Original Article

Attitude Regarding Dental Stem Cells among Dental Practitioners in Kerman, Iran

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Abstract

Introduction and Objective: Dental stem cells are widely used in the treatment of some diseases. As adoption of this new technology and the provision of regenerative therapies to dental patients are important, this study was conducted with the aim of evaluating the attitude of general dentists of Kerman city toward dental stem cells. Methodology: This descriptive-analytical type of cross-sectional study was conducted on 378 general dentists in Kerman city during the years 2018-2019. Census sampling method was used in this research. A researcher-made questionnaire was used to measure the level of knowledge. The questionnaire consisted of 3 general sections, including professional status, demographic information, and attitudes about stem cells and clinical application of stem cells. Finally, the data were entered into the SPSS 21 software and analyzed. Results: The research results revealed that the majority of dentists are at a positive level of attitude (74.34%). The results also revealed that those who read more articles (P = 0.005, B = 3.7), participate in the seminars (P = 0.04, B = 4.3), and have willingness to participate in the educational programs (p = 0.0001, P = 8.3) have more positive attitudes. The results showed a significant relationship between the attitude of dentists about stem cells and willingness to suggest stem cell storage for patients (P = 0.0001). Conclusion: The results of this study suggested that the attitude of dentists in Kerman about dental stem cells is at an acceptable level. A positive attitude toward stem cell application can lead to more use of it and an improvement in the clinical application.

Keywords: Dentist, Stem Cells, Attitude, Clinical Application

Introduction

One of the most important advances in medical science in the 21st century is the development of knowledge of stem cells [1]. It is a turning point for the treatment of diseases and the repair of injuries. It has also created many hopes for scientists and forced the researchers to conduct extensive studies in this area. After discovering these cells in the tooth pulp and conducting many studies on them, stem cells derived from dental pulp are currently considered as a potent and alternative source for umbilical cord blood in the clinical applications [2]. As these cells preserve their differentiation ability after freezing and re-melting, stem cell banking is appropriate for future therapies [3]. Stem cells can be excellent in the repair of injured parts of the body in any organ and in the elimination of the defect [4, 5]. Nowadays, researchers are able to separate the stem cells from the majority of human body tissues. It is interesting that the human pulp tissue has been reported to be among the primary isolated tissues [6-8]. Theoretically, stem cells can be divided without any restriction to restore any other cell and act as part of the body repair system [9]. Stem cells are pluripotent cells that are continuously divided and have the self-building property and the ability to create complex tissues and organs. They are generally defined as clonogenic cells, which have the ability of self-rebuilding and multiple differentiation. Postpartum stem cells have been separated from several tissues including the umbilical cord, bone marrow, neural tissue, skin, retina, and dental epithelium [10]. Generally, there are two types of stem cells, including embryonic stem cells and adult stem cells [11]. The embryonic stem cells are found in the blastocyst inner cell mass in the early stages of embryonic development. Their self-rebuilding ability, as well as their unlimited capacity to form tissue and organs, have made them a valuable cell source for cell-based regenerative therapies [12]. In dentistry, stem cells can be extracted from the third molar teeth pulp, loose deciduous teeth, apical papilla, and dental buds. Scaffolds are three-dimensional biomaterials that

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provide a physical-chemical environment for cell growth and differentiation. They also provide the conditions for cell adhesion and migration [13, 14]. Lack of complications related to the biocompatibility of recently-used dental materials or the problems related to the mismatch of physical or chemical properties of dental materials and tooth structure leading to mechanical failure are other advantages of this new discipline [15]. As adoption of this new technology and the provision of regenerative therapies to dental patients are important, this study was conducted with the aim of evaluating the attitude of general dentists of Kerman city toward dental stem cells.

Methodology

The present study is a descriptive-analytical type of cross-sectional study. The research population included general dentists of Kerman city during 2018-2019. A census sampling method was used. In this study, to measure the knowledge level, a researcher-made questionnaire was used that had several sections. The first section was related to the professional status and demographic information, including age, gender, professional skill, duration of professional activity, the initial place for starting the professional activity, and questions related to the study and participation in stem cell programs. It included a total of eight questions. The second section was related to the attitudes and opinions about stem cells in dentistry. It included seven questions. The third section included the clinical application of stem cells in dentistry, in which each question was separately evaluated. To assess the validity of this questionnaire, it was sent to 10 pediatric dentists, oral diseases specialist, restorative specialist, surgeon, and oral pathologist to be analyzed. The questions were recognized appropriate in terms of content, and the validity was found to be 0.90. To assess the reliability, the questionnaire was completed by 20 general dentists and re-completed by the same dentists after 3 weeks. ICC coefficient was 0.91% that is a desirable level. By separately evaluating the attitude questions, 7 questions were scored. The attitude questions included 7 questions scored 0 to 16 based on scoring a positive attitude. Therefore, scores were classified at the following levels:

1- 0 to 5.3 (0 to 33%) (Negative attitude)
2- 5.31 to 10.6 (33.1 to 66%) (Moderate)
3- 10.61 to 16 (66.1 to 100%) (Positive)

Finally, responses were collected and analyzed by SPSS 21 software. First, the mean and standard deviation were calculated for the quantitative data. The frequency and percent were calculated for qualitative data. Then, the Pearson correlation coefficient, t-test, variance analysis, and linear regression were used for the analytical statistics. P <0.05 was considered as a significant level. With regard to the ethical considerations, the questionnaires of this study were unanimous and all the demographic information of dentists remained confidential. The objectives of the study were explicitly explained to the dentists and their written consent to participate in the study was taken. In addition, this study was approved by the Ethics Committee of the Research Deputy of Kerman University of Medical Sciences with the ethical code of IR.KMU.REC.1397.122.

Results

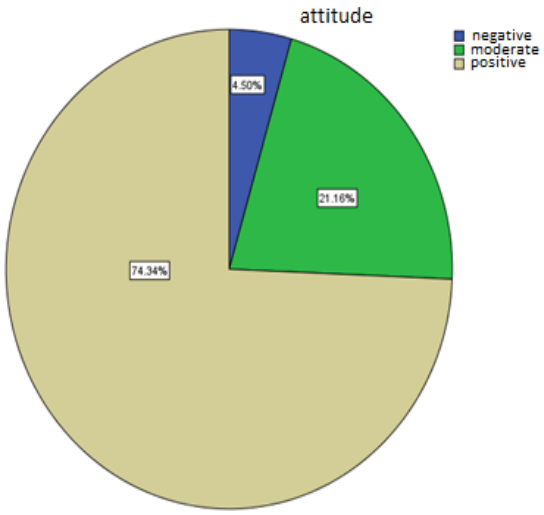
A total of 401 dentists participated in the present study. After reviewing the answers, 22 answers were excluded due to being defected, and finally, 378 answers were examined. Table 1 shows the demographic characteristics of the subjects.

Table 1- Demographic characteristics of dentists participated in the research

index	group		f	Knowledge level	
			(%)N	mean	SD
gender	male		(56.1)212	12.73	3.53
	female		(43.9)166	13.70	3.52
		male	(16.0)34	-	-
	20-30	female	(34.3)57	-	-
		total	(24.1)91	13.90	3.68
		male	(59.4)126	-	-
	31-40	female	(52.4)87	-	-
Age (year)		total	(56.3)213	13.16	3.08
		male	(21.7)46	-	-
	41-50	female	(12.0)20	-	-
		total	(17.5)66	12.59	3.98
		male	(0.5)1	-	-
	51-60	female	(1.2)2	-	-

	total	(0.8)3	12.33	2.31
	male	(2.4)5	-	-
Over 60	female	(0.0)0	-	-
	total	(1.3)5	7.20	7.82

The results of the general dentists' attitude towards dental stem cells in Kerman are presented in Figure 1. As can be seen, the majority of dentists are at a positive level of attitude (Graph 1).



Graph 1-Classification of dentists' level of attitudes towards stem cells.

The results of this study showed that there was no significant difference between male and female general dentists' attitudes towards dental stem cells in Kerman city (P = 0.46). Moreover, there was no significant difference between participation in the seminar and the attitude. However, the results showed that those who had the willingness to participate in the educational programs had a more positive attitude compared to those who were not willing to participate in these programs (P = 0.0001).

Statistical analysis showed that the rate of study of scientific articles significantly increased the positive attitude. The positive attitude was significantly higher in subjects who had a weekly study compared to those who did not have a weekly study (P = 0.0001). In addition, the one-variable analysis showed that subjects with a work experience of more than 20 years had a significantly negative attitude (P = 0.027) compared to those who had a work experience of fewer than 20 years. The age of over 60 years also showed a more negative attitude (P = 0.025). No significant relationship was found between the initial place of starting to work and attitude (P = 0.726 and P = 0.051).

Evaluation of the relationship between attitude and questions related to the clinical application

The results showed that there was a significant relationship between the attitude of dentists about stem cells and willingness to suggest stem cell storage to the patient (P = 0.0001). However, the attitude of the subjects who had stated that they often use one or more regenerative therapies in their work did not show a significant relationship. However, there was a significant relationship between the attitude of dentists about the role of incentive to suggest regenerative therapy to patients and the willingness to refer the patients to another dentist due to the lack of rehabilitation therapy facilities (P = 0.0001).

Multivariate analysis

Finally, multivariate analysis was performed to examine the simultaneous effect of independent variables on attitude. The results showed that those who read more articles (P = 0.005, B = 3.7), participated in the seminar (P = 0.04, B = 4.3), and were willing to participate in educational programs (B=8.3, p=0.0001) had more positive attitudes.

Discussion and Conclusion

One-variable analysis of this study showed that dentists with low work experience had significantly more positive attitudes, but this finding was not significant with multivariate analysis. However, the low negative attitude in people with more work experience can be justified according to age-related findings. In addition, the results of this study showed that there is no significant relationship between attitude and gender. Moreover, the dentists with a history of participation in related seminars, studying more academic articles, and willingness to participate in educational programs had more positive attitudes. The important point is the rate study of articles that the items "study of articles sometimes" and "never study of articles" obtained higher percentage than the item "weekly study of articles", indicating that dentists are somewhat unaware of the importance of the regular study. The attitude of the participants towards the questions related to the willingness to suggest the stem cell storage for patients and encouraging patients for rehabilitation therapies was also significantly positive, indicating that with increasing the positive attitude, the clinical application of the regenerative therapy also improves. In general, in the present study, most dentists showed an interest in regenerative therapies and had hope for their future. No similar study was found in the review of the studies. However, in a study conducted by Najafzadeh (2016), a relative and direct relationship was found between the mean score of knowledge and attitude. It means that with increasing the level of knowledge, a positive attitude also increased [16]. However, the mentioned study was conducted among the pediatric specialist dentists of Isfahan and this

study was conducted among dentists of Kerman. In general, it can be concluded that a positive attitude toward the application of stem cells can lead to greater use of it and an improvement in its clinical application. Some limitations of this study included a high workload of the dentists, difficult access to dentists due to the scattering of offices and clinics, and incomplete and defected questionnaires. This study tried to resolve these limitations by distributing and collecting a relatively large number of questionnaires (distributing 400 questionnaires) to ensure the sample size and complete explanation of the questionnaire by the researcher.

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