Original Article:

The Effect of Inclusive Quality Management on the Educational Accreditation Results of the Educational Centers of Mazandaran University of Medical Sciences in 2015-2018

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ABSTRACT

Background: The Deming model is an effective method for comprehensive quality management.

Objectives: This study aimed to investigate the effect of inclusive quality management on the educational accreditation results of the educational hospitals in the Mazandaran Province, Iran.

Methods: This interventional study was conducted in 5 hospitals. In this study, the Deming cycle validation model was employed. This model, which is based on the checklist for the educational centers of the Ministry of Health and Medical Education, has 91 benchmarks for 81 standards. Descriptive statistical methods (Wilcoxon and Friedman nonparametric tests) were used to analyze the data.

Results: A significant difference was observed among the accreditation scores of the hospitals before and after the intervention ($P<0.05$). The accreditation score obtained by the educational centers improved by 41.1, 37, 15.7, 53.2, and 49.2 units. Besides, the intervention outcomes in all areas of accreditation, except facilities management, space, facilities, equipment, and resources, were significantly different.

Conclusion: The use of the Deming cycle has proved effective in performing the educational accreditation of the centers, which can be achieved with continuous and proper implementation. This study can help improve the standards of education of the educational centers.

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Introduction

Nowadays, many organizations face increasing competition in technological innovations and changing environments, and diversity regarding customer demand, which presents a decisive aspect with respect to quality [1]. In this regard, the quality of the educational organizations responsible for maintaining the community's health is of particular importance [2]. The quality management of the training centers is very complex, and these centers can be maximized if they are continuously focused on improving the quality of their educational services [3]. It was reported that unlike the high-cost requirements of educational organizations, the effectiveness of educational mechanisms is not effectively measured on a periodical basis [4]. Educational organizations need to look for a comprehensive, reliable, flexible, and strategic process for assessing the effectiveness of their performance. Based on accurate information about the organization's position, they can improve the quality of their performance, and thereby, guarantee their sustenance [5].

The responsibility of the governments toward maintaining the health of the community requires them to establish an effective and responsive system to all essential health needs [6]. One of the most important measures, in this regard, is strengthening the health systems assessment in the country. The performance and quality assessment system has become inevitable for staying up to date with today's growth and ensuring sustainability in a competitive environment for public and private organizations [7]. Accreditation is the most effective method for controlling and evaluating the health system toward achieving these goals. The standards of accreditation must be defined through the verification of the achievements of a health care organization by an external evaluator group, which is independent of the organization being assessed [8], and the subsequent transparency will ensure that the program meets the preset criteria [9]. The main goals of accreditation are to improve the quality of health education, create rules and regulations, reduce risks and harm, provide training and counseling for health services, strengthen public confidence, reduce costs, and focus on increasing the efficiency and effectiveness of the services offered [10]. The nature and method of applying the accreditation process can be better understood by studying its approaches [11].

The goal of comprehensive quality management is to improve human resources and quality continuously [12]. Implementing inclusive management in health services is an essential strategy, and it can save costs and make changes in the organizational structure [13]. During the surveys, positive results have been frequently observed in medical institutions across different countries in regard to the application of universal quality management [14]. Various studies have mentioned savings in cost, increased faculty satisfaction, positive perceptions of organizational climate, improved quality of healthcare processes, improved effectiveness of clinical services, increased satisfaction of patients and students, reduced staff complaints, increased revenues, and elimination of processes that have been achieved through the application of quality management [15]. The deployment of comprehensive quality management is based on the use of the Deming principles. Implementing the Deming principles can be a reasonable basis for managing quality across organizations. Deming has expressed four stages: planning, operation, monitoring, and implementation for the continuous improvement of quality [16].

So far, a broad study has been conducted regarding the use of quality management in health care institutions. The results of the research in the Zanjan Province, Iran, demonstrated that the mean gap between the optimal situation and the status quo was statistically significant in all components of the overall quality management. Adinolfi has shown in his study that the implementation of universal quality management in public health services institutions in both Italy and Ireland has played a major role in improving the satisfaction of employees, patients, and their families. On the other hand, a fundamental change has taken place in reducing the administrative process time and eliminating administrative bureaucracy [17]. Some studies have indicated that an increase in the training interventions in educational and medical centers can significantly increase the accreditation points of the centers [18].

Quality models can increase the performance of organizations through the mechanisms of self-assessment and continuous evaluation. The use of the above model can ensure constant measurement of performance and help determine the areas of improvement. Hence, it is possible to improve the quality of educational organizations. To ensure the role of educational hospitals in promoting clinical education and attaining the transcendental goals of the health system, the accreditation protocol was first formulated by the Ministry of Health and Medical Education of Iran in 2015 and submitted to all Iranian universities for implementation. Therefore, there is a deficiency in the research related to educational accreditation in the country. The study aimed to evaluate the effect of universal quality management on the educational accreditation in the Mazandaran University of Medical Sciences.

Materials and Methods

The present study was conducted using an interventional method. The research population was determined from a census encompassing all 5 educational centers of the Mazandaran University of Medical Sciences between 2015 and 2018. The researchers obtained permission from the Research Deputy and coordinated with the educational deputies of the Mazandaran University of Medical Sciences. At first, 5 educational hospitals conducted a self-assessment of the educational accreditation based on the accreditation standards of the Ministry of Health and Medical Education. The team used the Deming cycle model to intervene in the four stages of the model (Plan, Do, Check and Act) (PDCA) to implement accreditation at the educational centers.

At the planning stage, to implement the accreditation model, monthly meetings were convened with the Accreditation Committee of the University (ACU) (the responsibility lay with the university chairperson), and weekly meetings were established by the accreditation committee at each training center (the responsibility lay with the head of the center). The Accreditation Committee of the University, with the responsibility of the university chairperson (by convening a monthly meeting) and the accreditation committee at each training center, with the responsibility of the head of the center (with the establishment of weekly sessions). The centers provided the status of the implementation and assisted with an accelerated implementation of these standards. The purpose of the committee was to examine the status of the centers and facilitating the implementation of these standards. Then, a headmaster was selected by the head of the university for each of the educational hospitals for leading the accreditation and de-centered for the implementation of the Deming process at full-time training centers.

To attract the maximum participation of the faculty members, the responsibility for implementing each area of the accreditation process was communicated to an interested and experienced faculty member in the hospital. The team was selected by the head of the university, including several sessions and training groups, which aimed at empowering the faculty members, educational experts, and other clinical staff. The teaching process continued throughout the intervention. The Plan stage was completed in 4 months. At the "Do" stage, the Accreditation Committee of the hospital, assisted by each of the authorities in the field of accreditation, effectively utilized the ability of other faculty members and experts to implement the standards through the formulation of policies, guidelines, processes, and other specified requirements. The "Do" stage was completed in 12 months. At the "Check" stage, the implemented accreditation standards were monitored continuously, and the results were submitted to each process owner. The "Check" stage was completed in 4 months. In the "Act" stage, the corrective actions identified for overcoming the deficiencies were designed, and this cycle was repeated to achieve the desired result. The "Act" stage was completed within 5 months.

The data collection tool included a checklist of the educational centers provided by the Ministry of Health and Medical Education and communicated to the universities. The data collection tool was the National Accreditation Questionnaire of Iranian educational hospitals (first edition), the validity and reliability of which were verified by the Ministry of Health and Medical Education. Each parameter was scored between 0 and 2, and then according to the two components, the achievement coefficient and the educational significance coefficient were calculated. The coefficient factor was ranked between 1 and 3, such that coefficient 1 represented the least difficulty and coefficient 3 represented the most difficulty in access.

The educational importance coefficient was graded from 1 to 5, such that coefficient 1 represented the lowest impact and coefficient 5 represented the most impact on education. The average of these two coefficients has represented the weight of each measure. In total, this checklist contained 91 measurements for 81 approved standards. These measurements included the management of education (11 measurements), the axis of monitoring and evaluation (11 measurements), the axis of the faculty (15 measurements), the axis of learners (9 measurements), the center of management of space facilities (13 measurements), the center of training for the learners in the emergency wards (6 measurements), the axis of the educational programs and procedures (13 measurements), focus on the patients' rights (7 measurements), and the research axis (6 measurements). The evaluation and accreditation of the educational centers were achieved in three stages.

The first stage involved a self-assessment by the Accreditation Committee of the Educational Center, the second phase consisted of an external evaluation by the ACU, and the third phase consisted of a formal accreditation by the Evaluation Team of the Ministry of Health and Medical Education. A training course was held for accreditation evaluators of educational centers, and they were trained on how to evaluate each of the standards. Each axis was assessed by an evaluator in 5 teaching hospitals to minimize and eliminate the study bias.

In this study, necessary permissions were acquired from the university authorities and the related hospitals, and informed consent was taken from the participants of the research. Besides, the confidentiality of the information obtained from the participants was maintained in line with the ethical considerations.

Statistical analysis

Descriptive statistics, including percentages and comparison of means and inferential methods, such as the Wilcoxon and Friedman nonparametric tests, were conducted to analyze the data obtained from the checklist using the SPSS V. 11.5. The obtained data have been expressed as the Mean±SD. The minimal level of significance was chosen as $P<0.05$.

Results

In this study, the accreditation data of the 5 educational centers before and after the intervention were investigated. Table 1 presents the values of the descriptive statistics of the accreditation scores of the centers surveyed. Based on the Wilcoxon nonparametric test, there was a significant difference among the scores of the accreditation centers before and after the intervention.

Table 2 presents the descriptive indicators scores of accreditation areas of educational centers before and after the intervention. Table 3 presents the ranking of the various validation areas based on the Friedman test. According to the scores obtained from the accreditation centers before the intervention, the highest score was related to "facility management, space, and facilities" and the lowest score was related to the field of "learner training in emergency and para-clinical". After the intervention, the highest score was obtained in the area of "educational programs and processes", and the lowest score was related to the field of "learner training in emergency and para-clinical".

The percentage accreditation score obtained by all the studied educational centers before the intervention was 47.5%; the highest scores were obtained for facilities management (67%), research (64%), and learners (51%), whereas the lowest scores were patients' rights (35%), emergency (37%), and monitoring (38%). After the intervention, the score of the center with a growth rate of 83.1% reached 86.6%, such that the highest scores were obtained for management areas (97.2%), research (96.7%), monitoring (94%), and patient's rights (88%); whereas, the lowest scores were for facilities (75%) and emergency (78%). The highest growth rates were observed for patient rights, monitoring, and management; whereas, the least growth rates were observed for facilities, research, and learners.

The percentage of accreditation points obtained by the H1 center before the intervention was 36.3%. The highest scores were obtained for facility management (66%), research (52%), and management (47%); whereas, the lowest scores were obtained for emergency areas (19%), monitoring (21.9%), and apps (21.4%). After the intervention, the center's score with a growth rate of 2.13% reached 44.4%, such that the highest scores were obtained for monitoring (97%), research (91%), and management (86%); whereas, the lowest scores were obtained for faculty (63%) and programs (69%). The highest growth rates were observed in monitoring, emergency, and patient rights; whereas, the least growth rates were observed in the areas of faculties and facility (Figure 1 and Table 1).

The percentage of accreditation points obtained by the H2 center before the intervention was 40.2%, with the highest score, respectively, for the management of facilities (58%), learners (53%), and research (52%), and the lowest scores in terms of monitoring (18%), emergency (19%), and patient's rights (23%). If after the intervention, the center score with the growth rate of 92.1 was 77.1%, so that the areas of management, emergency, and research (100%) had the highest score and facilities (60%) and patient rights (63%) earned the lowest score. The highest growth rates were observed in emergency areas, monitoring and evaluation, and patient rights; whereas, the least growth rates were observed in facilities and learners.

The percentage of accreditation points obtained by the H3 center before the intervention was 75.2%. The highest scores were obtained for facility management (89%), patient and research rights (83%), and management (81%); the lowest scores were for the fields of programs (64%) and faculty (67%). After the intervention, the center's score with a growth rate of 1.21% reached 90.9%, such that the highest scores were obtained for the following areas: management, monitoring, programs, patient rights, and research (100%); whereas the lowest scores obtained for the areas of emergency (73%) and facilities (78%). The highest growth rates were observed in programs, monitoring, and management, whereas the least growth rates were observed in the areas of facilities and emergency.

The percentage of accreditation points obtained by the H4 center before the intervention was 41.3%. The highest scores were obtained for the management of facilities (66%), emergency department (59%), and faculty (46%); the lowest scores were in the areas of management

Table 1. The values of the descriptive statistics of the accreditation scores of the educational centers in 9 examined areas before and after the intervention

Variable	Before			After			Improvement Rate	Sig.
	Min.	Max.	Mean±SD	Min.	Max.	Mean±SD		
Accreditation score of educational hospital	193.5	401	253.3±84.1	411	503.5	462.3±46.7	39.2	>0.05

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Table 2. Descriptive indicators score of accreditation areas of educational centers before and after the intervention

Variables	Before			After			Improvement Rate	Sig.
	Min.	Max.	Mean±SD	Min.	Max.	Mean±SD		
Management of education	7.5	43	23.6±12.8	45.5	53	51.5±3.4	52.6	>0.05
Monitoring and evaluation	14.5	56	29.8±17.1	56.5	79	74.1±9.9	56.1	>0.05
Faculty	32	60	41.9±11.0	56	83	74.4±11.2	36.5	>0.05
Learners	16.5	38.5	25.7±8.5	35	50	43.2±7.0	35	>0.05
Management of space facilities	44.5	69.5	52.4±10.1	47	63	58.3±6.6	7.6	>0.05
Training of learners in emergency	4	23.5	11.7±8.9	20	32	25±4.5	41.6	>0.05
Educational programs and procedures	18	54	34.8±14.2	55	84	73.0±15.1	45.5	>0.05
Focus of patient's rights	8	29	12.2±9.4	22	35	30.9±5.9	53.4	>0.05
Research	14	30.5	21.2±7.3	30	33	31.9±1.5	32.4	>0.05

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(14%) and patient rights (23%). After the intervention, the center's score with a growth rate of 2.29% reached 94.5%, such that the highest scores were obtained for the following areas of management, monitoring, programs, learners, programs, and patient rights (100%); whereas, the lowest scores obtained for facilities of the faculty and emergency (81%), and research (92%). The highest rate of growth was observed in management, patient rights, and monitoring, whereas the least growth rates were observed in the areas of facilities and emergency.

The percentage of accreditation scores obtained by the H5 center before the intervention was 44.6%. The highest scores were obtained for research management (92%), facilities (57%), and learners (55%); the lowest scores were in the areas of emergency (13%) and patient rights (23%). After the intervention, the center's score with a growth rate of 10.2% reached 93.8%, such that the highest scores were obtained for the following areas: management, monitoring, learners, programs, patient rights, and research (100%); whereas, the lowest scores obtained for emergency (63%) and facilities (81%). The highest growth rates were observed in emergency, patient, and programs; whereas, the least growth rates were observed in research and facilities (Tables 1-3).

Discussion

The purpose of this study was to investigate the effect of universal quality management on the accreditation results for the educational hospitals of the Mazandaran University of Medical Sciences. The results demonstrated that utilizing the Deming cycle, including the four stages—planning, implementation, monitoring, and action—has effectively improved the educational accreditation results of the educational hospitals. The average score before the intervention was 233.2 points (47.5%), which increased to 462.3 (86.6%) after the intervention. Besides, this study's findings indicated that the results of the 5 educational centers were 41.1%, 37%, 15.7%, 53.2%, and 49.2%, respectively. The results of the study done by Sayyadi Toranlou et al. indicated that the establishment of quality management models in hospitals is necessary for their excellence. There is a significant difference between the expectations and perceptions of the status quo and the desired status of quality management

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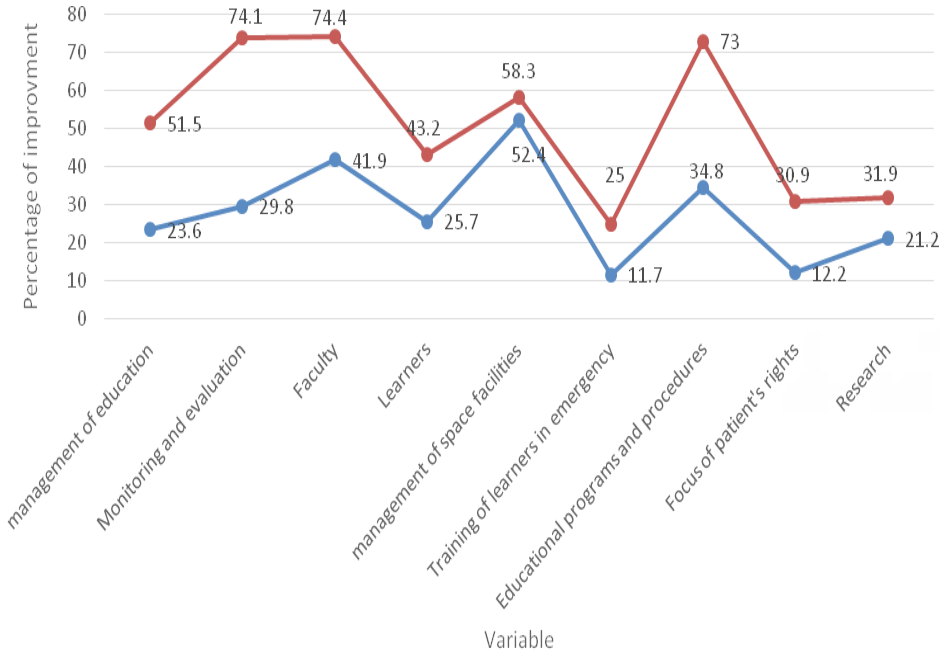

Figure 1. The trend of accreditation scores of educational centers in the 9 studied areas before and after the intervention

in Isfahan Hospital, Isfahan City, Iran [19]. Karami Matin et al. showed that the quality of the management system was effective on hospital indicators, which increased the satisfaction of staff and patients and decreased hospital infections and mortality [15]. The results of the study by Breedlove confirm that the use of quality management improves the quality of healthcare processes [14], which is compatible with the results of this study.

On the other hand, Farnia and Mohammadpour indicated that the quality of implementing the PDCA strategy was low at Tabriz University of Medical Sciences. The highest affected quality-related factor was the implementation of innovations and creativity. The main factor responsible for reducing the quality is an inadequate culture of quality in these organizations [20]. This contradiction maybe because of the above studies concerned with the status of existing centers. However, the present study confirms the impact of this model based on the validation results. Regarding the results of the present study, it can be said that organizing seminars, workshops, and sessions on empowerment and increasing the knowledge wand attitudes of faculty members, educational experts, and clinical staff has played an important role, besides the continuous monitoring of the educational processes clearly outlines and modifies the deviations from the standard.

Table 3. The status of the score obtained in the educational centers studied before and after the intervention

Educational Centers	Before		After		Improvement Rate	Change
	Score	%Score	Score	%Score		
H1	193.5	36.3	412.5	77.4	2.13	41.1
H2	214	40.2	411	77.1	1.92	36.96
H3	401	75.2	484.5	90.9	1.21	15.7
H4	220	41.3	503.5	94.5	2.29	53.2
H5	238	44.6	500	93.8	2.10	49.2
Total	253.3	47.5	462.3	86.6	1.83	39.3

In addition, the findings of this study demonstrated that the intervention was effective in all areas of accreditation, except the areas related to the management of facilities, space, facilities, equipment, financial, human resources, educational, and research. The highest impacts were on the monitoring and evaluation axes (56.1%), patients' rights (53.4%), and education management (52.2%); whereas, the least impacts were on the management of space facilities (7.6%), research (32.4%), and learners 35%. Considering that the educational standards of the educational hospitals were first announced in 2016 and subsequently approved in 2016 and 2018, the related studies on the accreditation in Iran have not been done yet. Besides, the number of studies in other countries is very limited in this regard. In similar studies, such as the study by Walker et al., the anxiety and stress of the nursing staff regarding the accreditation process decreased after the intervention [21]. According to Riahi et al. , hospitals with a quality management system exhibit better performance than the hospitals without it [22]. The results of the study by Zandiyan et al. with regard to the assessment of the relationship between the accreditation and organizational learning points revealed a significant relationship between these two variables. As the organizational learning increased, the average of the accreditation points scored by the educational centers of Ardabil increased [23]. Besides, the study results by Al Tehewy et al. conducted in Egypt indicated that in the centers with higher organizational learning levels, the accreditation points were significantly higher than the other centers [24]. Pomey et al.'s research demonstrated that the hospital indicators are affected by the implementation of accreditation, which can be observed as the result of the performance of accreditation as an exclusive process or in combination with other quality improvement measures [25], which is consistent with the results of the study by Salehian et al. [18]. The effectiveness of the implementation of accreditation on the productivity indicators is established by the results of the study by Arab et al., which is based on the impact of the implementation of the accreditation scheme on the hospital indicators [4]. The studies by Alkhnizan and Shaw in Saudi Arabia and El-Jardali and colleagues in Lebanon indicated that the implementation of accreditation impacted the quality of health services [26, 27].

In contrast, Barker [28], Sack [29], and Reznich [30] did not find a meaningful relationship between the components of the accreditation system and the performance of the service providers. Besides, Nicklin concluded that health care accreditation in Canadian healthcare has the highest standard [31]. This finding contradicts the present study results, which upholds the compliance with the accreditation standards before the intervention. This difference can be explained by the difference in the type of standards, methods of assessment, or the record of implementation and evaluation. In general, it can be argued that the training and management team was responsible for the performance of the process as well as for taking accountability for the monitoring and evaluation axes; besides, the academic accreditation committee had entrusted the responsibility for the implementation of the accreditation curriculum to the management of the training centers. To implement the standards of these axes, there had been considerable progress. However, in the research, the students and faculty members constituted the target groups. Despite the significant effort (organizing the workshops and seminars) for maintaining diversity and plurality, in the abovementioned groups, a slower rate of progress was observed. Therefore, it requires more time for a change in the attitudes and improving the awareness toward accreditation.

Therefore, implementation of the standards of these axes is considerable progress. Still, in the research, the learners and faculty members axes constituted the target groups, educational groups, faculty, and students, and despite the tremendous effort (organizing the workshops and seminars) for diversity and the plurality of these groups, the slower rate of progress was observed. Therefore, it requires more time for a change in the attitudes and improving the awareness toward accreditation.

Regarding the results of the present study, the implementation of comprehensive quality management did not affect the management of facilities, space, facilities, equipment, financial and human resources, education, and research. It can be inferred from this conclusion that the accreditation standards of this axis are structural, and the implementation of the improvement programs in the physical and human structure is long and time-consuming. In contrast, the standards of the other axes of accreditation represent a process, which obtained good results in this study through the training and empowering of the employees and by attracting the senior executives and members of the board, including the scientists and staff. The results of the study by Mohammadi et al. indicated that employee empowerment and customer orientation are the most important components of comprehensive quality management [32]. Besides, Ahire et al. demonstrated that quality management emphasizes the development and empowerment of human resources [33], which is consistent with the findings of the present study.

Regarding the results of the present study, the implementation of comprehensive quality management did

not affect the management of facilities, space, facilities, equipment, and financial and human resources educational and research.

Finally, it should be mentioned that one of the limitations of the study is the scope of time and place, so the results cannot be generalized to other hospitals. Future studies on the research and impact of total quality management on the results of therapeutic accreditation along with educational accreditation are recommended.

According to the findings of this study, universal quality management impact the educational accreditation results of the educational centers. Intervention in all areas of Deming-based accreditation (in the following 4 stages: planning, implementation, monitoring, and corrective action) was effective, except for the management of facilities, space, facilities, equipment, financial and human resources, education, and research. Owing to numerous problems in hospital education quality and the lack of human and financial resources as required in this area, the implementation of the accreditation program in the hospitals of the country can reduce prevalent problems and thus provide higher quality services to the learners and increase their satisfaction. To effectively validate this process, it is recommended that an appropriate organizational culture be created for senior managers and staff empowerment. On the other hand, the process of accreditation of the educational centers is a slow, continuous, and time-consuming process, and success in this area can be achieved by planning, implementing, monitoring, continuous monitoring, and designing corrective actions in case of divergence.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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Authors' contributions

Conceptualization: Hamidreza Mohammadi, Roya Malekzadeh, Fattane Amuei; Methodology: Roya Malekzadeh, Fattane Amuei, Hamidreza Mohammadi, Elaheh Mahmoudi, Ghasem Abedi; Writing the original draft: Hamidreza Mohammadi, Roya Malekzadeh, Fattane Amuei; Supervision: Roya Malekzadeh, Hamidreza Mohammadi; Writing, review, editing, and investigation: All authors.

Conflict of interest

The authors declared no conflicts of interest.

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