

# Assessment of Knowledge, Attitude, and Practice regarding Applications of Stem Cells in Dentistry among Dental House Surgeons, Postgraduate Students, and Teaching Faculties in Two Dental Colleges in Ernakulam, Kerala, India

Nitha Jose

## ABSTRACT

**Introduction:** The progress of research in the field of dental stem cells is at a high pace. Various studies have shown oral tissues to be a good source for adult stem cells and therefore dentists can play a great role in the field of regenerative therapies. For the dentists to explore the different applications of oral stem cells, they should be aware of the basic biology and storing and processing of stem cells. The aim of this study was to assess the knowledge, attitude, and practice regarding the applications of stem cells in dentistry, among the interns and dental teaching faculty members of two dental colleges in Ernakulam, Kerala, India.

**Materials and methods:** A cross-sectional questionnaire-based survey was carried out, consisting of 16 questions, to assess the objectives of the study. The study was conducted among dental house surgeons, postgraduate students, and teaching faculty members of two dental colleges in Ernakulam district, Kerala, India. For each question, the results were expressed as a number and percentage of responses and inferential statistical analysis was done using chi-square test.

**Results:** Almost majority of the dentists (84%) never received any training on handling and processing of oral stem cells, but about 89% were interested in attending training workshops. The majority (77.9%) were willing to practice regenerative dentistry.

**Conclusion:** Dentists are supportive for using stem cell-based regenerative treatments in their practice and are interested in attending more training for the same. Most of the dentists feel that the undergraduate syllabus should include this topic.

**Keywords:** Dentists, Regenerative dentistry, Stem cells.

**How to cite this article:** Jose N. Assessment of Knowledge, Attitude, and Practice regarding Applications of Stem Cells in Dentistry among Dental House Surgeons, Postgraduate Students, and Teaching Faculties in Two Dental Colleges in Ernakulam, Kerala, India. *Int J Oral Care Res* 2018;6(1):65-68.

Intern

Innov4Sight Health and Biomedical Systems Private Limited  
Bengaluru, Karnataka, India

**Corresponding Author:** Nitha Jose, Intern, Innov4Sight Health and Biomedical Systems Private Limited, Bengaluru, Karnataka India, e-mail: nithajose012@gmail.com

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

The recent discoveries providing the scope of isolating stem cells from deciduous and permanent teeth have opened up new role for dentists. The stem cells isolated from dental tissues can be processed and can be grown into different tissues.

Personalized medicine which mainly focuses on the growth and regeneration of tissues using stem cells from the patient ensures biocompatibility and patient-specific treatment. Dentists will play an important role in the recovery and use of stem cells in both medical and dental regenerative therapies.

The characteristic feature of plasticity makes dental stem cells an important source of mesenchymal stem cells used for regenerative therapies in dentistry and for tissue engineering in medicine.<sup>1</sup> Research on adult stem cells has led to new treatment protocols for endodontics, caries, periodontal, and maxillofacial procedures.<sup>1</sup> In the future, dental professionals will be utilizing stem cell therapies for everyday treatments.

In the coming years, a dentist's clinic could become a "stem cell bank" for patients who may require new bone or teeth in their later life. Dentists can be key providers of stem cells, as they are involved in the extraction, collection, and storage of the stem cells from their patients' oral cavity.

Dentists should become aware of the applications, banking, and clinical use of dental stem cells to participate in this new role.<sup>2</sup> Although stem cell therapy shows promising future, there is lack of knowledge and proper guidelines regarding this topic among the dental professionals. The advancements in regenerative dentistry and stem cells require serious consideration of the need to include this topic in the syllabus of dental students.<sup>3-6</sup>

The aim of this survey was to assess the knowledge, attitude, and practice about the applications of stem cells in dentistry among dental house surgeons, postgraduate students, and dentists.

## MATERIALS AND METHODS

Existing questionnaire<sup>1</sup> on opinion of dentists toward the use of stem cells in dentistry was checked and modified in making the questionnaire used in this study. The study was completed over a period of 1 week in the month of December 2017. The target population comprised of dental house surgeons, teaching faculties, and postgraduate students in two dental colleges in Ernakulam district of Kerala, India.

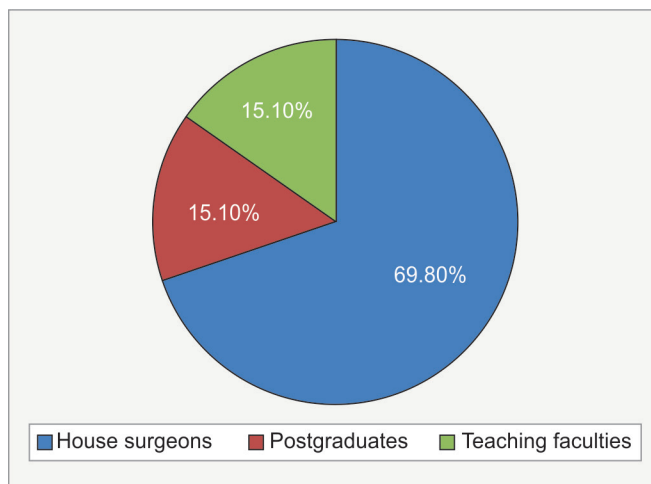
The questionnaire was validated and ethical clearance was obtained from the Ethics Committee of the institution. The questionnaire was distributed by the investigator to all those present on the day of data collection. A total of 172 copies of questionnaires were distributed. The questionnaire was divided into two parts. The first part consisted of questions on personal and professional data including gender and designation.

The second part consisted of 16 closed-ended questions. The respondents were informed to answer and return the questionnaire immediately. The informed consent of all the respondents were obtained.

### Statistical Analysis

All the questionnaires returned were coded and analyzed. The results were expressed as percentage and number of response for each question and were analyzed using the Statistical Package for the Social Sciences version 17 (SPSS Inc., Chicago).

To compare the response in relation to designation, chi-square test was performed, and the level of statistical significance was set at  $p = 0.05$ .



Graph 1: Respondents profile

## RESULTS

### Respondents Profile

Out of 173 respondents, 69.2% (n = 119) were house surgeons, 15.1% (n = 26) were postgraduates, and the rest (15.7%) (n = 53) were teaching faculty members. The profiles of the respondents are presented in Graph 1.

### Opinions and Awareness

Table 1 shows the response to the questions assessing the knowledge, attitude, and practice regarding stem cells in dentistry. Majority of the dentists (79.7%) were aware of the potential therapeutic applications of stem cells in dentistry, but 20.3% reported that they were not

Table 1: Response to questionnaire

Question		Response		p-value comparison between UGs and PGs
		Yes	No	
Are you aware of the potential therapeutic applications of stem cells in dentistry?	UG	87 (72.5%)	33 (27.5%)	0.001 (S)
	PG	50 (96%)	2 (3%)	
Should the topic be incorporated in UG curriculum?	UG	94 (78.3%)	26 (21.7%)	0.1 (NS)
	PG	46 (88.5%)	6 (11.5%)	
Have you discussed the applications of stem cells with your patients?	UG	20 (16.7%)	100 (83.3%)	0.3 (NS)
	PG	6 (11.6%)	46 (88.5%)	
Did you know that tooth banking is cost-effective than cord blood banking?	UG	32 (27%)	88 (73%)	0.04 (S)
	PG	22 (42%)	30 (58%)	
Are you willing to practice stem cell-based regenerative therapy in your practice?	UG	95 (79%)	25 (21%)	0.5 (NS)
	PG	39 (75%)	13 (25%)	
Have you attended a program/lecture on dental applications of stem cells?	UG	19 (16%)	101 (84)	0.8 (NS)
	PG	9 (17%)	43 (83%)	
Would you be interested in attending more advanced training regarding applications of dental stem cells?	UG	106 (88%)	13 (12%)	0.5 (NS)
	PG	47 (90%)	5 (10%)	
Can dental stem cells be used to develop nondental tissues/organs?	UG	59 (49%)	46 (38%)	0.4 (NS)
	PG	27 (60 %)	22 (42%)	
Do you think dental stem cell banking will be useful for regeneration of dental tissues?	UG	105 (88%)	3 (6%)	0.08 (NS)
	PG	51 (98%)	0	
Are there any dental stem cell banks in India?	UG	18 (15%)	96 (80%)	0.008 (NS)
	PG	18 (35%)	30 (58%)	

UG: Undergraduate; PG: Postgraduate; S: Significant; NS: Nonsignificant

aware about the applications of stem cells. Among the respondents, postgraduates (postgraduate students and faculty) had significantly more awareness than undergraduate students ( $p = 0.001$ ). Majority (90.7%) of participants thought that dental stem cell banking will be useful for regeneration of dental tissues, but about 15.1% of the respondents had discussed the applications of stem cells and convinced the need to store it with their patients. Only 31.4% of the population were aware that tooth banking is cost-effective than cord blood banking. Majority of the population (79.1%) were not aware of the availability of dental stem cell bank in India. Among the respondents, postgraduates (postgraduate students and faculty) were significantly more aware about the stem cell bank in India than the undergraduate students ( $p = 0.008$ ).

### Clinical Practice and Knowledge

Almost 93.6% knew the sources of dental stem cells. Most of the dentists (69.2%) knew that both soft tissues and hard tissue regeneration can be benefitted by the applications of dental stem cells. Only very few participants (2.9%) reported using some form of regenerative therapy in their practice, such as bioactive materials, membranes, and scaffolds regularly, while 26.2% of participants used them once in a while. Most of the participants (66.3%) felt that the concept of regeneration instead of repair will be the reason why they would recommend stem cell-based regenerative treatments to their patients.

While majority (83.7%) of the population has not attended a training course/program on dental applications of stem cells, 89% of the population was eager in attending more courses on advanced training regarding the same. About 81.4% felt the need of incorporating regenerative dentistry in the dental undergraduate curriculum.

### DISCUSSION

The discovery of stem cells in the pulps of permanent and deciduous teeth has led to an increase in research activities in the applications of stem cells in dentistry.<sup>1</sup> The potential of stem cell therapy is vast and will for sure play a significant role in next-generation dentistry. Stem cell research is a rapidly growing field with about 20,000 publications for tissue engineering and regenerative medicine in 2015 and 1,300 publications in dentistry in 2015 (PubMed search).<sup>1</sup> Stem cell therapy is showing promising results as future trends points out to successful clinical outcomes.

Therefore, there is growing demand for more lectures and incorporation of this subject into the curriculum whereby regenerative therapies can be provided to the patients. In this study, majority of the dentists are already

aware of the applications of stem cells. A similar study conducted among the dentists in Karnataka by Chitroda et al<sup>7</sup> also shows the same level of awareness.

Currently, the dentistry curriculum is incompetent in making the students learn more about regenerative therapy, hence, majority of the dentists (81.4%) were of the opinion that regenerative dentistry should be introduced into the undergraduate curriculum. A study conducted by Sede et al<sup>8</sup> showed that conference/symposium/seminar was the primary source of information.

This could be due to increased spurt of conversation regarding the topic within the public through a variety of forums like increased publication of scientific articles and also because it is one among the most novel topics ruling the world of medicine and dentistry.<sup>9,10</sup> In this study, 89% of the dentists showed interests on attending lectures and training on stem cells.

This is due to the increasing research, applications in this field, and also due to lack of sufficient deep knowledge about stem cells from dental tissues. This initiates the organization of workshops/continuous dental education (CDE) programs related to dental stem cells. There is a significant difference in the knowledge on stem cells among the postgraduate and undergraduate dentist population.

Since the topic is not taught through the curriculum, this may be the outcome of the CDE programs and seminars, which are attended by more postgraduates when compared with undergraduates. A similar study, conducted among medical doctors in Italy in 2014, found that the majority of the physicians interviewed did not have specific knowledge on stem cells (59%); most (65%) of those involved did not attend additional training courses regarding stem cells, but most were interested in stem cells (70%), suggesting that they believe in the potential benefits of developing stem cell therapies.<sup>11</sup> After a brief survey conducted by Bajek and Drewa,<sup>3</sup> at the Copernicus University, Bydgoszcz, Poland, an obligatory subject "Regenerative Medicine" for 5th year medical students was introduced.

Undergraduate students at Lahore Medical and Dental College received information in the form of lectures but no clinical training. They have observed regenerative procedures done by the faculty members, while postgraduate students do perform periodontal guided tissue regenerative procedures.

Undergraduate students at the College of Dentistry, University of Dammam, and Faculty of Dentistry, Griffiths University, Australia, have not received any clinical training in the field of regenerative dentistry. While there is not much literature, the current undergraduate and postgraduate dental programs do not provide the student with an in-depth knowledge and understanding required for the performance of stem cell-based procedures in dental treatments.<sup>1</sup>

Most of the dentists feel that regenerative therapies could be the most efficient treatment option, and majority of the dentists feel that lack of knowledge and cost could be the possible obstacles in practicing regenerative treatments in future, and comparable results were found in a survey done by Goyal<sup>12</sup> among the dental practitioners in Rajasthan in the year 2015, where 63.5% agreed that the high cost, lack of awareness, and lack of sufficient knowledge were hindering people from obtaining treatment using dental stem cells. These factors that refrain the people from obtaining treatment using dental stem cells could be minimized by reasonable charging of fees similar to other standardized management procedures<sup>9</sup> and by also spreading awareness at the public level by conducting seminars/lectures at public level, which in return will decrease the misconceptions related to stem cells.

## CONCLUSION

The results from the survey show that more than half of the dentists had awareness on the applications of stem cells in dentistry. But majority of the subjects revealed lack of knowledge as the biggest obstacle in accepting regenerative treatment, which suggests that more intensive training and incorporation of the topic in the dental curriculum are the need of the hour.

## REFERENCES

1. Basson RA, Moodley DS, Oliviera A, Basson NJ. A survey of the opinions of dentists regarding stem cells in dentistry. *SADJ* 2016 Sep;71(8):351-355.
2. Sreenivas SD, Rao AS, Satyavani SS, Reddy BH, Vasudevan S. Where will the stem cells lead us? Prospects for dentistry in the 21st century. *J Indian Soc Periodontol* 2011 Jul-Sep;15(3):199-204.
3. Bajek A, Drewa T. Should we teach regenerative medicine during undergraduate education? *Stem Cell Studies* 2011 Oct;1:e14.
4. Gupta AS, Gupta S, Singaraju S, Singaraju M. Role of dental adult stem cells in regenerative medicine. *J Orofac Res* 2013 Apr-Jun;3(2):115-120.
5. Jamal M, Chogle S, Goodis H, Karam SM. Dental stem cells and their potential role in regenerative medicine. *J Med Sci* 2011 Jun;4(2):53-61.
6. Ramazanoglu, M.; Schlegel, KA.; Kose, TK. Potential use of dental stem cells for craniofacial tissue regeneration. In: Turksen K, editor. *Stem cells: current challenges and new directions*. New York: Humana Press; 2013. p. 105-124.
7. Chitroda PK, Katti G, Attar NM, Shahbaz S, Sreenivasarao G, Patil A. Stem cells in dentistry: a study regarding awareness of stem cells among dental professionals. *Indian J Dent Res* 2017 Nov-Dec;28(6):711-716.
8. Sede MA, Audu O, Azodo CC. Stem cells in Dentistry: knowledge and attitude of Nigerian Dentists. *BMC Oral Health*. 2013;13:27. doi:10.1186/1472-6831-13-27.
9. Utneja S, Nawal RR, Ansari MI, Talwar S, Verma M. A survey of attitude and opinions of endodontic residents towards regenerative endodontics. *J Conserv Dent* 2013 Jul;16(4):314-318.
10. Huang GT, Gronthos S, Shi S. Mesenchymal stem cells derived from dental tissues vs. those from other sources: their biology and role in regenerative medicine. *J Dent Res* 2009 Sep;88(9):792-806.
11. Frati P, Gulino M, Pacchiarotti A, D'Errico S, Sicuro L, Fineschi V. A survey of Italian physicians' opinion about stem cells research: what doctors prefer and what the law requires. *BioMed Res Int* 2014 Apr;2014:480304.
12. Goyal A. Knowledge, awareness and attitude regarding stem cells among dental practitioners in Udaipur city, Rajasthan. *Int J Adv Res* 2015 Feb;3(2):677-684.