training can improve mental health by informing people with headaches about their positive and negative emotions and how to accept and express them in a timely manner. Therefore, teaching cognitive emotion regulation strategies to this group is recommended.

Conclusion

The aim of this study was to compare cognitive emotion regulation strategies in men and women with tension headaches, migraines, and normal headaches. The results showed that people with migraines use fewer positive strategies in the cognitive regulation of their emotions than people with normal headaches. Furthermore, the results showed that there is a significant difference between women and men in terms of the use of positive strategies in both groups, and women use more positive strategies. In summary, the present study's findings show that self-regulation is one of the factors that can be effective in causing headaches in patients. Clinical applications of this study include how people with headaches use cognitive emotion regulation strategies in the etiology and design of therapeutic interventions.

Conflict of Interests

Authors have no conflict of interests.

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None.

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The Prediction of Psychological Distress Tolerance based on the Motivational Structure and Traumatic Events Mediated by Ambiguity Tolerance in IBS Patients: A Structural Equation Modeling

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Quantitative Study

Abstract

Background: Irritable bowel syndrome (IBS) is a critical syndrome that harms the psychological, communicational, social, and emotional processes of individuals. Considering the importance of this topic, the present study was conducted with the aim to examine the relationship between motivational structure, traumatic events, and psychological distress tolerance mediated by ambiguity intolerance in individuals with IBS.

Methods: The present correlational research was conducted using structural equation modeling (SEM). The statistical population comprised all individuals with IBS referring to the Digestive Disease Research Institute of Shariati Hospital, Iran, in 2020. From among these patients, 177 individuals were selected using convenience sampling method. The data were gathered using the Kessler Psychological Distress Scale (K10), Personal Concerns Inventory (PCI), Ambiguity Tolerance Scale-II (MSTAT-II), and Life Events Checklist (LEC). SPSS software was used for the preliminary data analysis and SmartPLS software was used for PLS modeling.

Results: The results of data analysis indicated the direct effect of adaptive motivation structure and traumatic events on distress tolerance. The aforementioned variables could also affect the distress tolerance of individuals with IBS by influencing their ambiguity tolerance ($P < 0.01$). However, traumatic events had a higher indirect effect through ambiguity tolerance compared to their direct effect. Furthermore, adaptive motivation structure had no significant direct or indirect effect on distress tolerance.

Conclusion: This study confirmed the relationship between motivational structure and traumatic events with the mediating role of ambiguity intolerance among IBS sufferers.

Furthermore, further studies must be conducted on ambiguity tolerance and the problems of individuals with IBS regarding the plethora of scientific evidence on the etiology of IBS syndrome.

Keywords: Psychological distress; Irritable bowel syndrome; Life changing events

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Introduction

Stress and anxiety are factors that cause irritable bowel syndrome (IBS) (Banerjee, Sarkhel, Sarkar, & Dhali, 2017). Clinical and experimental evidence showed that IBS is a combination of an irritable bowel and an irritable brain (Padhy, Sahoo, Mahajan, & Sinha, 2015). Moreover, psychological stresses have a marked impact on intestinal sensitivity, motility, secretion, and permeability, and the underlying mechanism has a close correlation with mucosal immune activation, alterations in the central nervous system, peripheral neurons, and gastrointestinal microbiota. Stress-induced alterations in neuroendocrine-immune pathways act on the gut-brain axis and microbiota-gut-brain axis and cause symptom flare-ups or exacerbation of IBS. IBS is a stress-sensitive disorder (Qin, Cheng, Tang, & Bian, 2014).

In a systematic review of 6 studies in 36 countries worldwide, the prevalence of IBS equaled 3.8% (Oka, Parr, Barberio, Black, Savarino, & Ford, 2020). The most recent study on IBS prevalence in Iran was conducted on 4763 people within the age range of 19-70 years and indicated a total IBS prevalence of 21.5% and a higher prevalence among women compared to men (Hassanzadeh Keshteli, Dehestani, Daghaghzadeh, & Adibi, 2014). Many studies have emphasized the role of social-psycho-bio factors in the development of clinical features and IBS severity (Thakur, Quigley, El-Serag, Gudleski, Lackner, 2016). Some of the psychological dysfunctions observed in patients with IBS include high and mostly unreal personal expectations (a high-level perfectionism) (Spence, & Moss-Morris, 2017), unhealthy stress coping styles, sleep disorder (Park & Lee, 2017), early maladaptive schemas (Besharat & Dehghani, Gholamali Lavasani, & Malekzadeh, 2015; Sokhanvar Mojdehi, Belyad, & Tari Moradi, 2016), impaired body consciousness (Muscatello et al., 2016), fault tolerance (Besharat et al., 2015), and low quality of life (QOL) (Kopczyńska et al., 2018; Jamali et al., 2012).

Recent studies have shown a higher probability of IBS in the group with an unhealthy lifestyle compared to the group with a healthy lifestyle. Stress and psychological pressures in patients with IBS are beyond their tolerance, and thus, these distresses and stresses make their life challenging. Generally, the causes and clinical symptoms of psychological distress have been identified in patients with IBS. A review of the theoretical and research evidence can contribute to the explanation of psychological distress among patients with IBS. Determination of the causes of psychological distress in gastrointestinal diseases, particularly IBS, in addition to the results obtained by Cassar et al. (2018), indicate that psychological distress can significantly predict symptoms of IBS. The motivational structure of patients with IBS significantly affects their psychological distress because these patients are more motivated to show unhealthy behaviors, bad diet habits, and unhealthy lifestyles. The correlation between the mentioned behaviors and the mental health of patients leads to severer anxiety and distress among patients with IBS (Guo, Zhuang, Kuang, Zhan, Wang, & Liu, 2015).

Motivational structure indicates how to choose and pursue goals, and predicts individuals' tendency for unhealthy behaviors (Cox & Klinger, 2002). Cox and Klinger (2002) introduced two types of adaptive and maladaptive motivational structures. Individuals with a maladaptive motivational structure tend to derive their emotions through an unhealthy method; they pursue avoidant goals, goal achievement is not much pleasure for them, and if they fail they do not feel optimistic. Individuals with maladaptive motivational structures pursue their goals

without thinking about success or failure. They follow their goals unrealistically and do not feel positive even if they are successful. The mentioned signs are contrary to the adaptive motivational style. Seemingly, the maladaptive motivational structure is an underlying factor for other problems individuals face. Accordingly, Hauser et al. (2014) believe that IBS patients highly tend to interpret events negatively, which may lead to higher psychological distress making these patients show specific avoidant behaviors in both normal life events and challenges. Therefore, maladaptive motivation of IBS patients tends towards negative behaviors, which in turn disrupts the life, and psychological and physical discipline of these patients, thus leading to higher psychological distress.

The other part of psychological distress caused by IBS must be searched in traumatic events, which leads to stress in the form of psychological disorder. The traumatic event is a common incident; the estimated endurance of such events has been reported equal to 26-92.2% and 17.7-87.1% among men and women, respectively (Creamer et al., 2001; quoted from Basharpoor & Hoseinikiasar, 2016). According to the results obtained by Hassanzadeh et al. (2017), there is a positive relationship between stressful events, psychological distress, depression, and anxiety. The experience of stressful events has raised concerns for the occurrence of these events in the future. Moreover, the ambiguous circumstances of these events and fear of them may make the patients more doubtful, thus reducing ambiguity tolerance among them.

Ambiguity intolerance refers to the incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information and sustained by the associated perception of uncertainty. Ambiguity intolerance indeed represents the fear of the unknown (Carleton, 2016). Tolerance of ambiguity (TA) is defined as a method in which a person or a group faces a set of unfamiliar, complex, and uncertain procedures (Furnham & Marks, 2013). The effect of ambiguity intolerance on depression, anxiety, and psychological distress has been confirmed in clinical and non-clinical populations (Enoki, Koda, Nishimura, Kondo, 2019).

According to the studies on ambiguity intolerance, the effects of stress and anxiety can reduce ambiguity tolerance (Mikaeeli et al., 2018). Findings obtained by Zargham Hajebi, Najarian Noshabadi, and Faraji (2017) indicated low average ambiguity tolerance in IBS patients, and a significant correlation between QOL, ambiguity tolerance, negative affect, and social inhibition. It seems that the stress resulting from traumatic events and behavioral distresses caused by maladaptive motivations reduce the tolerance level.

Besharat et al. (2015) conducted a study on the mediating role of ambiguity tolerance and found a positive and significant relationship between intolerance of uncertainty and severity of symptoms. There was also a significant positive association between early maladaptive schemas and intolerance of uncertainty. Results showed that intolerance of uncertainty did not play a mediating role in the relationship between early maladaptive schemas and the severity of IBS symptoms.

Therefore, most studies on IBS in Iran have concentrated on the effects of IBS on the QOL and psychological traits of patients, while there is no study on the prediction of the underlying psychological factors of IBS, particularly ambiguity intolerance based on the various internal and external factors. For this purpose, the present study was conducted with the aim to examine the aforementioned variables in Iranian IBS patients to predict its effect on psychological distress. Hence, the role of exogenous factors, such as stressful events, and endogenous factors, including ambiguity tolerance and motivational structure, must be identified in IBS patients

due to comorbid somatic and mental diseases and the high prevalence of this syndrome among the Iranian population. Identification of the aforementioned features paves the way to finding psychotherapy approaches, teaching skills to IBS patients, reducing cost and duration of therapies, and helping mental health planners to provide suitable psychological support and interventions, as well as preventive procedures to improve the mental wellbeing of IBS patients. Therefore, the present study was performed with the aim to find the relationship between mediating variables of ambiguity tolerance, motivational structure, traumatic events, and psychological distress in individuals with IBS.

Methods

This descriptive (non-experimental), correlative research was conducted using structural equation modeling (SEM). The study population included all patients with IBS who referred to the Gastroenterology Research Center of Shariati Hospital in Tehran, Iran, in 2020.

In this research, 177 subjects were chosen using the convenience sampling method to increase the statistical power and external validity of the study. The study inclusion criteria were as follows: obtaining a score less than the mean score of the Kessler Psychological Distress Scale (K10), being 20-50 years of age, and having at least a diploma degree. The exclusion criteria included blood in stool, gastrointestinal bleeding, pregnancy or decision to become pregnant, weight loss during the past 3 months, abdominal surgery, a palpable mass in the abdomen, and mental illness in the last 2 years. It is worth noting that this study was approved under the ethical code of IR.IAU.TON.REC.1399.011 by Islamic Azad University, Tonekabon Branch.

A) Kessler Psychological Distress Scale: The K10 assesses the emotional state of the patient during the recent month based on 10 questions and was designed by Kessler, Barker, Colpe, Epstein, and Gfroerer (2003). The questions are scored on a 5-point Likert scale ranging between 0 and 4, with a maximum score of 4. The studies conducted on the K10 have indicated a strong relationship between high scores of this scale and diagnosis of mood and anxiety disorders with the Composite International Diagnostic Interview (CIDI). Moreover, there was a less but significant association between K10 scores and other psychological diseases (Andrews & Slade, 2000). In addition, the K10 has appropriate sensitivity and features to screen individuals with anxiety and depression; it is used as a measure to control and monitor post-treatment procedures (Kessler et al., 2003). Furthermore, other studies implied the validity of K10 for screening studies and identifying mental disorders (Green et al., 2010). In addition, Vasiliadis et al. (2009) and Anderson et al. (2011) reported the acceptable validity and reliability of this questionnaire for elderly people. Yaghoubi (2015) reported the reliability of K10 to be equal to 0.83 using Cronbach's alpha in Iran. The present study obtained reliability equal to 0.91 for this questionnaire using Cronbach's alpha coefficient.

B) Personal Concerns Inventory: The Personal Concerns Inventory (PCI) (Cox & Klinger, 2004) is the revised version of the Motivational Structure Questionnaire (MSQ developed by Klinger, Cox, Blount, Allen, and Columbus, (1995). Factor analysis of the aforementioned dimensions led to 2 general factors. The first factor was an adaptive motivational structure that indicates fundamental elements to achieve a satisfying solution for personal concerns, and the second one was a maladaptive motivational structure that indicates indifference in achieving personal goals (Cox et al., 2003). The dimensions 1, 2, 3, 4, 6, 7, 10, and 11 were entered into the

analysis as indicators of the latent construct of adaptive behavior, while dimensions 5, 8, and 9 were entered into the analysis as indicators of the latent construct of maladaptive behavior. Evidence indicates the acceptable validity and reliability of the MSQ. In terms of confirmed validity of the MSQ for the sample, a study indicated that skin conduction in subjects increased when they observed the goals selected in the MSQ (Nicole, Klinger, Alerson, & Guttman, 1993; quoted from Cox & Klinger, 2002). Fadardi (2003) designed the PCI, which includes 10 indicators for 2 types of samples, students and alcohol abusers. Cronbach's alpha coefficients for students and alcohol abusers equaled 0.77 and 0.75, respectively (Fadardi, 2003). Previous studies have reported that the Persian version of the PCI and each of its components have suitable internal consistency (Sharbaf, Fadardi, & Cox, 2004).

C) The Multiple Stimulus Types Ambiguity Tolerance Scale-II: The 13-item Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II) was developed by McLain (2009). Each item is scored based on a 5-point scale ranging from strongly agree to strongly disagree. Scores of higher than 45 are suggestive of a suitable tolerance level. McLain (2009) reported the reliability coefficient of this questionnaire to be 0.82 using Cronbach's alpha. Feizi, Mahbobi, Zare, and Mostafaei (2013) measured the validity of the MSTST-II and found a construct validity of 0.48 and reliability coefficient of 0.85 using Cronbach's alpha. Aalipour, Abbasi, Mirderikvand (2018) also reported the reliability of this questionnaire as equal to 0.8 based on Cronbach's alpha. In the present study, the reliability of this questionnaire was calculated to be 0.85 using Cronbach's alpha.

D) Life Events Checklist: The Life Events Checklist (LEC) was developed at the National Center for Post-traumatic Stress Disorder (PSTD) and the Clinician-Administered PTSD Scale (CAPS) was designed by Weathers et al. (2013). LEC is used before CAPS to determine how to deal with traumatic events (Blake et al., 1995). The LEC is composed of 17 items, and each item represents the domain of PTEs from natural disasters to other stressful events. Bae, Kim, Koh, Kim, and Park (2008) examined the psychiatric feature of the Korean version of the LEC and found Kappa value and internal consistency of the 17 items to be equal to 0.619 and 0.66v (Cronbach's alpha), respectively. Exploratory factor analysis was used to determine the validity of the ELC in Iran, and the results indicated 4 factors, including accidents/incidents, damages, rape/assault, and abnormal experiences that explained 62.49% of the variance in variables. Cronbach's alpha coefficient of the ELC equaled 0.76, indicating a reliability value of greater than the average rate (Shadkam, Molazadeh, & Yavari, 2016).

The study adds in the current literature of PLS-SEM as an assessment model for direct and mediation relationships

Results

Findings obtained from the collected data have been presented in descriptive and inferential statistics. According to the demographic data, among the total selected IBS patients (177), there were 131 women (74.8%) and 46 men (26.2%). Moreover, 103 subjects (58.3%) were married, while 74 subjects (74.8%) were single. In terms of education level, 35 subjects (19.8%) had a diploma, 13 subjects (7.3%) had an associate degree, 88 subjects (49.7%) had a BA, 37 subjects (20.8%) had an MA, and 4 subjects (2.3) had a Ph.D. degree. In terms of age range, 64 subjects (34.5%) were 2-30 years old, 89 subjects (50.3%) were 31-40 years old, and 37 subjects (15.3%) were 41-50 years old. The average age equaled 31 years. Table 1 shows the descriptive indexes of the research variables

Table 1. Descriptive indexes of the research variables

Variables	n	Min	Max	Mean	SD	Kurtosis	Skewness
Ambiguity tolerance	177	26.00	57.00	39.2316	5.55320	0.103	-0.258
Traumatic events	177	44.00	88.00	64.8531	10.38689	-0.039	-0.972
Adaptive motivation	177	9.00	51.00	34.0508	7.98242	-0.330	0.176
Maladaptive motivation	177	2.00	28.00	14.9435	5.79647	-0.083	-0.725

According to the results of the Kolmogorov-Smirnov test, no variables had the following conditions for normal distribution of scores. Since the PLS method is not sensitive to the non-normal distribution of data in model fit, the SmartPLS software (version 3.2.8, SmartPLS GmbH, Germany) was used for structural equations due to the non-normality of data. In the SmartPLS software, the t-value represents the significance of variables' effects on each other. If the t-value is greater than 1.96, their effect is positive and significant, and if the t-value is between 1.96 and -1.96, the variable has no significant effect. In addition, path coefficients of greater than 0.60, 0.3-0.6, and less than 0.3 indicate a strong, moderate, and weak relationship between variables, respectively (Chin, 2003; Vinzi, Chin, Henseler, & Wang, 2010). Table 2 presents the results of the Spearman correlation test of the association between the studied variables and divergent validity. Furthermore, the Fornell–Larcker method was used to assess divergent validity.

As can be seen in table 2, psychological distress tolerance (dependent variable) correlated with all three variables of traumatic events, motivational structure, and psychological distress ($P < 0.05$). There was a negative relationship between distress tolerance and variables of traumatic events, maladaptive motivational structure, and psychological distress, while there was a positive relationship between distress tolerance and adaptive motivational structure. Accordingly, an increase in traumatic events, motivational structure, and psychological distress leads to a reduction in psychological distress tolerance. However, an increase in adaptive motivational structures leads to a rise in psychological distress tolerance. The severity of the correlation between variables varied between -0.441 and 0.635.

SEM technique (based on PLS method) relies on some statistical assumptions, which lead to higher accuracy of this method in the estimation of coefficients. In terms of sample size presumption, modeling requires large samples. Some believe that the minimum sample size for analysis generally varies between 100 and 250 (Khin, 2013). The calculated sample size for the present study was 200 samples, which was a suitable sample size for SEM. Normal distribution of variables is an assumption for modeling through LISREL and Amos software (covariance-based methods); the PLS technique was used in the present study due to the non-normal distribution of the two main variables.

Table 2. Correlation coefficients between the research variables and divergent validity

	Ambiguity tolerance	Traumatic events	Adaptive motivational structure	Maladaptive motivational structure	Psychological distress
Ambiguity tolerance	1				
Traumatic events	-0.522**	1			
Adaptive motivational structure	0.285*	-0.442**	1		
Maladaptive motivational structure	0.041	0.215*	-0.502**	1	
Psychological distress	-0.323**	0.635**	-0.472**	0.321**	1

**P < 0.01, *P < 0.05

Another assumption was a lack of strong collinearity between independent variables (traumatic events, motivational structure, and psychological distress). As there was no strong correlation between the three independent variables, there was no strong collinearity between variables affecting psychological distress tolerance. Figure 1 shows the SEM in terms of path coefficient mode and t-values.

Table 3 presents the goodness of fit indicators of the model. As can be seen in table 3, most models fit the model; therefore, the drawn path has a good fit. Table 4 shows the direct effects of research variables.

Ambiguity tolerance mediation role test

Table 5 presents the inhibitory results of intermediate relationships using bootstrap test. The result obtained from the findings presented in table 5 shows that the obtained t-statistics of all the paths entered in the present model of non-adaptive motivational structures are confirmed by tolerance of ambiguity at a significant level ($P < 0.01$). This means that all direct paths and all indirect paths have a significant effect on psychological distress.

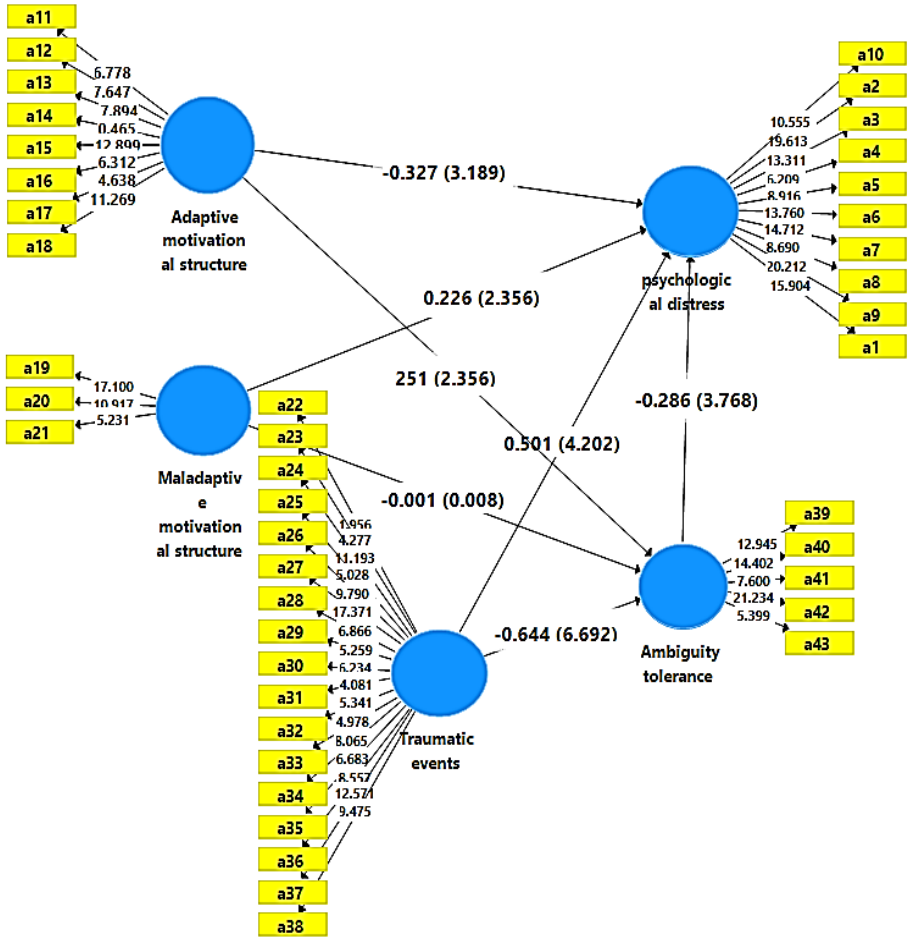

Figure 1. SEM in terms of path coefficient mode and t-values

Table 3. Goodness of fit indicators of the model of the mediating role of ambiguity tolerance in the relationship between motivational structure, traumatic events, and psychological distress

	SRMR	d_ULS	d_G	Chi-Square	NFI
Saturated Model	0.075	0.275	0.081	164.012	0.805

Standard bootstrapping (500 bootstrap samples) was used with 177 sample observations for the present study to examine the significance of path coefficients. Therefore, considering the presented materials, the research hypothesis is confirmed based on the effect of adaptive motivational structure and traumatic events by tolerating ambiguity on the tolerance of psychological distress in people with IBS. Moreover, the mediating role of ambiguity tolerance in influencing the non-adaptive motivation structure with significant distress tolerance was not obtained.

Discussion

The purpose of this study was to examine the mediating role of ambiguity intolerance in the relationship between motivational structure, traumatic events, and psychological distress among individuals with IBS. The results indicated the strong predictive role of ambiguity intolerance in concerns and psychological distress. Therefore, distressed and anxious people suffer from a kind of ambiguity intolerance (Shihata, McEvoy, & Mullan, 2018; Oglesby & Schmidt, 2017; Hancock & Mattick, 2019; Fadaee, Panahi Gorji, Miladi Gorji, and Hooshyar, 2018). Ambiguity intolerance has 3 of the 4 conditions necessary to be considered as a risk factor for worry and distress; there is a close relationship between ambiguity intolerance and worry, ambiguity intolerance is changeable, and changes in ambiguity intolerance have been before worry changes in most of the treatment course. However, previous studies have considered that condition 4 indicates that factor A (ambiguity intolerance) must be before factor B (excessive worry and anxiety) (quoted from Bagheri et al., 2018). People with ambiguity intolerance cannot bear daily stressful events, so they experience higher distress levels. Moreover, these individuals may believe that they do not have problem-solving skills for the effective management of uncertain situations, which may lead to lower self-worth (Fahimi, Aliloo, Poursharifi, Fakhari, Akbari, & Rahim Khanli, 2014).

Table 4. Direct effects of research variables

	Original Sample (O)	Standard Deviation (SD)	T Statistics (|O/SD|)	P-value
Adaptive motivational structure -> Ambiguity tolerance	-0.251	0.011	2.356	0.047
Adaptive motivational structure -> psychological distress	-0.327	0.012	3.189	0.001
Ambiguity tolerance -> psychological distress	-0.286	0.015	3. 768	0.015
Maladaptive motivational structure -> Ambiguity tolerance	-0.001	0.095	0.009	0.993
Maladaptive motivational structure -> psychological distress	0.226	0.048	2.356	0.044
Traumatic events -> Ambiguity tolerance	-0.644	0.093	6.915	0.001
Traumatic events -> psychological distress	0.501	0.12	4.171	0.001

Table 5. Indirect effects of research variables

	Original Sample (O)	Standard Deviation	T Statistics (|O/SD|)	P-value
Adaptive motivational structure -> Ambiguity tolerance -> psychological distress	-0.0717	0.015	1.968	0.048
Maladaptive motivational structure -> Ambiguity tolerance -> psychological distress	-0.0002	0.011	0.001	0.999
Traumatic events -> Ambiguity tolerance -> psychological distress	-0.184184	0.077	3.103	0.018

There is a negative and significant association between traumatic events and ambiguity tolerance, meaning that stressful events affect the underlying attitude and beliefs of the person. Studies have shown the effect of traumatic life events on depression, serotonin transporter-linked promoter region (5-HTTLPR), wellbeing and family functioning, coping skill, optimism, and generalized anxiety (Tiwari & Deshpande, 2020; Houwing et al., 2021; Haberstick et al., 2016; Zhao et al., 2021; Farčić & Barać,, 2012; Houwing, Buwalda, van der Zee, de Boer, & Olivier, 2017; Taher, Mahmud, Amin, 2015). Assessments have confirmed the effect of these events on cognitive dysfunctions (Boyle, Lawton, Arkbage, Thorell, & Dye, 2013). It can be explained that when individuals face stressful events which affect life experiences tensions, they find it difficult to tolerate these conditions in the absence of emotion regulation and effective skills. Exposure to stressful events is a barrier to problem-solving approaches and active adaptation (Baumeister, Gailliot, DeWall, Oaten, 2006). Seemingly, stressful events change the attitudes and perception functions of individuals and reduce their ambiguity tolerance by influencing their cognitive systems. Studies have found a negative and significant relationship between perceived stress and ambiguity tolerance (Fadaee et al., 2018). It can be explained that different types of stressful events evoke many challenges, and many mental reactions, such as stress, anxiety, and depression. The aforementioned reactions may cause many problems in controlling anxiety and stress symptoms, poor decision-making skills, and dysfunctional social interactions that leave destructive and negative effects on the QOL. Moreover, the low ambiguity tolerance resulting from possible stressful events may convert to chronic intolerance. The results of the present study were consistent with findings obtained by Radman et al. (2016) and Abedi, Mogtabaei, and Bagheri (2020) who found that ambiguity tolerance has a negative mediating role in the relationship between traumatic events and psychological distress. Individuals with low ambiguity tolerance of severe distress sense in facing life events may bring this assumption these the response of these individuals to life events may be traumatic (Keinan, 1994). However, ambiguity intolerance not only causes severe psychological distress, but also causes traumatic events (Ruderman et al., 2014). According to research evidence, ambiguity intolerance increases the consequences of traumatic events, which intensifies the effect of these events (Fetzner, Horswill, Boelen, & Carleton, 2013; Goto et al., 2006; Lee, Taylor, & Drummond, 2006). Shiri, Rachel, and Marianne (2007) conducted a study on individuals who have experienced a traumatic event and found that individuals with low ambiguity tolerance reported a higher distress level compared to individuals with high ambiguity tolerance, even if not exposed to a traumatic event. The mentioned finding is in line with previous studies indicating that individuals with ambiguity intolerance tend to have more concern, magical thinking, and causal assignment, which are cognitive mechanisms that distort the truth to

increase control (Urvi & Douglas, 2021). The therapies introduced for the empowerment of the patient in coping with uncertainty (Iannello, Mottini, Tirelli, Riva & Antonietti, 2017) may help them to cope with stressful life events and reduce the consequences of these events. In addition, in a recent study, ambiguity tolerance has been reduced in students to help them deal with stressful events during their studies (Avery and Douglas, 2021).

Moreover, the study indicated the significant effect of adaptive motivational structure on psychological distress tolerance through ambiguity tolerance. It can be stated that adaptive motivational structure can reduce psychological distress through the mediating role of ambiguity tolerance. The mediating role of ambiguity tolerance in the relationship between adaptive motivational structure and psychological distress can be explained based on the meaning of ambiguity tolerance being the extent to which a person feels risk and problems in adapting them to life events. If changes occur rapidly and unpredictably, information will be insufficient and non-transparent. In this case, the difference between people affects their reaction and response (Zambianchi & Ricci Bitti, 2014). Individuals with high ambiguity tolerance usually have a complicated understanding of events, and follow the cognitive-perceptual style in their interpretations. Sanders et al. have also stated that scientific assessments of ambiguity in behavioral sciences, such as psychology and management, have attracted the attention of scientists of other human sciences towards the importance of individuals' understanding of ambiguity in terms of advantage or threat in other areas of life. Individuals' response to ambiguity in different areas of life and in various forms affects many of their mental and behavioral aspects. In practice, individuals' perception of ambiguity manifests itself in the two concepts of advantage and threat causing tolerance and intolerance. Ambiguity tolerance refers to individuals' tendency to interpret uncertain situations that are sources of risk and concern (Sanders, Whited, Martino, 2013). Herman et al. (2010) believe that individuals give cognitive, emotional, and behavioral responses to uncertain situations that are mostly new, complex, unsolvable, unpredictable, and doubtful. The responses might be negative or positive. Cognitive reactions include those responses that indicate the person's desire for the interpretation of the uncertain situation through black and white thinking. Moreover, emotional responses refer to the expression of concern, grief, hatred, anger, and anxiety in response to an uncertain situation. Behavioral responses refer to those responses including rejection or avoidance of the uncertain situation.

Conclusion

In general, this study confirmed the relationship between motivational structure and traumatic events with the mediating role of ambiguity intolerance among IBS sufferers. Moreover, further studies must be conducted on ambiguity tolerance and problems of individuals with IBS regarding the plethora of scientific evidence on the etiology of IBS syndrome. However, studies that aim to find the relationship between factors and their effects face many limitations. The present study also had some limitations. For instance, the researcher could not examine the role of other variables, such as socioeconomic class. Hence, it is suggested that these variables be considered in future studies. It is also recommended that this study be conducted on IBS patients referring to all medical centers and hospital wards of gastrointestinal diseases in Tehran, Iran. Moreover, further studies can control the confounding variables of biological depression, intelligence, and socioeconomic and cultural status of patients.

Considering the mediating role of ambiguity tolerance in psychological distress and higher ambiguity tolerance in the mental health of IBS patients, some interventions and treatments must be designed to increase ambiguity tolerance, especially among IBS patients. Furthermore, it is necessary to incorporate the adaptive motivational structure in educational discussions.

Conflict of Interests

Authors have no conflict of interests.

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The Effect of Bioenergy Economy on Cardiac Function and Inflammatory Factors in Myocardial Infarction: A Randomized Controlled Trial

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Quantitative Study

Abstract

Background: This study was conducted with the aim to investigate the effectiveness of a psychological bioenergy economy intervention on the cardiac function and inflammatory factors in patients with myocardial infarction (MI).

Methods: This randomized controlled trial (RCT) was performed on 60 post-MI patients who referred to the Cardiovascular Research Institute, Isfahan, Iran, in 2019. The intervention group received an energy-based bioenergetics intervention that consisted of rehabilitation training and nutrition patterns training. In the control group, only rehabilitation training and nutrition pattern training was provided in 8 sessions. Quantitative data were expressed as mean ± standard deviation (SD). Between-group differences of data departing from normal distribution were analyzed using the Mann-Whitney U test. All statistical analyses were performed in SPSS software.

Results: The enrolled patients included 60 post-MI patients (27.3% women in the intervention group, and 18.2% in the control group). We lost 16 patients during the study. Fasting blood sugar was higher in the control group before the intervention (106.7 ± 14.1 vs. 96.3 ± 11.0; $P < 0.001$). Systolic blood pressure was significantly higher in the control group before the intervention ($P = 0.04$). There was no significant difference in total cholesterol, TG, HDL, and LDL after the intervention compared to before the intervention in either groups. Intercellular adhesion molecule 1 (ICAM-1) and vascular cell adhesion molecule 1 (VCAM-1) did not change during the intervention in either groups ($P < 0.05$).

Conclusion: Our results displayed that the psychological intervention based on bioenergy economy has no significant effect on cardiac function and inflammatory factors in patients with MI. However, it is suggested that this study be repeated on a larger population.
Keywords: Psychotherapy; Heart function; Inflammatory factors; Myocardial infarction

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Introduction

With increase in the mean age of the population, the incidence of chronic diseases has increased and this has led to an increase in deaths from chronic diseases (Veras, 2009). Cardiovascular diseases (CVDs) are considered as a global public health problem and have been the leading cause of death in many countries (Lloyd-Jones et al., 2010). Different psychological, physical, and environmental factors can improve the quality of life (QOL) of CVD patients (Hasanpour et al., 2007). QOL is one of the indicators used to evaluate the effect of therapeutic interventions on CVD (Salles, Vannucci, Salles, & da Silva, 2014). It seems that psychological interventions can improve the cardiac and psychological symptoms of CVD and reduce the recurrence of CVD (Adsett & Bruhn, 1968; Lan, Lai, Wong, & Yu, 1996). Complementary medicine can be considered as an effective tool for coping with these challenges (Lan, Lai, Chen, & Wong, 1998). Bioenergy economy (BEE) is an integrative model of treatment toward the supportable expansion of contentment. BEE improves body mindfulness and mind-body reliability by controlling physical, intellectual, behavioral, and attentive modalities. Integrated energy investments are then attuned to the realization of salutogenesis (Goli, 2018). In addition, BEE is based on biosemiotics that investigates bodily and representative signals and roles through a communal meta-language. This is a mind-body model that clarifies how cellular functions can be interpreted as representative and demonstrative purposes/senses and vice versa (Putwain, Langdale, Woods, & Nicholson, 2011) In recent years, the efficiency of BEE has been considered in all areas of well-being and remedy (Goli, 2018; Putwain et al., 2011; Goli, 2016). Previous studies have demonstrated that BEE can improve somatic function, tolerance, and QOL in patients with chronic heart disease by improving heart function (Tavakolizadeh, Goli, Ebrahimi, Hajivosough, & Mohseni, 2021; Naji, Rahnamay-Namin, Roohafza, & Sharbafchi, 2020). Previous studies have demonstrated the efficacy of bioenergy medicine techniques on repairing the body's energy system and activating natural healing processes (Yeh, Wang, Wayne, & Phillips, 2008). To the best of our knowledge, this study is the first in Iran to evaluate the effect of BEE on cardiovascular functional and inflammatory factors and QOL in patients after myocardial infarction (MI), and the effectiveness of psychological interventions in addition to medications. In this study, we aimed to investigate the impact of a bioenvironmental-based psychological intervention course on cardiac function and inflammatory factors in CAD patients.

Methods

This randomized controlled trial (RCT) was performed on MI patients who were referred to Isfahan Cardiovascular Research Institute, Iran, in 2019. The study protocol was explained to all patients and they were recruited only if they provided informed consent. The inclusion criteria were age of 35-65 years, a minimum reading and writing literacy, lack of any debilitating chronic illnesses, management of underlying heart conditions and non-symptomatic, and lack of severe heart failure and a threatening arrhythmia, major depression, and severe mental illness, immunodeficiency and autoimmune disorder, and cancer. The exclusion criteria included being scheduled for coronary artery bypass surgery, not having sufficient compliance to participate, and having a history of suicide.

The sample size was calculated using the mean comparison formula and taking into account the values related to the emotional dimension of QOL in the study by

Putwain et al. (2011). In this study, 60 post-MI patients who referred to rehabilitation training were enrolled based on the inclusion and exclusion criteria. Individuals were randomly divided into intervention and control groups (each including 30 individuals). The patients and counselors did not know the type of grouping of patients. A consent form was signed by every patient after explaining the study design.

The intervention consisted of bioenergy economy training rehabilitation and nutritional patterns training. In the control group, only rehabilitation and nutrition pattern training was provided. Psychological intervention based on bioenergy economy methods is a macro bio-psychosocial model that quantitatively and qualitatively quantifies bio-energetic phenomena in the matrix and examines the bio-psycho-social-spiritual matrix. These exercises consisted of 8 weekly 90-minute clinical and educational sessions based on the bioenergy economy therapeutic package and the subjects performed the exercises throughout the week. A written summary and a compact disk were provided 2 days after each session for feedback and potential problems with the exercise. The variables were assessed before the intervention, after the eighth session (2 months later), and 4 months after the sessions.

The control group received 8 training sessions (90 minutes each) based on the training package provided by Isfahan Cardiovascular Research Center which includes a healthy lifestyle, aerobic exercise, rehabilitation techniques, nutritional instructions, cardiovascular risk factors, and CVD medications. The exercises and information were provided in the written and CD format (Table 1). After the training, a phone call is made to obtain feedback.

Statistical analysis: The normality of distribution of data was assessed using the Kolmogorov-Smirnov test. Quantitative data were expressed as mean ± standard deviation (SD). Differences between the intervention and control groups were evaluated through t-test. Between-group differences of data departing from normal

Table 1. Content of the energy-based psychological intervention sessions

Sessions	Energy-based psychological interventions
1	Getting to Know the Whole Program and Group Members / The Role of Stress in Health / The Cycle of Feeling-Feeling-Thinking / Stress-Exercising-Releasing / Feedback / Presenting the Schedule for the Week
2	Getting to Know the Energy-Based Psycho-Energy-Energy / Energy / Satisfaction Circuit / Generation of Satisfaction / Happiness Working Group / Attention to Happiness and Life Values / Release Practice / Feedback
3	Reviewing Life Experiences and Happiness / Sustainable Happiness Working Group / Sustainable Happiness Review / Practicing the Control Key in Times of Stress / Feedback / Weekly Presentation
4	Reviewing Experiences / Stimulating Happiness and Processing Levels of Energy, Impulsivity, Reaction, and Action / Workshop Examples of Each Form of Energizing and Its Results / Conditional Exercise / Feedback / Weekly Schedule
5	Reviewing weekly experiences/tons of memory and happiness/ tons of free energy/tons of vibrational energy and posture practices/feedback/ week schedule
6	Reviewing the experiences of the week / emphasizing free energy flow, awareness, and relaxation/ enhancement of happiness through thankfulness/thanksgiving reflection/barriers to self-esteem, otherness, and existence/acquaintance with energy coherence, and role of mind-body coordination /vibrational energy exercises, posture, alignment, and arrangements/feedback / weekly presentation
7	Reviewing Weekly Experiences / Group Practice / Modifying Methods / Feedback / Presenting the Schedule for the Week
8	Reviewing Experiences of the Week / Group Practice / Modifying Techniques / Feedback / Presenting the Schedule for the Week / Encouraging the Continuation of Exercises

distribution were analyzed using the Mann-Whitney U test. Categorical variables were presented as frequency counts and compared using χ^2 test. *P*-values of less than 0.05 were considered as statistically significant. All statistical analyses were performed using SPSS software (version 17.0; SPSS Inc., Chicago, IL, USA).

Results

In this study, 44 Iranian patients with CVD were enrolled (27.3% women in the intervention group and 18.2% in the control group).

Table 2 displays the demographics of patients with MI in both intervention and control groups. No significant differences were observed between the study groups regarding mean age (53.54 ± 5.7 vs. 55.36 ± 10.45; P = 0.48).

Table 3 shows clinical and laboratory characteristics of study subjects. Fasting blood sugar was higher in the control group before the intervention (106.7 ± 14.1 vs. 96.3 ± 11.0; P < 0.001). The triglyceride level was higher in the control group (177.7 ± 93.03 vs. 153.5 ± 51.94; P = 0.71). Systolic blood pressure was higher in the control group before the intervention (P = 0.04). There was no significant difference between the study groups in total cholesterol, HDL, and LDL before and after the intervention. Moreover, there were no significant differences in terms of anthropometric measurements (such as BMI, Waist Circumference, and WHR) between the two groups (P < 0.05). Intercellular adhesion molecule 1 (ICAM-1) and vascular cell adhesion molecule 1 (VCAM-1) have not changed during the intervention in either groups (P < 0.05).

Table 4 demonstrated the relationship between ICAM-1, VCAM-1, and the psychological intervention. We could not find any significant relationship between these factors and the interventions in either crude or adjusted models.

Discussion

This study was conducted with the aim to investigate the impact of a bioenvironmental-based psychological intervention course on cardiovascular function, inflammatory factors, and QOL in MI patients. The results of our study demonstrated that psychological intervention based on the bio-energetic circuit has no significant effect on cardiac function and inflammatory factors in MI patients. According to guidelines developed by various cardiovascular associations worldwide, the treatment of patients with CAD through invasive treatments as well as pharmacological treatment is most recommended (Carney, Freedland, Veith, & Jaffe, 1999).

Cardiac rehabilitation programs are considered as one of the most important non-pharmacological treatments in patients with CVD (Bagherian, Sanei, & Kalantari, 2011). Dickens et al. (2013) have shown that cardiac rehabilitation is a cost-effective

Table 2. Baseline characteristics of study subjects

	Intervention (n = 22)	Control (n = 22)	P-value
Women [n(%)]	6 (27.3)	4 (18.2)	0.72
Age (Year) (mean ± SD)	53.54 ± 5.73	55.36 ± 10.45	0.48
Education (Year) (mean ± SD)			
0-6	12 (54.5)	10 (45.4)	
6-12	6 (27.3)	9 (40.9)	0.62
>12	4 (18.2)	3 (13.6)	
Married [n(%)]	22 (100.0)	20 (90.9)	0.49

Table 3. Clinical and laboratory characteristics of study subjects (Part I)

	Intervention		
	Pretest	Posttest	P-value*
Systolic Blood Pressure (mmHg) (Mean ± SD)	118.1 ± 14.9	125.1 ± 18	0.06
Diastolic Blood Pressure (mmHg) (Mean ± SD)	81.9 ± 10.62	83.4 ± 9.9	0.49
Total Cholesterol (mg/dl) (Mean ± SD)	151.3 ± 25.97	158.9 ± 31.5	0.17
Triglyceride (mg/dl) (Mean ± SD)	154.1 ± 35.59	152.6 ± 36.81	0.89
HDL-C(mg/dl) (Mean ± SD)	30 (25.3-38.3)	33 (27-39.8)	0.90
LDL-C (mg/dl) (Mean ± SD)	86.1 ± 25.48	89.2 ± 28.38	0.49
Fasting Blood Sugar (mg/dl) (Mean ± SD)	117.5 (153.3 ± 94)	106 (-13094)	0.64
BMI* (Kg/m^2)	28.3 (24.8-30.8)	28.6 (26.7-32)	0.026
Waist Circumference (cm) (Mean ± SD)	99.6 ± 9.79	99.8 ± 9.26	0.87
WHR (Mean ± SD)	1 ± 0.07	1 ± 0.05	0.13
ICAM-1	1086 (958.2-1358)	1058 (897.4-1691.3)	0.08
VCAM	11 (8.4-13.2)	9.1 (8.1-14.4)	0.35
METS	2.75 ± 1.25	2.84 ± 1.16	0.96

Table 3. Clinical and laboratory characteristics of study subjects (Part II)

	Control			P-value
	Pretest	Posttest	P-value*	
Systolic Blood Pressure (mmHg) (Mean ± SD)	127.4 ± 21.96	124.6 ± 19.16	0.36	0.04
Diastolic Blood Pressure (mmHg) (Mean ± SD)	81.3 ± 12.45	80.3 ± 11.76	0.59	0.17
Total Cholesterol (mg/dl) (Mean ± SD)	159.7 ± 30.73	164.3 ± 37.87	0.51	0.74
Triglyceride (mg/dl) (Mean ± SD)	177.7 ± 93.03	153.5 ± 51.94	0.17	0.71
HDL-C(mg/dl) (Mean ± SD)	32.5 (27.5-39)	37 (31.5-42.3)	0.017	0.05
LDL-C (mg/dl) (Mean ± SD)	79.4 ± 27.78	86.5 ± 32.36	0.42	0.83
Fasting Blood Sugar (mg/dl) (Mean ± SD)	113 (95-174)	98.5 (87.8-178.3)	0.12	0.25
BMI* (Kg/m^2)	29 (27.3-30.5)	28.9 (27.3-31)	0.55	0.19
Waist Circumference (cm) (Mean ± SD)	102.6 ± 9.21	103.4 ± 8.39	0.46	0.66
WHR (Mean ± SD)	1 ± 0.05	1 ± 0.05	0.32	0.07
ICAM-1	821.2 (745-1047.8)	811 (688.3-1046.9)	0.80	0.25
VCAM	11.2 (9.6-12.6)	10.4 (9-11.3)	0.46	0.75
METS	2.90 ± 1.30	2.50 ± 1.26	0.39	0.57

HDL-C: high density lipoprotein cholesterol; LDL-C: low density lipoprotein cholesterol; WHR: Waist-to-hip ratio; ICAM-1: Intercellular adhesion molecule 1; VCAM-1: Vascular cell adhesion molecule 1; METS: Metabolic equivalent of task

$P < 0.05$ considered as significant

*used paired t-test and Wilcoxon Signed Ranks test for nonparametric variables

Program in the treatment of patients with CVD. Tavakolizadeh et al. (2021) have conducted an RCT to evaluate the efficacy of a bioenergy economy-based psycho-education package on the improvement of vegetative function, forgiveness, and QOL of patients with coronary heart disease (CHD) (Tavakolizadeh et al., 2021). They indicated a significant difference in heart rate, forgiveness, and QOL and its physical and psychological dimensions between the case and control groups after training ($P < 0.05$).

Table 4. Relationship between intercellular adhesion molecule 1, vascular cell adhesion molecule 1, and bioenergetics intervention in the study population

	OR (95% CI)	P-value
Crude Model		
ICAM-1	1.000 (0.999-1.002)	0.927
VCAM-1	0.991 (0.962-1.021)	0.555
Adjusted Model		
ICAM-1	1.000 (0.999-1.002)	0.741
VCAM-1	0.994 (0.965-1.025)	0.711

ICAM-1: Intercellular adhesion molecule 1; VCAM-1: Vascular cell adhesion molecule 1
Adjusted for age, sex, and baseline values

The post hoc test showed that heart rate decreased significantly in the posttest compared to the pretest, and forgiveness, and QOL and its physical and psychological dimensions increased significantly ($P < 0.05$). However, heart rate increased significantly in the follow-up compared to the posttest, and forgiveness, and QOL and its physical and psychological dimensions decreased significantly ($P < 0.05$).

Various indicators associated with ischaemic heart disease (IHD) symptoms, including mental, physical, and environmental indiators, and myocardial dysfunction, may be associated with improved QOL of CVD patients (Friedman et al., 1986). Life expectancy is one of the indicators used to evaluate the effects of treatment interventions on chronic diseases, including CVD. Today, life expectancy is no longer the only measure of patient response to treatment; QOL and quality-adjusted life years (QALY) are also important measures of success in treatment procedures. Health-related quality of life (HRQoL) is an indicator that measures a person's sense of health in various health, physical, mental, social, and environmental areas (Behnammoghadam, Alamdari, Behnammoghadam, & Darban, 2015). A review study evaluated the QOL of patients with CVD in Iran. The mean score of QOL in these patients was 53.19, with the highest score in the social domain. Sex, age, education, marital status, employment status, duration of illness, and frequency of hospitalization were the most important factors affecting the QOL (Yammine, Frazier, Padhye, Burg, & Meininger, 2014). Appropriate psychological interventions improve the cardiac and psychological symptoms of CVD patients by improving respiratory capacity and muscle (Mayou et al., 2000; Roest, Martens, Denollet, & de Jonge, 2010; Roest, Martens, de Jonge, & Denollet, 2010; Schoemaker & Smits, 1994). Previous studies have also shown that mind-body exercises can reduce blood pressure in CVD patients by reducing heart oxygen consumption, and thus, can have a positive effect on the disease process (Wann et al., 2007).

Atherosclerotic plaque instability occurs when inflammatory mediators inhibit collagen synthesis and cause collagenases to be expressed by the foam cells inside the wound. Tissue coagulation factors that are expressed within the atheroma then stimulate thrombogenesis, block the veins, and cause clinical manifestations (Norlund, Olsson, Burell, Wallin, & Held, 2015). Binding molecules such as ICAM-1 and VCAM-1 plays an important role in the process of atherosclerosis and facilitates the entry of leukocytes without veins. CAMs are secreted in response to cytokines, they play an important role in atherogenesis, and their local expression can be observed in atherosclerotic plaques. Soluble forms of ICAM-1 and VCAM-1 have been found in the plasma of patients with unstable angina and acute coronary syndromes and may remain elevated in patients with unstable angina for up to 6 months (Rabito & Kaye,

2013). In this regard, Hasanpour et al. (2007) demonstrated an increase in the risk of MI by 1.6 times in men with high ICAM-1 concentrations. They also found that ICAM-1, VCAM-1, and E-selectin in CAD patients were significantly associated with cardiovascular mortality (Hasanpour et al., 2007). Similar studies have revealed that the values of VCAM-1 and ICAM-1 were significantly higher in patients with acute coronary syndrome than in the control group (Diaz-Rodriguez, Arroyo-Morales, Cantarero-Villanueva, Fernandez-Lao, Polley, & Fernandez-de-las-Penas, 2011; Barnes, Bloom, & Nahin, 2008; du Quebec, Chi, Master, & Kung, 2007; Ackerman & Cameron, 2002).

Bioenergy economy techniques are considered as methods for repairing and improving the body's energy system, which can activate natural healing processes. These processes include relaxation, which can improve many health problems (Friedman, Burg, Miles, Lee, & Lampert, 2010). A case-control study on CVD patients has shown that bio-energy economy techniques can reduce blood pressure in these patients (Grant, Bin, Kiat, & Chang, 2012). Another study has also shown that meditation and Reiki techniques can reduce anxiety and stress in patients with CVD, which in turn lowers blood pressure (Yeh, Davis, & Phillips, 2006). A study on 66 hypertensive patients has shown that using energy medicine techniques can significantly lower blood pressure, and it has been suggested that this technique be used as a complementary method in the treatment of hypertension (Salles et al., 2014). Other studies have shown that mind-body exercises have been an effective and cost-effective method in patients with recent cardiovascular events (Goli, 2010).

The bioenergy-based psychological intervention method is an integrative health system that differs from the conventional medicine system; bioenergy economy is a disease-centered and person-centered approach. It is also not based on pathogenesis, but on salutogenesis, it has a holistic view of humans, and its effects are based on their effects on the homeostasis systems. This method is based on body-centered psychotherapy, mindfulness, and bioenergy economy treatments. It is a way of removing blocks and flowing energy through the body. Our results indicated that the energy-based psychological intervention method had no effect on ICAM-1 and VCAM-1 in the study patients.

Conclusion

Although, our results displayed that the psychological intervention based on the bio-energetic circuit has no significant effect on cardiac function and inflammatory factors in patients with MI, we suggest the repetition of this study on a larger population.

Limitation: A limitation of the present study was its small sample size that reduces the power of the study. In addition, as this study was a nonrandomized clinical trial, obtaining consent for randomization was often difficult. In bioenergy economy interventions, blinding is often impossible because patients may have a preconceived notion of what treatment they wish to receive. Furthermore, the technical nature of bioenergy economy can make randomization difficult.

Conflict of Interests

Authors have no conflict of interests.

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Effectiveness of Transcranial Direct Current Stimulation on Cravings in Overweight Individuals

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Quantitative Study

Abstract

Background: Overweight is one of the current problems of people. One of its causes is the craving for food. This study was conducted with the aim to evaluate the effectiveness of transcranial direct current stimulation (tDCS) on craving for food in overweight people.

Methods: The research was a quasi-experimental study with a pretest-posttest design and a control group. The statistical population of the study included all overweight people referred to Aramesh Psychology Center in Tehran, Iran, in 2019. They were selected using a purposeful sampling method and were randomly divided into two groups. The mean and standard deviation of the age of the subjects was 34.27 ± 6.45 years and the mean body mass index (BMI) was 28.12 ± 2.23 kg/m^2. The research instrument was the Food Cravings Questionnaires (FCQs) developed by Cepeda-Benito, Gleaves, Williams, and Erath (2000). Data were analyzed using multivariate analysis of covariance (ANCOVA).

Results: The results showed a significant difference between the tDCS group and control group in terms of mean trait craving ($P \leq 0.001$) and state craving ($P \leq 0.001$) scores.

Conclusion: It seems that tDCS can be used to reduce food cravings in obese people. Theoretical and practical considerations of the research have been presented in the discussion and conclusion sections.

Keywords: Transcranial direct current stimulation; Craving; Overweight

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Introduction

A report released by the World Health Organization (WHO) shows that the prevalence of obesity and overweight between 2011 and 2014 was about 36.5% (Ogden, Carroll, Fryar, & Flegal, 2015). Obesity is a chronic disease that, in addition to causing physical and mental diseases, reduces people's work capacity and ability and makes them vulnerable to most diseases (Nissen & Holm, 2015). In Iran, 28.6% of the population is overweight, 10.8% are obese, and 3.4% suffer from morbid obesity. Unhealthy lifestyle habits play a major role in this public health problem. Thus, it can be stated that the epidemic of obesity requires behavioral and environmental approaches to modify eating behavior and physical activity (Gouda & Prusty, 2014; Yokum, Ng, & Stice, 2011; Sagliano, D'Olimpio, Izzo, & Trojano, 2017). Obesity is not a mental disorder, but it causes widespread anxiety in obese people. Presently, the reaction of communities to obesity is one of the main causes of anxiety. Obesity has a correlation with stress and psychological disturbances (Kristensen & Pedersen, 2015). Contemporary neurological models consider obesity as a brain disorder that involves severe neuronal damage and results in persistent consumption of food despite its negative consequences (Moreno-Lopez, Soriano-Mas, Delgado-Rico, Rio-Valle, & Verdejo-Garcia, 2012). Based on brain imaging, the dorsolateral prefrontal cortex (DLPFC) plays an important role in craving (da Silva et al., 2013; Kulandaivelan, Joshi, Chaturvedi, & Malik, 2018; Andres, Masson, Larigaldie, Bonato, Vandermeeren, & Dormal, 2020). The studies conducted on obesity disorders have also identified changes in prefrontal areas of the brain, especially in the DLPFC and these brain changes are exacerbated by craving and impaired inhibitory control (dos Santos & Granon, 2012; Ray et al., 2019; English, Kitching, Maybery, & Visser, 2018).

Human and animal studies have shown that in transcranial direct current stimulation (tDCS), anodal stimulation increases cortical stimulability, while cathodal stimulation decreases cortical stimulability. The tDCS intervention is used to reduce the symptoms of craving for food and alcohol (Ke et al., 2019; Rooholamini, Soleymani, & Vaghef, 2018; Nitsche & Paulus, 2001). The effectiveness of tDCS on the recovery of drug-dependent patients with food cravings has been investigated in various studies. The results of these studies indicate the effectiveness of this treatment method (Zhang et al., 2019; Cruz, Fong, & Brown, 2018; Hanenberg, Getzmann, & Lewald, 2019).

Studies have identified attentional bias as one of the underlying cognitive factors in craving so that the preference is focused on a specific class of information in such conditions (MacLeod & Mathews, 2012; Moezzi, Ghoshuni, & Amiri., 2020; Ljubisavljevic, Maxood, Bjekic, Oommen, & Nagelkerke, 2016). In a world full of appetizing and tempting images and scenes, encountering food-related clues leads to increased cravings and overeating, since the pleasurable and short-term effects of eating overcome the prediction of the long-term consequences of food consumption such as obesity and health-related problems. There are several treatments available to reduce the harmful effects of obesity. One of the newest therapies used is tDCS (Rohner et al., 2018). In this method, an electric current, although weak, enters the nerve tissue through the skin and skull, and changes the stimulability of the tissue. Common protocols for this procedure are the use of tDCS through 2 electrodes attached to the skin, one of which is the anode and the other is the cathode. An electric current of 1-2 mA is applied for 20 minutes between these 2 electrodes, each

of which usually has a cross-sectional area of 35 square centimeters. The direction of the current is from the anode to the cathode, and according to the direction and intensity of the current, the level of stimulability of the cerebral cortex increases or decreases (Bikson, Name, & Rahman, 2013). Given what was stated above, the present study was conducted to evaluate the effectiveness of tDCS on craving in overweight people.

Methods

The current research was a semi-experimental, single-blind, clinical trial; the experimental and control groups were not aware of the type of intervention. The statistical population of the present study included all overweight people referred to Aramesh Psychology Center in Tehran, Iran, in 2019. It should be noted that the number of participants in each group in an experimental research should be at least 8-12 people (Shafiabadi, 2001); in the present study, each group consisted of 12 people. In total, 24 overweight people were selected as a statistical sample using a purposeful sampling method based on the inclusion and exclusion criteria, and they were randomly assigned to the tDCS group (n = 12) and control group (n = 12). The inclusion criteria included education level of diploma and higher, age of 25-40 years, body mass index (BMI) of 25-29.9 kg/m^2, not taking concomitant medication for other disorders, and uncontrollable tendency to consume at least 1 of the following foods 3 times a week for at least the last month: sweets and nuts, high-fat foods, and fast food. The exclusion criteria included unwillingness to continue the research process and absence from more than 3 treatment sessions. Any metal objects in the head (e.g., implants) or other parts of the body (e.g., heart battery), smoking, drug use, and alcohol consumption were also considered as the exclusion criteria. Moreover, ethical considerations were observed. The ethical principles taken into consideration in the present study were as follows: All individuals received written information about the research and participated in the research voluntarily. Participants were reassured that all their information would be kept confidential and would be used for research purposes only. For privacy reasons, participants' first and last names were not registered.

In the present study, the experimental and control groups were matched by simple random sampling. Before the experimental intervention was implemented in the experimental group, the Food Cravings Questionnaires (FCQs) were completed by overweight people referring to the Royan Clinic in Tehran in the pretest stage. After that, for the subjects of the experimental group, direct current cranial wall stimulation intervention was performed by the researcher who received specialized training in tDCS intervention. No intervention was performed for the control group. The intervention sessions were held 2 days a week at the Aramesh Counseling Center in Tehran. After the interventions, a posttest was taken from the experimental and control groups. Follow-up was performed for both groups 1 month after the posttest. The collected data were then analyzed. Moreover, after the end of the study, the treatment was performed for the control group.

Food Cravings Questionnaires: The FCQs were designed by Cepeda-Benito, Gleaves, Williams, and Erath (2000). The FCQs include the FCQ-Trait (FCQ-T), which examines an individual's mental tendencies to eat, and the FCQ-Status (FCQ-S), which examines the state and intensity of food cravings in a person. Kachooei and Ashrafi (2016) have examined the validity of the Persian version of this questionnaire. It includes questions to examine the axes of thoughts or mental occupation with food

in the patient, emotions before or during food consumption, feeling of guilt after eating, feeling of guilt for surrendering to food cravings, the patient's intention for eating, predicting positive reinforcement in food consumption, and predicting relief from negative states and feelings as a result of eating. The FCQ-S includes 15 questions and the FCQ-T includes 21 questions; the questions are scored on a 6-point Likert scale ranging from never (1) to always (6). A high score in this questionnaire indicates high severity of the disease. In the present study, Cronbach's alpha method was used to determine the reliability of the FCQs and it was 0.85 for the whole questionnaire.

Summary of the tDCS treatment sessions

In this method, a simple tool was used. It included sponge electrodes with an area of 35 square centimeters (7 × 5 cm) that were impregnated with saline and placed on the person's head, and an electric current generating device (Neurosistem 2, serial number 8078-2 MD; Medina Teb Gostar Co, Tehran, Iran). The device worked with a battery and passed a continuous and light electric current through the individual's head. In this study, subjects were treated with tDCS every other day for 5 sessions. Accordingly, the anode electrode (stimulator) was placed on the right dorsolateral posterior region of the cortex (F3) and the cathode electrode (inhibitor) was placed on the right dorsolateral posterior region of the cortex (F4). For artificial stimulation, the electrodes were placed in the same places as the actual stimulation, but the current was cut off after 30 seconds. Therefore, the subject felt the initial itching due to the turning on of the device, but did not receive any current after that. For the experimental group participants, direct current was applied with an intensity of 2 mA for 20 minutes.

To analyze the data in this study, descriptive statistical methods such as frequency, percentage, mean, and standard deviation, and inferential statistics such as univariate analysis of covariance (ANCOVA) and Bonferroni post hoc test were used. Furthermore, SPSS software (version 24; IBM Corp., Armonk, NY, USA) was used to analyze the research data. The significance level in this study was considered at $\alpha = 0.05$.

Results

Mean ± standard deviation of the age of the experimental and control group was 38.6 ± 8.9 and 37.8 ± 6.2 years, respectively. There was no significant difference between the two groups in terms of age ($P > 0.05$). Table 1 shows the mean and standard deviation of craving in the subjects of the experimental and control groups.

After data were collected and coded in the software, they were analyzed. Pretest and posttest scores of food craving for the experimental and control groups were first provided. Descriptive indices, including mean and standard deviations of food craving scores are presented in table 1.

Table 1. Mean and standard deviation of craving in the experimental and control groups

		Groups	N	Mean	SD
FCQ-S	Pretest	tDCS group	12	50.500	3.966
		Control group	12	56.083	5.534
FCQ-S	Posttest	tDCS group	12	36.667	11.452
		Control group	12	54.000	4.767
FCQ-T	Pretest	tDCS group	12	70.917	5.143
		Control group	12	74.833	7.964
FCQ-T	Posttest	tDCS group	12	51.083	14.286
		Control group	12	72.333	4.677

Table 1 shows that the control group's mean pretest and posttest FCQ-S scores were not significant. The mean pretest score was 56.083 ± 5.534, while the mean posttest score was 54.00 ± 4.767. However, the mean posttest FCQ-S score of the experimental group decreased compared to the pretest score of this group, reducing to 36.667 ± 3.966 from 50.500 ± 11.452.

Moreover, the mean pretest score of the control group was 74.833 ± 7.964, while the mean posttest score was 72.332 ± 4.677. However, as stated, the mean posttest FCQ-S score of the experimental group declined compared to the pretest, dropping to 51.083 ± 5.134 from 70.917 ± 14.286.

To examine the research question, ANCOVA was used, and the assumptions were first tested, and the results were later provided. One of the assumptions of the parametric analyses was the normality of the research variable scores. Moreover, Kolmogorov–Smirnov test was used to measure the normality distribution. The results of this test suggested that the variables were normally distributed ($P > 0.05$).

Homogeneity of regression slopes assumption: This assumption requires an equal relationship between the covariate and dependent variables for each group. This assumption is examined by comparing the regression line slopes in the two groups and calculating the F values and their significance. Because the F value for the different regression line slopes of pretest and posttest scores of the research variables between the two groups was 0.05, the regression line slope of these scores between the two groups was not significant, and the homogeneity of the regression slopes assumption was met.

Levene's test was used to determine the homogeneity of variances which yielded no significant difference in the scores variance of the dimensions of FCQs. This is because the significance level of the F value, in this case, was higher than 0.05 ($P < 0.05$), thus confirming the homogeneity of the variance assumption.

Covariance matrix assumption with Box's M value was 3.74. examined for the multivariate analysis of the dimensions of the FCQs, as Box's statistic amounted to 3.74. The F value obtained for this statistic was 0.73, and the significance level of the F value calculated was greater than 0.001 ($P > 0.001$). Thus, the homogeneity of the covariance matrix assumption was met.

ANCOVA was used to examine the research question: Does tDCS training significantly reduce FCQ dimensions among overweight people? The results are given in table 2.

As multivariate ANCOVA assumptions were confirmed, Wilks' lambda value had to be examined, the results of which are given in table 2.

Table 3 shows that the F value obtained from Wilks' lambda is 6.833, where the significance level is less than 0.05 ($P = 0.001$). Therefore, the mean combined scores of food craving dimensions differ significantly between the control and experimental groups. Subsequently, ANCOVA was carried out to understand which of the two dependent variables (FCQ-S and FCQ-T) had significantly changed (Table 3).

Table 2. Multivariate test results on posttest scores of the Food Cravings Questionnaires by controlling the pretest scores

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Observed Power[b]
Pillai's trace	0.418	6.833[a]	2.000	19.000	0.006	0.418	0.872
Wilks' lambda	0.582	6.833[a]	2.000	19.000	0.006	0.418	0.872
Hotelling's trace	0.719	6.833[a]	2.000	19.000	0.006	0.418	0.872
Roy's largest root	0.719	6.833[a]	2.000	19.000	0.006	0.418	0.872

Table 3. Analysis of covariance results on posttest scores of the Food Cravings Questionnaires by controlling pretest scores

Dependent variable		Sum of Squares	df	Mean Square	F	P.	Partial Eta Squared
FCQ-S posttest	Contrast	1003.999	1	1003.999	12.169	0.002	0.378
	Error	1650.068	20	82.503			
FCQ-T posttest	Contrast	1606.151	1	1606.151	13.518	0.001	0.403
	Error	2376.255	20	118.813			

Table 3 shows that for the FCQ-S dimensions, the F value is 12.169, and the significance level is lower than 0.05 (F = 12.169; P = 0.002). Thus, the mean FCQ-S score differed significantly between the control and experimental groups. Generally speaking, tDCS was found to reduce FCQ-S of overweight people, as the Eta squared was 37%. For FCQ-T, the F value was 13.518, and the significance level was less than 0.05 (F = 12.169; P = 0.002). Therefore, the mean FCQ-T score differed significantly between the control and experimental groups. Thus, it was found that tDCS caused FCQ-T to decrease, with 40% Eta squared.

Discussion

The present study was conducted with the aim to determine the effectiveness of tDCS on attentional bias in overweight people. The results indicated that tDCS treatment has been effective on cravings (trait craving and trait craving). This finding is consistent with the results of a study by Brunoni et al. (2013) on the effectiveness of tDCS on reducing depression and a study by Chatroudi (2018) on the effect of tDCS on reducing pain.

In explaining this result, it can be stated that tDCS treatment has high impact on cognition and behavior. The dorsolateral prefrontal area is associated with executive actions in the brain, and craving is one of the dimensions of executive actions. Therefore, electrical stimulation of this area of the brain is used to improve many cognitive and emotional processes and controls, including attention, and reduces behavior. It seems that transcranial stimulation of the brain using the tDCS method can cause changes in the simultaneous activity of nerve cells without a direct change in the action potential during the stimulation time. Experimental studies have shown that electrical stimulation activates the neural pathways of white matter (Brunoni et al., 2013). The relatively extensive brain stimulation by tDCS is an important advantage both in terms of the physiopathological effects that occur primarily at the network level and in terms of the many beneficial effects it produces (Rohner et al., 2018). In this regard, it can be stated that centralized stimulation plays a major role in reducing cravings among overweight people. However, transcranial stimulation of the brain using tDCS can cause this stimulation in the frontal lobe and ultimately improve craving (Chatroudi, 2018).

Nitsche and Paulus (2001) suggested that the effects of a 13-minute tDCS session could last for 90 minutes after stimulation. Fregni et al. (2008) demonstrated that DLPFC simulation using an anode (left) and cathode (right) reduced food cravings. Goldman et al. (2011) suggested that a 20-minute tDCS therapy session on the forehead cortex of healthy people could temporarily reduce food cravings, but increase the (expressed) ability of resistance against food cravings. Kekic et al. (2014) found similar results among overweight women.

In their clinical study, Heeren, De, Koster, and Philippot (2013) found that DLPFC controls attention. Thus, manipulating this area can change how attention is

controlled, as it is one of the major problems of overweight and obese people. Overweight people are distracted with the slightest sign of food, which causes them to overeat. Each method that can improve attention and inhibition in the forehead cortex will also reduce food cravings, thereby reducing weight.

One of the limitations of the present study was the unfamiliarity of many individuals and specialists with this uncommon cranial wall stimulation treatment and as a result the lack of public approval for this type of treatment. Another limitation was the short duration of the study. The limited statistical population of people referring to Royan Clinic in Tehran limits the generalizability of the results of this study to other groups. It is suggested that in future research, the subjects of the control and experimental groups be matched in terms of age, intelligence, and pretest scores. Other psychological variables associated with overweight in individuals should also be treated with cranial wall stimulation. It is recommended that follow-up be performed in future studies to more accurately calculate the duration of treatment. It is suggested that larger samples be used in future research in order to increase the generalizability of the findings. Moreover, more extensive studies are recommended by increasing the number of treatment sessions in this area. Planners and administrators of psychological service centers are advised to use cranial wall stimulation therapies to improve psychological characteristics. Researchers are advised to investigate the effectiveness of cranial wall stimulation therapies on psychological characteristics such as mental health, anxiety, stubbornness, and obsession.

Conclusion

Based on the findings of this study, it can be stated that the treatment of direct current stimulation through the skull was effective on cravings. Therefore, treatment of direct stimulation through the skull can be used as a therapeutic or educational method for the improvement of the condition of overweight people.

Conflict of Interests

Authors have no conflict of interests.

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