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The Future of Healthcare: Navigating Challenges and Embracing Technological Advances

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Editorial

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This article provides a comprehensive overview of the current crisis in modern medicine, accentuated by demographic shifts, epidemiological transitions, and the evolving sociocultural perceptions of health and well-being. We critically examine the limitations of the traditional biomedical model, which focuses predominantly on disease rather than health, highlighting its inadequacy in addressing the complex web of factors influencing health outcomes. The advent of COVID-19 has further exposed the vulnerabilities of our healthcare systems, underscoring the urgent need for a more integrated, resilient infrastructure capable of responding to global health emergencies. Through an exploration of emerging technologies, including IoT healthcare systems, 6G, and AI, we discuss their potential to revolutionize healthcare delivery, making it more accessible, personalized, and efficient. However, these advancements also bring to the forefront ethical considerations and the imperative to ensure equity in access to healthcare services. Furthermore, the article emphasizes the critical role of medical humanities and the importance of adopting a holistic approach that encompasses not only the physical but also the psychological and socio-cultural dimensions of health. By integrating advanced technologies with a humanistic approach, we advocate for a healthcare system that is adaptable, inclusive, and prepared to meet the challenges of the future. In summary, "The Future of Healthcare" calls for a paradigm shift towards an interdisciplinary, cross-cultural, and human-centric model of health and medicine. It is through embracing this complexity and leveraging the potential of technological advances that we can forge a path towards a more integrative, empathetic, and resilient healthcare system, capable of addressing the needs of a diverse global population.

Modern medicine finds itself at a crossroads, facing a paradigmatic crisis fueled by demographic changes, epidemiological transitions, and the sociocultural evolution

of health beliefs and behaviors. The crisis is manifested in the gaps between the ontological, epistemological, and methodological approaches in biomedicine and the real-world needs of patients (Khashab & Caruso, 2023; Luiz Vancini et al., 2023; Raja et al., 2020). The biomedical model, with its focus on disease rather than health, fails to address the complex interplay of factors that influence health outcomes, leading to a 'chaotic condition in health beliefs and behaviors' (Alhaffar & Sándor, 2021).

The COVID-19 pandemic has accentuated these gaps, highlighting the limitations of current healthcare systems in addressing public health emergencies. Abuhammad (2022) underscores the challenges for healthcare leadership in preparing for future pandemics, emphasizing the need for a more integrative and resilient healthcare infrastructure (Abuhammad, 2022). Similarly, Al-Atawi, Khan, & Kim (2022) discuss the application and challenges of IoT healthcare systems in the context of COVID-19, pointing towards the potential of technology in bridging some of these gaps (Al-Atawi et al., 2022). The integration of 6G and IoT for intelligent healthcare, as discussed by Ahad and Tahir (2023), represents a forward-looking approach that could revolutionize healthcare delivery. However, these technological advancements also bring new challenges, particularly in ensuring equity and accessibility (Arnrich et al., 2010). The potential for pervasive healthcare to transform medical practice and patient care is immense, provided that it is implemented in a manner that is mindful of the socio-cultural dimensions of health (Bajwa et al., 2021).

The crisis in modern medicine is not merely a technological or biomedical issue; it is fundamentally a humanistic one. The importance of integrating medical humanities into medical education and practice cannot be overstated. The role of social media in transforming healthcare practices and emerging leadership (Booth et al., 2017), and the call to address the healthcare needs of marginalized populations (Cannon et al., 2017) are critical in creating more inclusive and humanistic health promotion and clinical settings.

Furthermore, the leadership challenges in healthcare, particularly in the context of sustainability and future preparedness, require a reevaluation of current models of healthcare leadership (Khan & Khalid, 2022). The future of healthcare materials (Hoseini, 2023; Khashab & Caruso, 2023), alongside the evolution of healthcare big data (Raja et al., 2020), offer new avenues for innovation but also necessitate a rethinking of ethical considerations in the adoption of digital healthcare technology (Zarif, 2021). In addressing the crisis in modern medicine, it is imperative to adopt a more integrative and holistic approach that goes beyond the biomedical model. This approach should encompass the socio-cultural dimensions of health, integrate advancements in technology in a manner that is accessible and equitable, and incorporate insights from medical humanities to foster a more humanistic practice of medicine

The evolving landscape of healthcare, especially with the advent of emerging technologies, has profound implications for the therapeutic relationship between therapists and clients. The integration of digital tools, telehealth platforms, and AI-driven therapies offers novel avenues for interaction and intervention (Saadati & Saadati, 2023; Vannacci, 2023). However, this technological shift necessitates the development of new strategies to maintain and enhance the therapeutic alliance, which is foundational to effective treatment. Therapists and clients must navigate the nuances of digital communication, addressing potential barriers to empathy, non-verbal cues, and the sense of connection that are intrinsic to traditional face-to-face therapy sessions. Ensuring confidentiality, privacy, and personalization in the digital realm becomes paramount, requiring both practitioners and patients to adapt to these changes while preserving the core values of trust, understanding, and empathy that

define the therapeutic relationship (Vannacci, 2023).

Moreover, the influence of emerging technologies on psychological factors such as loneliness, emotional needs, and empathy cannot be overstated. While digital platforms and social media can offer unprecedented opportunities for connection, they can also contribute to a sense of isolation and inadequate emotional support if not leveraged thoughtfully. The impersonal nature of digital interactions can exacerbate feelings of loneliness and disconnection, underscoring the need for technologies that foster genuine empathy and emotional engagement (Parsakia & Rostami, 2023; Rostami & Navabinejad, 2023; Saadati & Saadati, 2023). Furthermore, the use of AI and virtual reality in therapeutic settings introduces new dynamics in addressing emotional needs, offering personalized and immersive experiences that can complement traditional therapies. However, the reliance on technology also raises critical questions about the authenticity of connections formed in virtual spaces and the potential for digital tools to fulfill or diminish human emotional needs. As such, emerging technologies present both challenges and opportunities in addressing psychological factors, necessitating a careful and considered approach to their integration into healthcare and therapeutic practices (Baker, 2023; Parsakia, 2023).

The 21st century has ushered in a period of unparalleled challenges and opportunities for healthcare. From the demographic shifts resulting from an aging population to the rapid advances in technology, the healthcare landscape is undergoing a seismic shift. This shift is further complicated by a burgeoning crisis in modern medicine, characterized by an over-reliance on a biomedical model that often overlooks the holistic aspects of health - encompassing the physical, psychological, and socio-cultural dimensions of well-being. The way forward requires a paradigmatic shift towards an interdisciplinary, cross-cultural, and humanistic approach to health and medicine. This shift must be supported by strategic leadership in healthcare that is forward-looking, adaptable, and inclusive. The challenges are significant, but the opportunities for creating a more integrative, humanistic, and resilient healthcare system are within reach. It is through embracing this complexity and diversity that we can hope to address the current crisis in modern medicine and pave the way for a healthier future for all.

Conflict of Interests

Authors have no conflict of interests.

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Impact of Team Relationship Differentiation on Team Creativity: A Qualitative Research with Psychological Safety in the Team as a Mediator

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Qualitative Study

Abstract

Background: The aim of this study was to investigate the impact of team relationship differentiation on team creativity from the perspective of psychological safety of teams in China.

Methods: Qualitative research methods were used to conduct in-depth online and face-to-face interviews with respondents. The interviewees were 7 team leaders aged 23-43 years in the professional services, and retail and manufacturing sectors, which account for a large proportion of small and medium-sized enterprises (SMEs). Data were collected by exploring the perspectives and experiences of the team leaders, analyzing the material in detail using content analysis, and then, managing and interpreting the data using NVivo software.

Results: The results show that the effects of the differentiation of team relationships on team creativity are mainly reflected in two aspects: differentiation of exchange relationships between the leader and team member (leader-member exchange) and differentiation of relationships between team members. In particular, psychological safety in the team plays an important role as a bridge and mediator.

Conclusion: It can be concluded thatin the case of different levels of team psychological safety, the difference of the relationship between superiors and subordinates and the relationship between team members will have difference in the impact strength of team creativity. If the impact of the differentiation of adjustment relationships on the team cannot be balanced, it will hinder the team's innovation activities and the improvement of team effectiveness, thus affecting the team's overall creativity.

Keywords: Team psychological safety; Team creativity;Qualitative research

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Introduction

In today's intense competitive business environment, enhancing creativity is crucial for a company to maintain a competitive edge (Lv, Chen, & Ruan, 2021). Domestic and foreign scholars pay more and more attention to this topic year by year (Ding, Liu, Huang, & Gu, 2019; Luqman, Talwar, Masood, & Dhir, 2021). They have emphasized that it is not only necessary for individuals to have the ability to innovate, but also to establish an open communication atmosphere within the team. However, the "circle" phenomenon in the Chinese culture and the differentiated relationship between leaders and members may affect the willingness of team members to share and discuss. The potential impact of team relationship differentiation in the context of the Chinese culture and its mechanism are very important for in-depth analysis and improvement of team innovation ability of Chinese enterprises.

Research indicates that, compared to westerners, Chinese individuals seem less inclined to share and collaborate (Wang & Zhong, 2011). Leadership is considered crucial for achieving team goals, and the exchange relationships between leaders and members may affect members' willingness to discuss and share ideas. The prevalent "circle" culture in Chinese society, reflecting hierarchical features, profoundly influences interpersonal interaction rules and team outcomes (Zhang, 2018).

The quality of relationships within work teams has been shown to significantly impact individual and team creativity (Hammond, Neff, Farr, Schwall, & Zhao, 2011), encompassing both leader-member exchange (LMX) and team-member exchange (TMX). As an innovation in the organizational behavior field, exchange relationship theory highlights the quality differences in social exchange relationships within work teams (Graen & Uhl-Bien, 1995). Yet the issue of exchange relationship differentiation has not been thoroughly addressed (Hammond et al., 2011; Pan, Wang, Zhou, Miao, & Zhao, 2017). Addressing relationship differentiation allows the simultaneous consideration of the coexistence of different exchange relationships within teams and members' reactions in this context, thus providing a more comprehensive understanding when explaining team creative output. Therefore, further exploration of the relationship between relationship differentiation and team creativity is needed.

A project team made up of members from different cities, backgrounds, and industries can use individual networks to bring in expertise and resources from each region or industry (Brunetta, Marchegiani, & Peruffo, 2020). Defining creativity and innovation as employees using their knowledge and skills to creatively integrate resources to advance the interests of the company (Olaisen & Revang, 2017) will inject multiple innovative perspectives into the team, helping to break through traditional thinking and increase the level of creativity. Conversely, if members from different regions feel excluded from communication and decision-making, resulting in blocked information and divergent opinions, team creativity may be affected (Herman, Troth, Ashkanasy, & Collins, 2018). In china's "circle" culture, the diversity of relationships represents both a challenge and an opportunity. leaders and members must adapt flexibly to maximize the potential to unleash the team's creativity (Liu, Liu, Chen, Li, & Julie, 2020).

Team creativity is closely linked to team psychological safety, with the latter significantly influencing the former (Mehmood, Jian, Akram, Akram, & Tanveer, 2022). Moreover, local enterprises can effectively manage teams from the similar perspective of leader-member relationship differentiation by adopting flexible team management models and HR practices that are consistent with Chinese cultural and

ethnic characteristics (Chen, He, & Weng, 2018). Accordingly, it is interesting for this study to extend the research framework on applying the concept of relationship differentiation and explore the effects of team relationships on team creativity mediated by team psychological safety using a qualitative research design, offering insights for improving team management and fostering a positive psychological safety environment to enhance team creativity.

Due to the differential characteristics of Chinese traditional culture, the differentiation of interpersonal relationships within a team has a profound impact on the rules of interpersonal interaction and team output within a team, so this study is necessary. The results of this study can help local enterprises in the management of teams from the perspective of relationship differentiation and improvement of team creativity. In the process of establishing creative teams, it is also conducive for local enterprises to adopt a suitable team management mode and human resource practice mode to adapt to China's national conditions. According to the existing literature, although scholars have made a series of discussions on the team outcome variables of team relationship differentiation, there is very limited research on the relationship between team relationship differentiation and team creativity. Therefore, the authors of this study believe that it is necessary to explore the impact of team relationship differentiation on team creativity through the mediation of team psychological safety. Therefore, as mentioned above, the purpose of this study was to focus on the impact of team relationship differentiation on enterprise team creativity and the mediating role of team psychological security in this relationship under China's national conditions and national characteristics.

Methods

Study Design and Participants: The research strategy used in this study was a qualitative approach. In-depth interviews were used to attempt to explain the impact of team relationship differentiation on corporate team creativity in the context of China's national and cultural setting, as well as the mediating role of team psychological safety in this relationship. Qualitative research aims to explore the background of why individuals or groups make decisions and behave in certain ways and provides explanations for why certain phenomena occur. Bi-directional communication helps to obtain more data throughout the interview process, which requires in-depth knowledge. It allows researchers to ask questions that go beyond the parameters of semi-structured surveys, allowing for more effective data collection and subsequent action (Limna, Siripipatthanakul, & Phayaphrom, 2021; Tong-On, Siripipatthanakul, & Phayaphrom, 2021). According To Bryman (2006) and Siripipatthanakul and Bhandar (2021), although semi-structured interviews are widely used in research, their diversity, underlying structure, and extensive application in qualitative research are often overlooked. Therefore, this study utilized a semi-structured interview approach by collecting data from 1 team leader in each of the 7 selected small and medium-sized enterprises (SMEs) in China, resulting in 7 interview transcripts. Purposive sampling requires researchers to select the most helpful samples based on their expertise. This method is often used in qualitative research to gain deeper insights into specific phenomena or populations (Limna, Siripipatthanakul, Siripipattanakul, & Auttawechasakoon, 2022). The data is collected through purposive sampling. The 7 key informants for this study were team leaders from 7 SMEs in China. The study inclusion criteria were: 1) being leaders of teams in SMEs in China, 2) being between 23 and 43 years of age, and 3) having awareness

and knowledge of team relationship differentiation, team creativity, and team psychological safety.

Sample Size: According to the inclusion criteria, 7 managers with special characteristics in promoting creativity in their respective teams were selected as a sample. The 7 respondents were between 33 and 43 years of age, their companies had between 10 and 300 employees and were SMEs. These interviewees have outstanding expertise and different management characteristics in their respective fields and have different opinions on building their own team creativity. This ensures the authenticity and universality of the data.

Instruments and Variable: The researchers conducted an in-depth review of secondary data (Literature Review) to obtain the original data results for the relevant research questions. The interview questions were based on reliable and effective sources as described in the research by Cappelli (2008). The following is a list of interview questions for the survey.

Q1：What influence do you think positive leadership has on team creativity?

Q2 : How do you create and maintain the psychological safety of your team through positive leadership in the organization?

Q3 : What role do you think team psychological safety plays in the impact of positive leadership on team creativity?

Q4 : In your opinion, how does positive leadership affect the promotion orientation of teams?

Q5：In your opinion, what role does the team's promotion orientation play in the impact of positive leadership on the team's creativity?

Q6 : In your opinion, how does positive leadership affect the team's entrepreneurial passion?

Q7 : What role do you think the team's entrepreneurial passion plays in the impact of positive leadership on the team's creativity?

Analysis: The participants in this study were team leaders from 7 SMEs in China; 6 men and 1 woman were selected through purposive sampling. According To Limna et al. (2022), content analysis is a qualitative technique in which meaningful conclusions are systematically and objectively drawn from verbal, visual, or written data to describe and quantify phenomena.

In this paper, the researchers used content analysis to conduct a detailed analysis of qualitative data collected through in-depth online and face-to-face interviews. By delving deeper into team members' perspectives and experiences, we seek to understand how relational differentiation directly or indirectly affects team creativity and explore the mediating role of team psychological safety in this relationship. Moreover, the process of qualitative data analysis involves the systematic collation and coding of interview recordings and textual material. To support data management and interpretation, we used NVivo (version 14; QSR International, Burlington, MA, USA). The software helps us to effectively organize and sift through large amounts of qualitative information so that we can identify underlying patterns, themes, and trends. When interpreting the results, we relied on the visualization tools and reporting features of the software to clearly and comprehensively present key insights from the qualitative data analysis.

Ethics: The researchers collected data and obtained valid and truthful information through in-depth, semi-structured interviews. The format and duration of each interview varied depending on the content of the topic and the circumstances of each participant. It depended on a variety of factors, such as time, perception, and personal

desire. Thereby, the interviews were recorded after the initial coordination. The researchers conducted the narrative interviews between December 2023 And January 2024. The interviews lasted between 25 and 60 minutes, and where possible, the audio recordings were tape-recorded, and then, transcribed verbatim. Once the interviews were completed, the rich data was saturated from the participants' experiences.

Results

Demographic information of participants: The participants were mainly from the professional service sectors, which accounts for a significant proportion of SMEs, including 6 people from the internet and technology services industry and 1 person from the retail and manufacturing sectors. They were between 23 and 43 years of age, including 6 male team leaders and 1 female team leader. They provided insights into team relationships and team creativity in their respective teams and were able to identify the impact of team relationship differentiation on team creativity.

Leader-member exchange differentiation and team creativity

Social comparison theory states that individuals who compare themselves to others can trigger negative emotions, such as frustration, jealousy, and rejection of others. When maintaining a differentiated exchange relationship between leaders and team members, employees with low exchange relationship quality may have less communication with leaders and have power distance (Gooty & Yammarino, 2016). This can stimulate positive performance, but may also lead to conflict with close ties to the leadership of the staff, make them reluctant to provide more feedback and new ideas for the team, and be more focused on individual ability to ascend (Lin, Chen, Tse, Wei, & Ma, 2019). Low-quality exchange relationship is reflected in the failure of leaders to motivate and praise employees for their efforts in performing their duties, which may inhibit the enthusiasm of subordinates and prevent them from expressing their opinions. With the further deepening of LMX differences, the enthusiasm of subordinates may decline significantly, which has a serious negative impact on team creativity.

"*When communication between our leader and team members is relatively limited, resulting in a significant power imbalance between the leader and employees, I have found that some colleagues are more motivated and strive to improve their individual performance. In such situations, they may actively adapt to the leader's expectations and strive for more recognition*" (Interviewee 1: Mr. Guo, male, 37 years old, Engineer in a small electronic technology company).

"*Some partners may be more actively engaged in their work and strive to improve the overall performance of the company because they feel motivated. On the other hand, some partners may be less willing to cooperate due to dissatisfaction with the distribution of power. This situation can lead to a tense atmosphere within the team, which hinders smooth cooperation and is not conducive to creating a healthier and more dynamic working environment.*" (Interviewee 5: Mr. Li, male, 43 years old, Partner in a law firm).

Team Psychological safety as a mediator in differentiated leader-member exchange relationships and team creativity

Differences in LMX can have a psychological impact on team members, causing internal tensions and feelings of insecurity as members vie for the leader's attention. Inappropriate distribution systems can also affect team members' trust and sense of belonging. Research shows that people assess the safety of the environment before actively sharing suggestions and ideas (Wang & Niu, 2004). The psychological safety of a team is based on a working atmosphere characterized by high trust and mutual

respect among members. In teams with high psychological safety, members are more willing to express their ideas in detail and give constructive feedback, which promotes learning and innovation in the team (Pan, Zhou, & Zhou, 2010).

The exchange relationship between leaders and members represents a leadership style and reflects the overall team atmosphere. Differences in LMX can lead to the deterioration of relationships between team members (Sherony & Green, 2002). Studies show that the more similar the LMX quality is to the team leader, the better the quality of colleague relationships (Sherony & Green, 2002). LMX differences can disrupt the internal psychological safety of the team, and the leader's differential treatment of subordinates can lead to the fragmentation of team members into informal subgroups, increasing interpersonal risks within the team and increasing the likelihood of conflict (Ma & Qu, 2010). This ultimately reduces the psychological safety of the team. In summary, LMX differentiation can undermine team creativity by reducing the psychological safety of the team.

"*Members, who feel insecure while competing for the attention of leaders, experience a decrease in trust and sense of belonging to the team due to an unfair distribution system. Having recognized these situations, I know how important it is to create psychological safety in the team in an open and relaxed atmosphere.*" (Interviewee 4: Mr. Qin, male, 39 years old, director of a technology company).

"*I have found that differences in relationships between leaders and members can lead to the deterioration of relationships between colleagues, especially when there are conflicts between leaders and partners. This can disrupt psychological safety within the team, increase interpersonal risks and increase the likelihood of internal conflicts.*" (Interviewee 5: Mr. Li, male, 43 years old, head of a law firm).

Differential team member relationships and team creativity

The interactionist view of creativity assumes that creativity is not only influenced by individual characteristics, but also by social and contextual factors, especially in the context of teams. The differentiation of exchange relationships between team members leads to differences in the extent to which social-emotional resources are exchanged (Liao, Liu, & Loi, 2010). The shared atmosphere within a team, members' emotional care and resource support have a positive impact on individual creativity, with high-quality exchange relationships significantly influencing creative behavior (Muñoz-Doyague & Nieto, 2012; Zhou & George, 2001).

The interactionist perspective emphasizes the crucial role of interaction between individual and contextual factors for creativity. In this framework, it is assumed that the exchange relationships between team members play a moderating role in the process in which individuals with high central self-evaluation influence creativity through harmonious passion. Harmonious passion has a significant positive impact on individual creativity, especially in the context of high-quality exchange relationships between team members. Under such circumstances, resources are aligned, and emotional support is exchanged between team members, and this promotes individual creativity.

However, in the context of low-quality exchange relationships between team members, individuals with high harmonious passion may have difficulty receiving positive feedback through regular channels and may even face negative feedback such as jealousy (Braun, Aydin, Frey, & Peus, 2018) and rejection (Yan, Zhou, Long, & Ji, 2014). As individuals with high harmonious passion typically prefer interpersonal relationships, this negative feedback may affect their creative enthusiasm, which negatively impacts individual creativity.

"*Information sharing, resource support, and positive feedback between team members play a crucial role in increasing individual creativity levels. Especially in situations where there are high-quality exchanges between members, it is easier for team members to engage in resource matching and emotional support.*" (Interviewee 2: Mr. Wang, male, 33 years old, engineer in a small information technology company).

"*In a good relationship, our team members encourage each other through resource matching and emotional support, and receive positive support and feedback, which enhances our overall creativity. In teams with poor relationships between members, team members may have difficulty receiving positive feedback and may even be harassed by negative feedback, which affects the organization's innovation.*" (Interviewee 3: Mr. Tao, male, 40 years old, partner in an IT technology company).

Team psychological safety as a mediator in the relationship between team member relationship differentiation and team creativity

Psychological safety in the team as a social belief that creates trust, respect, and care within a team can play a mediating role in the relationship between the relational differentiation of team members and the creativity of the team. According to the IPO model (Input → Process → Output), Team input influences team processes and ultimately affects team results. The relationship differentiation of team members as a form of team input can affect the psychological safety of the team during team processes, and thus, influence the creativity of the team (Kozlowski, 2015). Relationship differentiation directly creates a tense atmosphere and forms an unsafe working environment (Gu, Wang, & Wang, 2013). In such a situation, communication barriers and obstacles to the sharing of resources can arise, which significantly affect the creativity of the team. By promoting psychological safety in the team, the team can better manage the challenges arising from members' different relationships, maintain efficient communication and collaboration of resources, and thus, unleash the potential for team creativity.

"*Working in a law firm requires a high level of cooperation and coordination, and psychological safety within the team is the basis for open communication between members. We strive to create a working environment characterized by trust and respect. I promote psychological safety in the team through regular team training and maintaining open channels of communication. This ensures that team members can grow together in a safe environment, which promotes the ability to creatively tackle legal challenges*" (Interviewee 5: Mr. Li, male, 43 years old, director of a law firm).

"*From our daily management experience, we know that too much difference in the interaction between leaders and members can lead to internal division and the formation of small groups within the team. This can lower the overall level of psychological safety, and thus, have a negative impact on creativity.*" (Interviewee 7: Ms. Fang, female, 38 years old, director of a cultural and artistic creativity company).

Discussion

The aim of the present qualitative research was to investigate the impact of team relationship differentiation on team creativity in SMEs based on the national conditions and characteristics of china. The main objective of this study in this area was to identify the importance and role of psychological safety in the team as a mediator between team relationship differentiation and team creativity from the recorded statements of the participants. In our study, the process of increasing team creativity is described as a dynamic and evolving process.

The research findings support that of earlier studies by Henderson, Liden,

Glibkowski, and Chaudhry (2009), Boies and Howell (2006), Hooper and Martin (2008), Liden et al. (2006), Ma and Qu (2010), and Naidoo, Scherbaum, Goldstein, and Graen (2011). In particular, the study confirms that the differentiation of exchanges between leaders and members is a universal team phenomenon. It has a significant impact on team interactions, team effectiveness, team atmosphere, and relationships between team members. These influences have a direct impact on the development of team creativity.

The study also confirms the theories of Pan et al. (2010), Sherony and Green (2002) and Shalley and Gilson (2004), which emphasize the mediating role of team psychological safety in the relationship between differential (LMX and team creativity. Differential LMX reflects the degree of resource allocation in the team and status differences among members, which inevitably affects the efficiency of interactions and psychological changes among team members. The difference in LMX between team leaders and subordinates can lead to negative relationships between colleagues, and thus, disrupt the psychological safety atmosphere in the team. In addition, the different treatment of subordinates by leaders can lead to a split among team members (Gerstner & Day, 1997; James, Demaree, & Wolf, 1984) and even lead to the formation of informal subgroups within the team. This increases interpersonal risks within the team, which increases the likelihood of internal conflict, and consequently, reduces the psychological safety of the team.

This study confirms the theories put forward by Seers (1989), Alge, Wiethoff, & Klein (2003), Shangen (2011), Gajendran and Joshi (2012), and Ismail, Hamzah, Ngah, Mustaffa, Zakaria, and Noordin (2012). In low-quality exchange relationships, communication between team members is passive and is only fulfilled out of a sense of duty to achieve common goals. In contrast, high-quality exchange relationships involve active participation of team members, with focus on emotional expression, mutual respect, and other aspects of communication during goal pursuit. The high quality of internal exchanges within a team reflects and altruistic work atmosphere, such as mutual benefit and information sharing among team members. Negative effects can affect the quality of social exchange, as team members who perceive poor quality of exchange relationships gradually lose trust in the knowledge and perspectives of other members. They also fail to appreciate the critical importance of internal knowledge sharing and communication to the overall benefit of the team. In such a situation, they are more likely to adopt an "outsider" attitude towards the team tasks, which poses a serious threat to the team's creativity. This tendency can lead to team members being less inclined to engage in intensive collaboration, creating internal barriers within the team, and hindering the emergence of innovation. Therefore, this study not only confirms the practical implications of relationship differentiation, but also highlights its potential harm to team collaboration and creative performance.

Finally, the research findings also suggest that psychological safety in the team plays a mediating role in the relationship between team members' relational differentiation and team creativity. This suggests that as the level of relationship differentiation between team members increases, the level of psychological safety in the team decreases, which in turn affects team creativity. This finding can be attributed to the team members' perception of interpersonal risk due to relationship differentiation, which leads to less involvement in collaborative decision-making and a lack of enthusiasm for creative activities. As a result, the overall level of team creativity decreases significantly.

This study examines team-level variables to help individuals better understand and adapt to the ever-changing social exchange relationships within teams. To reasonably mitigate the effects of differentiation on fostering team creativity, there are the following strategic recommendations for management practice. First, define innovation goals precisely by using quantifiable team innovation targets to maintain the team's efficient innovation capability. Second, emphasize the selection of team leaders with extensive professional experience, and a strong sense of honor and responsibility to avoid excessive relational differentiation. Third, ensure a rational distribution of team members' roles to minimize the degree of differentiation within the team. Fourth, create effective performance incentive mechanisms to reduce internal friction, integrate resources, and maximize the contribution of each team member.

Conclusion

In this study, the different effects of differentiating LMX and TMXs on team creativity are examined in detail. The introduction of the variable of psychological safety in the team illustrated that this variable serves as a mediator in both influence processes. This enriches the research on the outcomes of differentiation in relationships and contributes to the further development of differentiation theories. The research focuses on situational factors at the team level and uses qualitative analysis to validate the differences in the strength of the relationship between LMX differentiation, TMX differentiation, and team creativity at different levels of team psychological safety. This finding contributes to a deeper understanding of the relationship between relational differentiation and team creativity under different contextual conditions. The study focus is on a careful examination of situational factors, complements existing research, and provides a comprehensive conclusion for a more thorough understanding of the impact of relational differentiation on team creativity. In addition, this study serves as a valuable reference for future research and practical applications in related fields and provides a more detailed understanding of the mechanisms by which relationship differentiation affects team creativity under different levels of team psychological safety.

Although this research has some contributions in both theory and practice**,** there are still some deficiencies in this paper due to the limited attention paid to qualitative methods in research. First, the impact of relationship differentiation on team creativity requires balanced adjustments, as extreme levels can impede innovative activities. Second, when team psychological safety plays a differentiated role in the relationship between differentiation and team creativity, managers must choose the most effective methods to enhance team effectiveness. Third, the simplicity of interview methods results in somewhat limited persuasiveness, prompting suggestions for more in-depth quantitative research to deepen our understanding of these relationships.

The research findings indicate that in a high-quality team psychological safety environment, a reasonable control of the degree of team relationship differentiation is more likely to enhance team creativity. Managers can maintain internal status differences at an appropriate level, fostering the development of labor division and comprehensive employee growth, reducing the wasting of social resources in non-productive activities. However, when introducing status attribution methods, team managers should tailor them to their specific context. Additionally, team managers can increase employees' sense of psychological safety by improving task interdependence, setting shared goals, and enhancing leadership styles, thereby

minimizing the negative effects of team status threats on psychological safety.

Conflict of Interests

Authors have no conflict of interests.

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Effectiveness of Bioenergy Economy-based Health Improvement versus Mindfulness-based Stress Reduction on the Occupational Stress and Psychosomatic Symptoms of Distressed Employees

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Quantitative Study

Abstract

Background: Career stress is one of the most important and challenging risk factors among employees because of its vast effect on mental and physical health. This research was conducted with the aim to compare the effectiveness of mindfulness-based stress reduction (MBSR) and bioenergy economy-based health improvement (BEHI) program on occupational stress and psychosomatic symptoms of distressed employees.

Methods: This quasi-experimental study was conducted using a pretest-posttest design. The targeted population of the study comprised all employees of the customer service management department of Telecommunications Company in Isfahan, Iran, in the year 2018. Purposeful sampling was employed, and 60 candidates exhibiting distress symptoms were randomly assigned to 3 groups (MBSR, BEHI, and control groups), each consisting of 20 individuals. Data collection was performed using the Kessler Psychological Distress Scale (K6; Kessler et al., 2003), Stressful Life Event (SLE) Questionnaire (Roohafza et al., 2011), Occupational Stress Questionnaire (Cousins et al., 2004), and Screening for Somatoform Symptoms-7 (SOMS-7) questionnaire (Ebrahimi et al., 2018). The experimental groups participated in the MBSR (Kabat-Zinn, 1990) and BEHI (Goli, 2022) program training sessions. The control group received no intervention. The data were assessed in SPSS software.

Results: Both the BEHI program and MBSR therapy significantly decreased the occupational stress ($F = 2.78$) and psychosomatic symptoms ($F = 3.63$) of distressed employees ($P < 0.05$). However, there was no significant difference between the mean scores of the experimental groups in the posttest ($P > 0.05$).

Conclusion: Both programs could reduce the employees' distress on worksites and could be beneficial for healers to mitigate the psychosomatic manifestations of occupational stressors.

Keywords: Occupational stress; Psychological distress; Mindfulness; Psychosomatic medicine; Bioenergy economy

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Introduction

Occupational stress is one of the most important factors of stress in employees and workers. It is considered as one of the major environmental challenges that put the physical and mental health of individuals at risk. It is a result of the conception that the threats or demands are much more than the employee's capacity to cope (Nowrouzi, Nguyen, Casole, & Nowrouzi-Kia, 2017). The association between medicine and psychology has a long history and this relation is more prominent in psychosomatic diseases. The human psyche is directly influenced by his physical condition. Reciprocally, the body and the organs' function are also affected by the individual's mental and nervous condition. As many employees are struggling with personal, professional, and work environment stressors, it becomes probable for the staff to face occupational stress, anxiety, depression, and overall reduced quality of life (QOL). This occupational stress often causes mental distress that has destructive effects on the body and mind of individuals. Moreover, concomitant with stress-induced physiologic problems, many psychosomatic symptoms also appear. Hence, many psychological interventions have been applied to moderate occupational stress and its impact on everyday life. Mindfulness and cognitive-behavioral therapies have been the most successful of these interventions (Clough, March, Chan, Casey, Phillips, & Ireland, 2017; Restrepo & Lemos, 2021).

Mindfulness education is a common methodology applied to stress-related therapies. A reputable method is mindfulness-based stress reduction (MBSR), which is known as a relaxation training program. MBSR was first used by Kabat-Zinn for a wide range of people with stress-related disorders and chronic pain (Kabat-Zinn, 1990). In its paradigm, mindfulness means the intentional attention of the individual to the experience that is currently going on. This attention has non-judgmental characteristics and is accompanied by acceptance. MBSR practices reduce the role of tunneled awareness of the patients. Furthermore, these trainings diminish the emotional and behavioral disturbing effects of their psychological experiences (Anheyer, Haller, Barth, Lauche, Dobos, & Cramer, 2017; Conversano et al., 2021; Khoury, Sharma, Rush, & Fournier, 2015; Raja-Khan et al., 2017). On the other hand, methods based on energy medicine are introducing unique healing approaches. These methods are based on the belief that human beings are all surrounded by a field of energy that is flowing among and around them, and it has a constant and continuous collaboration with the surrounding world. In the condition of health, energy is flowing freely (Goli, 2010). In this regard, Bioenergy Economy-based Health Improvement (BEHI) is a complete model that provides a framework and method for interpreting and using energy-based treatments in clinical and educational settings. BEHI program activates salutogenesis, benefiting from ideological deductions and improving psycho-neuro-immunologic pathways. It can be considered a psychosomatic approach to medicine that organizes the vital energy in the intra-, inter-, and transpersonal domains to develop health and awareness (Goli, 2022). Hitherto, behavioral science experts and psychologists have sought to adjust and reduce employees' various mental and psychological pressures in different aspects (Carolan, Harris, & Cavanagh, 2017; Joyce et al., 2016; Ryan et al., 2021). Accordingly, the use of psychological interventions was effective in reducing many of these pressures. However, the intersection of various mind-body approaches has not been vastly surveyed (Artemiou, Gilbert, Callanan, Marchi, & Bergfelt, 2018; Burnett & Pettijohn, 2015; Siu et al., 2024; Wolever et al., 2012).

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Based on the structural and functional similarities, BEHI and MBSR methods were selected for this work. This quasi-experimental study was conducted to assess the superiority/interchangeability of these methods. Therefore, in this study, the BEHI program versus the MBSR method has been researched to investigate their effect on occupational stress and psychosomatic symptoms of distressed employees.

Methods

Study design and participants

This quasi-experimental study was conducted using a pretest-posttest design. The targeted population of the study was all (197 individuals) of the employees of the customer service management department of Isfahan Telecommunications Company in Isfahan, Iran, in the year 2018. To determine the appropriate sample size, Gpower software was used. Considering the effect size, significance level of 0.05, test power of 0.8, and 3 investigation groups, a total of 60 individuals were considered for the sample size (Hosseini, Tanha, Abbasnia, & Azizpour, 2023). The screening tests were then conducted on the participants.

According to the test results and a psychiatrist's discretion, 60 personnel with distress manifestations were randomly selected and divided into 3 groups of 20 people, 2 experimental groups and 1 control group. The inclusion criteria were having a diploma or higher education, having job conditions with a high volume of work and job stress due to answering and serving millions of subscribers, having symptoms of distress based on the screening and diagnosis of the psychiatrist, and having a history of no other previous psychotherapy training program. The exclusion criteria were lack of willingness to participate in the treatment course and absence from more than 3 sessions.

Instruments and variables

Kessler Psychological Distress Scale: The Kessler Psychological Distress Scale (K6) provides a simple measurement of psychological distress during 1 month (Kessler et al., 2003). The questionnaire is self-report type and has 6 questions about the emotional state of the individual. The scoring method of the questionnaire is a 5-point Likert scale ranging from 0 to 4. Therefore, the minimum and maximum score that can be obtained by the participant is 0 and 24, respectively. In Iran, research has been conducted on the validity and reliability of this questionnaire. In a recent study, Cronbach's alpha of 0.92 was obtained for the K6. For the cut point of this questionnaire, which was equal to 10, the sensitivity was equal to 0.73 and the specificity was equal to 0.78. Therefore, the results showed that this questionnaire had acceptable validity and reliability in Iran (Hajebi et al., 2018).

Stressful Life Event (SLE) Questionnaire: The Stressful Life Event (SLE) Questionnaire includes 46 questions, and the subject has to mark the events he/she has personally experienced in the last 6 months. Next, he/she determines the intensity of discomfort and the level of mental pressure at the time of that event. Thus the score is determined in two steps: first, the absence or presence of stressful events, second, the severity of the stressful events. The severity of the stressful event is determined on a 6-point Likert scale ranging from 1 to 5. In case of no stressful events, a score of 0 is given (Roohafza, Ramezani, Sadeghi, Shahnam, Zolfagari, & Sarafzadegan, 2011). In Iran, researches have been conducted on the validity and reliability of this questionnaire. In a profound study, Cronbach's alpha was found to be 0.92, which showed the reasonable validity and reliability of this questionnaire in Iran (Roohafza et al., 2011).

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Occupational Stress Questionnaire : The Health and Safety Executive (HSE) Institute of England presented this questionnaire as a tool for determining health in the workplace and measuring the job stress of workers and employees. This questionnaire has 35 questions in 7 areas. The questions are scored on a 5-point Likert scale (Cousins*, Colin, Simon, Kelly, Peter, & Ron, 2004; Sun, Song, Liu, Mao, Sun, & Cao, 2021). In Iran, a study approved the validity and reliability of this questionnaire with Cronbach's alpha coefficient of 0.78 (Azad Marzabadi & Gholami Fesharaki, 2011) .

Screening for Somatoform Symptoms-7 questionnaire: The Screening for Somatoform Symptoms-7 (SOMS-7) questionnaire consists of 53 questions that assess a wide range of somatic symptoms and evaluate the patient's manifestations in 7 days (Ebrahimi, Mirshahzadeh, Afshar-Zanjani, Adibi, Hajihashemi, & Nasiri-Dehsorkhi, 2018). The scoring is based on signs/symptoms severity using a Likert scale ranging between 0 and 4. Rief and Hiller (2003) reported a reliability of 0.85 and a validity of 0.75 for this questionnaire. In Iran, evaluating the Persian version of the SOMS-7 demonstrated a reliability score of 0.7 with a Cronbach's alpha coefficient of 0.92 (Ebrahimi et al., 2018).

Procedure and intervention: The first experimental group (N = 20) underwent MBSR therapy in 8 weekly 90-minute sessions, which lasted 8 weeks. The details of each instruction session have been discussed elsewhere based on Kabat-Zinn's guidelines for MBSR (Demarzo et al., 2017; Kabat-Zinn, 1990; Kabat-Zinn, 2013; Kabat-Zinn & Hanh, 2009).

The second experimental group (N = 20) underwent the BEHI program in 8 weekly 90-minute sessions, again lasting 8 weeks. The details of each instruction session have been discussed elsewhere based on BEHI guidelines (Farzanegan, Derakshan, Hashemi-Jazi, Hemmati, & Azizi, 2023; Goli, 2022; Tavakolizadeh, Goli, Ebrahimi, Hajivosough, & Mohseni, 2023). It is noteworthy that at the end of each session, printed flash cards were presented to the participants that included key concepts of the session and the practical home exercises. The control group (N = 20) received no training in this period. The pretest and posttest were, respectively, carried out at the beginning and the end of the study in these three groups.

Analysis: The data obtained from the questionnaires were analyzed using descriptive and inferential statistics in SPSS software (version 22; IBM Corp., Armonk, NY, USA). Analysis of covariance (ANCOVA) and pairwise comparison of the methods were used to analyze the outcome data.

Ethics: All candidates voluntarily participated in this study, and the perspective of the study was fully explained to them. Written informed consents were obtained from the participants and the study protocol was held in total accordance with the Declaration of Helsinki.

Results

This study was conducted on 60 candidates with distress symptoms in Isfahan, Iran. The individuals were randomly assigned to 3 groups (MBSR, BEHI, and control), each consisting of 20 participants. Descriptive findings revealed that the mean ± SD age of the MBSR, BEHI, and control groups was 37.3 ± 8.4, 38.8 ± 6.9, and 37.6 ± 5.8 years, respectively. In the MBSR group, 18 people (90%) were women, and 2 (10%) were men. In the BEHI group, 14 people (70%) were women, and 6 (30%) were men. In the control group, 15 people (75%) were women, and 5 (25%) were men.

Table 1. Mean and standard deviation of pretest and posttest scores of occupational stress and psychosomatic symptoms in the study groups

Variables	Groups	Pretest (Mean ± SD)	Posttest (Mean ± SD)
Occupational stress	BEHI	353.10 ± 128.38	290.80 ± 97.79
	MBSR	368.9510 ± 138.06	299.00 ± 126.37
	Control	356.7510 ± 119.04	355.25 ± 124.56
Psychosomatic symptoms	BEHI	38.5010 ± 24.25	26.40 ± 23.02
	MBSR	34.8510 ± 24.17	25.55 ± 16.75
	Control	37.1010 ± 27.08	39.25 ± 25.86

SD: Standard deviation; BEHI: Bioenergy economy-based health improvement; MBSR: Mindfulness-based stress reduction

Regarding marital status, 50%, 65%, and 55% of the individuals were married in the MBSR, BEHI, and control groups, respectively. According to the education level, 15%, 35%, and 35% of the participants in the MBSR, BEHI, and control groups, respectively, had bachelor's degrees. The mean ± SD occupational stress and psychosomatic symptoms scores of the experimental and control groups in the pretest were approximately equal. However, in the posttest, the mean ± SD scores of the intervention groups were notably lower than those of the control group. Table 1 demonstrates the aforementioned data for these 3 groups.

The distribution of the statistical population was approved to be normal by the Kolmogorov-Smirnov test (P-value not significant). For the inferential analysis, ANCOVA and pair comparison of the methods were applied.

Table 2 demonstrates the findings of ANCOVA. Accordingly, after controlling the pretest scores and considering the values of the calculated F and its significance levels, there was no significant difference between the 3 groups regarding the mean scores of occupational stress and psychosomatic symptoms in the posttest stage.

To assess the effectiveness of each method in comparison with the other, a pairwise comparison of the groups with the Bonferroni test was used. According to table 3, there was no significant difference between the experimental groups. However, there was a significant difference between the control and the experimental groups regarding the posttest occupational stress and psychosomatic symptoms scores ($P < 0.05$). Therefore, the BEHI and MBSR methods are effective on the mentioned manifestations of distressed employees. However, this study found no statistically significant difference between the methods.

Discussion

In the present study, MBSR and BEHI methods were compared in terms of their effectiveness on occupational stress and psychosomatic symptoms of distressed employees.

Table 2. Multivariate analysis of covariance of the posttest results for the research variables in the Bioenergy economy-based health improvement (BEHI), Mindfulness-based stress reduction (MBSR), and control groups

Variables	Total squares	df	Mean squares	F	Significance level	η2
Occupational stress	52193.23	2	26096.61	2.78	0.07	0.09
Psychosomatic symptoms	2281.72	2	1140.86	3.63	0.03	0.11

df: Degree of freedom

Table 3. Pair comparison of the posttest results of the mean scores of the research variables in the BEHI, MBSR, and control groups (Bonferroni test)

Groups	Occupational stress		Psychosomatic symptoms	
	Mean Differences	Significance Level	Mean Differences	P-value
BEHI vs. MBSR	|290.80-299.00| = 8.20	0.99	|26.40-25.55| = 0.85	0.84
BEHI vs. Control	|290.80-355.25| = 64.45	0.04	|26.40-39.25| = 12.85	0.01
MBSR vs. Control	|299.00-355.25| = 56.25	0.05	|25.55-39.25| = 13.70	0.03

The results demonstrated that these manifestations significantly decreased in the posttest assessment of the individuals. Therefore, it was revealed that both MBSR and BEHI methods had alleviating impacts on the study variables and made a significant difference compared to the control group.

MBSR has been markedly known as an effective method for mental health promotion and stress management (Fjorback, Arendt, Ornbol, Fink, & Walach, 2011). It has been demonstrated that MBSR can decrease occupational stress in medical staff and employees and improve individuals' self-compassion, personal accomplishment, and overall psychological functioning (Green & Kinchen, 2021; Janssen, Heerkens, Kuijer, Van Der Heijden, & Engels, 2018).

Additionally, the investigation of MBSR on psychosomatic symptoms of individuals with bodily distress syndrome revealed marked improvements and enhanced QOL, which lasted in long-term follow-ups (Fjorback, 2012). A study on psychiatric nurses demonstrated the alleviating effects of MBSR on their notable work stress (Yang, Tang, & Zhou, 2018). Its results showed a significant reduction in job stress, anxiety, depression, and overall negative emotions. Another study examined the effect of short-course MBSR practice on healthy adult employees and found a significant reduction in their self-reported perceived stress (Klatt, Buckworth, & Malarkey, 2009). Moreover, a study was performed on nonmedical staff's occupational burnout and revealed a profound decrease in post-intervention stress scores with a sustained impact in a 3-month follow-up. This study suggested that MBSR also has uplifting effects on employees other than healthcare professionals (Haghighinejad et al., 2022). These data are in accordance with the present study results regarding the reported reduction in posttest occupational stress levels.

A meta-analysis on mindfulness approaches investigated MBSR's effect on the bodily distress of adults (Maas Genannt, Hulsmann, & Martin, 2023). The results demonstrated that mindfulness therapies were more effective than the control population in reducing psychosomatic symptoms. Another meta-analysis reported the mild to moderate positive effects of mindfulness techniques on the improvement of symptom severity and QOL of patients with somatization disorders (Lakhan & Schofield, 2013). It demonstrated that MBSR and Mindfulness-based Cognitive Therapy (MBCT) had a much greater impact than other mindfulness approaches. These data are in line with the present study findings regarding the evidence of alleviating psychosomatic symptoms recorded in the posttest evaluation.

The BEHI program is a holistic model that focuses on body awareness, coherent narrative, synergic relationship, and non-dual intentionality. Previously, this method has been applied for a variety of diseases and has demonstrated improving results on psychosomatic symptoms of the disorders, stress, anxiety, depression, and overall QOL of individuals, which has been discussed elsewhere (Bavari et al., 2022; Derakhshan, Manshaei, Afshar, & Goli, 2016; Farzanegan et al., 2023; Ghassemi, Vahedi, Tabatabaei,

& Alivandi-Vaf, 2023; Goli, 2023a; Goli & Boroumand, 2016; Goli et al., 2019; Tavakolizadeh et al., 2023). Accordingly, this method could diminish distress and facilitate better mind-body integration toward the healing process. Similarly, the presented works supported positive improvement impacts on the occupational stress and psychosomatic symptoms of the individuals (Derakhshan et al., 2016; Goli et al., 2019; Keyvanipour, Goli, Bigdeli, Boroumand, Rafienia, & Sabahi, 2019).

Due to the structural similarities of the MBSR and BEHI programs, these methods were selected for the present research. Both models have elaborated cognitive, behavioral, body-centered, and mindful subsets. The resulting mindful awareness from these models dissociates the individual from self-disruptive thoughts. This detachment causes less fusion and hyper-identification with the stressors related to occupational stress and psychosomatic symptoms. On the other hand, the spread of mindfulness through the body decreases the intensity of malicious thoughts and increases the bodily vibration, which draws the individual's attention to the present moment instead of olden or unborn days. MBSR has breath-focusing, body-scanning, and gentle yoga movements for its body-centered practices. On the other hand, BEHI adds specific tensile, vibrational, and percussional practices. This triad of BEHI movements upregulates the distribution of bioenergy. The redistribution of body energy alleviates the bodily tensions and magnifies the homogeneity. Notably, BEHI practices demonstrate a broad and detailed focus on the bodily properties of awareness (Goli, 2016; Goli & Boroumand, 2016; Kabat-Zinn, 1990).

Despite the astounding effects of MBSR on the occupational stress and psychosomatic symptoms of distressed employees in this study, it seems that BEHI might offer a more holistic approach. The BEHI program adds healing to the table by implementing the wholeness mindset. This mindset allows the individual to obtain personal and therapeutic achievement as a whole unit instead of interfering with the obstacles of each part. This means that instead of expecting each dissatisfaction and failure to be corrected, one should concentrate on the correctness of the totality and whole. This openness to totality and not every element is a paradigm shift for the individual's energy economy. By implementing this upward-down (top-down) integrity approach, everyday tensions and conflicts could be facilitated as the individual is not attached to the dualities of the distress, but is in harmony with the wholeness of the overall improvement. So long as an individual becomes whole, senses the totality first, and lets the healing process happen, it might be unnecessary to correct each part in order to experience wholeness. Wholeness embraces the entire entity rather than the isolation of each part. These BEHI program concepts of wholeness, well-being promotion, boundlessness, and intentionality are less touched in the MBSR program (Goli, 2022; Goli, 2023b).

The present study faced limitations regarding its population, which might demand a larger size to generalize the results to the community. Moreover, this study found no apparent difference between the application of MBSR and BEHI programs for distressed employees. A more extensive study is suggested to investigate and discriminate these models from each other. Another limitation to acknowledge is that this study lacked a follow-up for the participants. As it has been discussed, psychological dilemmas demand long-term care and intention. A more cohesive investigation with 3-, 6-, and 12-month follow-ups is suggested for obtaining the long-term effects of MBSR and BEHI on distressed individuals. One of the strengths of this study was its additional screening for excluding participants with previous or concurrent psychotherapy. As pre-existing or simultaneous psychological training

could interfere with the effectiveness of the interventions, this extra screening is suggested to be replicated in forthcoming studies.

All in all, it seems that body awareness and mindful mind-body integration could help individuals with occupational stress and its psychosomatic manifestations. The mentioned models could hypothetically reduce stressors' impacts and induce behavioral and lifestyle changes to achieve a noble sublimation of living.

Conclusion

The BEHI and MBSR methods are effective on the occupational stress and psychosomatic symptoms of distressed employees. This study found no statistically significant difference between the methods. Since the BEHI program demonstrated similar outcomes to the MBSR method, it could be applied in worksites for distressed employees. Further investigations are needed to discriminate between these therapy approaches.

Conflict of Interests

Authors have no conflict of interests.

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None.

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Clarifying the Role of Emotional Self-regulation Strategies and Health Anxiety in Predicting Negative and Positive Reactions to Stress, Psychosomatic Symptoms, and Quality of Life Indicators in Women with Breast Cancer

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Quantitative Study

Abstract

Background: Today, one of the most challenging diseases that mankind is facing is cancer. The present study aimed to explain the prediction model of negative and positive reactions to stress, psychosomatic symptoms, and quality of life (QOL) indicators based on emotional self-regulation strategies (SRS) and health anxiety in women with breast cancer.
Methods: The current research was of a correlational type, which was conducted by structural equation modeling (SEM) using the path analysis method. The statistical population included all women with breast cancer in hospitals of Tehran, Iran, and 485 women with breast cancer, who visited medical centers and hospitals in the second half of 2021, were selected by purposive sampling. The questionnaires used in this research included psychosomatic symptoms questionnaire, World Health Organization Quality of Life Questionnaire (WHOQOL), Stress Reaction Questionnaire, Post-Traumatic Growth Inventory (PTGI), and Cognitive Emotion Regulation Questionnaire (CERQ). In the descriptive part, the data were analyzed using mean and standard deviation (SD), and in the inferential part, Pearson's correlation coefficient and path analysis were used via SPSS and Amos software.
Results: The desired model had a favorable fit in terms of statistics, and it was also found that the emotion regulation strategies and health anxiety were able to provide a meaningful explanation for the paths of predicting positive and negative reactions to stress symptoms to have mental health and QOL [root mean square error of approximation (RMSEA) = 0.039, goodness of fit index (GFI) = 0.92].
Conclusion: It can be concluded that in the treatment of people with cancer, paying attention to psychological and emotional indicators can be of great importance.
Keywords: Quality of life; Breast neoplasms; Anxiety; Female

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Introduction

Breast cancer is the result of uncontrolled and malignant growth of cell masses lining the ducts or lobules of breast tissue in women (and in rare cases in men). These malignancies constitute about 33% of women's cancers and their prevalence in the general population of different countries of the world is estimated between 8%-10% in the age range of 40-44 years (Badrian, Ahmadi, Amani, & Motamedi, 2014). In the world, more than one million cancers are diagnosed annually and 600000 people die from them (Huang, Zhang, An, & Xu, 2019). In Iran, it ranks third in terms of disease burden and fifth in terms of the cause of death with a ratio of 4 per hundred thousand people (Aldao, Nolen-Hoeksema, & Schweizer, 2010).

Nowadays, paying attention to the components of quality of life (QOL) is considered one of the important consequences of the treatment of diseases and is evaluated as one of the determining indicators of treatments (Eisenberg et al., 2001). Menin et al.'s research shows that people who cannot effectively manage their emotional responses to everyday events experience more intense and longer periods of psychological distress (Liverant, Brown, Barlow, & Roemer, 2008). For this reason, there is a need for people to learn skills to think in more adaptive ways and act more resiliently when faced with problems and stressful situations.

Unpleasant consequences arising from incompatible coping with stress in patients have reduced their QOL, which is considered a very important point in studying the psychological conditions of patients with cancer (Badrian et al., 2014). Heidarzadeh et.al (2015) study examined and clarified the impact of psychosocial factors on illness, health, and recovery, highlighting the connection between psychosocial stress and the body's immune system, and emphasized that individuals have varying ways of perceiving and responding to both external and internal events, including different types of stress reactions.

The cognitive model of post-traumatic stress disorder (PTSD) is based on the assumption that people suffering from this disorder are unable to process or justify the trauma that has accelerated the disorder. They continue to experience stress and try to withdraw from experiencing stress again with coping methods. Experiencing alternating periods of acknowledging and denying the event is consistent with their relative cognitive ability with the event (The WHOQOL Group, 1995). In the psychoanalytical model of this disorder, it is also assumed that the trauma causes the reactivation of a previously silent but unresolved conflict. Revival of childhood trauma leads to regression and the use of defense mechanisms of suppression, denial, and invalidation. The actions used by the ego to control anxiety and reduce it are repeated. Moreover, the victim gains secondary benefits from the outside world, which common types include material compensation, increased attention and sympathy, and satisfaction of dependency needs. These benefits strengthen the disorder and its durability (The WHOQOL Group, 1995).

Based on this, one of the harms of stressful factors is jeopardizing a person's mental health and causing mental disorders. The role of mental and social stress has been mentioned as one of the most important factors in the emergence and formation of various physical and mental diseases and the death of people. In this context, it is possible to refer to the connection of stressful events with the heart, skin, immune system, and diseases such as gastric ulcers and cancer. Health anxiety is a disorder that is characterized by great anxiety and fear about having a serious illness; therefore, the main problem in this disorder is anxiety, the form of which is different from other anxiety disorders. Health anxiety is a continuum concept that was first proposed by

Salkovskis and Warwick (Bar-On, 2006). On one side of the continuum, there are mild worries about health and getting sick, and on the other side, self-diagnosis disorder is characterized by extreme fears and sometimes delusions about health and physical symptoms (Lopes & Osorio, 2023). Shi et al., (2015) believe that health anxiety is caused by catastrophic misinterpretations of physical signs and symptoms.

One of the concepts that are strongly related to anxiety in patients with cancer is the self-regulation component (Kashdan & Rottenberg, 2010), which is directly related to the components related to health promotion and is particularly important in controlling mental health (Khamoshi Darmarani & Moradi, 2018). Emotion regulation is considered a basic principle in starting, evaluating, and organizing adaptive behavior and also preventing negative emotions and maladaptive behaviors (Garnefski & Kraaij, 2007). Theorists believe that people who are unable to properly manage their emotions in the face of everyday events show more diagnostic symptoms of internalizing disorders such as depression and anxiety (Badrian et al., 2014). Therefore, it can be said that emotion regulation is a key and determining factor in psychological well-being and effective functioning (Garnefski & Kraaij, 2007), which plays an essential role in adapting to life's stressful events (Moradi, Afrazizadeh, & Asadzadeh, 2015).

It seems that there is a kind of chain relationship between emotional stressors and the cognitive system of people regarding cancer. Since the high prevalence of cancer, especially breast cancer, among women has been noticed, which has a high prevalence in societies, it is necessary to investigate the psychological consequences of this disease in detail. Therefore, this research aims to model the role of emotional self-regulation strategies (SRS) in predicting the reaction to stress, psychosomatic symptoms, and QOL indicators in women with breast cancer.

Methods

The current research was of a correlational type, which was conducted by structural equation modeling (SEM) using the path analysis method. The statistical population included all women with breast cancer in hospitals of Tehran, Iran, and 485 women with breast cancer, who visited medical centers and hospitals in the second half of 2021, were selected by purposive sampling. In the pre-test stage, the sample members completed the emotional SRS questionnaire, the post-traumatic growth and PTSD syndrome questionnaires to assess people's reactions to stress, as well as the World Health Organization Quality of Life Scale (WHOQOL) and psychosomatic symptoms questionnaire.

Ethical considerations included coordinating and obtaining permission to enter the environment, explaining the purpose of the research, the method of completing the questionnaires and the right of the participants to participate in the study assuring the participants about the confidentiality of personal information, and obtaining informed consent to participate in the study.

Psychosomatic symptoms questionnaire: This questionnaire is self-report and measures the intensity of psychosomatic symptoms experienced by the individual and has 20 items that are answered on a 5-point Likert scale. Mineka and Sutto, 1992 has mentioned the internal reliability of this questionnaire in different studies and with different samples between 0.7 and 0.93. Brackett & Geher, 2013 has reported the reliability of this questionnaire using Cronbach's alpha method of 0.89 and its factorial validity as appropriate.

WHOQOL Scale: This questionnaire measures the four areas of physical health,

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mental health, social relations, and environmental health with 24 questions. The questionnaire has two other questions that do not belong to any of the areas and evaluate the health status and QOL in a general way; thus, this questionnaire has a total of 26 questions. After performing the necessary calculations in each area, a score equal to 4-20 will be obtained for each area separately, where 4 is the worst and 20 is the best condition of the desired area.

These points can be converted into a score with a range of 0-100. On the other hand, the values of Cronbach's alpha and indices related to construct validity also indicated the acceptable validity of this test in the population of Iran and it was as follows: physical health = 0.77, mental health = 0.77, social relations = 0.75, environmental health = 0.84 (Fazel Hamedani & Ghorban Jahromi, 2017).

Stress Reaction Questionnaire: The PTSD checklist is a self-administered 17-question questionnaire that covers all dimensions of this disease based on the symptoms presented in the Diagnostic and Statistical Manual of Mental Disorders (DSM). In this questionnaire, three categories of symptoms of re-experiencing (5 items), avoidance symptoms (7 items), and symptoms of intense arousal (5 items) are asked from the patient. The validity and reliability of this questionnaire have been evaluated in various kinds of research.

The scoring method is Likert scale from one to five and the score of all items (17-85) is considered an individual score. A score of 35 is considered the cut-off point in most research (Ghalyanee, Asadzandi, Bahraynian, & Karimi Zarchi, 2021). The validity and reliability of this test have been confirmed in Iran (Isanejad, Gharib, Ghanbari Motlagh, & Nazari, 2020). The internal consistency and alpha were 0.92 and the retest reliability and kappa were 0.74 (Prapa, Papathanasiou, Bakalis, Malli, Papagiannis, & Fradelos, 2021).

Post-Traumatic Growth Inventory (PTGI): This questionnaire is a self-assessment tool that was created by Tedeschi and Calhoun (2004) to evaluate the changes in people's self-perception related to the experiences of traumatic events. This questionnaire consists of 21 statements on a Likert scale with a range of zero to five, and the range of subjects' scores is between 0 and 105. Tedeschi and Calhoun (2004) obtained the reliability of this instrument using Cronbach's alpha equal to 0.96 and its convergent validity was significant through the relationship with religiosity, optimism, and the main dimensions of NEO personality.

The Cognitive Emotion Regulation Questionnaire (CERQ): This questionnaire is a 36-item tool that measures the cognitive regulation strategies of emotions in response to threatening and stressful events in life on a five-point scale from one (never) to five (always) according to the following 9 subscales: blaming self, blaming others, rumination, catastrophizing, positive refocusing, planning refocusing, positive reappraisal, broad perspective, and acceptance. A higher score indicates a person's greater use of that cognitive strategy.

The alpha coefficient for the subscales of this questionnaire was reported by Garnefski and Kraaij (2007) in the range of 0.71 to 0.81 and the reliability coefficient of its subscales in the retest method at a time interval of 14 months in the range of 0.48 to 0.61 (Etemadi & Arianfar, 2017). In Iran, the alpha coefficient for the subscales of this test has been obtained in the range of 0.62 to 0.91, as well as the reliability coefficient of these factors in the retest method with a time interval of one week between 0.75 and 0.88.

In the descriptive part, the data were analyzed using mean and standard deviation (SD), and in the inferential part, Pearson's correlation coefficient and path

analysis via SPSS (version 22, IBM Corporation, Armonk, NY, USA) and Amos software (version 22) were used.

Results

By examining the questionnaires completed by the members of the research sample, the distorted questionnaires were removed from the analysis process, and in this way, 459 questionnaires were finally analyzed and examined.

Most of the patients were married (n = 289, 63%), and the number of patients receiving chemotherapy (n = 253, 55%) was more than the patients receiving radiation therapy (n = 94, 20%) and surgery (n = 112, 25%). It was also found that the number of patients with self-employment was higher.

The Table 1 indicate the non-significance of the correlation of that subscale with the corresponding component. The goodness of fit of the proposed model was evaluated based on the chi-square index (χ^2), comparative fit index (CFI), goodness of fit index (GFI), adjusted GFI (AGFI), and root mean square error of approximation (RMSEA).

The results of the structural equation analysis were as follows: degree of freedom (DF) = 25, χ^2 = 43.212, χ^2/DF = 1.728, RMSEA = 0.039, GFI = 0.922, AGFI = 0.908, CFI = 0.901 (P = 0.001).

The χ^2/DF ratio was less than 2.5 and the RMSEA value was close to zero. Moreover, the value of GFI, AGFI, and CFI was close to one. As a result, the presented model with a probability value of $P < 0.001$ had a good fit and validity.

Table 2 shows the amount of direct, indirect, and total effects of each structure compared to the variables defined in the path. Based on this, the direct and indirect effects have been investigated, and according to the highlighted cases that represent the paths that could not be statistically significant, it was found that SRS in total had many paths to explain the predictor variables which had statistically significant paths.

Table 1. Correlation of variables and subscales included in the research model (Part I)

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Positive SRS	1											
Negative SRS	0.34**	1										
Re-experiencing	-0.34**	0.58**	1									
Avoidance	-0.61**	0.22**	0.73**	1								
Intense arousal	0.40**	0.55**	0.47**	0.41**	1							
PTG	0.29**	-0.58**	-0.44**	0.43**	-0.68**	1						
Physical health	0.27**	-0.21*	-0.21*	0.40**	0.31**	0.38**	1					
Mental health	0.27**	-0.26**	-0.21*	-0.46**	0.52**	0.50**	0.56**	1				
Environmental health	0.34**	0.44**	-0.96**	-0.10*	0.38**	0.32**	0.46**	0.60**	1			
Community relations	-0.35**	-0.70**	0.62**	0.26**	-0.03	0.25**	0.60**	0.62**	0.76**	1		
Psychosomatic symptoms	-0.31**	-0.28**	0.26**	0.28**	0.31**	-0.28*	-0.35*	-0.18*	-0.15*	-0.23*	1	
Health anxiety	-0.27**	0.26**	0.31**	0.21*	0.35**	-0.43*	0.22*	-0.27**	-0.23*	0.19*	0.27**	1

SRS: Self-regulation strategies; PTG: Post-traumatic growth; *P < 0.05, **P < 0.01

Table 2. Direct, indirect, and total effects for explaining the model

Paths	Beta	Direct	P-value
Positive SRS for re-experiencing	0.381	1.235	0.021
Positive SRS for avoidance	0.324	1.262	0.014
Positive SRS for intense arousal	0.387	1.239	0.011
Positive SRS for PTG	0.310	1.238	0.035
Positive SRS for physical health	0.196	0.653	0.134
Positive SRS for mental health	0.439	1.373	0.017
Positive SRS for environmental health	0.299	0.985	0.048
Positive SRS for social relations	0.209	0.726	0.106
Positive SRS for psychosomatic symptoms	0.360	1.198	0.043
Negative SRS for re-experiencing	0.241	1.185	0.048
Negative SRS for avoidance	0.128	0.736	0.095
Negative SRS for intense arousal	0.361	1.216	0.031
Negative SRS for PTG	0.236	1.197	0.043
Negative SRS for physical health	0.181	0.811	0.083
Negative SRS for mental health	0.256	1.244	0.041
Negative SRS for environmental health	0.260	1.296	0.038
Negative SRS for social relationships	0.184	0.869	0.078
Negative SRS for psychosomatic symptoms	0.264	1.262	0.041
Health anxiety to re-experiencing	0.274	1.285	0.029
Health anxiety to avoidance	0.176	0.774	0.116
Health anxiety to intense arousal	0.319	1.368	0.017
Health anxiety to PTG	0.327	1.248	0.028
Health anxiety to physical health	0.197	0.967	0.097
Health anxiety to mental health	0.346	1.314	0.014
Health anxiety to the health of the environment	0.288	1.119	0.031
Health anxiety to social relationships	0.177	0.746	0.126
Health anxiety to psychosomatic symptoms	0.336	1.322	0.011

SRS: Self-regulation strategies; PTG: Post-traumatic growth

Discussion

This study aimed to model the role of emotional SRS in predicting stress response, psychosomatic symptoms, and QOL indicators in women with breast cancer. The obtained findings show the significance of predicting paths to stress response, psychosomatic symptoms, and QOL indicators based on emotion regulation strategies, except for the subscales of physical health and social relations for both emotion regulation and avoidance strategies. Self-regulation is negative. This finding is in line with the results obtained by Huang et al. (2019), who found that emotion regulation strategies had a significant relationship with the type of reaction to stress among people when they experienced stress. According to their view, cognitive reappraisal is a background-focused coping strategy by which people change their interpretation or evaluation of emotional stimuli and shift their focus away from the negative aspects of an emotional event.

It shows its positive side before the emotional responses are fully evoked. In contrast, expressive suppression is considered a response-focused strategy that involves consciously inhibiting one's emotional expressions after their emotional responses are fully activated, as an attempt to suppress emotions (Wang, Zheng, Duan, Li, & Li, 2022). Since the reconstruction of the cognitive process leads to positive changes, by reinterpreting the traumatic event and paying attention to its positive side, the injured people can become more aware of the power in themselves and the support of others, reconsider the value of life, and make more informed choices (Zhou, Wu, An, & Chen, 2014).

Additionally, in line with these findings, it is indicated that emotional self-regulation has a positive relationship with patients' well-being. Emotional responses after a crisis are adaptive and normative, as long as functioning and the ability to lead a satisfying life remain intact (Tedeschi & Calhoun, 2004), because managing distress through avoidance, distancing, or extensive involvement in safety

behaviors limits people's ability to stay involved in valuable activities, and as a result, reduces life satisfaction and creates a negative mindset (Kashdan & Rottenberg, 2010). Based on this, it can be said that emotion regulation refers to the processes through which people pay attention to their feelings and emphasize when and how to express them. Therefore, people try to make life conditions interpretable for themselves by focusing on prediction to change the meaning and emotional impact of a specific situation and focused response to try to understand the meaning of the situation in question (Yildiz & Duy, 2019). Finally, Yildiz and Duy (2019) found that emotion regulation strategies were significant predictors of symptoms related to psychosomatic disorders. In line with these findings, it can be said that since emotion regulation can maintain an emotion, aggravate, or prevent it (Goossens, 2020), if we consider the two main processes in emotion regulation to be re-evaluation and suppression, through a re-evaluation of emotions appropriate to the situation, people rebuild their emotional views and reduce stress. Repression also inhibits the emergence of emotion. Emphasizing that repression reduces overt states such as pain, pride, and amusement (Liverant et al., 2008), emotion dysregulation is a clear symptom of multiple psychopathologies (Ghalyanee et al., 2021), and in different cases, such as mood and anxiety disorders, emotional disorder is at the forefront of the definition of disorders (Mineka & Sutton, 1992; Bender, Reinholdt-Dunne, Esbjorn, & Pons, 2012). Eisenberg et al. (2001) found that people with psychosomatic complaints were prone to sadness, anger, and impulsive issues and were unsuccessful in regulating their emotions.

One of the limitations of this research is the presence of disturbing variables such as the marital status and employment of the sample. Besides, the limitation of this research to the city of Isfahan, Iran, makes it necessary to be cautious in generalizing the results to other cities. It is suggested that researchers interested in the field of psychological problems of patients with cancer should investigate the role of metacognitive variables and antecedent factors such as defense mechanisms and personality traits. The results of this research can be used in developing intervention protocols for psychological treatments of patients with cancer.

Conclusion

In conclusion, this study emphasizes the importance of considering psychosocial factors and emotional self-regulation strategies in predicting stress response, psychosomatic symptoms, and quality of life indicators in women with breast cancer. The findings highlight the significance of cognitive reappraisal as a coping strategy and the positive relationship between emotional self-regulation and well-being. It is crucial for healthcare professionals to address these factors in the treatment of cancer patients and develop interventions that enhance mental health and overall quality of life. Further research is needed to explore the role of metacognitive variables and develop effective support systems for individuals with breast cancer..

Conflict of Interests

Authors have no conflict of interests.

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The Effectiveness of Communication Skills Training on Job Satisfaction and Conflict Resolution among Emergency Medical Technicians

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Quantitative Study

Abstract

Background: Communication skills in establishing positive interactions and constructive conflict management are directly and significantly associated with job satisfaction. This study investigated the effectiveness of communication skills training on job satisfaction and conflict resolution among emergency medical technicians (EMTs).

Methods: The current research was a quasi-experimental study with a pretest-posttest design and a control group. The research statistical population consisted of all EMTs in Rafsanjan city, Iran, in 2016 (n = 280). By utilizing a purposive sampling technique, 30 EMTs were chosen. The participants were randomly divided into two groups of intervention and control (n = 15). The intervention group underwent 8 sessions of training during 2 months (a 1.5-hour session per week) (Fetterman & Wandersman, 2012). The data collection tools included the Job Descriptive Index (JDI; Smith et al., 1969), and Dubrin Job Conflict Questionnaires (DJCQ; 1985). In order to analyze the data analysis of covariance (ANCOVA) was used in SPSS software (Dubrin, 1985).

Results: The results showed that communication skills training was effective on job satisfaction (F = 4.637; P = 0.04) and conflict resolution (F = 7.654; P = 0.003) among EMTs.

Discussion: To optimize the impact of communication abilities on emergency care personnel, it is advisable to devise tailor-made workshops separately for different EMTs.

Keywords: Communication skills training; Job satisfaction; Conflict resolution; Emergency medical technicians

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Introduction

Emergency medical technicians (EMTs) face daily exposure to human tragedy and chronic stressors such as dealing with cardiac arrest, chronic diseases, and accidents, and their work environment, unlike a hospital, is not well-equipped with sufficient medical staff. Under these circumstances, they must decide quickly and provide suitable care to their patients (Parvaresh-Masoud, Cheraghi, & Imanipour, 2021).

Thus, good communication skills are essential for healthcare professionals to diagnose illnesses, provide effective treatment, increase patient satisfaction, and resolve issues (Nikmanesh, Mohammadzadeh, Nobakht, & Yusefi, 2018). Moreover, job satisfaction is a sign that human expectations are parallel to their job rewards. Low job satisfaction among nurses is due to a variety of factors, including interaction with co-workers. Few studies have examined how communication skills explain job satisfaction (Jankelova & Joniakova, 2021).

According to the job demands-resources model (JD-R model), the abilities needed in interpersonal tasks involve cognitive,psychomotor, and emotional efforts, and they also help in enhancing communication (Lee, Lovell, & Brotheridge, 2010). Job satisfaction has been identified as a major determinant of nurse retention and performance. Moreover, the quality of intraorganizational communication and perceived communication satisfaction influence job satisfaction at different levels and for all types of employees within the organization (Vermeir et al., 2017). Communication skills training for nursing students leads to an increase in their satisfaction with patients. It is suggested that nursing teachers and managers pay more attention to communication skill training in both theoretical and practical courses (Sabet Dizkohi, Nasrabadi, & Ebrahim Abyaneh, 2016).

The emergency service, when compared with other hospital departments, is the unit in which violence against healthcare workers is most common. The increasing incidence of exposure to violent behaviors and verbal violence was found to decrease nurses’ emotional commitment to their occupation (Kiymaz & Koc, 2023). Conflict is an inevitable part of life, and EMTs must learn how to reduce its destructive effects while increasing its constructive results (Parvaresh-Masoud et al., 2021). It is also stated in the international literature that good relationships between the teams function as facilitators of the communication process in responding to emergencies, highlighting the effects that conflict in interpersonal relationships can have on the care provided (impairment in communication during the transfer of care can lead to unnecessary delays in diagnosis and treatment) and adverse events that result in deaths or in serious harms to the patients (da Silva Indruczaki, Miorin, Pais, Gemelli, da Silva Lima, & Dal Pai, 2020).

Thus, understanding the causes of the conflicts between the teams in transferring pre-hospital care can support investment in processes related to interactions between the pre- and in-hospital health teams. Previous researches have shown that effective communication between a nurse and patient can not only enhance the patient's physical condition regarding their illness, but also positively affect their emotional, mental, and social well-being (Parvaresh-Masoud et al., 2021; Vermeir et al., 2017). Skar and Soderberg (2018) reported that communication issues rather than healthcare staff's incompetence are often the root cause of patients' grievances regarding care services and improper adherence to doctors' orders. Their findings showed no significant difference between the mean pre-intervention score of job satisfaction of nurses in the two study groups. After the communication skills training program in

the experimental group, the mean job satisfaction score increased and it was significant compared to the control group. The data analysis showed that the interpersonal communication skills training program increased the mean score of job satisfaction in the intervention group. Therefore, it seems necessary that nursing managers design training programs in this regard for nurses (Dehaghani Akhormeh, & Mehrabi, 2012).

Huaman et al (2023) indicated an inverse relationship between work-family conflict and communication skills and work engagement. Moreover, their results indicate the influence of work-family conflict and resilience through the mediating role of work engagement and work-family conflict on job satisfaction. The importance of human resources in the organization is such that they are called internal customers and it can be said that until these customers are satisfied with their activities, it is very difficult and perhaps impossible to satisfy external customers. The present study investigated the effect of communication skills training on conflict resolution and job satisfaction among EMTs.

Methods

The current research was a quasi-experimental study with a pretest-posttest design and a control group. The research statistical population consisted of all EMTs in Rafsanjan city, Iran, in 2016, whose number was 280. By utilizing a purposive sampling technique, 30 emergency medical workers were chosen. The calculated sample size for the study was 43, considering $\alpha = 5\%$, $\beta = 20\%$, $d = 3$, and $\sigma = 5$. However, only 30 individuals were ultimately included in the study after considering the potential loss of participants in both the intervention and control groups. The participants were randomly divided into two groups of intervention and control ($n = 15$). The inclusion criteria of the study included permanent and not part-time employment in the hospital, engaging in different shifts, the willingness and physical and mental ability to cooperate, working experience of over 6 months in the hospital, and a minimum age of 25 years. The exclusion criteria were not taking part in training classes and unwillingness to answer questionnaire questions.

At the beginning of the study, participants received instructions on how the plan was going to be implemented and they were assured of the confidentiality of their information. The questionnaires used in the study were completed by the participants. The intervention group participants took part in 8 sessions of training during 2 months (a 1.5-hour session per week). The control group did not receive any training. The groups completed the questionnaires before and after the training.

In the first 30 minutes of the class, the topics were reviewed, and thereafter, the subjects participated in the group discussion. A clinical therapist participated in the discussion as an expert. Then, for 15 minutes, the subjects reviewed the taught skills through role playing and made a conclusion at the end of each session. The course covered the following areas that are essential in understanding the importance of effective communication skills and increasing the participants' ability to practice these skills effectively (Fetterman & Wandersman, 2012) (Table 1).

Job Descriptive Index: The tool included inquiries regarding satisfaction in the workplace that were taken from the Job Descriptive Index (JDI). The JDI was created at Cornell University by Smith, Kendall, and Hulin in 1969 and later translated by Shekarshekan in 2004. This 40-item questionnaire has 5 subscales including job description (10 questions), current manager or superintendent (10 questions), current

coworkers (10 questions), promotion opportunities in the organization (5 questions), and salary (5 questions). The items are scored on a 5-point scale ranging from 1 to 5 ("strongly disagree", "disagree", "no comment", "agree", and "strongly agree", respectively). Moreover, the total score of each dimension shows the satisfaction rate in that dimension. Furthermore, a score obtained from the total of 5 dimensions is considered as the total score. Scores of 40 and 200 indicate low and high satisfaction, respectively. Finally, the scores are calculated from 100 and expressed as percentage. Through correlating this scale with the Minnesota Satisfaction Questionnaire (MSQ), for the factors of overall job satisfaction, job, supervisor, salary, promotions and coworker, Dehghani obtained a Cronbach's alpha of 42.63, 0.25, 0.48, 0.37, 0.0, and 0.31, respectively, and confirmed the validity of the JDI. Moreover, for its reliability, he obtained a Cronbach's alpha of 0.67 for job, 0.92 for supervisor, 0.86 for coworker, 0.90 for promotions, 0.93 for salary, and 0.92 for overall job satisfaction, and confirmed it as a reliable tool (Dehaghani, 2012).

Dubrin Job Conflict Questionnaires: Dubrin (1985) constructed the Dubrin Job Conflict Questionnaires (DJCQ) with 20 two-choice questions (mostly agree and mostly disagree) (Dubrin, 1985). In this questionnaire, a score of +1 is given for mainly agreeing to answers and a score of 0 for mainly opposing answers; therefore, the job conflict score ranges between 0 and 20. Scores of less than or equal to 3 illustrate a low level of conflict, scores between 4 and 14 illustrate a medium level of conflict, and a score equal to or greater than 15 is suggestive of a high level of conflict in the person.

Table 1. Communication skills training

Sessions	Content
Module 1: The Characteristics of an Effective Communicator	Importance of Communication in the 21st Century; Communication Self-Assessment; Basics of Communication; Elements of Effective Communication; Summary
Module 2: Core Components of Effective Communication	An Introduction | Components of Communication; Verbal Communication; Importance of the Tone; Application and Practice; Assessment and Personal Constructive Feedback
Module 3: Effective Verbal Communication	What You Say Matters; Effect and Impact of Power Words; Positive Communication; Words for Success; Words to Avoid; Practice Activities & Constructive Feedback
Module 4: Vocal Impact	Introduction | The 'How' of Effective Communication; Pronunciation and Syllable Stress; Common Grammatical Errors; Constructing Effective Sentences; Word Stress for Vocal Impact; Role-plays and Constructive Feedback
Module 5: Non-Verbal Communication	Introduction | Body Language; Elements of Non-Verbal Communication; Do's and Don'ts; Interpretation of Various Body Signals; Recommended Postures for Workplace Communication; Summary and Practice
Module 6: Role of Listening in Communication	Introduction | Listening; The Impact of Listening on Communication; The 3 Levels of Listening; Listening with Empathy; How to Display Effective Listening; Practice Activities & Constructive Feedback
Module 7: Probing and Acknowledgment	Introduction | Questioning Skills; Use of Effective Probing in Communication; What is Acknowledgement? Benefits of Sincere Acknowledgements; The Conversation Cycle; Rapport Building; Summary & Assignment
Module 8: Assertive Communication	Types of Communication; Introduction to Assertiveness; The Art of Assertive Communication; Applying Communication Components Effectively; Cross-cultural Communication; Summary & Personal Constructive Feedback; Personal Development Plan

Aliabadi and Khakpour (2014) used exploratory factor analysis to validate this questionnaire, and reported a Cronbach's alpha coefficient of 0.81 for the questionnaire, which is acceptable. In order to determine the formal and content validity of the questionnaire, the questionnaire was given to 7 faculty members of the School of Nursing and Midwifery in Mashhad, and the validity of the questionnaire was confirmed.

*Statistical analyses:*The data were analyzed in the pretest and posttest stages using the descriptive statistics of mean and standard deviation and the inferential statistics of the analysis of covariance (ANCOVA). The normality of the data was checked using the Kolmogorov-Smirnov test. Moreover, Levene's test was used to assess the assumption of homogeneity of variances. Chi-square test was used to compare the means in the experimental and control groups. Data analysis was done using SPSS software (version 16; SPSS Inc., Chicago, IL, USA).

Results

Table 2 shows that 6 participants (20%) were 25 to 30 years old, 20 participants (66%) were 35 to 40 years old, and 4 participants (14%) were 40 years old and above. Most of the participants were married and most of them had an MSc.

Table 3 shows a difference in the mean of job satisfaction and conflict resolution between the control and experimental groups before and after the intervention.

Table 4 presents the results of ANCOVA. The results demonstrated the significant effects of time (pretest and posttest) ($F = 4.637$; $P = 0.04$), and conflict resolution ($F = 7.654$; $P = 0.003$) on job satisfaction. In other words, the estimated mean scores of job satisfaction and conflict resolution from the pretest and posttest stages were significantly different. Therefore, communication skills training had a significant effect on job satisfaction and conflict resolution at the level of five percent.

Discussion

The aim of this study was to investigate the effectiveness of communication skills training on job satisfaction and conflict resolution among EMTs. As was observed, there was a significant difference between job satisfaction in the control and experimental groups in the posttest after controlling the effect of the pretest.

The results are consistent with the research of Dehaghani et al. (2012), Jankelova and Joniakova (2021), Khodadadi, Ebrahimi, Moghaddasian, and Babapour (2013), and Sabet Dizkohi et al. (2016).

Table 2. Comparison of demographic data across groups

Variables	Categories	Groups		Comparison
		Intervention (n)	Control (n)	
Age	25-30 years	4	2	$X^2 = 1.33$ $P = 0.230$
	35-40 years	9	11	
	40 years and above	2	2	
Marital status	Married	9	8	$X^2 = 2.41$ $P = 0.222$
	Unmarried	6	7	
Education	BA	3	3	$X^2 = 4.97$ $P < 0.001$
	MSc	6	9	
	PhD	6	3	

Table 3. Mean and standard deviation of research variables in experimental and control groups

Variables	Groups	Pretest (Mean ± SD)	Posttest (Mean ± SD)
Job Satisfaction	Experimental	80.58 ± 10.11	83.35 ± 13.64
	Control	80.41 ± 9.23	80.35 ± 12.20
Conflict Resolution	Experimental	12.28 ± 3.3	9.30 ± 4.3
	Control	11.30 ±.3.8	11.39 ± 3.7

SD: standard deviation

The previous findings point to the strong direct effects of communication skills on nurses' job satisfaction (Jankelova & Joniakova, 2021). The role of communication in promoting organizational efficiency is increasingly recognized and emphasized. The absence of effective communication can compromise patient safety and the quality of care, so it is necessary to ensure effective communication, as well as to develop and maintain communication skills in the clinical setting (Paksoy, Soyer, & Çalık, 2017). By increasing communication skills, job satisfaction increases. At all levels of management and human resources of organizations, special importance is given to job satisfaction because this concept plays a significant role in organizational progress and improvement as well as the health of the workforce, and various fields of human sciences, for example, psychology, sociology, economics, and management, have addressed it. Therefore, in order to create a pleasant interpersonal atmosphere in the workplace, the organization members should pay attention to communication factors (Wikaningrum & Yuniawan, 2018). Communication in the workplace is important because it boosts employee morale, engagement, productivity, and satisfaction. Communication is also crucial for better team collaboration and cooperation.

Ultimately, effective workplace communication helps drive better results for individuals, teams, and organizations.

The results showed a significant difference between conflict resolution in the control and experimental groups in the posttest after controlling the effect of the pretest.

Therefore, communication skills training had a significant effect on conflict resolution in the experimental group. The results of the present research are consistent with the findings of Akhlaghi Rezaei, Salehmoghaddam, Heshmati Nabavi, and Behnam Vashani (2022), Nikmanesh et al. (2018), Soltani Ramezan Zadeh et al. (2020), and Sweeney, Warren, Gardner, Rojek, and Lindquist (2014). Our findings showed that the implementation of conflict management programs for nurses leads to a reduction in job conflicts among them. Further studies are suggested to explain the role of conflict management program implementation in the functioning of the health system.

Table 4. Analysis of covariance test of job satisfaction and conflict resolution in the control and experimental groups

Variables	Source	SS	MS	F	P	η^2	Power
Job Satisfaction	Pretest effect	496.88	987.85	698. 5	0.03	0.564	0.865
	Group	689.43	653.37	4.637	0.04	0.752	0.423
	Error	529.354	354.10				
Conflict Resolution	Pretest	342.29	310.28	6.235	0.07	0.147	0.723
	Group	527.31	247.31	7.654	0.003	0.198	0.752
	Error	296.91	369.4				

SS: Sum of squares; MS: Mean square

Nikmanesh et al. (2018) and Soltani Ramezan Zadeh et al. (2020) showed that the implementation of communication skills training courses for nurses can lead to improved patient satisfaction. Hospital directors were then recommended to hold regular communication skills training courses for their nursing staff. Research shows that conflict in organizations can have positive or destructive consequences. The essential destructive consequences of conflict are the loss of time and energy in the organization, dissatisfaction in the organization, reduction of the group's effectiveness, forgetting the main goals of the organization, people's misjudgment of each other, weakening of harmony, and lack of disagreement between the organizational groups.

Individuals, who are unsuccessful, tend to distance themselves from one another, resulting in the disintegration rather than the integration of the organization. (Parvaresh-Masoud et al., 2021). Effective communication and teamwork are essential to provide high-quality care and patient safety (Vermeir et al., 2015). Poor communication can lead to various negative outcomes, such as discontinuity of care and compromising of patient safety (Vermeir et al., 2015). The complexity of medical care along with the limitations of human action reinforces the importance of standardized communication and a secure environment, in which team members can express their concerns about patient safety. In such an environment, members can speak freely and critical language can create alertness and prevent confusion (Vermeir et al., 2017).

This research faced some limitations. The current investigation was conducted to examine a few employees, and thus, it cannot be generalized to other societies. The socio-cultural and economic differences of employees were not taken into account. According to the results, the impact of other skills such as problem-solving skills and assertiveness skills on job satisfaction should also be determined. The impact of communication skills should be measured among other people in society, including students, athletes, employees, etc. Based on the results of the research and the identification of the effects of communication skills training, the employees of organizations should try to increase this feature in the organization from the beginning. Since increasing the efficiency of human resources depends on training and developing knowledge and techniques, and creating desirable behaviors for successful job performance, more attention should be paid to this matter. To have efficient training, the content of the training courses must be consistent with individual and organizational needs.

Conclusion

Emerging knowledge about emergency care systems in post-conflict areas reveals a shortage of evidence concerning optimal practices and interventions. When rebuilding healthcare systems after conflict, it is crucial to focus on overcoming common obstacles that prevent effective emergency care. This involves improving pre-hospital care services and training healthcare workers in emergency care practices that are tailored to the specific context.

Conflict of Interests

Authors have no conflict of interests.

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Psychological Vulnerability and Self-Efficacy of Adolescents with and without Attention Deficit Hyperactivity Disorder

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Quantitative Study

Abstract

Background: Along with the negative effects of attention deficit hyperactivity disorder (ADHD) symptoms on individuals, various psychological factors are thought to be associated with these symptoms. The aim of the current study was to compare psychological vulnerability and self-efficacy in teenagers with or without ADHD syndrome.

Methods: This study was conducted using comparative method. The statistical population comprised all the first-grade middle school students of Karaj City, Iran, in 2018 (n = 100). A total of 100 people (50 people with ADHD by referring to Alborz Health Counseling Center and 50 normal people by referring to the first secondary school in Karaj) were selected and tested by a convenience sampling method. To collect data, Self-Efficacy Questionnaire for Children (SEQ-C) and Symptom Checklist-25 (SCL-25) were administered. Kolmogorov-Smirnov test was used at the level of descriptive statistics, as well as multiple regression, analysis of variance (ANOVA), and independent t-tests. The analysis was conducted using SPSS software.

Results: Based on the results, f values observed regarding obsessive-compulsive (F = 20.01, P = 0.001), depression (F = 19.48, P = 0.001), anxiety (F = 8.74, P = 0.001), morbid phobia (F = 5.58, P = 0.001), and psychosis (F = 19.06, P = 0.001) were significant at the level of $P \leq 0.05$. Therefore, there was a significant difference between the two groups regarding the symptoms of the above mental disorders. Moreover, social (F = 8.05, P = 0.001), educational (F = 2.70, P = 0.001), and emotional (F = 9.42, P = 0.001) self-efficacy were significant at the level of $P \leq 0.05$.

Conclusion: According to the results, self-efficacy and psychological vulnerability in adolescents with ADHD are lower than in normal adolescents. Since inefficiency and mental damage can bring problems in the later stages of development, it is suggested that schools focus more on the extracurricular and collective activities of students.

Keywords: Attention deficit disorder with hyperactivity; Adolescents; Psychological vulnerability; Self-efficacy

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Introduction

Attention deficit hyperactivity disorder (ADHD) is a childhood-onset disorder with core symptoms of inattention and hyperactivity/impulsivity, which may persist into adulthood (Brinksma et al., 2021). Since the diagnosis of ADHD depends on a clinician's interpretation of behavior and how he or she integrates reports from parents, caregivers, and teachers, measuring the true prevalence of the disorder can be challenging (Fadus et al., 2020). ADHD severely affects people's health and performance. Besides having a profound impact on the lives of thousands of children and adolescents, this disorder also places an individual at greater risk for mental health issues (Chen, 2022). Clinically, ADHD is characterized by persistent symptoms of inattention, hyperactivity, and impulsivity that impair functioning across multiple domains of daily life (Sedgwick-Muller et al., 2022).

Besides short attention spans, difficulties prioritizing activities, being easily bored, being distracted from activities that require reading or attention, and avoiding uninteresting activities, clinical psychologists list other symptoms associated with adult ADHD. Difficulties related to difficulties in organizing, focusing, and completing tasks may induce stress, anxiety, and feelings of inadequacy among those who experience these problems (Sahmurova, Arikan, Gursesli, & Duradoni, 2022). Several longitudinal studies have suggested that children and adolescents with ADHD are more likely to develop depression as adults. The co-occurrence of depression significantly worsens health outcomes (including the risk of completing suicide), causes psychosocial impairment, lowers the quality of life, and increases medical costs compared to those resulting from either disorder alone (Mayer et al., 2022).

Interestingly, these profound changes can trigger the vulnerability in teens, including mental health problems (Lonigro, Longobardi, & Laghi, 2023). As estimated by the World Health Organization (WHO) (2020), up to 50% of mental health conditions appear before the age of 14 years, with suicide representing one of the three leading causes of death among older adolescents (World Health Organization, 2020). In Bandura's definition of self-efficacy, self-confidence refers to confidence in a person's ability to succeed (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003). Due to low self-expectations, people with low self-efficacy believe that accidents and incidents are higher than they are, as well as adolescents with ADHD disorder (Lev, 1997). They often experience low self-efficacy, which increases the possibility of psychological damage to these teenagers (Komarraju & Nadler, 2013).

Self-efficacy is a universal psychological need that controls an individual's cognition, emotions, and decisions related to psychological well-being. Self-efficacy plays a critical role in stress management, influencing stressor assessment, method selection, and implementation (Sabouripour, Roslan, Ghiami, & Memon, 2021; Villada, Hidalgo, Almela, & Salvador, 2017). It does not hide the importance of mental health in human growth and development from anyone, and this issue is more important during adolescence. Investigators have determined that happiness, hope, life satisfaction, self-efficacy, and stress are significant predictors of adolescent mental health. Adolescents, especially those with ADHD, experience considerable psychological problems and receive less professional help (Wilcox & Nordstokke, 2019). Earlier research found a relationship between self-efficacy and psychological well-being (environmental mastery, autonomy, self-acceptance, positive relationships with others, personal growth, and purpose in life) (Komarraju & Nadler, 2013;

Sabouripour et al., 2021; Villada et al., 2017; Wilcox & Nordstokke, 2019). Despite this, little research has been conducted in Iran on how self-efficacy relates to health in normal and hyperactive individuals. The importance of adolescence as an infrastructure for mental health and improving mental disorders has already been demonstrated in past studies. This study was carried out to evaluate the psychological vulnerability and self-efficacy among adolescents with ADHD and healthy adolescents in Karaj City, Iran.

Methods

This study was conducted using a causal-comparative method. The research purpose was to compare patterns of psychological vulnerability and self-efficacy in adolescent boys with ADHD and normal boys. The statistical population comprised all the first-grade middle school students of Karaj City in 2018 (n = 100). A total of 100 people (50 people with ADHD by referring to Alborz Health Counseling Center and 50 normal people by referring to the first secondary school in Karaj) were selected and tested by a convenience sampling method. They were matched in two variables of age and economic income. The inclusion criteria were the informed consent of the children's parents to take part in the research and no history of participating in the self-efficacy and self-confidence training courses. Moreover, the exclusion criteria included incomplete questionnaires and dissatisfaction to continue the study. The method of conducting the research was to give a questionnaire to the group with ADHD disorder who were referred to Alborz Health Psychiatry Clinic, and to the normal group after referring to secondary school students. During the questionnaire, no personal information was asked of the respondents to maintain confidentiality. However, the researcher reminded them that the information collected was confidential. Additionally, they have been asked to answer the questionnaires with the researcher to improve the quality of the study.

Self-Efficacy Questionnaire for Children (SEQ-C): Muris (2001) developed this questionnaire based on the self-efficacy questionnaire (Bandura et al., 2003; Muris, 2001). SEQ-C contains 23 items, including academic self-efficacy, social self-efficacy, and emotional self-efficacy. It measures the subjects' ability in different situations. The social self-efficacy subtest consisted of the first eight items of the questionnaire. This scale measures the ability to communicate with peers, assertiveness, and social standards achievement. The academic self-efficacy subtest consisted of the second eight items of the questionnaire and measured a feeling of empowerment in managing learning behaviors, having mastery of the course topics, and fulfillment of academic expectations. The subtest of emotional self-efficacy includes the last seven items of the questionnaire and measures one's ability to deal with negative emotions and control them. Muris, 2001 showed a three-factor structure of scale in three social, academic, and emotional domains. A five-point Likert scale (ranging from 1 to 5) was used. Score one shows the lowest level of self-confidence, and score five shows the highest self-confidence. The author reported that the scale reliability was good and calculated an internal consistency of 0.80. Investigating the convergent and divergent validity of the scale, this study reported the reliability of the whole scale as 0.70, social self-efficiency as 0.78, academic self-efficiency as 0.80, and emotional self-efficiency as 0.87 . In Iran, the internal consistency of the whole scale was reported as 0.89, respectively (Khodayarifard, Manzari Tavakoli, & Farahani, 2012).

Symptom Checklist-25 (SCL-25): This is a brief form of SCL-90 made by Najarian and Davoodi (2001) based on the original version through explorative factor analysis

(Mayer et al., 2022; Najarian & Davoodi, 2001). Participants' responses on a Likert scale included: never (0), a few (1), somewhat (2), great (3), and very great or severe (4) according to the original scale. The total score is extracted from this list and higher scores mean more psychopathology. Mayer et al. (2022) assessed its validity through factorial analysis, convergent and divergent validity, and reliability via an internal consistency and re-test. They reported Cronbach's α of the new version as 0.97 for women and 0.98 for men and re-test coefficients after five weeks in the total sample as 0.78, women 0.77, and men 0.79.

Research findings have been analyzed at two levels: descriptive and inferential. Kolmogorov-Smirnov test was used at the level of descriptive statistics, as well as multiple regression, analysis of variance (ANOVA), and independent t-tests at the level of inferential statistics. The analysis was conducted using SPSS software (version 23, IBM Corporation, Armonk, NY, USA).

Results

The research sample comprised 50 boys with ADHD [mean ± standard deviation (SD) of age = 12.23 ± 0.09] and 50 normal boys (mean ± SD of age = 11.31 ± 1.07).

Based on the results of table 1, the range of scores for physical complaints was between 6 and 27, obsessive-compulsive between 3 and 15, depression between 2 and 7, anxiety between 3 and 12, morbid fear between 3 and 10, paranoid thoughts between 1 and 4, psychosis between 3 and 9, and total score fluctuated between 28 and 78 in the normal group. Besides, the range of scores for physical complaints was between 6 and 23, obsessive-compulsive between 3 and 12, depression between 2 and 8, anxiety between 3 and 12, morbid fear between 3 and 14, paranoid thoughts between 1 and 5, psychosis between 3 and 13, and total score fluctuated between 30 and 83 in the ADHD group. According to these results, the mean scores of all symptoms of mental disorders in the group of adolescents with ADHD symptoms were higher than that of normal students.

Based on the results of table 2, the range of social self-efficacy scores was between 17 and 37, academic between 14 and 38, emotional between 11 and 32, and the total score fluctuated between 58 and 101 in the normal group.

Table 1. Distribution of minimum, maximum, mean, and standard deviation (SD) of symptoms of mental disorders in the groups

Groups	Variable	Minimum	Maximum	Mean ± SD
Normal	Somatic complaints	6	27	12.97 ± 4.98
	Obsessive-compulsive	3	15	6.05 ± 2.56
	Depression	2	7	2.91 ± 1.19
	Anxiety	3	12	6.26 ± 2.32
	Morbid phobia	3	10	5.07 ± 1.96
	Paranoid thoughts	1	4	2.14 ± 1.01
	Psychosis	3	9	4.88 ± 1.07
ADHD symptoms	Somatic complaints	6	23	14.76 ± 4.91
	Obsessive-compulsive	3	12	8.79 ± 2.47
	INT	3	12	8.02 ± 2.57
	Depression	2	8	4.50 ± 1.72
	Anxiety	3	12	7.94 ± 2.34
	Morbid phobia	3	14	7.02 ± 2.61
	Paranoid thoughts	1	5	2.41 ± 1.41
	Psychosis	3	13	7.14 ± 2.50
	ADI	1	4	2.29 ± 1.05

ADHD: Attention deficit hyperactivity disorder; SD: Standard deviation

Table 2. Distribution of minimum, maximum, mean, and standard deviation (SD) of self-efficacy in normal and attention deficit hyperactivity disorder (ADHD) groups

Groups	Variable	Minimum	Maximum	Mean ± SD
Normal	Social self-efficacy	17	37	26.70 ± 4.25
	Educational self-efficacy	14	38	30.29 ± 4.92
	Emotional self-efficacy	11	32	22.27 ± 5.25
ADHD symptoms	Social self-efficacy	15	36	23.52 ± 4.94
	Educational self-efficacy	14	37	73.23 ± 5.46
	Emotional self-efficacy	10	31	19.11 ± 4.42

ADHD: Attention deficit hyperactivity disorder; SD: Standard deviation

In addition, the social self-efficacy scores ranged from 15 to 36, academic scores from 14 to 37, emotional scores from 10 to 31, and the total score ranged from 43 to 99 in the ADHD group. Based on these results, the mean score of all self-efficacy components in the group of adolescents with ADHD symptoms was lower than that of normal students.

According to the results of table 3, the Kolmogorov-Smirnov statistics was not significant at the level of P ≥ 05. Therefore, the distribution of scores was normal and there was a difference between the level of psychological vulnerability of adolescent students with ADHD and normal students.

In table 4, considering that the significance level is greater than 0.05, the assumption of the equality of the observed covariance matrix of the symptoms of mental disorders is accepted. Considering that the significance level is more than 0.05, the assumption of the equality of the observed self-efficacy covariance matrix is accepted.

Based on the findings in table 5, the observed f was significant at the level of P ≤ 0.05. In other words, the relationship between the linear combination of the dependent variables and the independent variable was significant.

Based on the results of table 6, f values observed regarding obsessive-compulsive, INT, depression, anxiety, morbid phobia, and psychosis were significant at the level of P ≤ 0.05. Therefore, there was a significant difference between the two groups regarding symptoms of the above mental disorders.

Besides, the f value observed regarding social, academic, and emotional self-efficacy was significant at the level of P ≤ 0.05. Therefore, there was a significant difference between the two groups regarding the components of self-efficacy. Based on the findings in table 7, the observed t was significant at the level of P ≤ 0.05. Therefore, there was a significant difference between the psychological vulnerability of normal students and those with ADHD symptoms. Moreover, there was a significant difference between the self-efficacy of normal students and those with ADHD symptoms.

Table 3. Comparison of the distribution of self-efficacy scores and symptoms of mental disorders with normal distribution

Groups	Variable	Kolmogorov-Smirnov	P-value
Symptoms of mental disorders	Somatic complaints	0.859	0.452
	Obsessive-compulsive	0.732	0.658
	Depression	0.428	0.642
	Anxiety	0.040	0.227
	Morbid phobia	1.250	0.061
	Paranoid thoughts	1.160	0.135
	Psychosis	0.102	0.202
Self-efficacy	Social self-efficacy	0.643	0.803
	Educational self-efficacy	1.020	0.243
	Emotional self-efficacy	0.831	0.495

Table 4. The covariance matrix test of symptoms of mental disorders and self-efficacy in two groups

Groups	Box's M	F	df1	df2	P-value
Symptoms of mental disorders	64.130	1.218	45	14310.252	0.151
Self-efficacy	8.450	1.339	6	31560.453	0.236

df: Degree of freedom

Discussion

In Powell et al. (2020) study, childhood ADHD is associated with an increased risk of later depression (Powell et al., 2020). Childhood ADHD symptoms were associated with higher depressive symptoms and an increased odds of clinically significant depressive symptoms in adolescence (Najarian & Davoodi, 2001). Perceived stress and sleep problems should be considered when mapping ADHD-related problems (Masi, Abadie, Herba, Emond, Gingras, & Amor, 2021). Further, ADHD is associated with higher exposure to stressors, and perceived stress has been found to be associated with comorbid emotional and externalizing symptoms in individuals with ADHD (Frick, Meyer, & Isaksson, 2023).

A recent qualitative study reported that adolescents with ADHD experienced stress as closely intertwined with negative feelings and anxiety (Hartman, Rommelse, van der Klugt, Wanders, & Timmerman, 2019). These authors found a significant relationship between the presence of externalizing behaviors in childhood and the appearance of ADHD traits at the start of adolescence. Moreover, the relationship between both variables appears to increase over time. As for internalizing symptoms, Sevincok et al. (2020) indicate a prevalence of 4.79% of anxious-depressive symptomatology, 2.72% of withdrawal, and 1% of somatic complaints among adolescents with ADHD (Oster, Ramklint, Meyer, & Isaksson, 2020; Sevincok, Ozbay, Ozbek, Tunagur, & Aksu, 2020).

To explain this finding, some of the problems experienced by adolescents or adults with ADHD, such as planning and organizing problems, time management difficulties, and difficulties in setting priorities and paying attention can create extra stress. Moreover, problems related to difficulties in organizing, focusing, and completing tasks may induce stress, anxiety, and feelings of inadequacy among those who experience these problems. Traditionally, stress-psychopathology relationships are studied in the context of internalizing problems, in particular depression, anxiety disorders, and medically unexplained somatic complaints rather than ADHD (Frick et al., 2023). Therefore, when studying stress exposure and the course of ADHD, not only the core symptoms of ADHD, but also the classic stress-related anxiety, depression, and somatic complaints need to be considered as possible comorbid outcomes. It may be hypothesized that individuals with ADHD who are exposed to stress are characterized both by a more persistent form of ADHD and by the onset of comorbid internalizing problems alongside this persistent ADHD trajectory (Sevincok et al., 2020). In addition, the effects of stress exposure in children with ADHD may also differ from the classic stress-related internalizing problems.

Table 5. Multivariate analysis of variance (ANOVA) comparing the mean score of symptoms of mental disorders and self-efficacy in two groups

Groups	Value	F	P-value	Eta
Symptoms of mental disorders	0.591	4.45	0.001	0.409
Self-efficacy	0.688	9.69	0.001	0.312

Table 6. Comparison of the mean score of symptoms of mental disorders and self-efficacy in two groups

Groups	Variable	SS	df	F	Eta	Statistical power
Symptoms of mental disorders	Somatic complaints	54.720	1	2.230	0.033	0.313
	Obsessive-compulsive	127.191	1	20.010	0.233	0.993
	Depression	42.880	1	19.480	0.228	0.992
	Anxiety	47.770	1	8.740	0.117	0.830
	Morbid phobia	29.770	1	5.580	0.078	0.644
	Paranoid thoughts	1.190	1	0.782	0.012	0.141
	Psychosis	87.190	1	19.060	0.224	0.990
Self-efficacy	Social self-efficacy	171.529	1	8.050	0.109	0.779
	Educational self-efficacy	731.309	1	2.700	0.290	0.999
	Emotional self-efficacy	222.485	1	9.429	0.125	0.857

SS: Sum of squares; df: Degree of freedom

Recent accounts of ADHD symptomatology have proposed that emotional regulation problems (e.g., low frustration tolerance, and explosive anger) are an important aspect of ADHD (Larsson, Dilshad, Lichtenstein, & Barker, 2011).

Researchers concluded that adolescents with ADHD suffer from low self-efficacy, which means that increasing self-efficacy speeds up the recovery process. Related literature reveals that adults with ADHD showed lower levels of self-esteem and self-efficacy when compared with the control group. The authors found some, but not all, of the resources of adults with ADHD to be reduced. In other words, people with ADHD seem to possess specific resources (Bunford, Evans, & Wymbs, 2015). Female youth with ADHD reported the lowest levels of confidence in their ability to self-regulate their learning.

Male youth with ADHD reported similar levels of self-efficacy for self-regulated learning (SESRL) beliefs as youth without ADHD (Newark, Elsasser, & Stieglitz, 2016). In fact, according to the results of the mediation analysis, the self-efficacy worked as a partial mediator in the association between mindfulness, stress, depression, and anxiety (Major, Martinussen, & Wiener, 2013). Thus, high self-efficacy beliefs lead to better management of interpersonal relationships and in this way, overestimate life satisfaction. Such adolescents who are strong in terms of self-efficacy believe that they are able to effectively control their life events. This understanding and belief gives them a different perspective from adolescents who are low in self-efficacy because this feeling has a direct effect on the behavior of these adolescents (Newark et al., 2016).

In order to explain this finding, according to Barclay's Hierarchy Theory (2003), the disturbance in inhibiting the behavior of adolescents suffering from ADHD causes disturbance in emotional self-regulation (drive and motivation) and this leads to disturbance in the temporary organization of behavior, prediction, and control. According to this theory, the effectiveness of the self-regulation of motivational behaviors on the academic self-efficacy beliefs and finally the academic progress of these teenagers take place through the mediation of executive functions and the behavioral inhibition system

Table 7. Comparison of the mean score of symptoms of mental disorders in two groups

Groups	Variable	ADHD group (mean ± SD)	Normal group (mean ± SD)	T	P-value
Symptoms of mental disorders	Social self-efficacy	62.70 ± 15.62	49.67 ± 12.62	3.78	0.001
Self-efficacy	Emotional self-efficacy	66.38 ± 12.49	79.72 ± 10.33	4.80	0.001

ADHD: Attention deficit hyperactivity disorder; SD: Standard deviation

In explaining this finding, it can be said that teenagers with low self-efficacy may think that events are more difficult than they really are, which increases stress and anxiety. On the other hand, high self-efficacy helps in creating a feeling of calm in facing difficult tasks and activities. Therefore, self-efficacy becomes an important source of feeling happy and causes mental health (Sabouripour et al., 2021). Psychological treatments have been evaluated for other psychiatric disorders in Iran (Dana, Effatpanah, & Mahjoub, 2018; Lee & Zentall, 2012; Sami, Effatpanah, Moradi, & Massah, 2017; Sharma & Kumra, 2022).

The sample of this research consisted only of male adolescents and cannot necessarily be generalized to female adolescents. Because the present study only compares students with ADHD with normal students, generalizing the findings to other groups of exceptional students should be done with caution. Moreover, the sample in this study included only willing respondents from 12-year-old students who were in the first grade of the first secondary school in Karaj City, which may limit the generalizability of the results. Self-reported questionnaires may propagate reporting bias, as students might not judge their skill levels accurately. Therefore, future research should consider utilizing integrated methods, such as combining quantitative and qualitative designs, to obtain complete information and minimize such bias.

It is suggested that self-efficacy and psychological damage among adolescents with special needs and normal adolescents be compared in future research. In addition, it is suggested that the self-efficacy and psychological vulnerability be investigated in adolescents with ADHD and adolescents with special needs and compared with the self-efficacy and psychological vulnerability of adolescents without special needs. Furthermore, it is recommended that future studies should carry out the research with a larger sample, and longitudinal and prospective studies in the sample group can better determine the evolution of this category of disorders in people who receive this diagnosis. This research showed that adolescents with ADHD are different from normal adolescents of the same age in terms of self-efficacy and psychological vulnerability. Therefore, measures should be taken through timely interventions and training of necessary skills for teenagers with this disorder to increase appropriate social, academic, occupational, and other skills. Teachers, parents, and peers can become better acquainted with the signs and symptoms of this disorder by participating in counseling sessions and gaining more knowledge about how to interact with adolescents with ADHD.

Conclusion

As a final summary of the results of this research, it can be stated that between the dimensions of self-efficacy including academic self-efficacy, social self-efficacy, emotional self-efficacy, and dimensions of psychological vulnerability including physical complaints, obsessive-compulsive, depression, anxiety, morbid fear, paranoid thoughts, and psychosis, there is a difference in two groups of adolescents with and without ADHD. According to the results of the present research, self-efficacy and psychological vulnerability in adolescents with ADHD are lower than in normal adolescents. Since inefficiency and mental damage can bring problems in the later stages of development, it is suggested that schools focus more on the extracurricular and collective activities of students. By consciously directing these programs, it is possible to help improve the self-efficacy and mental health of children and teenagers.

Conflict of Interests

Authors have no conflict of interests.

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Relationship of Ambivalence Over Emotional Expression and Cancer-Related Fatigue with Adherence to Treatment in Patients with Cancer

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Quantitative Study

Abstract

Background: In addition to the body, cancer affects the mental health of patients and can be associated with significant cognitive-emotional and behavioral effects. Among the vital behavioral factors in patients with cancer is adherence to treatment, which is essential due to the length of the treatment process. On the other hand, different styles of expressing emotions and fatigue related to this disease can impact adherence to treatment orders in patients. Therefore, the present research investigates the relationship of ambivalence over emotional expression (AEE) and cancer-related fatigue (CRF) with adherence to treatment in patients with cancer .

Methods: The present study was a correlational research. The statistical population included all patients with cancer with files in the Iranian Cancer Control Center (MACSA), Isfahan branch. From among them, 206 people (men and women) were selected through convenience sampling. The data collection tools used included the Ambivalence over the Expression of Emotion Questionnaire (AEQ; King and Emmons, 1990), Cancer Fatigue Scale (CFS; Okuyama et al., 2000), and General Adherence Scale (GAS; Hays et al., 1994). The collected data were analyzed using Pearson's correlation and stepwise regression statistical methods in SPSS software.

Results: As the results showed, there was a significant negative relationship between the variable of AEE and treatment adherence ($r = -0.184$; $P < 0.01$) and between the variable of CRF and treatment compliance ($r = -0.173$; $P < 0.05$). The variables of cancer fatigue and AEE predict a total of 4% of treatment adherence in patients with cancer ($R^2 = 0.048$).

Discussion: The conflict in expressing or not expressing emotions the patients experience during the various stages of diagnosis and treatment, and the physical and psychological fatigue associated with the disease can significantly impact adherence to treatment in patients.

Keywords: Emotional; Fatigue; Treatment adherence

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Introduction

As reported by the World Health Organization (WHO; 2018), 18.1 million fresh cases of cancer were diagnosed in 2018, and 9.6 million people died because of cancer (Oh et al., 2020). In Iran, it has been predicted that the number of new cases of cancer in 2025 will reach over 130 thousand people, approximately a 35% increase in the current prevalence (Abachizadeh & Keramatinia, 2016). The diagnosis of this disease as a highly stressful event and its complex treatment process is associated with many psychological disturbances in the patient and his/her family members (Seyedtabaee, Rahmatinejad, Mohammadi, & Etemad, 2017). Patients with cancer experience a range of negative moods, including tension, sadness, anger, fatigue, and confusion (Tabatabaeinejad, Golparvar, & Aghaei, 2019). These conditions affect patients not only psychologically and physically, but also behaviorally. Following medication and treatment orders is a behavioral factor that is important because of the length of the disease treatment process in patients with cancer . Adherence to treatment can be influenced by various factors, including the disease and treatment characteristics, the patient's characteristics, and those of the doctor and the health service system (Al Hamid, Ghaleb, Aljadhey, & Aslanpour, 2014).

Emotional and cognitive factors can also affect treatment adherence in patients. The two components of ambivalence over emotional expression (AEE) and disease fatigue are the most common factors that can lead to an increase in disease burden and affect treatment adherence. Emotional turmoil and lack of emotional regulation, followed by lack of expression or conflict in expressing emotions, can affect interpersonal relationships, health-oriented behaviors, doctor-patient-caregiver communication, and ultimately, efficacious treatment of patients. According to the research results, the experience of negative and disturbing emotions (Wandell, Ljunggren, Wahlstrom, & Carlsson, 2014) and AEE (Amiri, Ghasemi Gheshlagh, & Abbas Zadeh, 2018; Darandegan, 2015) are common in patients with chronic diseases, and is associated with the decrease in acceptance and completion of rehabilitation programs and non-adherence to healthy behaviors that reduce the risk of disease and adherence to treatment (Kneeland, Dovidio, Joormann, & Clark, 2016).

Another variable that can be effective in the relationship between cancer-caused cognitive damage and the consequences of cancer, and can affect the adherence to treatment in these patients is cancer-related fatigue (CRF) (Jacobs et al., 2019). Fatigue, as researches show, has been a most annoying and lasting symptom in breast cancer survivors after treatment and is associated with non-observance of self-care behaviors, psychological distress, and non-compliance with therapeutic orders (Arch et al., 2021).

Vorobiof, Malki, Deutsch, and Bivasbenita (2018) showed in their study that severe fatigue, especially in patients with advanced breast cancer and lung cancer, significantly affected treatment adherence and led to poor adherence to treatment in patients.

Many researchers in Iran and the world have investigated the psychological factors that patients with cancer struggle with. Examining the previous literature on patients with different cancers reveals that they have mainly paid attention to the expression or non-expression of emotions, and less conflict and AEE as essential psychological variables relevant to the various aspects of life and treatment of patients. The results in this field are contradictory. Researchers have discussed CRF as an influential component both in the expression of emotions and adherence to treatment in patients with cancer . Conducting such research seems necessary because of the increase in the prevalence of this disease, its long and complicated

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treatment process, and the lack of studies in this field. Therefore, the current research was conducted to determine whether AEE and CRF in patients with cancer can affect treatment adherence in these patients.

Methods

Study Design and Participants

The present study was a correlational research. The statistical population of the current research comprised all patients with cancer with files in the Iranian Cancer Control Center (MACSA), Isfahan branch. The present study sample included 206 people (men and women), with each type of cancer selected using a convenience sampling method. Due to the high prevalence and risk of Covid-19 disease, data were collected online. Accordingly, all patients who met the inclusion criteria were contacted, and the link to the research questionnaires was sent to patients after providing them with the necessary explanations, obtaining informed oral consent, and ensuring they are able to complete the questionnaire online. It should be noted that the questionnaires of the present study were completed individually, and in the case of any question or need for guidance in completing the questionnaires, the researcher answered them online.

Ethical considerations in the present study included obtaining oral consent for participation, all research patients having the freedom to withdraw from the study at any stage, and all their information being kept confidential. Patients were also ensured that not participating in the research or not continuing to cooperate would not affect the care provided to them and would not interfere with their treatment. The information of subjects or their names were not disclosed in any of the data collection steps or preparation of the final report, and their data was not provided to any actual or legal person. Moreover, participation in the research did not impose any financial burden on the subjects.

The inclusion criteria were age range of 16-65 years, awareness of the disease by the patient, the passage of at least 1 year since the diagnosis of the disease, minimum literacy (ability to read and write), lack of any psychological treatment from the time of the onset of the disease until the time of the research, the absence of any other diseases, the absence of terminal conditions of the disease (End Stage), and the absence of major psychiatric disorders based on the DSM-V diagnostic criteria. The exclusion criteria were the subject's unwillingness to participate in the research and physical disability caused by the treatment.

Sample Size

In the current research, considering the error level of $\alpha = 0.05$ and the statistical power of 80% (Warwick & Lininger, 1975; Bashiri Nejadian, Bayazi, Joharifard, & Rajaei, 2021), the sample size of 200 people was calculated, and considering the possibility of loss of samples, the final sample size was considered to be 250 people. Finally, after removing the distorted questionnaires, the data of 206 people were included in the research.

Instruments and variable

Ambivalence over the Expression of Emotion Questionnaire: The original version of the Ambivalence over the Expression of Emotion Questionnaire (AEQ) includes 28 questions, and the number of questions in its Iranian version has been reduced to 23.

This questionnaire was developed by King and Emmons in 1990 and has two factors: ambivalence in expressing positive emotions and ambivalence in expressing negative emotions. This questionnaire is scored on a 5-point Likert scale ranging from

1 (never) to 5 (always). King and Emmons (1990) reported a Cronbach's alpha of 0.89 for the whole questionnaire, 0.87 for expressing positive emotions, and 0.77 for expressing negative emotions (King & Emmons, 1990). Alavi, Asgharimoghadam, Rahiminezhad, and Farahani (2017) examined the validity and reliability of this questionnaire in Iran. Their research confirmed this tool's validity, and the results showed that its reliability was between 0.77 and 0.86 by Cronbach's alpha method. In the present study, the reliability of this questionnaire was calculated to be 0.88 by Cronbach's alpha method.

General Adherence Scale: Hays et al. designed the General Adherence Scale (GAS) in 1994. The General Adherence Scale measures the patient's willingness to follow the physician's recommendations in general. It includes 5 items scored on a 6-point Likert scale. The scores of 2 items of the test (questions 1 and 5) are achieved reversely. In the study conducted by Hays et al. (1994), the validity of the test was determined through construct validity using internal consistency method (R = 0.81) and was reported at an acceptable level, and the reliability of this scale based on the test-retest method with a two-year interval was reported at 0.60. In Iran, Zarani, Zamani, Besharat, Ehsan, Rahiminejad, and Sadeghian (2010) obtained the reliability of this scale at 0.47 using Cronbach's alpha coefficient. In the present study, the reliability of this scale was calculated at 0.66 using Cronbach's alpha method.

Cancer Fatigue Scale: The Cancer Fatigue Scale (CFS) was developed by Okuyama et al. (2000). It is a self-report scale for measuring CRF. This scale includes 15 items and the 3 physical, emotional, and cognitive subscales. Its questions are scored on a 5-point Likert scale. Each question obtains a score between 1 (not at all) and 5 (very high). The patient's current condition is marked on this scale (Shun, Beck, Pett, & Berry, 2006).

The minimum and maximum total scores of this questionnaire are 0 and 60, respectively, and higher scores indicate more significant fatigue and vice versa.

Accordingly, the probable degree of fatigue varies between 0 and 28 in the physical dimension, between 0 and 16 in the emotional dimension, between 0 and 16 in the cognitive dimension, and the general fatigue score varies between 0 and 60.

The validity and reliability of this tool were examined in the study conducted by Okuyama et al. (2000), and the results showed that it was a reliable measurement tool. Regarding internal consistency, Cronbach's alpha coefficient was 0.89 in the physical subscale, 0.79 in the emotional subscale, 0.79 in the cognitive subscale, and 0.88 in total scale. In Iran, Haghighat, Montazeri, Akbari, Holakouei Naeini, and Rahimi (2008) calculated the reliability of the CFS and reported it at 0.92, 0.89, 0.85, and 0.95, respectively, for dimensions of physical, emotional, cognitive, and total fatigue, using Cronbach's alpha coefficient. In the present study, the reliability of this scale was calculated at 0.92 using Cronbach's alpha method.

Analysis

The patients completed the demographic characteristics questionnaire before completing the abovementioned questionnaires. SPSS software (version 19; IBM Corp., Armonk, NY, USA) was used to analyze the data. The demographic characteristics of patients and research variables were analyzed using descriptive statistics. Pearson's correlation coefficient and stepwise regression were used to evaluate the correlation of AEE and CRF and their ability to predict adherence to treatment. The statistical results were considered significant at a level of $P \leq 0.05$.

The present study was derived from a plan approved by Isfahan University of Medical Sciences, Iran, with a scientific code of 299061 and a code of ethics of IR.MUI.MED.REC.1400.169. It was conducted from April to June 2020.

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Table 1. Descriptive results of research variables

Statistical indices	Mean	SD	Minimum	Maximum
Ambivalence over emotional expression	75.66	14.73	39	118
Cancer-related fatigue	25.48	13.60	2	60
Adherence to treatment	22.70	4.67	12	30

SD: Standard deviation

Results

According to the obtained data, the mean age of patients in the present study was 44.90 years, and their level of education varied from diploma to master's degree. In terms of gender, 15% of them were female, and 85% of them were male. Moreover, 82% of the patients reported metastasis, and 40.3% had a family history of cancer. Regarding disease status, at the time of diagnosis, 11.2% were in stage 1, 46.1% were in stage 2, 35.4% were in stage 3, and 7.3% were in stage 4. Regarding socio-economic status, 59.7% reported a moderate level, 6.8% reported a deficient level, and 1.9% reported a high level. Table 1 presents descriptive results related to research variables.

As can be seen in table 1, the highest mean among the three variables is related to AEE (75.66). Furthermore, the mean of the CRF variable is 25.48, and the mean of the adherence to treatment variable is 22.70. The Pearson correlation coefficient was used to investigate the correlation of AEE and CRF with adherence to treatment, the results of which are presented in table 2.

As the results presented in table 2 show, there is a significant negative relationship between AEE and adherence to treatment ($r = -0.184$; $P \leq 0.01$) and between CRF and adherence to treatment ($r = -0.173$; $P \leq 0.05$). Then, stepwise regression was used to predict the score of AEE and CRF based on adherence to treatment, the results of which are presented in tables 3 and 4.

As the results of model analysis of variance (ANOVA) show, the obtained regression model is significant at the level of $P < 0.01$, and CRF and AEE variables predict a total of 4% of adherence to treatment in patients with cancer ($R^2 = 0.048$).

As can be seen in table 4, the beta value obtained for the AEE variable is -0.045, which is significant at $P \leq 0.05$ given the t-statistic ($t = -1.987$).

Discussion

The present study evaluated the relationship of AEE and CRF with adherence to treatment in patients with cancer . The results showed that AEE and CRF have a negatively significant relationship with adherence to treatment, and increasing fatigue and AEE can reduce adherence to treatment in patients with cancer . In addition, the two variables of AEE and CRF predicted 4% of treatment adherence in patients with cancer .

Table 2. Results of the correlation coefficient of ambivalence over emotional expression and cancer-related fatigue with adherence to treatment

Variable	AEE	CRF	Adherence to treatment
1	1		
2	0.321**	1	
3	-0.184**	-0.173*	1

AEE: Ambivalence over emotional expression; CRF: Cancer-related fatigue

*P ≤ 0.05; **P ≤ 0.01

Table 3. Results of stepwise regression of ambivalence over emotional expression and cancer-related fatigue with adherence to treatment

Model	Variable		Indices						
			SS	df	MS	F	P	R	R^2
Step 1	Cancer-related fatigue, ambivalence over emotional expression	Regression	216.914	2	108.457	5.169	0.006	0.220	0.048
		Residual	4259.610	203	20.983				
		Total	4476.524	205					

SS: Sum of squares; df: Degree of freedom; MS: Mean square

These findings are in line with those of previous researches by Ramesh, Ghazian, Rafiepoor, and Safari (2018), Bashiri Nejadian et al. (2021), Nadrian, Hosseini, Basiri, and Tahamoli (2019), and Vorobiof et al. (2018).

AEE and CRF can have a mutual relationship. Because a person suffering from a chronic disease such as cancer not only experiences much physical fatigue caused by medication and treatment, but also suffers from emotional and psychological fatigue.

Various aspects of disease fatigue can negatively affect the patient's sense of security and certainty in decisions, and finally, the patient becomes ambivalent in multiple elements, including the expression of emotions. This ambivalence and lack of emotional regulation in difficult and prolonged conditions of the disease can impose a tremendous psychological burden on the patient. This leads to an experience of more dynamic and cognitive fatigue besides fatigue caused by the disease and treatment.

Research has also shown that there is a direct relationship between disease-related characteristics and emotional disturbance, cancer fatigue, and cognitive performance in patients with cancer (Shariati, 2021).

As for the relationship between the two variables of AEE and adherence to treatment, our research showed a significant negative relationship between AEE and adherence to treatment. This finding is in line with that of previous research by Ramesh et al. (2018) and Bashiri Nejadian et al. (2021). An explanation for this finding is that, as researchers have shown, individuals with cancer experience a high level of AEE compared to healthy individuals (Ji, 2019). Indeed, the disease can lead to emotional dysregulation and AEE in patients. The suppression of emotions and lack of expression of feelings results in the lack of acceptance of the illness and relevant emotions, and this can lead to reduced self-care behaviors and adherence to treatment in patients.

Research has also shown that treatments based on regulating and correcting emotions can increase patients with cancer ' self-care behaviors (Tabibzadeh, soleimani, & Ghorban Shiroodi, 2022).

Table 4. Stepwise regression coefficients of ambivalence over emotional expression and cancer-related fatigue with adherence to treatment

Variable	Coefficient B	Standard error	Beta coefficient	t	P
Constant	27.217	1.652		16.470	0.001
Ambivalence over emotional expression	-0.045	0.023	-0.144	-1.987	0.048
Cancer-related fatigue	-0.044	0.025	-0.127	-1.756	0.081

AEE, in the long term, can lead to feelings of anger, despair, depression, loneliness, disruption in interpersonal relationships, and even feelings of guilt and frustration in patients (Bashiri Nejadian et al., 2021; Alavi et al., 2017). These negative emotions destroy the patient's beliefs, knowledge, and health-oriented behaviors and reduce or disrupt their adherence to the treatmen.

Our findings on the relationship between CRF and treatment adherence align with previous research findings by Nadrian et al. (2019) and Vorobiof et al. (2018).

This finding can be explained by the fact that CRF affects patients physically, cognitively, and emotionally and leads to lack of energy, dysfunction, impaired concentration and attention, an increase in cognitive errors, and a decrease in motivation (Weis & Horneber, 2015; Schottker et al., 2020). These factors, both behaviorally and negatively impacting the patient's beliefs and views about the disease, treatment, and treatment results, can lead to a decrease in motivation and adherence to the treatment. Research has also shown an inverse and significant relationship between self-care behaviors and adherence to treatment and fatigue in patients (Nadrian et al., 2019), and greater fatigue in patients is associated with less adherence to treatment. Fatigue in patients with cancer can also lead to a delay in the continuation of treatment, stopping or changing treatment, and poor adherence to treatment (Vorobiof et al., 2018).

The results showed that AEE and CRF cannot predict patients' adherence to treatment. According to the theories, these two variables are expected to have more impact. A reason for this finding can be the demographic characteristics of the disease and those of the patients in the current study, including the unique history of metastasis, different cancers, and differences in the stage of the disease at the time of diagnosis, and even the patients' culture. All of these factors affect the beliefs and knowledge of the patients, their attitude to their disease, and their expression or non-expression of emotion and disease fatigue. Research has also shown that trust in treatment and belief in the effectiveness of treatment has a direct relationship with adherence to treatment (Te Paske, Vervloet, Linn, Brabers, van Boven, & van Djik, 2023). Adherence to treatment can also be associated with factors such as treatment costs, insurance support for patients, availability of medical services, health literacy of patients, and the effectiveness of previous treatments. AEE and CRF may exert their effect on treatment adherence through these mediating variables.

Despite all the researchers' efforts to be accurate in all stages of the research, this research had some limitations. Among the main limitations, it can be mentioned that the sample of patients with cancer was limited to one center in Isfahan City, and also, the sample of patients in the present study included patients with all types of cancer. Thus, the generalizability of the results should be done with caution. In this regard, it is suggested that patients from other cities and cultures be studied in future research. It is also recommended that in future research, the role and performance of each of the variables of the present research in each type of cancer be investigated as a unit.

Moreover, due to the high prevalence and risk of coronavirus, data collection in the present study was done online, and due to some patients' lack of access to and familiarity with the Internet, some patients who met the study inclusion criteria were not included in the study. Furthermore, there was not much research background about the research variables inside and outside the country. Therefore, the possibility of comparing the results of this research with other research conducted in this field was limited.

Conclusion

According to our results, lack of emotional regulation in patients, conflict in expressing or not expressing emotions, and disease-caused physical and emotional fatigue can have a significant effect on adherence to medication and treatment orders in patients. The research results suggest that healthcare workers and treatment staff should pay special attention to the importance of treatment adherence, and provide appropriate therapeutic and psychological training and support to patients and their families to improve treatment adherence. They should also take advantage of methods such as expressive therapies, cognitive-behavioral interventions such as relaxation, cognitive reconstruction, and supportive counseling to increase the ability of patients to recognize and express their emotions and feelings, to promote self-expression, and create empathic relationships in order to reduce AEE and CRF.

Conflict of Interests

Authors have no conflict of interests.

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The Effectiveness of Alpha-Asymmetry Neurofeedback on Depression and Rumination in Women with Sexual Dysfunction

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Quantitative Study

Abstract

Background: The purpose of the current study was to correct frontal alpha asymmetry (FAA) in order to reduce depression and rumination in women with sexual dysfunction using neurofeedback intervention and comparing its effectiveness with a control group.

Methods: The research method was a quasi-experimental design with a pretest-posttest and control group. The target population included all women with sexual dysfunction in the northern part of Tehran city, Iran, in the year 2021. Initially, a sexual dysfunction questionnaire was distributed among 100 women with sexual dysfunction visiting psychological clinics in the northern part of Tehran, and from among those who scored high on the sexual dysfunction questionnaire, 20 individuals were conveniently selected and divided into two groups of 10 (experimental and control). At this stage, depression and rumination questionnaires were administered as a pretest to the subjects. Subsequently, the experimental group received the intervention of FAA correction in 15 sessions of 45 minutes each, and then, the aforementioned tests were administered again as a posttest. Data were analyzed using analysis of covariance (ANCOVA) in SPSS software.

Results: The results of this study emphasize the effectiveness of alpha asymmetry neurofeedback in reducing symptoms of rumination following neurofeedback training, which is significant due to the important role of these two variables in the continuation of depression.

Conclusion: The findings of the current study suggest that neurofeedback training can be used as a beneficial intervention to reduce symptoms of depression and rumination in women with sexual dysfunction.

Keywords: Alpha asymmetry; Neurofeedback; Depression; Rumination; Sexual dysfunction

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Introduction

Marriage and cohabitation always start with a beautiful outlook for couples, but after a while, due to differences between men and women that stem from growing up in two different environments (Ruhlmann, Gallus, & Durtschi, 2018), as well as a lack of sufficient understanding of each other's psychological characteristics and personality, problems arise, creating an unpleasant image of marriage (Ebrahimi, 2020). Moreover, marital relationships are sometimes accompanied by problems and dissatisfaction that lead to conflict in couples. After marriage, changes occur in the lifestyle, social relationships, and interpersonal relationships of both parties, all of which require the couple's ability to adapt (Siegel, Dekel, & Svetlitzky, 2021), as each individual has been nurtured in a unique developmental context and possesses a lifestyle that includes personal and social values and beliefs, which are, in fact, different from those of their spouse. Thus, they must adapt to these conditions, sharing life with another person who has different beliefs, values, and culture (Jomenia, Nazari, & Soliemanian, 2021).

One of the issues that cause conflict and its continuation in couples is their sexual dysfunction. Although the exact prevalence of women's sexual disorders is difficult to determine, existing statistics indicate that about 19% to 45% of women suffer from at least one sexual problem. A good sexual relationship can lead to pleasure, satisfaction, and emotional closeness in couples, while sexual dysfunction can cause severe individual dissatisfaction and negatively affect quality of life (QOL) and interpersonal relationships (Mosadegh, Darbani, & Parsakia, 2023; Shadanloo, Yousefi, Parsakia, Hejazi, & Dolatabadi, 2023). Even in the short term, this disorder can lead to the emergence of dissatisfaction, grief, and sorrow, and if it becomes chronic, it can lead to disturbance, depression, damage to interpersonal relationships, increased conflict, and problems in other aspects of individual life (Hamzehgardeshi, Sabetghadam, Pourasghar, Khani, Moosazadeh, & Malary, 2023). According to the American Psychiatric Association (APA), female sexual dysfunction is divided into 4 categories: disorders of sexual desire, arousal, orgasm, and pain, where sexual desire disorder means that despite being physically healthy, the individual has no desire for sexual participation and behavior, and arousal disorder appears as a decrease in vaginal lubrication or painful intercourse, in some of these women, vascular congestion in response to erotic stimuli significantly decreases. Physiologically, orgasm means reaching the peak of sexual pleasure. Before reaching this stage, the arousal phase must be completed. The fundamental problem in most patients is that they remain in the arousal phase and cannot move to the next stage, gradually losing their sexual desire (Hasanzadeh Mofrad, Karami Dehkordi, Mozaffar Tizabi, & Amirian, 2015).

Women's sexual dysfunction is a multidimensional and multifactorial problem linked to biological, psychological, social, and cultural factors, affecting overall well-being and QOL (Ghassami, Shairi, Asghari Moghadam, & Rahmati, 2014). One of the characteristics in women with sexual dysfunction is depression. Despite numerous researches on improving diagnostic and prognostic methods, the prevalence of depression remains high (Patten, Williams, Lavorato, Bulloch, Wiens, & Wang, 2016).

According to the World Health Organization (WHO), by 2020, depression will be the second leading cause of disability (Reddy, 2010). In this context, rumination can be considered an underlying factor for the failure of psychotherapeutic and pharmacological methods, and consequently, as an explanation for cognitive deficits

in depressed individuals (Askari Masuleh & Taheri, 2023; Watkins, 2018). The cognitive resource theory suggests that negative thoughts of depression and rumination consume the cognitive abilities that should be involved in task-related processes (Gotlib & Joormann, 2010; Levens, Muhtadie, & Gotlib, 2009; Watkins & Moulds, 2005).

Based on this theory, valuable cognitive resources are diverted towards irrelevant depressive and ruminative thought processes. Some researchers believe that rumination in depression stems from a defect in executive functions in cognitive control functions, such as inhibition (De Lissnyder, Ernst, Derakshan, & De, 2010; Owens, Koster, & Derakshan, 2013), ultimately leading to excessive processing and preoccupation with negative emotions (Gotlib & Joormann, 2010; Owens et al., 2013).

Overall, findings from various studies indicate that there is a relationship between depression, rumination, and cognitive impairment, especially damages related to attention, inhibition, and working memory processes (Connolly, Wagner, Shapero, Pendergast, Abramson, & Alloy, 2014; Gotlib & Joormann, 2010; Hertel, 1998; Levens et al., 2009; Watkins & Moulds, 2005).

Furthermore, frontal left asymmetry (FLA) is a common finding in brainwave measurements of individuals with depression and rumination (Blackhart, Minnix, & Kline, 2006; Feng et al., 2012; Mathersul, Williams, Hopkinson, & Kemp, 2008). FLA is defined as the relative difference between the levels of electrical activity in the left and right frontal hemispheres during EEG measurement in a resting state (Davidson, 1998; Henriques & Davidson, 1990). Research regarding the hyperactivity of the right hemisphere and relatively low activity of the left hemisphere - disorder associated with a lack of coordination in intrahemispheric brain activity - emphasizes the connection of depression with high activity of the right hemisphere (Allen, Urry, Hitt, & Coan, 2004; Baehr, Rosenfeld, Baehr, & Earnest, 1998; Baehr, Rosenfeld, Baehr, & Earnest, 1999; Carvalho et al., 2011; Gold, Fachner, & Erkkila, 2013; Gotlib, 1998; Gotlib & Joormann, 2010; Vuga, Fox, Cohn, George, Levenstein, & Kovacs, 2006). Thus, frontal alpha asymmetry (FAA) reflects the balance between the activity of the right and left frontal hemispheres (Allen et al., 2004). Evidence suggests that the right hemisphere primarily encompasses the processing of negative emotions, pessimistic thoughts, and maladaptive thinking styles, all of which play a role in the cognitive phenomenology of depression, and subsequently, in the increase in anxiety, stress, and pain associated with illness (Spielberg et al., 2012).

One of the therapeutic methods used to correct alpha asymmetry in order to reduce depression and rumination is neurofeedback intervention. Electroencephalography (EEG) biofeedback, or neurofeedback, is presented as a tool for adjusting hemispheric asymmetry in frontal activity with the aim of regulating affect (Brambilla, Pirovano, Mira, Rizzo, Scano, & Mastropietro, 2021). Typically, biofeedback is a biobehavioral technique aimed at changing physiological activity and, in turn, improving health or performance. According to biofeedback principles, neurofeedback also relies on the premise that providing individuals with information about brain activity can expand their conscious control and help them learn how to regulate their brain activity (Aghaziarati, Fard, Rahimi, & Parsakia, 2023). Repeating neurofeedback sessions strengthens and creates new brain connections and pathways in the mechanism of neural reconstruction, leading to positive changes in emotions. One of the most common neurofeedback protocols for treating affective disorders is the alpha asymmetry protocol (ALAY), which has been used in various studies and yielded different findings (Allen et al., 2004; Choi, Chi, Chung, Kim, Ahn, & Kim,

2011; Quaedflieg, Smulders, Meyer, Peeters, Merckelbach, & Smeets, 2016). The results of these studies have shown therapeutic effectiveness for individuals with depression or anxiety, but the criticisms that can be made of each are the small number of intervention sessions and the selection of individuals with depression solely based on the presence of symptoms, regardless of the initiating factor of the disorder. Therefore, on the one hand, designing a clinical trial that, in addition to diagnosing and treating depression symptoms, examines the initiating factor of depression symptoms, and on the other hand, examining the effect of neurofeedback intervention on improving rumination scores and executive functions in individuals with depression and comparing the results with a placebo group will demonstrate the importance of such a research. From a clinical perspective, similar patterns of FAA have been observed in different conditions characterized by emotional dysregulation, such as anxiety and depression (Mennella, Messerotti, Buodo, & Palomba, 2015; Moscovitch, Santesso, Miskovic, McCabe, Antony, & Schmidt, 2011; Stewart, Coan, Towers, & Allen, 2011).

Thus, in the present study, an attempt was made to control the anxiety variable of the participants and to adjust the therapeutic protocol with the goal of reducing alpha power on the left hemisphere to correct FAA. In this study, in addition to frontal alpha power, frontal beta power was measured as an indicator of frontal activity. Ultimately, the current research was conducted with the aim of assessing the effectiveness of alpha asymmetry neurofeedback on depression and rumination in women with sexual dysfunction conflicts.

Methods

This quasi-experimental study was conducted with a matched two-group, pretest-posttest design, consisting of an experimental group and a control group. The target population included all women with sexual dysfunction in the northern part of Tehran city, Iran, in the year 2021. Initially, a sexual dysfunction questionnaire was distributed among 100 women with sexual dysfunction visiting psychological clinics in the northern part of Tehran. From among those who scored high on the sexual dysfunction questionnaire, 20 individuals were conveniently selected and divided into two groups of 10, experimental and control.

Research Tools

1. Female Sexual Function Index: The Female Sexual Function Index (FSFI(is referred to as the gold standard for assessing women's sexual function, and has been translated and validated in more than 30 different countries (Ghassami et al., 2014). It consists of 19 questions, measuring 6 dimensions of sexual function (sexual desire, orgasm, arousal, sexual pain, lubrication, and sexual satisfaction) over the past 4 weeks. The score range for the sexual desire dimension is 1.6-2 points, and for the other dimensions 0-6. The minimum score for the sexual desire dimension is 1.2, for sexual arousal, lubrication, orgasm, and pain is 0, and for sexual satisfaction is 0.8 or 0, with a minimum total scale score of 2. The maximum score for each section is 6, and for the total scale, it is 36. Obviously, the total score is obtained from the sum of the scores of the 6 sections. A score of 0 indicates that the individual has had no sexual activity in the past month. The reliability of this tool in previous studies has been estimated at 0.87, and the cut-off point for the total scale to diagnose sexual dysfunction has been determined to be 28 or less (Shayan, Masoumi, Yazdi-Ravandi, & Zarenezhad, 2015).

2. Beck Depression Inventory-II: The Beck Depression Inventory (BDI) is a widely used self-report tool for measuring depression-related cognitions. The revised version (BDI-II) is more aligned with the DSM-IV criteria and covers all elements of depression based on cognitive theory (Steer, Clark, Beck, & Ranieri, 1999). Stefan-Dabson, Mohammadkhani, and Massah-Choulabi (2007) reported a one-week test-retest reliability coefficient of 0.93 for this questionnaire in a sample of 354 individuals.

3. Ruminative Responses Scale: Nolen-Hoeksema and Morrow (1991) developed the Ruminative Response Scale (RRS) as a self-assessment questionnaire. In Iran, Bagherinezhad, Salehi Fadardi, and Tabatabayi (2010) reported the correlation of this scale with the BDI at 0.79 and with the Beck Anxiety Inventory (BAI) at 0.56.

4. Two-Channel EEG Diagnostic System; Clinical Q: This diagnostic system is a two-channel EEG recording conducted using the ProComp2 Infiniti device in this study.

This system has a clinical database of 1508 clinical references and is based on the notion that a client reporting a specific mental state (e.g., anxiety) also presents a neurophysiological representation of that state. According to the diathesis-stress model, the condition reported by the client is related to the neurological background that appears. Thus, a normative database would consider the client normal (or symptom-free) and consistent with normative databases as long as the client only has the neurological background. To evaluate in Clinical Q, points Cz, O1, F3, and Fz (the international 10-20 system for EEG recording sites) are recorded under specific conditions (eyes closed or open) for a specific duration (320 seconds). Finally, the recorded measurements are presented in Excel output tables. According to the Clinical Q database, if the alpha range (8-12 Hz) on the left is more than 15% different from the right (less activity in the left hemisphere) and if the beta range (12-18 Hz) on the right is more than 15% different from the left (more activity in the right hemisphere), depression symptoms should be examined. Considering the clinical characteristics of our sample and the hypotheses of our research (depression resulting from marital conflicts and cognitive impairments in depression), several other indices in Clinical Q are significant; one is the change in alpha amplitude over Cz in the eyes open condition compared to eyes closed less than 30%, which encourages clinicians to explore problems in short-term memory and information retention. Another is the difference of less than 50% in alpha amplitude over O1 from eyes open to eyes closed, which, directs the specialist towards examining symptoms of post-traumatic stress; therefore, here the difference in alpha and beta amplitudes over F3-F4 as a characteristic of reactive depression disorder and its severity before and after the intervention and pseudo-intervention are evaluated. The difference in alpha amplitude in eyes open compared to eyes closed in Cz, O1 is also measured as an indicator of the effectiveness or ineffectiveness of the intervention or pseudo-intervention of neurofeedback in both groups (Swingle, 2015).

Procedure: After the pretest phase and random assignment of participants to two groups, the intervention program was implemented. According to the intervention plan, each group received 15 sessions of 45 minutes 3 times a week for the experimental intervention and sham intervention. At the end of the experimental and sham intervention sessions, all measurements from the pretest phase were repeated as a posttest. It is worth mentioning that in the current study, since the therapist had to implement the treatment protocol purposefully, the double-blind method was not feasible. To eliminate the effect of suggestion or being in the intervention situation on the research results, a sham neurofeedback intervention was used. This group received a treatment program completely identical to the intervention group,

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including 15 regular 45-minute sessions and baseline assessment at the beginning of each session, with the difference that instead of receiving neurofeedback training, they only observed a recorded program without being able to change it. In informing applicants of the research, it was stated that they would participate in therapeutic sessions for depression symptoms and that several different therapeutic methods would be used in this research plan, with individuals being randomly selected for each method; therefore, participants of the sham neurofeedback group participated in sessions without knowing about the fictitious nature of their training program. It is notable that in adherence to ethical and professional principles, after the end of the therapeutic program and conducting the posttest, the participants of this group were informed about the fictitious nature of their therapeutic program and were offered 15 sessions of actual neurofeedback training free of charge.

Analysis: Data were analyzed using analysis of covariance (ANCOVA) in SPSS software (version 22; IBM Corp., Armonk, NY, USA).

Results

Mean and standard deviation of the measured variables in the pretest and posttest are presented in table 1.

Based on Clinical Q assessment, the beta asymmetry on F3-F4 also emphasizes the examination of depression symptoms; this study analyzed the difference of more than 15% in beta range on F4 compared to F3 to assess the effectiveness of neurofeedback intervention.

Therefore, the hypothesis comparing the effectiveness of neurofeedback intervention between the two groups on frontal beta asymmetry scores was tested using the ANCOVA statistical method, with groups as the independent variable, beta asymmetry scores in the pretest as the covariate, and beta asymmetry scores in the posttest as the dependent variable. The results showed a significant difference between the two groups [$F(1,26) = 73.083$; $P < 0.001$; Partial $\eta^2 = 0.73$; $d = 3.28$].

Additionally, to test whether the neurofeedback intervention in the experimental group could effectively impact rumination scores, depression, and alpha range on Cz compared to the control group, the multivariate analysis of covariance (MANCOVA) model was used.

Table 1. Mean and standard deviation of measured variables in the pretest and posttest

Variables	Steps	Intervention Group (n = 15) (Mean ± SD)	Control Group (n = 15) (Mean ± SD)
Depression	Pretest	25.06 ± 3.41	24.73 ± 3.91
	Posttest	16.53 ± 3.66	24.80 ± 4.67
Rumination	Pretest	61.20 ± 6.53	66.06 ± 6.07
	Posttest	42.86 ± 5.96	64.06 ± 6.69
Alpha Asymmetry	Pretest	47.26 ± 11.57	46.49 ± 15.45
	Posttest	26.78 ± 12.11	46.06 ± 14.64
Beta Asymmetry	Pretest	28.54 ± 9.23	32.67 ± 10.09
	Posttest	21.87 ± 8.54	38.81 ± 10.97
Alpha Range Difference on O1	Pretest	28.46 ± 8.30	29.43 ± 7.60
	Posttest	37.12 ± 8.12	30.53 ± 8.97
Alpha Range Difference on Cz	Pretest	21.06 ± 5.10	21.84 ± 4.71
	Posttest	29.94 ± 7.04	22.44 ± 6.27

SD: Standard deviation

Table 2. Effect size between subjects

Variables	df			F	P-value	Cohen's d*
	Group	Error	Sum			
Rumination	1	17	20	79.902	0.0005	3.65
Depression	1	17	20	33.639	0.0005	2.39
Alpha Difference on Cz	1	17	20	20.658	0.0005	1.88

* To understand the effect size, Eta^2 was converted to Cohen's d.

In this model, group as the independent variable, rumination scores, depression, and the difference in alpha range on Cz in the posttest as the dependent variables, and scores of these variables in the pretest as the covariate were entered into the analysis. The results of Box's M test indicated that the assumption of homogeneity of covariance matrices between the two groups was met ($P = 0.422$; $F = 1.028$). The analysis results [$F(5,23) = 28.811$; $P > 0.001$; Wilks' Lambda = 0.117; Partial η^2 = 0.88) showed that control variables had no significant effect on the model. In contrast, a significant difference was observed between the two groups in the dependent variables.

The test results for between-subject effects in MANCOVA are summarized in table 2. As observed, the effect size of rumination, executive functions, and the difference in alpha range significantly indicates the impact of the experimental variable (intervention) on them. Among the measured variables, rumination showed the highest, whereas sustained attention showed the lowest susceptibility to the experimental variable.

Lastly, to address the final research question of whether employing neurofeedback intervention could lead to a significant reduction in depression scores and improve the neurocognitive index (difference in alpha range between open and closed eyes on O1) compared to the control group, the MANCOVA model was used. In this model, group as the independent variable, depression scores and the difference in alpha range on O1 in the pretest as the covariate, and scores of these two in the posttest as the dependent variable were entered into the analysis. The analysis results showed a significant difference between the two groups in terms of the impact of neurofeedback intervention on love trauma scores and the difference in alpha on O1.

Discussion

The present study distinguishes itself from other similar studies in several aspects.

First, in addition to assessing and correcting FAA in depressed individuals, assessing and correcting frontal beta asymmetry was also examined as an indicator of frontal activity in participants with sexual dysfunction disorders. Second, the initiating event or factor for depression symptoms in participants with sexual dysfunction was considered a criterion for entry into the research, and the impact of alpha symmetry neurofeedback on it was neurologically measured.

Finally, cognitive deficits were evaluated not only through the participants' performance on standardized computer tasks, but also through neurocognitive assessment. Moreover, the effectiveness of neurofeedback training on them and their relationship with rumination was measured.

The current findings support the initial hypothesis that correcting FAA can lead to a reduction in depression symptoms, which is in line with the results of several

previous studies (Allen et al., 2004; Harmon-Jones, Gable, & Peterson, 2010; Mennella et al., 2015; Peeters, Ronner, Bodar, van Os, & Lousberg, 2014; Quaedflieg et al., 2016; Young et al., 2018). However, there are still discrepancies in the findings of different studies, challenging the certainty of this relationship. For instance, the findings of Mennella et al. (2015) indicated a reduction in rumination scores in participants after neurofeedback training.

Certainly, research methodologies vary across studies, including differences in measurement tools and scalp points considered representative of the frontal area. Only studies that followed the 10-20 system were reviewed here, encompassing the number and duration of neurofeedback sessions, the treatment protocol, and participants' clinical histories. Therefore, methodological differences lead to varied findings across studies, some of which are contradicted in other studies. This issue can be considered a limitation of the research due to the vast scope of the study area and the development of neuroscientific methods in clinical psychology. Thus, in the current study, researchers also examined the neurocognitive index of frontal beta asymmetry in relation to depression symptoms. The findings are consistent with that of Peeters et al. (2014), who stated that training to increase frontal alpha also increases beta at that point, while such changes do not occur in theta or delta ranges, showing the correction of alpha and beta in the frontal lobe only in the experimental group, not the sham intervention group (Peeters et al., 2014). Therefore, the findings of this study can be more confidently relied upon and generalized to similar groups, as not only were clinical trial methodologies adhered to, but neurocognitive indicators related to depression symptoms were also considered and examined.

Another distinctive feature of this research is that it tried to use brain activity training (neurofeedback) instead of the usual psychological methods for reducing rumination, improving cognitive components involved in rumination (working memory, cognitive inhibition, and sustained attention), and achieving a reduction in rumination responses. Therefore, the first research question in this study sought to measure the effectiveness of neurofeedback intervention on reducing rumination responses, and improving working memory, cognitive inhibition, sustained attention, and the neurocognitive index of executive functions. Statistical findings indicated that implementing the neurofeedback protocol was effective in improving these components, whereas such an effect was not observed in the sham intervention group.

Thus, the findings of the present study, emphasizing the theoretical assumptions of the resource allocation theory and related research (Connolly et al., 2014; Gotlib & Joormann, 2010; Hertel, 1998; Levens et al., 2009; Watkins & Moulds, 2005), indicate the effectiveness of correcting alpha asymmetry in reducing cognitive impairments of depression and rumination. Hence, these results suggest that neurofeedback training for FAA, in addition to reducing depressive mood symptoms, can effectively improve executive functions and rumination. Considering that rumination is a significant factor in the recurrence and persistence of depressive disorder, the importance and application of this finding become clear. In other words, the current research findings assert that effective methods for reducing rumination can be utilized to decrease and prevent the recurrence of depressive symptoms. Although as a clinical trial, this finding needs repetition of results in similar studies to determine its reliability, the clinical significance and application of the results cannot be overlooked.

The third characteristic of this study is the examination of the initiating factor for

depression symptoms. In most similar studies, being depressed and diagnosed with a depressive disorder according to the DSM was considered a condition for research entry, without considering factors such as the initiating event or duration of depressive disorder. Here, conflict in marital life was considered as the stressor initiating depression symptoms. This study, using brain training as one of the relatively new methods in psychological rehabilitation, with neurofeedback being one of the most established, was able to correct alpha and beta asymmetry in the frontal lobes of women with sexual dysfunction disorders, improve rumination, and improve the effects left from various marital conflicts.

Conclusion

The results of this study are significant due to the vital role of depression and rumination in the continuation of depression. The findings of this study can be used as a valuable intervention to reduce symptoms of depression and rumination in women with sexual dysfunction.

Conflict of Interests

Authors have no conflict of interests.

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Investigating the Relationship between Parenting Styles and Suicide Ideation with the Mediation of Avoidant Insecure Attachment Style

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Quantitative Study

Abstract

Background: This research was conducted with the aim of investigating the effect of parenting style variable on youth suicide variable with the mediating role of avoidant insecure attachment style.

Methods: The current research was correlational. The statistical population of the research consisted of all young people aged 15 to 23, who in 2013 visited the psychological clinics where the researcher started the research and filed a case. The sampling method was simple random sampling. The size of the statistical population was equal to 570 people and the sample size of 230 people was selected for this research. To determine the sample size, the calculation method using Cochran's formula was used, and the sample size of 230 people was selected for this research. Beck Scale for Suicidal Ideation (BSSI), Baumrind Parenting Style Scale, and Attachment Styles Questionnaire (ASQ) were measured. Finally, the data were analyzed using SPSS and Smart PLS 3 software and with the structural equation modeling (SEM) method. The statistical findings were considered significant at the 0.05 level.

Results: There was a relationship between authoritarian parenting style and suicidal thoughts ($\beta = 0.486$, $P < 0.001$), permissive parenting style and suicidal thoughts ($\beta = 0.216$, $P = 0.004$), authoritative parenting style and suicidal thoughts ($\beta = -0.283$, $P < 0.001$), and insecure attachment and suicidal thoughts ($\beta = -0.049$, $P = 0.353$).

Conclusion: The analysis showed that the variable of parenting style was effective on youth suicide. In terms of parenting styles, it can be said that two parenting styles, authoritarian and parenting, have a significant and positive effect on suicidal, but the authoritative parenting style variable has a significant and negative effect on suicidal. On the other hand, the results of this study showed that insecure attachment style, as a mediating variable, had no significant relationship with youth suicide.

Keywords: Parenting; Suicide; Avoidant insecure attachment style

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Introduction

Suicide is one of the serious and complex issues that exists in many societies around the world. One of the most important factors that can affect suicidal thoughts is parenting style. Parenting styles are classified into three general categories. This theoretical classification is based on the level of acceptance/sensitivity and demand/control that parents of children show in their interactions with their children (Pinquart & Gerke, 2019). In the autocratic parenting style, children do not fully understand the concept of freedom, equality, and mutual respect, and they do not learn any of these behaviors, only domineering behavior, complete obedience to parents, and bullying of weaker individuals (Lin & Wang, 2022). Usually, in families with a permissive parenting style, chaos reigns, because the parents do not impose any restrictions and do not give any guidance to the child for proper behavior. In addition, normally, negligent parents accept their child's demands with no question, which causes them to face unreasonable demands and many negative consequences in the future (Kiefner-Burmeister & Hinman, 2020). In an authoritative style, the child's parents put a lot of energy into raising their child and use the reward and encouragement method. As a result, they promote the independence of their children and have reasonable demands from them. Children of parents who show this parenting style are much stronger in many areas such as communicating with peers and making friends and social interactions (Nie, Yan, & Chen, 2022). Several types of research on adolescents show that parenting styles may affect suicidal thoughts and ultimately suicide attempts. Likewise, parenting styles may interact with individual factors and, as a result, increase the risk of suicide. Negative and violent parenting, which is often a feature of an authoritarian parenting style, is associated with suicidal behavior (Banstola, Ogino, & Inoue, 2020).

In the previous study, the researchers found that an authoritarian parenting style was one predictor of suicidal behavior (Arafat, Menon, Dinesh, & Kabir, 2022). Another important and influential variable that could affect suicide is attachment style. According to Aminabadi et al., (2012), attachment includes the innate human ability to create and develop emotional bonds. Therefore, the emotional bond is established between the caregiver and the child from the very childhood and acts as a survival and protective function, in such a way that the attachment can dominate the physical and emotional development level of the child (D'Arienzo, Boursier, & Griffiths, 2019). People with this attachment style may have had caregivers who were emotionally unavailable or inconsistent in their responsiveness, leading them to develop a belief that they cannot rely on others for comfort or support. As a result, they may distance themselves from others, suppress their emotions, and prioritize independence over connection. They may also struggle with trusting others, expressing their needs, and forming lasting relationships (Golshani et al., 2021). The research results showed a higher level of attachment avoidance rather than attachment anxiety among the most at-risk adolescents. The odds ratio (OR) for attempted suicide was over two times higher for adolescents who were insecurely attached to their fathers compared to adolescents who were insecurely attached to their mothers. Research results confirmed the importance of attachment, especially paternal attachment, in developing suicidality during adolescence (Leben Novak, Gomboc, Postuvan, De Leo, Rosenstein, & Drobnic, 2023).

In addition, based on the results of some research, it has been shown that people with a history of attempted suicide were higher in anxious attachment compared to participants with no such history. Those aimed at reducing suicide attempts should

focus on reducing attachment anxiety by helping people develop skills in emotional regulation (Green, Berry, Danquah, & Pratt, 2021). According to one survey, it has been shown that childhood trauma had a completely mediated effect on the presence of prior suicide attempts through its effect on avoidant attachment (Ihme et al., 2022). Based on one study, insecure attachment is widely accepted as a risk factor for suicidal thoughts and behavior (Green et al., 2021). According to another research, a direct relationship was found between avoidant attachment and suicide ideation (Turton, Berry, Danquah, Green, & Pratt, 2022). In a study, the researchers found a link between avoidant attachment style and parents' levels of suicidal ideation and depression, and an association between anxious attachment style and the parent's level of suicidal ideation, depression, and anxiety (Shtayermman & Zhang, 2022). This research was conducted with the aim of investigating the effect of parenting style variable on youth suicide variable with the mediating role of avoidant insecure attachment style.

Methods

The current research was correlational. The statistical population of the research consisted of all young people aged 15 to 23, who in 2013 visited the psychological clinics on which the researcher conducted research and filed a case. The size of the statistical population was equal to 570 people. The sampling method was simple random sampling. Sampling was done in this way: firstly, a list of names of all the people who filed a psychological file in the investigated clinics in this research was obtained. In the next step, the research community was determined based on the entry criteria and exit criteria in the research. This work was done in such a way that all people who were between 15 and 23 years old were selected and other people were excluded from the research. In the next step, the researcher took a random sample from among the people. To determine the sample size, the calculation method using Cochran's formula was used and the sample size of 230 people was selected for this research. At the same time, since the researcher intended to use the structural equation modeling (SEM) method, according to Gadagnoli and Veliser (1998), the number of 300 people and more was suitable for determining the sample size of the SEM method. From each member of the sample, three variables of parenting style, suicide, and insecure attachment style were measured. In order to comply with the ethical principles, before the implementation of the questionnaires, a willingness to cooperate form was taken from the participants in the research, and there was no obligation for them to participate in the research and continue it. They were told that participation in the research was completely voluntary and they could withdraw from the research at any time. It was also explained to them that the tests did not contain identity information.

Beck Scale for Suicidal Ideation (BSSI): This scale is a tool for measuring suicidal thoughts, which includes 19 items that evaluate the presence and severity of suicidal thoughts (Beck, Brown, Steer, Dahlsgaard, & Grisham, 1999). Each item is scored based on an ordinal scale from 0 to 2, and the total score can be scored from 0 to 38. Cronbach's alpha coefficient of this questionnaire was equal to 0.96 based on Beck et al.'s (1999) review, which reports a high level of reliability (Beck et al., 1999). Esfahani et al. (2015) reported Cronbach's alpha value of 0.82 for this questionnaire (Esfahani, Hashemi, & Alavi, 2015). The value of Cronbach's alpha obtained by the researcher in this research for this questionnaire was equal to 0.81, which indicates a high level of reliability in this test.

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Baumrind Parenting Style Scale: The Parenting Style Scale by Baumrind (1991) including 30 items was used to evaluate parenting styles. This scale has three dimensions, which are: authoritative parenting style (10 items), authoritarian parenting style (10 items), and permissive parenting style (10 items). Adolescents rated their parents on these items using a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scale scores range from 10 to 50 for each dimension, with a high score indicating a high level of parenting style in each dimension. In a study, test-retest reliability of the Persian version of this scale after a two-week interval was 0.74 (Aminabadi, Pourkazemi, Babapour, & Oskouei, 2012). Cronbach's alpha values for parenting style subscales in the present study are as follows: authoritative (0.73), authoritative (0.79), and permissive (0.75).

Simpson's Attachment Styles Questionnaire (ASQ): This questionnaire was created by Simpson (1990) and is used to measure parenting styles. This test consists of 10 items on a Likert scale, and the subject must choose one of the 5-point options (from completely agree to completely disagree) in response to each question. There are four items in this questionnaire to evaluate secure attachment style, three items to evaluate avoidant attachment style, and three items to evaluate anxious attachment style. Rezazadeh et al. (2023) obtained a Cronbach's alpha value of 0.61 for the insecure attachment subscale (Rezazadeh, Hosseini, & Musarezaie, 2023). In this study, the researcher obtained Cronbach's alpha equal to 0.72.

Finally, the data were analyzed using SPSS software (version 27, IBM Corporation, Armonk, NY, USA) and Smart PLS 3 software and with SEM method. Statistical findings were considered significant at the 0.05 level. The researcher used SPSS software to check the descriptive statistics in this research. At the same time, SEM method was used to examine the path coefficients and mediating variables. Bootstrapping was also used to check the significance of the model. In addition, Sobel test was used to check the significance of mediating variables.

Results

The mean ± standard deviation (SD) of the age of the participants was 18.73 ± 2.62. Likewise, 95 of the participants were men (41.3%) and 135 of them were woman (58.7%). Kolmogorov-Smirnov test was used to check the normality of the distribution of the research variables, and since this test was significant for the research variables, as a result, the research variables did not have a normal distribution (Table 1).

Table 2 shows that the lowest correlation between the variables was related to the relationship between the insecure attachment variable and the suicide variable (r = 0.622) and the authoritative parenting style variable had a negative relationship with the suicidal thoughts and insecure attachment variables.

Table 1. Mean and standard deviation (SD) of research variables

Variable	Mean ± SD	Kolmogorov-Smirnov	Shapiro-Wilk
Age (year)	18.73 ± 2.62		
Authoritarian parenting style	11.86 ± 26.37	P < 0.001	P < 0.001
Permissive parenting style	13.48 ± 27.33	P < 0.001	P < 0.001
Authoritative parenting style	13.56 ± 30.48	P < 0.001	P < 0.001
Suicidal thoughts	8.84 ± 21.62	P < 0.001	P < 0.001
Insecure attachment	3.70 ± 14.27	P < 0.001	P < 0.001

SD: Standard deviation

Table 2. Correlation matrix of research variables

Variable	1	2	3	4	5
Authoritarian parenting style	1.000				
Permissive parenting style	0.831**	1.000			
Authoritative parenting style	-0.725**	-0.740**	1.000		
Suicidal thoughts	0.836**	0.794**	-0.763**	1.000	
Insecure attachment	0.701**	0.702**	-0.634**	0.622**	1.000

According to table 3, the path coefficient of the variable of authoritative parenting style with insecure attachment was not found significant, and also the path coefficient of the variable of insecure attachment with suicidal thoughts was not found significant.

Figure 1 show Standard research coefficients in general.

Table 4 show summary of T-value and path coefficients of the model, and the summary of the results of the interface between the variables of the model.

Figure 2 show path coefficients between variables.

Researcher used the Sobel test to check the significance of the mediator variable. The Z-value obtained after calculation through the Sobel test formula was equal to 0.36648992, which shows that the mediator variable does not have a significant role in the model.

$$Z - value = \frac{a * b}{\sqrt{(b^2 * s_a^2) + (a^2 * s_b^2) + (s_a^2 * s_b^2)}}$$

Table 5 show goodness of fit of the research model.

Discussion

The present study aimed to investigate the effect of parenting styles on youth suicide with the mediating role of insecure attachment style. In general, it should be mentioned that based on the results, the parenting style variable is effective on the suicide variable. It can be said that two parenting styles have a significant and positive effect on suicidal thought, but the authoritative parenting style variable has a significant and negative effect on suicidal thought. This result shows that the more the authoritative parenting style increases among parents, the more the amount of suicidal parenting among adolescents decreases.

On the other hand, as the amount of despotic and parenting styles increases, it can be expected that the amount of suicidality among young people will also increase. Several studies are a line with the previous studies (Choi et al., 2020; Dienst, Forkmann, Schreiber, & Holler, 2023; Sadjadpour, Heydarinasab, Shairi, & Gholami Fesharaki, 2022). According to a study, students in the authoritarian parenting group had a more permissive attitude toward suicide compared with the democratic and permissive parenting groups.

Table 3. Standard research coefficients

Relationships of variables	P-value
Authoritarian parenting style -> suicidal thoughts	< 0.001
Authoritarian parenting style -> insecure attachment	0.003
Permissive parenting style -> suicidal thoughts	0.004
Permissive parenting style -> insecure attachment	0.005
Authoritative parenting style -> suicidal thoughts	0.001
Authoritative parenting style -> insecure attachment	0.061
Insecure attachment -> suicidal thoughts	0.353

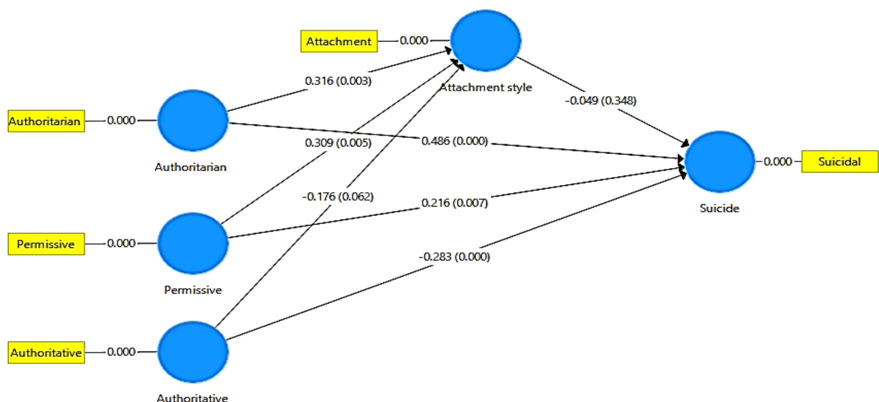

Figure 1. Standard research coefficients in general

These students considered that suicide was justified in certain situations and that choosing suicide was an individual's right. They also had a negative attitude toward talking about suicide or intervening in others' suicide. This association remained statistically significant after adjusting for the impact of confounding factors that could affect attitudes toward suicide, except for suicidal processes and preparedness to prevent suicide. In the mediation analysis, researchers observed that some components of the attitudes toward suicide mediated between authoritarian parenting attitudes and suicidal ideation suicide as a right, preventability, suicide as normal/common, preparedness to prevent suicide, and resignation (Choi et al., 2020).

In addition, based on one survey, it was found that the parents' use of an authoritarian style increased the likelihood of their children committing suicide. On the other hand, the results of this study showed that insecure attachment style, as a mediating variable, had no significant relationship with youth suicide. This was inconsistent with the findings of Sadjadpour et al. (2022), which confirmed the mediating role of difficulty in emotion regulation in the relationship between avoidant attachment and suicidal ideation. Avoidant attachments and a high need to belong are risk factors for suicidal ideation in people with thwarted belongingness. Therefore, attachment style and the need to belong should both be considered in suicide risk assessment (Dienst et al., 2023).

One of the limitations of the current research was the implementation of the research among only those who filed a case in psychological clinics, and therefore, it can be said that it does not include many people. For this reason, it is suggested that similar research be conducted among other people with different conditions.

Table 4. Summary of T-value and path coefficients of the model, and the summary of the results of the interface between the variables of the model

Relationship of variables	Path coefficient	T-value	Result of the hypothesis
Authoritarian parenting style by suicidal thought	0.486	5.67	Confirmation
Parenting style by suicidal thought	0.216	2.86	Confirmation
Authoritative by suicidal thought	-0.283	5.26	Confirmation
Insecure attachment by suicidal thought	-0.049	0.93	Rejection

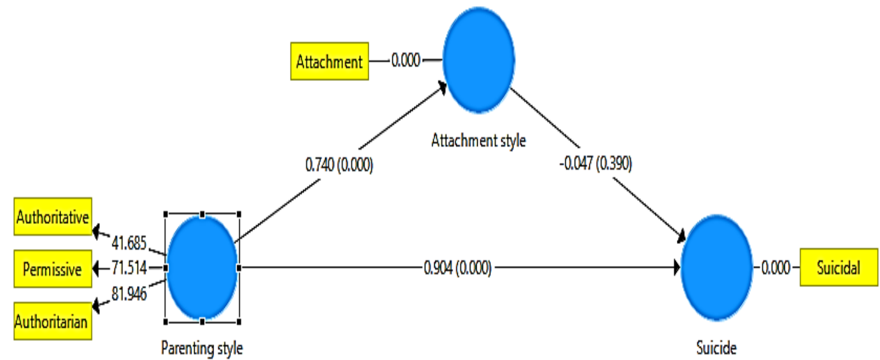

Figure 2. Path coefficients between variables

Table 5. Goodness of fit of the research model

	Cronbach's alpha	Composite reliability	AVE
Parenting style	-1.096	0.671	0.844
Suicide	1.000	1.000	1.000
Attachment style	1.000	1.000	1.000

AVE: Average variance extracted

Conclusion

Based on the findings of this research, the variable of parenting style is impressive on the variable of suicide. Among these, as the amount of despotic or authoritarian parenting styles increases, the amount of suicidality among young people also increases, and as the amount of authoritative parenting styles increases among parents, the amount of suicidality among children decreases. In addition, the insecure attachment style variable could not play a mediating role in the relationship between parenting style and suicide variables.

Conflict of Interests

Authors have no conflict of interests.

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