Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Evaluation and comparison of the awareness, attitude and knowledge of the use of stem cells in Dentistry among undergraduate and postgraduate students

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ABSTRACT:
Aim: Evaluation and comparison of the awareness, attitude and knowledge of the use of stem cells in Dentistry among undergraduate and postgraduate students. **Materials and method:** The questionnaire consisted of self-administered questions to evaluate awareness, attitude and knowledge of the use of stem cells in Dentistry. Questionnaire data for each participants was converted to equivalent score based on Yes/No answers (1/0) with an ordinal rating which ranges from a value of 0 to 15. Data obtained was statistically analysed. **Results:** Of the 401 participants, 27% were male and 73% were female. 37.1% general dentist once in a while and 51.3% specialist weekly read scientific journals. 39.9% weekly read scientific journals. 61.7%did not attend any training course/program/lecture on dental application of stem cells. 71.6% were aware of the potential therapeutic applications of stem cells in dentistry. 82%think that dental stem cell banking will be useful for regeneration of dental tissues.74.8% agreed that regenerative therapy should be incorporated into the dentistry undergraduate course. 89% of participants were willing to save teeth and dental tissue for future regenerative dental treatment. 71.1% think that regenerative dental treatment will be a better treatment option than tooth implant placement.41.6% do not have any ethical concerns regarding the use of stem cells in dentistry. Significant data was found with specialist reporting that they didn't have any concerns regarding ethical concerns. 73% recommended a patient to store dental stem cells and explain its future prospects. **Conclusion:** This questionnaire survey demonstrated that dental practitioners had a high degree of awareness. Specialist staff was totally familiar with the language used by general dentists when separated into categories. This research also found a link between academic qualifications and level of knowledge and awareness among dental practitioners.
Keywords: Attitude, knowledge, stems cells, Dentistry

Received: 05 October, 2022 Accepted: 01 November, 2022

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This article may be cited as: Tiwari P, Showkat I, Tiwari S, Sinha AA. Evaluation and comparison of the awareness, attitude and knowledge of the use of stem cells in Dentistry among undergraduate and postgraduate students. J Adv Med Dent Scie Res 2022;10(11):1-6.

INTRODUCTION

The next decade of dentistry is speculated to see unparalled advances in the field of stem cell tissue engineering. Stem cells are unspecialized cells that continually reproduce themselves and can differentiate into specialized cells of one or more types.[1]

Stem cell therapy is emerging as a revolutionary treatment modality to treat diseases and injury with wide- ranging medical benefits.[2] Research on adult stem cells is leading to new dental treatment protocols for caries, endodontics, periodontal and oral-maxillofacial procedures.[3] A characteristic of dental pulp stem cells, i.e. their plasticity, make them an important source of mesenchymal stem cells for regenerative therapies in dentistry and for tissue bioengineering in medicine.[4]

This novel therapy has been proved to be a huge scope in dentistry and currently has large-scale clinical applications. The WHO recommends dentists should encourage following evidence based literature in order to educate patients about the collection, storage and use of stem cells. There is a need to assess

graduate and postgraduate dental care students, which would help in understanding awareness on this topic.

MATERIALS AND METHOD

A total of atleast 401 participants were asked to complete the questionnaire. The questionnaire consisted of self-administered questions to evaluate awareness, attitude and knowledge of the use of stem cells in Dentistry. Questionnaire data for each participants was converted to equivalent score based on Yes/No answers (1/0) with an ordinal rating which ranges from a value of 0 to 15. Data obtained was statistically analysed.

RESULTS

Of the 401 participants, 27% were male and 73% were female. The distribution of chi square test was used to compare. It failed to reach the level of significance. 37.1% general dentist once in a while and 51.3% specialist weekly read scientific journals. 39.9%weekly read scientific journals. It was found to be significant with specialist reporting that they read journal weekly. 61.7%did not attendany training course/program/lecture on dental application of stem cells. It was found to be significant with specialist reporting that they attended training courses. 71.6% were aware of the potential therapeutic applications of stem cells in dentistry. It was found to be significant with specialist reporting that they were aware of therapeutic application of stem cells. 82%think that dental stem cell banking will be useful for regeneration of dental tissues. It was found to be significant with specialist reporting that the dental stem cell bank will be used. 74.8% agreed that regenerative therapy should be incorporated into the dentistry undergraduate course. 89%were willing to save teeth and dental tissue for future regenerative dental treatment. 71.1% think that regenerative dental treatment will be a better treatment option than tooth implant placement. Most of the participants(41.6%) do not have any ethical concerns regarding use of stem cells in dentistry. Most of the participants(73%) recommend patients to store dental stem cells and explain its future prospects. 81.3%agreed with that stem cell tissue regenerative technology be applicable to dentistry.46.9%agreed that dental stem cells will be used to develop non-dental tissues/organs. It was found to be significant with specialist reporting that dental pulp, apical papilla, gingival were sources of dental stems. It was found to be significant with specialist reporting that it helps in pulp/dentin tissue engineering and regeneration.

Table 1: Distribution of study population according to level of education and gender

			Female	Male	Total
	General dentist	n	107	33	140
		%	76.4%	23.6%	100.0%
	Specialist	n	186	75	261
		%	71.3%	28.7%	100.0%
Total		n	293	108	401
		%	73.0%	27%	100.0%
P value				0.144	

Table 2: Distribution of study population according to level of education and How frequently do you read scientific journals.

			monthly	never	once in a while	weekly	Total
	General dentist	n	36	26	52	26	140
		%	25.7%	18.6%	37.1%	18.6%	100.0%
	Specialist	n	76	14	37	134	261
		%	29.1%	5.4%	14.2%	51.3%	100.0%
Total		n	112	40	89	160	401
		%	27.9%	10.0%	22.2%	39.9%	100.0%
P value			0.0001*				

Table 3: Distribution of study population according to level of education and Have you attended a training course/program/lecture on dental application of stem cells.

			Yes	no	Total
	General dentist	n	33	107	140
		%	23.6%	76.4%	100.0%
	Specialist	n	100	161	261
		%	38.3%	61.7%	100.0%
Total		n	133	268	401
		%	33.2%	66.8%	100.0%
P value				0.002	

Table 4: Distribution of study population according to level of education and Are you aware of the potential therapeutic applications of stem cells in dentistry.

			Yes	No	Not sure	Total
	General dentist	n	85	34	21	140
		%	60.7%	24.3%	15.0%	100.0%
	Specialist	n	202	27	32	261
		%	77.4%	10.3%	12.3%	100.0%
Total		n	287	61	53	401
		%	71.6%	15.2%	13.2%	100.0%
P value				0.001*		

Table 5: Distribution of study population according to level of education and Do you think that dental stem cell banking will be useful for regeneration of dental tissues.

			Yes	No	Not sure	Total
	General dentist	n	109	2	29	140
		%	77.9%	1.4%	20.7%	100.0%
	Specialist	n	220	13	28	261
		%	84.3%	5.0%	10.7%	100.0%
Total		n	329	15	57	401
		%	82.0%	3.7%	14.2%	100.0%
P value				0.007*		

Table 6: Distribution of study population according to level of education and gender Should regenerative therapy be incorporated into the dentistry undergraduate course.

			Yes	No	Not sure	Total
	General dentist	n	113	11	16	140
		%	80.7%	7.9%	11.4%	100.0%
	Specialist	n	187	37	37	261
		%	71.6%	14.2%	14.2%	100.0%
Total		n	300	48	53	401
		%	74.8%	12.0%	13.2%	100.0%
P value				0.092		

Table 7: Distribution of study population according to level of education and Would you be willing to save teeth and dental tissue for future regenerative dental treatment.

			Yes	No	Not sure	Total
	General dentist	n	124	3	13	140
		%	88.6%	2.1%	9.3%	100.0%
	Specialist	n	233	8	20	261
		%	89.3%	3.1%	7.7%	100.0%
Total		n	357	11	33	401
		%	89.0%	2.7%	8.2%	100.0%
P value				0.749		

Table 8: Distribution of study population according to level of education and Do you think that regenerative dental treatment will be a better treatment option than tooth implant placement.

			Yes	No	Not sure	Total
	General dentist	n	102	7	31	140
		%	72.9%	5.0%	22.1%	100.0%
	Specialist	n	183	25	53	261
		%	70.1%	9.6%	20.3%	100.0%
Total		n	285	32	31	401
		%	71.1%	8.0%	84	100.0%
P value			0.268			

Table 9: Distribution of study population according to level of education and Do you have any ethical concerns regarding use of stem cells in dentistry.

			Yes	No	Not sure	Total
	General dentist	n	32	64	44	140
		%	22.9%	45.7%	31.4%	100.0%
	Specialist	n	112	103	46	261
		%	42.9%	39.5%	17.6%	100.0%
Total		n	144	167	90	401
		%	35.9%	41.6%	22.4%	100.0%
P value				0.001*		

Table 10: Distribution of study population according to level of education and In a clinical practice, will you recommend a patient to store dental stem cells and explain its future prospects.

			Yes	No	Not sure	Total
	General dentist	n	112	2	26	140
		%	80.0%	1.4%	18.6%	100.0%
	Specialist	n	204	19	38	261
		%	78.2%	7.3%	14.6%	100.0%
Total		n	293	21	64	401
		%	73.0%	5.2%	16.0%	100.0%
P value				0.032*		

Table 11: Distribution of study population according to level of education and Can stem cell tissue regenerative technology be applicable to dentistry.

			Yes	No	Not sure	Total
	General dentist	n	116	6	18	140
		%	82.9%	4.3%	12.9%	100.0%
	Specialist	n	210	14	37	261
		%	80.5%	5.4%	14.2%	100.0%
Total		n	326	20	55	
		%	81.3%	5.0%	13.7%	100.0%
P value				0.822		

Table 12: Distribution of study population according to level of education and Can dental stem cells be used to develop non-dental tissues/organs.

			Yes	No	Not sure	Total
	General dentist	n	57	15	68	140
		%	40.7%	10.7%	48.6%	100.0%
	Specialist	n	131	25	105	261
		%	50.2%	9.6%	40.2%	100.0%
Total		n	188	40	173	
		%	46.9%	10.0%	43.1%	100.0%
P value				0.189		

Table 13: Distribution of study population according to level of education and Which of the following are sources of dental stem cells.

			dental pulp, apical papilla, gingiva	dont know	enamel	Total
	General dentist	n	116	22	2	140
		%	82.9%	15.7%	1.4%	100.0%
	Specialist	n	238	17	6	261
		%	91.2%	6.5%	2.3%	100.0%
Total		n	354	39	8	401
		%	88.2%	9.7%	2.0%	100.0%
P value				0.024		

Table 14: Distribution of study population according to level of education and Which of the following procedures can benefit by the application of dental stem cells.

			continued root formation	dont know	pulp/dentin tissue engineering and regeneration	regeneration of enamel	Total
	General dentist	n	11	37	87	5	140
		%	7.9%	26.4%	62.1%	3.6%	100.0%
	Specialist	n	28	21	196	16	261
		%	10.7%	8.0%	75.1%	6.1%	100.0%
Total		n	39	58	283	21	401
		%	9.7%	14.5%	70.6%	5.2%	100.0%
P value				0.0001*			

DISCUSSION

The medical applications of stem cells in several fields have increased dramatically since the turn of the century, including scientific research (such as developmental biology), medical fields such as pharmaceuticals and stem cell therapies for chronic diseases, and the food industry, such as beef production from muscle stem cells. [5] Stem cells have the ability to provide lasting treatments for any pulpal or periodontal disorders in dentistry. Congenital and acquired intra- and extra-oral soft and hard tissue deficiencies might also be efficiently controlled or treated using stem-cell-based techniques, and future tooth replacements in the form of a "new natural tooth" now seem to be a possibility. [5]

Stem cells are cells that can differentiate into various kinds of cells via many cell divisions while still retaining the potential to develop and proliferate into mature cell types. Because of their potential to self-renew and transdifferentiate, stem cells are also known as precursor cells or progenitor cells. [6] Wilson invented the phrase "stem cell." In the year 1908, a Russian histologist named Alexander Maksimov proposed the presence of hematopoietic stem cells. [7] Stem cells are generically classed as ESCs and ASCs based on their origin and differentiation capacity. [8] ASCs are multipotent cells that can develop into more than one kind of cell but not all cell types. ASCs, which may be derived from bone marrow, umbilical cord, pancreas, adipose tissue, and tooth pulp, are also known as postnatal stem cells or somatic stem cells. 8 Dental stem cells are a kind of adult mesenchymal cell that is easily accessible and a viable source of stem cells. [9,10] Dental pulp stem cells, dental follicle stem cells, apical papilla stem cells, periodontal ligament stem cells, tooth germ progenitor cells, and immature dental pulp stem cells are all sources of dental stem cells in the orofacial area. This progenitor cell has several uses, including ongoing root production, regeneration of an immature tooth with substantial pulp injury, periodontal regeneration, biological tooth, and stem cell-based treatments, which are receiving international interest due to their multiple advantages. [10] of the 401 participants, 27% were male and 73% were female. The distribution of chi square test was used to compare. It failed to reach the level of significance. similar results were found in others study.[11] In the present study, It was found to be significant with specialist reporting that the read journal weekly, with specialist reporting that the attended training courses, that the aware of therapeutic application of stem cells, the dental stem cell bank will be used and with specialist reporting that dental pulp, apical papilla, gingival were sources of dental stems. It was found to be significant with specialist reporting that It helps in pulp/dentin tissue engineering and regeneration. similar results were found by others research.[12]

CONCLUSION

This questionnaire survey demonstrated that dental practitioners had a high degree of awareness. Specialist staff was totally familiar with the language used by general dentists when separated into categories. This research also found a link between academic qualifications and levels of knowledge and awareness among dental practitioners. This highlights the need of increasing general dentists' understanding of improvements in dental stem cell uses, storage, banking, and guidelines, which may be accomplished via seminars and the organisation of seminars and conferences. Similar surveys and studies must be undertaken at all levels to raise global awareness and ensure that everyone benefits in the near future.

REFERENCES

1. Abdullah FM, Ponnuraj KT, Mokhtar KI. DPSCs and SHED in Tissue Engineering and Regenerative Medicine.Open Stem Cell J 2013;4:1-6.
2. Arora V, Arora P, Munshi AK. Banking Stem Cells From Human Exfoliated Deciduous Teeth (SHED):Saving For The Future. J Clin Pediatr Dent 2009;33(4):289-94.
3. Gronthos S, Brahim J, Li W, 1. et al. Stem cell properties of human dental pulp stem cells. J Dent Res. 2002;81(8):531-5.
4. Pranke PHL, Casagrande L, Luisi SB. Stem cells from dental 2. tissue for regenerative Dentistry and Medicine. In: Bhattacharya N, Stubblefields PG. Regenerative Medicine: Using Non-fetal sources of Stem Cells. London: Springer; 2015.
5. Blau HM, Daley GQ. Stem cells in the treatment of disease. *New England Journal of Medicine*, 2019, May 2, 380(18), 1748-60.
6. Fortier LA. Stem cells: Classifications, controversies, and clinical applications. Vet Surg 2005;34:415-23.
7. 16. Xiao L, Nasu M. From regenerative dentistry to regenerative medicine: Progress, challenges, and

potential applications of oral stem cells. Stem Cells Cloning 2014;7:89-99.
8. 17. Pushpalatha C, Nimbal A, Jain S, Tammannavar P. Dental pulp stem cells scope in dentistry. IOSR J Dent Med Sci 2013;8:38-41.
9. 18. Sharma R, Bhargava D, Yadav M, Rastogi P, Chandavarkar V, Siddhartha M, et al. Dental stem cells: Harnessing newer possibilities. J Indian Acad Forensic Med 2013;35:378-82.
10. 19. Vyas S, Vyas K, Madathanapalli S, Shende V, Srivastav R. Stem cells – The future of dentistry: A review. J Indian Acad Oral Med Radiol 2011;23:S370-2
11. Orenuga OO, Dacosta OO: A survey and career aspirations of clinical dental students in Nigerian Universities. Nig Dent J 2009, 17(1):19–23.
12. Alzahrani F.**A.** Knowledge of and attitudes towards stem cells and their applications: A questionnaire-based cross-sectional study from King Abdulaziz university. Alzahrani,2019, AJMS 3 (1): 18-21, DOI:10.5455/ajms.31