

# Use of PowerPoint presentation as a teaching tool for undergraduate students in the subject of gerodontology

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## Abstract

**Aim:** Though different teaching learning media have been employed in the instruction of geriatric dentistry, their efficacy has not been adequately evaluated. This study was conducted with the aim to determine the efficacy of a PowerPoint presentation in teaching gerodontology.

**Materials and Methods:** This is a prospective follow-up study using a pre- and post-intervention assessment. A pilot study was conducted on the final year students to check the feasibility of the study. A convenience sampling procedure was used. All interns ( $n = 80$ ) of the Modern Dental College and Research Centre, Indore, India were invited to participate. Interns completed a 24-item questionnaire documenting their current knowledge on gerodontology. One week after a 30 min PowerPoint presentation on gerodontology, the same interns completed the same questionnaire again, providing an indication of the efficacy of the learning tool. Paired *t*-test and McNemar test were employed for statistical analysis.

**Results:** A statistically significant difference was observed in pre- and post-intervention scores ( $P < 0.05$ ).

**Conclusion:** The results of this study indicated that PowerPoint presentation can be used as an effective tool for improving the knowledge regarding gerodontology.

**Key Words:** Gerodontology, PowerPoint presentation, teaching/learning tools

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## INTRODUCTION

The population of senior citizens (60 and above) in India is increasing. India harbors 77 million senior citizens, comprising 7.7% of its total population.<sup>[1]</sup> Growth rate of elderly is higher than that of the general population.<sup>[2]</sup> The gray population

which accounted for 6.7% of total population in 1991 is expected to increase its share to more than 10% by the year 2021.<sup>[3]</sup> This improved life expectancy is as a result of greater health awareness, accessibility, affordability, and acceptability of improved medical care.<sup>[4]</sup> The alteration of the age pyramid

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poses significant new challenges for health care professionals in the 21<sup>st</sup> century to provide oral health care facilities to the geriatric population.<sup>[5,6]</sup> Poor oral health can have a significant impact on the quality of life and that might lead to deterioration of general health.<sup>[7-13]</sup> The importance of the subject of gerodontology does not reflect in the undergraduate curriculum of dentistry.<sup>[11,14,15]</sup> Normally all the universities in India follow the curriculum designed by the Dental Council of India. There is lack of training and the basic aspects of geriatric dentistry are not included in the curriculum.<sup>[16]</sup> The provision to learn about geriatric patient is mentioned only as a part of complete denture prosthodontics in diagnosis and treatment planning chapter.<sup>[17]</sup> The graduates after completion are likely to have less knowledge about the problems of geriatric patients. Dentists need to understand the socioeconomic, physical, and psychological problems, and the complexity in treating the elderly patients.<sup>[16]</sup> With often more than one chronic disease affecting individuals and polypharmacy, there is a need to increase overall knowledge of geriatric pharmacy and geriatric medicine to enhance the quality of life of the elderly which is a social responsibility.<sup>[6,18-21]</sup>

Among the teaching and learning methods employed in dental education, audio visual media are the most popular. These media provide a multisensory experience.<sup>[5]</sup> The different senses tend to play a key role in improving the memory of the student who can easily remember the content that is presented.<sup>[22]</sup> Efficacy of different media in the teaching and learning process of a specific subject of dentistry is not well-documented. Therefore, this study was undertaken to determine the efficacy of a PowerPoint presentation in teaching gerodontology to the dental interns.

## MATERIALS AND METHODS

This is a prospective follow-up study using a pre- and post-intervention assessment. Ethical clearance was obtained from the institute to conduct the study. The duration of the study was from July 2012 to October 2012. A pilot study was conducted among 15 final year BDS students to find out the feasibility of the study and the questionnaire used was modified accordingly. A convenience sampling procedure was used. The study center was the Modern Dental College and Research Centre, Indore, India. All dental interns ( $n = 80$ ) of 2012 batch were invited to participate in the study. Inclusion allowed for both genders, and all ages of interns. There was no exclusion criterion, besides unwillingness to participate. Written consent to participate in the study was taken.

The study instrument used was a 24-item structured self-administered closed-ended questionnaire (options comprised

of combination of multiple-choice true/false questions and single best answer questions) that was based on four domains measuring familiarity with geriatric dentistry and prior experience with “learning or teaching tools” (6 items); knowledge of characteristics of older people (7 items); knowledge of care provision (8 items); and barriers to and neglect of care provision (3 items). The questionnaire was adopted from Teasdale and Shaikh.<sup>[23]</sup> and modified to suit the Indian context.

All the interns were assembled in a classroom and were briefed about the study. They were asked to complete a preintervention questionnaire which took approximately 10 min. Afterward single investigator gave a 30 min PowerPoint presentation (Microsoft Office 2007) on gerodontology. The PowerPoint presentation comprised of information on educational tools, an introduction to ageing, effects of ageing on oral and systemic health, effects of systemic conditions on oral health of elderly population, oral side effects of medications, care provision, and challenges and barriers of geriatric oral health care. One week after the PowerPoint presentation, the same interns were recalled and requested to complete the same questionnaire again. Questionnaires were coded allowing paired analysis of alteration in the scores. Each “correct” answer to a question was awarded one point while an “incorrect” response was given zero. Questions that were not answered were given zero points. Questionnaires with overwriting were disqualified for analysis. The Statistical Package for the Social Sciences version 17.0 (SPSS Inc., Chicago, Illinois, USA) was used for all data analysis. Paired *t*-test was employed to find out the difference in overall scores that occurred before and after the lecture. McNemar test was used to find the improvement in correct answers for individual questions.

## RESULTS

Out of the 80 interns, 61 (76%) completed the preintervention assessment form and 56 interns (92% of those who answered the pretest) completed the postintervention assessment form, more female than male respondents.

In the questions on general characteristics comprising of the geriatric age and the number of people in the 60-plus age group in India in 2013 the percentage of correct answers increased 1 week after the presentation. Regarding the question related to efficient learning or teaching tool there was no change [Table 1a].

In the question on rating oneself in terms of familiarity with gerodontology a substantial increase of those who considered “it had increased a lot” was found. Three quarters of the respondents agreed “a lot” to include gerodontology in the

dental school curriculum after the PowerPoint presentation compared to only one-third before the test. No great changes were seen regarding the extent of training/experience including older patients after the test [Table 1b].

In the seven statements, 7–13, the posttest correct values improved for five questions [Table 2]. Among questions 14–21, the posttest correct values enhanced significantly in seven of the questions [Table 3].

In the seven statements 22–24 the posttest correct values improved significantly in three of them, whereas no significant change occurred for the other statements [Table 4].

The overall mean scores before the lecture were  $18.5 \pm 2.7$ , whereas the mean score posttest increased to  $24.9 \pm 1.9$  showing a mean increase in score by  $6.4 \pm 2.8$ . This difference was found to be statistically highly significant [Table 5].

The percentage of correct answers before and after the lecture for “knowledge of characteristics of older people” was 68.6% and 87.5%; for “knowledge of care provision” the percentage improved from 60.2% to 87.9% and for “barriers to and neglect of care provision” the percentage increased from 82.4% to 92.1%. In all the domains, there was an increase in percentage of correct answers after the lecture.

## DISCUSSION

The knowledge of the teacher alone is not sufficient to make the students understand the subject. The presentation of the lecture also plays an important role. In addition to the traditional “chalk and talk” method, use of PowerPoint presentation (PP) is increasing.<sup>[24]</sup>

The increase in the population of aged individuals makes it relevant to include gerodontology in the dental curriculum. During the undergraduate dental education programme gerodontology is not given much importance although the student is expected to treat the elderly. Therefore, this study was undertaken to determine the efficiency of PowerPoint presentation in teaching gerodontology.

When the first domain related to “general characteristics of older people” was considered 1 week after the presentation, all the graduates answered that the geriatric population includes 60 years and older individuals. 85.7% of graduates correctly answered that the number of people in the 60-plus age group in India is expected to increase to 100 million in 2013. 94.6% of the graduates rated audio visual aids as effective before the presentation. Graduates found themselves more familiar with gerodontology 1 week after the presentation. There was an appreciable increase in the number of graduates who felt

**Table 1a: Comparison between pre- and post-PowerPoint presentation results regarding domain 1 (“general characteristics of older people”)**

Questions	n (%)		P
	Pretest correct answer	Posttest correct answer	
1. Geriatric population includes people from the age group	48 (85.7)	56 (100)	0.008**
3. The number of people in the 60-plus age group in India is expected to increase in 2013 to 100 million	3 (5.4)	48 (85.7)	<0.0001**
6. From your past experience, which is an efficient learning/teaching tool?	53 (94.6)	54 (96.4)	1.000

McNemar test used for comparison. \*\*Very highly significant (at 99% CI). CI: Confidence interval

**Table 1b: Comparison between pre- and post-PowerPoint presentation results regarding domain 1 (“general characteristics of older people”)**

Question	n (%)		
	Not at all	Somewhat	A lot
2. How would you rate yourself in terms of familiarity with gerodontology?			
Pretest	9 (16.1)	45 (80.4)	2 (3.6)
Posttest	1 (1.8)	39 (69.6)	16 (28.6)
4. Do you think gerodontology should be a part of the dental school curriculum?			
Pretest	3 (5.4)	34 (60.7)	19 (33.9)
Posttest	1 (1.8)	13 (23.2)	42 (75.0)
5. To what extent has your training/experience included older patients?			
Pretest	2 (3.6)	33 (58.9)	21 (37.5)
Posttest	1 (1.8)	37 (66.1)	18 (32.1)

**Table 2: Comparison between pre- and post-PowerPoint presentation results regarding domain 2 (“knowledge of characteristics of older people”)**

Questions	n (%)		P
	Pretest correct answer	Posttest correct answer	
7. Tooth loss is an inevitable consequence of ageing?	16 (28.6)	33 (58.9)	<0.0001**
8. Older persons experience more injuries in the home than persons younger than 60 years of age	25 (44.6)	48 (85.7)	<0.0001**
9. In India, the poverty rate of older people is higher than the poverty rate of persons younger than 60 years of age	30 (53.6)	47 (83.9)	<0.0001**
10. Older persons who reduce their activities tend to be happier than those who remain active	48 (85.7)	53 (94.6)	0.227
11. When the last child leaves home, the majority of parents have serious problems adjusting to their “empty nest”	48 (85.7)	54 (96.4)	0.031*
12. Edentulous older people, when compared to dentate older people, have a higher mortality rate	17 (30.4)	43 (76.8)	<0.0001**
13. Coronal caries is more common in older people than periodontal disease	49 (87.5)	48 (85.7)	1.000

McNemar test used for comparison.\*Statistically significant (at 95% CI), \*\*Very highly significant (at 99% CI). CI: Confidence interval

**Table 3: Comparison between pre- and post-PowerPoint presentation results regarding domain 3 (“knowledge of care provision”)**

Questions	n (%)		P
	Pretest correct answer	Posttest correct answer	
14. The oral health assessment of an older patient includes...	36 (64.3)	56 (100)	<0.0001**
15. Dental infections impact on the treatment of which of the following medical conditions	2 (3.6)	42 (75)	<0.0001**
16. How important is it for an oral health care provider to know about the medications an older patient is taking?	50 (89.3)	54 (96.4)	0.219
17. Denture problems which inhibit older patients wearing their dentures may be relieved by including in their oral health care plan...	20 (35.7)	54 (96.4)	<0.0001**
18. Oral health care planning for a dentate older patient should include use of fluoride gel and fluoride dentifrice	27 (48.2)	53 (94.6)	<0.0001**
19. Fluoride dentifrices and fluoride gels are inappropriate for older people because of an increased risk of bleeding	51 (91.1)	49 (87.5)	0.774
20 a. Complications of medication use sometimes observed in the oral cavity and surrounding structures include... Gingival hyperplasia secondary to dilantin therapy	54 (96.4)	56 (100)	0.500
20 b. Complications of medication use sometimes observed in the oral cavity and surrounding structures include... Oral candidiasis secondary to use of corticosteroids	48 (85.7)	55 (98.2)	0.016*
20 c. Complications of medication use sometimes observed in the oral cavity and surrounding structures include... Hyposalivation secondary to antihistamine therapy	45 (80.4)	54 (96.4)	0.022*
20 d. Complications of medication use sometimes observed in the oral cavity and surrounding structures include... Hypersalivation secondary to antidepressants	34 (60.7)	31 (55.4)	0.664
21. The prognosis of implant-supported restorations is as good in older as in young adults	6 (10.7)	44 (78.6)	<0.0001**

McNemar test used for comparison. \*Statistically significant (at 95% CI), \*\*Very highly significant (at 99% CI). CI: Confidence interval

that gerodontology should be a part of the dental school curriculum. The results of our study are in agreement with Shah,<sup>[11,18]</sup> Kalk et al.<sup>[14]</sup> and Talwar and Chawla.<sup>[15]</sup> A slight decrease in percentage was observed for extent of experience in treating older patients which could be due to the realization of their insufficient knowledge and experience after the presentation. These findings are similar to those reported by Shah<sup>[2]</sup> that there is little emphasis on practical training of elderly in undergraduate dental curriculum in India.

When the second domain “knowledge of characteristics of older people” was assessed 58.9% of the graduates knew that tooth loss is not an inevitable part of ageing. Awareness that

**Table 4: Comparison between pre- and post-PowerPoint presentation results regarding domain 4 (“barriers to and neglect of care provision”)**

Questions	n (%)		P
	Pretest correct answer	Posttest correct answer	
22. An older patient may experience barriers to oral health care including...	43 (76.8)	56 (100)	<0.0001**
23. A common inhabitant of the oral cavity, <i>Candida albicans</i> , becomes a problem as a result of .....	45 (80.4)	56 (100)	0.001**
24 a. Neglect of oral health in older patients may lead to tooth loss	56 (100)	54 (96.4)	0.500
24 b. Neglect of oral health in older patients may lead to dental pain	54 (96.4)	56 (100)	0.500
24 c. Neglect of oral health in older patients may lead to periodontal disease	56 (100)	56 (100)	1.00
24 d. Neglect of oral health in older patients may lead to more complicated and expensive dental treatment plans	38 (67.9)	54 (96.4)	0.000**
24 e. Neglect of oral health in older patients may lead to sialorrhea	31 (55.4)	29 (51.8)	0.824

McNemar test used for comparison. \*\*Very highly significant (at 99% CI). CI: Confidence interval

**Table 5: Overall comparison between pre- and post-PowerPoint presentation results**

	Mean±SD	Difference in mean±SD	t	P
Pretest	18.5±2.7	6.4±2.8	17.3	<0.001**
Posttest	24.9±1.9			

Paired sample t-test used for comparison. \*\*Very highly significant (at 99% CI). SD: Standard deviation, CI: Confidence interval

elderly experience more injuries in the home improved among 85.7% of the graduates. Knowledge that the poverty rate of older people is higher improved in 83.9% of the graduates. The percentage of correct answers increased among 96.4% of the graduates when the responses were assessed for parents having problems adjusting to their “empty nest.” One week after the presentation, 76.8% of the graduates knew that the edentulous older people when compared to dentate older people have a higher mortality rate. 85.7% of the graduates had prior knowledge that older persons who reduce their activities are not happier than those who remain active. This prior knowledge could be attributed to observation among grandparents or relatives.

On assessing the third domain “knowledge of care provision” all graduates could answer regarding the aids used for oral health assessment of an older patient. 75% of correct answers were obtained for dental infections impact on the treatment of medical conditions. 96.4% correct scores were obtained for means to relieve denture problems. 94.6% scores were acquired for including use of fluoride gel and fluoride dentifrice in dentate older patients. Oral candidiasis secondary to use of corticosteroids and hyposalivation secondary to antihistamine therapy also showed 98.2% and 96.4% correct answers posttest.

The PowerPoint presentation helped 78.6% of the graduates to understand that the prognosis of implant-supported restorations is as good in older as in young adults. 89.3% and 96.4% of the graduates were aware that it is important for an oral health care provider to know about the medications an older patient is taking and gingival hyperplasia secondary to dilantin therapy before the presentation. This awareness could be attributed to the similar finding among young adults.

When the last domain “barriers to and neglect of care provision” was assessed it was found that all the interns (100%) knew the various barriers to oral health care provision and the predisposing factors related to opportunistic infection of *Candida albicans*. 96.4% graduates knew the consequences of neglect of oral health. All graduates knew that periodontal disease may be caused by neglect of oral health. This awareness may be as these sequelae are commonly observed.

There was an overall increase in the posttest scores 1 week after the presentation. The results of our study are in agreement with Teasdale and Shaikh,<sup>[23]</sup> who also reported significant improvement in test scores after use of a compact disc based educational tool. According to a study conducted by Parolia *et al.*<sup>[25]</sup> the use of diagrams and symbolic devices such as graphs, flow charts, and arrows help students to understand the topic better.

An overall comparison of all the domains revealed an improvement in knowledge in each of them which could be attributed to the use of audio visual aids. The results support Mayer’s cognitive theory of multimedia learning<sup>[26]</sup> according to which when learning we place relevant words into auditory working memory and relevant images into visual working memory. This information is then integrated as one along with the prior knowledge.

The least preintervention scores were obtained for the domain “knowledge of care provision” which may be due to gerodontology not being given sufficient importance in the undergraduate curriculum. This finding is similar to that reported by Shah<sup>[11]</sup> that there is no orientation of dental graduates toward the special needs of the geriatric.

Limitations of the study were small sample size; limited time gap between pre- and post-test and between the lecture and the posttest (where a longer gap would help assess longer-term retention of knowledge). The same questions were given in the pre- and post-tests, so students might have had the opportunity to look up answers from another source other than the PowerPoint before the posttest. If so the PowerPoint presentation had an additional advantage of stimulating the interest of the students. Therefore, the results may be biased

toward finding a greater effectiveness of PowerPoint than there actually is.

In this study, PowerPoint presentation proved to be an effective tool for teaching. In other instances alternative techniques may be effective, so it is best to test these before implementation.

We can employ different teaching techniques and modify them regularly to break monotony and to incorporate best out of each.<sup>[27]</sup>

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### Conflicts of interest

There are no conflicts of interest.

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