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## Perception about Future Prospects of Dental Stem Cell Therapy among House Surgeons and Postgraduate Students: A Cross-Sectional Survey

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### ABSTRACT

**Background:** Advancements in healthcare demonstrated that stem cells could be used for the management of various ailments. This encouraging data supports the aim of applying stem cell treatment in medicine. Therefore, it is essential that future dentists be updated on stem cell therapy in order to further regenerative medicine.

**Aim:** To find out the perception of house surgeons and postgraduate students regarding the future prospects of stem cell therapy.

**Methodology:** In this survey, 414 dental students were invited to participate, and 375 interns and PG students responded. A 26 items self designed structured, closed-ended questions were used to assess their perceptions regarding the future prospects of stem cell therapy.

**Results:** About 73% of our students had knowledge on dental stem cell therapy, and they primarily cited books, journals, and websites as their sources. Nearly 53% of them stated lack of awareness among patients as the major obstacle to receiving dental stem cell treatment.

**Conclusion:** The study concluded that interns and PGs' had a favourable perception of dental stem cell therapy. However, the knowledge was insufficient. Hence, they should be educated regarding dental stem cells and their prospective utilization in regenerative oral health care.

**Key words:** Stem cell therapy, Dental students, Awareness, Knowledge

### INTRODUCTION

Our body is made up of numerous types of cells, which are combined to form tissues and later organ systems. The cellular system comprises of nerve cells, epithelial cells, exocrine cells, endocrine cells, white and red blood cells [1]. All of which are derived from a set of unspecialized cells also called stem cells. These cells possess the extraordinary capacity to develop and form a large diverse cell types that carry out various functions. [2]. In addition to having the capacity to specialise, stem cells can also collaborate to repair tissues that have been injured [3]. Perhaps the most useful property of stem cells is that of property of self renewal.

Mesenchymal multipotent Stem Cells (MSCs) are type of adult stem cells and easily harvested from tooth structure. Natal dental pulp and other parts of tooth structures are considered potential tissues for Dental Stem Cells (DSCs)[4]. DSCs have been found to have equivalent differentiation potential to bone marrow stem cells and are easy to obtain, affordable, and non-invasive [4,5]. The best time to harvest DSCs is when children and young people are losing their deciduous teeth, either naturally or for orthodontic purposes. The teeth that retain a blood supply until they are taken will have the highest concentration and quality of stem cells [6]. As a result, during the past ten years, these structures have caught the attention of researchers.

Dental Stem Cell (DSC) research appears to have immense promise, and dentists are crucial participants in the chain of collecting dental stem cells. Those harvested cells could be used to treat a wide range of medical conditions as well as dental pathologies such as mandibular reconstruction and augmentation of the alveolar ridge. Therefore, dentists must have fundamental knowledge of stem cells, their storage, and their prospective uses [7]. A survey was undertaken to find out the perceptions about the future prospects of dental stem cell therapy among dental house surgeons and post graduate students of Davangere.

### MATERIALS AND METHODS

**Study design:** An observational, cross-sectional survey was designed to collect information on the future prospects of dental stem cell therapy among dental house surgeons and post graduate students studying of Davangere city. The protocol was scrutinised by the IRB of Bapuji Dental College. The validity of our questionnaire was assessed on 10% of the participants. The Cronbach's  $\alpha$  value of 0.86 was considered good to conduct the final survey.

**Instrument for data collection:** An investigator designed closed-ended, self-completion questionnaire had two sections. Section I contained 20 questions; first 11 questions were regarding knowledge, the 12 and 13 number questions focused on awareness, and the 14 to 20 questions had attitude related questions. Section II had three questions to elicit information regarding socio-demographic details like age, gender, year of completion of the final year as undergraduate course, area of specialization in dentistry.

**Collection of data:** After obtaining official permission from the college heads, a list of house surgeons and post graduate students was procured from the administrative office. A total of 414 house surgeons and post graduate students were approached in their respective clinics during the working hours. They were requested to fill out the questionnaire when they were relatively free. The filled out questionnaire was collected back after checking for completeness within two days. The response rate of 90.5% was achieved, and it was found to be high.

**Statistical analysis:** The statistical analysis was done using SPSS version 20. Descriptive statistics were expressed in frequencies and percentages. The Pearson's chi square test was used to find out the perception of house surgeons and post graduate students about dental stem cell therapy.

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## RESULTS

A total of 375 students participated in our survey. They were in age range of 22-27 years, 39% were under 25 years old, and 61% were over 25 years old. The majority (62.9%) were female students, and about 72.5% were house surgeons. (Table 1)

About 80.6% (n=83) of postgraduate students and 30.9% (n=84) of interns had knowledge on various sources of DSCs. All the postgraduate students and 30.7% (n=103) of interns had knowledge on application of DSCs in the development of non-dental tissues. Seventy nine percent (n=216) of interns, and 77.7% (n=80) of postgraduate students had information on the existence of dental stem cell banks in India. The majority 94.2% (n=97) of postgraduate students and about 78.3% (n=213) were more interested in suggesting their patients to preserve stem cells for potential use in the future. (Table 2)

The main sources of knowledge on stem cells were conferences/symposium/seminars (37%), journals (34%), mass media (16.5%), professional societies (11%) and peer groups (1.5%). (Fig 1)

The major obstacles to stem cell therapy were lack of awareness (52.3%), high cost (28.8%) and dearth of clinical trials (16.5%). (Fig 2) About 98% of our study participants expressed interest in improving their knowledge on dental stem cells. (Fig 3)

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## DISCUSSION

Stem cell research is advancing globally with the hope of improving human health [7]. Dental Stem Cells (DSCs) have the capacity to produce a variety of cells and tissues in vitro [8,9,10]. Theoretically, dental stem cell therapies are considered the cure for the majority of oral related diseases, including those thought to be incurable [11]. Studying dental students' knowledge, attitudes, and practises with respect to stem cell use in dentistry may help identify any gaps and problematic areas that the curriculum may need to address.

Our students reported conferences, seminars, and journals as the leading sources of information on stem cells. This is in line with studies conducted by Sede [12], Chitroda [13], Goswami [14], Katge [15] and Goyal [16]. A higher level of information on stem cells was observed among postgraduate students. This could be due to the greater exposure in their post graduate training program. Basic knowledge on stem cell classification was found to be less among house surgeons compared to postgraduate students, Goyal [16], Goswami [14] made similar observations in their studies.

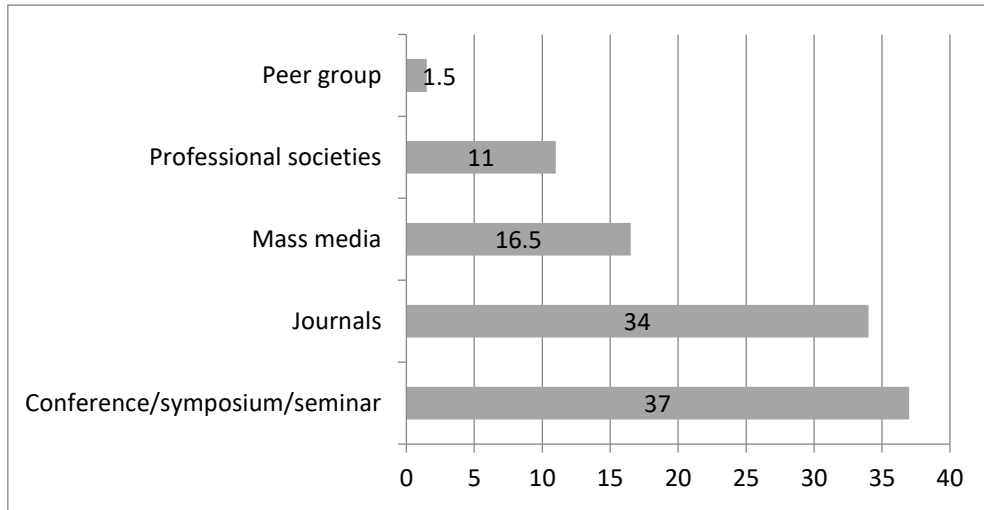
Regarding the various sources of dental stem cells, 43.2% of our students reported dental pulp as the major source. This could be due to the high commercialization of media and industries over the past few years. Nearly seventy percent of house surgeons displayed a favourable attitude towards the utilization of stem cells in regenerative dental procedures. This is supportive of a study done by Utneja [17]. More than one-third of our students considered lack of awareness among patients, followed by high cost, as the main barriers to seeking stem therapy. The results of our survey findings are in contrast to previous research [18], where more than two-thirds of participants identified high cost as the greatest obstacle to stem cell therapy.

Exploration of postnatal stem cells in the dental pulp tissue opened up a new horizon in oral health care discipline. Collection and storage of stem cells from naturally exfoliated teeth and extracted for orthodontic purposes are considered cost effective, feasible for regenerative therapies. Hence, tooth banks are expanding in number worldwide [19]. More than two third of our students had information on dental stem cell banking in our country. This could be due to the wide commercialization of the internet and other social media platforms. This finding is contradictory to the previous surveys [15, 20].

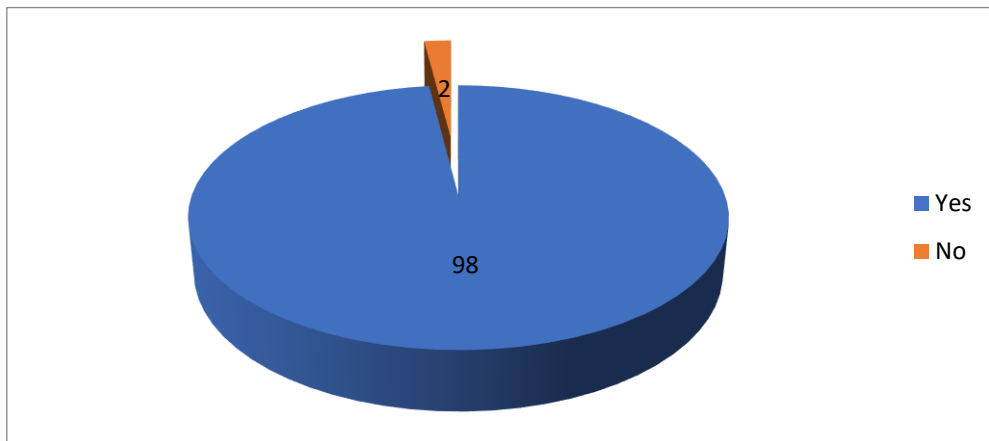
Almost all participants were willing to update their knowledge on dental stem cells through conferences, symposium, and CDE programs. They concur that dental stem cell research is still in its infancy and has not yet shown the full breadth of its potential applications in the field of regenerative medicine. However, there were a few limitations to our survey. The survey was conducted on a smaller population, and the generalizability of the findings was limited to the geographic location of the study. Therefore, the findings should be interpreted with caution.

**CONCLUSION**

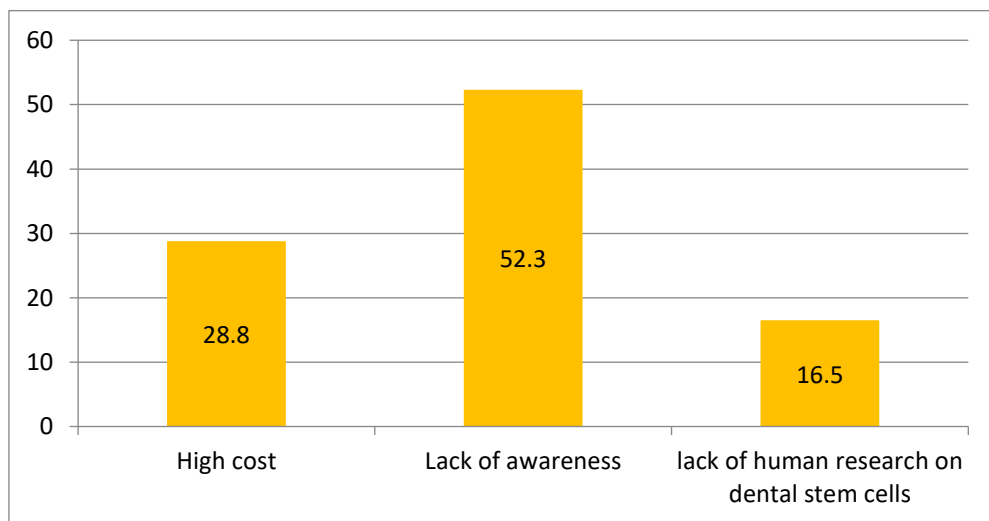
From the present survey, it can be concluded that our participants expressed a favourable attitude regarding the application of stem cell therapies in dentistry. However, dental house surgeons had a low level of knowledge on the fundamentals of stem cells compared to postgraduate students. All the participants expressed willingness to update their knowledge regarding DSCs through CDE programs, conferences, and workshops.



**Fig 1: Source of information regarding dental stem cells**



**Fig 2: Barriers to seeking dental stem cell therapy in India**



**Fig 3: Willingness to improve knowledge on dental stem cells**

**TABLE 1: CHARACTERISTICS OF STUDY SUBJECTS**

Variables	N (%)
Age in years	
< 25 years	39%
> 25 years	61%
Gender	
Male	37.1%
Female	62.9%
Qualification	
BDS	72.5%
MDS	27.5%

**TABLE 2: PERCEPTION OF STUDY PARTICIPANTS ON DENTAL STEM CELLS**

	Interns		MDS		Significance value (p)
	Yes N (%)	No N (%)	Yes N (%)	No N (%)	
<b>Knowledge</b>					
Information on different sources of stem cells from dental origin?	84 (30.9%)	188 (69.1%)	83 (80.6%)	20 (19.4%)	0.000
Information on implementation of dental stem cells in developing non- dental tissues?	103 (37.9%)	169 (62.1%)	103 (100%)	0	0.000
<b>Awareness</b>					
Awareness on dental stem cell banks in India?	216 (79.4%)	56 (20.6%)	80 (77.7%)	23 (22.3%)	0.000
<b>Attitude</b>					
Willing to recommend patients to store dental and other stem cells for potential use in future	213 (78.3%)	59 (21.7%)	97 (94.2%)	6 (5.8%)	0.000

**CONFLICT OF INTEREST**

Nil

**AUTHOR CONTRIBUTION**

Author is entirely responsible for the conceptualisation of survey, design, collection of data, interpretation of results and preparation of the manuscript.

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