

# Awareness and Knowledge about Dental Implants among Undergraduate Students

Basimi Swapna, Jorige Ramya Jyothy, Priyalatha Suvvati

Department of Prosthodontics, Government Dental College and Hospital, Hyderabad, Telangana, India

Email for correspondences: dr.ramyajyothy2009@gmail.com

## ABSTRACT

**Background:** Dental implantology is the current trend in the restorative practices in the developed countries and emerging trend in the developing countries like India. The undergraduates are future dentists and they should have thorough knowledge about latest developments in dentistry and they are responsible in spreading awareness among patients. Thus, a study was conducted to determine the level of awareness and knowledge about dental implant among dental students at different academic levels of Government Dental College and Hospital, Hyderabad.


**Aims and Objectives:** The present study was taken to assess the awareness and knowledge of dental implants among undergraduate students in Government Dental College and Hospital, Hyderabad, to compare the knowledge of dental implants among different level of academics (2<sup>nd</sup> year, 3<sup>rd</sup> year, 4<sup>th</sup> year, and interns) and to compare the knowledge of dental implants between male and female undergraduate students. **Materials and Methods:** The present cross-sectional study was done to compare the knowledge and awareness among the undergraduates and interns of Government Dental College and Hospital, Hyderabad, using a self-explanatory questionnaire. The data thus collected were evaluated and compared based on gender and year of study using Chi-square test. **Results:** When compared among male and female responses, significant difference has been found regarding knowledge of implants. When compared among different academic levels, it has been found significant difference regarding awareness about implant materials, body designs, life span, maintenance, and oral hygiene care by the patient and the dentist. **Conclusion:** The present study suggests that knowledge of implants should be enhanced among undergraduates by conducting CDE programs, more structured teaching programs so that it will provide impact on practitioners for future clinical practice as well as for preparing for competitive examinations.

**Key words:** Awareness, dental implants, implant, knowledge, undergraduate dental students

## INTRODUCTION

Dental implantology is the current trend in the restorative practices in the developed countries and emerging trend in the developing countries like India.<sup>[1]</sup> Many techniques are available for the replacement of missing teeth to maintain or improve the function, esthetics, speech, and psychological well-being of the patient.<sup>[2]</sup> For the past five decades, implants evolved as a mainstream of replacement of

the missing teeth in partial or complete edentulous patients. Quality of life has been significantly improved in patients preferring implants as the treatment modality over other techniques. This is because of its longevity and more conservative approach.<sup>[3]</sup> Among dental practitioners, only few dentists practice dental implantology routinely in their practice for replacing missing teeth, as they have limited knowledge about implants in dentistry. The basic knowledge and information about fundamentals of implants must be included at the undergraduate level that will help the dentist in adequate communication and guide the patient to select the appropriate treatment modality. This, in turn, will eliminate the negative opinion, fear, and misconception about implant treatment.<sup>[4]</sup> As undergraduates are future dentists, they should have thorough knowledge about latest developments

Quick Response Code	Article Info:
	doi: 10.5866/2021.12.10040
	Received: 12-04-2021
	Revised: 24-05-2021
	Accepted: 08-06-2021
	Available Online: 02-07-2021, (www.nacd.in) © NAD, 2021 - All rights reserved

in dentistry and they are responsible in spreading awareness among patients. Thus, the present study was conducted to determine the level of awareness and knowledge about dental implant among dental students at different academic levels of Government Dental College and Hospital, Hyderabad.

## MATERIALS AND METHODS

The present cross-sectional study is done to compare the knowledge and awareness among the UG students and interns of Government Dental College and Hospital, Hyderabad. Ethical clearance was obtained. Participants were assured of anonymity and confidentiality. The information was collected using a self-explanatory questionnaire. The questionnaire was distributed in lecture class and participants were asked not to discuss while answering.

The questionnaire was finalized after conducting a pilot study on 20 students to check the reliability and validity of questionnaire. Sufficient time or stipulated time was given to them to fill the questionnaire and answered questionnaire was collected. The data thus collected from questionnaire were compared based on gender and year of study using Chi-square test,  $P < 0.05$  was considered statistically significant.

## RESULTS

Among the participants who participated, 15% (40) were male and 85% (224) were female, participants in the 2<sup>nd</sup> years, 3<sup>rd</sup> years, final years, and internship were 11%, 18%, 26%, and 47%, respectively [Table 1]. Around 264 participants completed the questionnaire and were included in the survey, only 5% of the participants did not know about the dental implants, with 48.86% agreeing to have received information during dental course.

**Table 1: Demographic profile**

Demographic profile	No. of respondents (%)
Gender	
Male	40 (15.15)
Female	224 (84.85)
Year of study	
2 <sup>nd</sup> year	29 (10.98)
3 <sup>rd</sup> year	48 (18.18)
4 <sup>th</sup> year	69 (26.14)
Internship	118 (44.70)
Total	264 (100.00)

A significant difference among males and females was noted (0.04). Almost 70% of the participants knew the father of implantology, with no significant differences between males and females.

Most of the participants (81.06%) were aware of clinical situation where we can use the implants and males being more aware than females and only 24.6% of the participants were well aware of contraindications. Almost 89% of the participants were aware of implant material, with a minor difference between males and females, surprisingly few were aware of the different trade names of the implants, 64.77% did not know the trade name. Most of the participants were aware of dental implants 75% and different implant design with no significant difference between males and females. Merely 25% of participants were not aware of dental implant parts and 63% were aware of different designs with no significant difference between male and female participants. Almost half of the participants did not know the Branemark's theory of osseointegration, and a lesser percentage (45.9%) of girls knew it with a significant difference of 0.0120.

Highest percentage of the participants was not aware of the factor for implant success, only 7% answered correct with no significant difference among males and females. Main advantage of implants compared to other treatment modalities, is longevity, 61.7% of the students answered correct. Less than half (48.11%) thought that the case selection is more important factor for implant success with more male participants being aware of.

Most of the students (48.86%) were in the impression that implants need more care than natural teeth while 29.9% were in the opinion that they can be maintained and clean like natural teeth. About 53% of participants were aware of life span of implants as 10–20 years and 25% thought that it is about 5–10 years [Table 2].

All the participants in the internship were aware about implants and majority of all participants from the 2<sup>nd</sup> year, 3<sup>rd</sup> year, 4<sup>th</sup> year, and interns know about implants, but only 60% of the interns got sufficient information about implants based treatment procedures on their course with a significant difference between the 2<sup>nd</sup> year, 3<sup>rd</sup> year, 4<sup>th</sup> year, and interns. The 3<sup>rd</sup> years (54.17%) were less aware of father of implantology and interns being 75% with a significant difference between them. Overwhelming, 87.29% of interns know about

**Table 2:** Comparison of male and females with their responses in each item

Items	Male (%)	Female (%)	Total	%	$\chi^2$	P-value
Do you know about dental implants?						
Yes	35 (87.50)	214 (95.54)	249	94.32	4.0520	0.0440*
No	5 (12.50)	10 (4.46)	15	5.68		
Have you received sufficient info about implant-based treatment procedures as a part of dental course syllabus?						
Yes	19 (47.50)	110 (49.11)	129	48.86	0.0180	0.8940
No	21 (52.50)	114 (50.89)	135	51.14		
Who is considered as father of implantology?						
Per Ingvar Branemark	30 (75.00)	154 (68.75)	184	69.70	0.8030	0.8490
Pierre Fauchard	6 (15.00)	37 (16.52)	43	16.29		
Riggs	2(5.00)	15 (6.70)	17	6.44		
O'Brein	2 (5.00)	18 (8.04)	20	7.58		
Where we can use implants?						
Presence of weak Abutments	0 (0.00)	7 (3.13)	7	2.65	6.0680	0.0480*
Missing teeth	2 (5.00)	41 (18.30)	43	16.29		
All of the above	38 (95.00)	176 (78.57)	214	81.06		
Implants are more often made of?						
Titanium	38 (95.00)	197 (87.95)	235	89.02	2.1360	0.3440
Hydroxyapatite	0 (0.00)	8 (3.57)	8	3.03		
Stainless steel	2 (5.00)	19 (8.48)	21	7.95		
Which is the absolute contraindication for implant procedure?						
Systemic hematologic disorders	8 (20.00)	57 (25.45)	65	24.62	1.1460	0.7660
Renal disorders	3 (7.50)	10 (4.46)	13	4.92		
Osteoporosis	26 (65.00)	138 (61.61)	164	62.12		
Parafunctional habits	3 (7.50)	19 (8.48)	22	8.33		
Do you know the trade name of implants?						
Yes	15 (37.50)	78 (34.82)	93	35.23	0.1070	0.7440
No	25 (62.50)	146 (65.18)	171	64.77		
Are you aware of parts of implants?						
Yes	29 (72.50)	167 (74.55)	196	74.24	0.0750	0.7840
No	11 (27.50)	57 (25.45)	68	25.76		
Are you aware of various body designs of implants?						
Yes	26 (65.00)	140 (62.50)	166	62.88	0.0910	0.7630
No	14 (35.00)	84 (37.50)	98	37.12		
Are you aware of Branemark's theory of osseointegration?						
Yes	27 (67.50)	103 (45.98)	130	49.24	6.2870	0.0120*
No	13 (32.50)	121 (54.02)	134	50.76		
What are the factors that determine the success of dental implants?						
Density of alveolar bone	2 (5.00)	17 (7.59)	19	7.20	0.3410	0.5590
All	38 (95.00)	207 (92.41)	245	92.80		
What is the main advantage of dental implants as compared tooth replacement modalities?						
Esthetic	11 (27.50)	38 (16.96)	49	18.56	4.2900	0.2320
More conservative	3 (7.50)	37 (16.52)	40	15.15		
Longevity	25 (62.50)	138 (61.61)	163	61.74		

(Contd...)

Table 2: (Continued)

Items	Male (%)	Female (%)	Total	%	$\chi^2$	P-value
Do not know	1 (2.50)	11 (4.91)	12	4.55		
What do you think is the most important factor for implant success?						
Case selection	21 (52.50)	106 (47.32)	127	48.11	8.6620	0.0340*
Implant type and material	3 (7.50)	60 (26.79)	63	23.86		
Surgical technique	6 (15.00)	28 (12.50)	34	12.88		
Experience of the operator	10 (25.00)	30 (13.39)	40	15.15		
Do you feel that dental implants need additional oral hygiene maintenance and care by the patient and dentist?						
No, are cleaned like natural teeth	11 (27.50)	68 (30.36)	79	29.92	0.9680	0.8090
Yes, need more care than natural teeth	22 (55.00)	107 (47.77)	129	48.86		
No, needless care than natural teeth	1 (2.50)	11 (4.91)	12	4.55		
Do not know	6 (15.00)	38 (16.96)	44	16.67		
What is the life span of implants?						
2–5 years	1 (2.50)	7 (3.13)	8	3.03	1.0940	0.7780
5–10 years	8 (20.00)	60 (26.79)	68	25.76		
10–20 years	24 (60.00)	116 (51.79)	140	53.03		
Do not know	7 (17.50)	41 (18.30)	48	18.18		

\* $P < 0.05$  indicates statistical significance

the condition where we can use implants with only little difference among the participants.

Among final years, 97% of the participants have knowledge of the materials used to fabricate implants and among the 2<sup>nd</sup> years, only 68.97% know about it, which is significant. Contrary to the other questions, 37% of 2<sup>nd</sup> years answered contraindications as systemic hemolytic disorders, whereas 68% of interns answered osteoporosis answer being systemic hemolytic disorders. Only few participants knew about different trade names of implants 41% being highest among interns, lowest % among the 2<sup>nd</sup> years, that is, 7.2%.

Most of the interns (96.6%) were aware of different parts of implants compared to the other participants in different years of academics least being the 3<sup>rd</sup> years 27% correct. Almost same result is seen regarding the knowledge on theory of osseointegration. Only few participants know the factors that determine the success of dental implants least being the interns (4.24%) and 3<sup>rd</sup> years (4.17%).

Among the participants, most of them were in the opinion that longevity is the main advantage and life span of implants being 10–20 years. Only half were aware about the fact with more percentage being interns followed by final years, significant difference is observed between the

groups. Almost two-thirds of the intern participants were in opinion that the case selection is the prime factor for implant success, with a huge difference in an opinion when compared to the other groups with only 1/5<sup>th</sup> of the 2<sup>nd</sup> years being aware of the same. Regarding the maintenance care of the implants, 61% of the interns were in the opinion that they need more care than the natural teeth with the 3<sup>rd</sup> years being least aware (25%) [Table 3].

## DISCUSSION

Dental implant is one of the popular approaches for the replacement of the lost or missing teeth in dentistry. Unlike in India, dental implant therapy gained popularity among patients and dentists in developed countries with the help of various education and health-related programs.<sup>[5]</sup> In spite of the success of implant therapy as an alternative to removable treatment therapy, the implant procedures are neglected in undergraduate dental curriculum, as a result of this, the dental students are lacking knowledge about dental implants.<sup>[6]</sup>

A survey was conducted amongst undergraduates in Government Dental College and Hospital, Hyderabad, to assess the knowledge and awareness about dental implants. A simple questionnaire was made and filled by the undergraduate students in Government Dental College and Hospital. A total of 264 students had participated in the survey and

**Table 3:** Comparison of years of study with their responses in each item (numbers are in%)

Items	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	Interns	$\chi^2$	P-value
Do you know about dental implants?						
Yes	86.21	91.67	89.86	100.00	13.9480	0.0030*
No	13.79	8.33	10.14	0.00		
Have you received sufficient info about implant based treatment procedures as a part of dental course syllabus?						
Yes	41.38	31.25	44.93	60.17	12.8420	0.0050*
No	58.62	68.75	55.07	39.83		
Who is considered as father of implantology?						
Per Ingvar Branemark	68.97	54.17	71.01	75.42	21.0100	0.0130*
Pierre Fauchard	13.79	20.83	15.94	15.25		
Riggs	6.90	6.25	2.90	8.47		
O'Brein	10.34	18.75	10.14	0.85		
Where we can use Implants?						
Presence of weak Abutments	3.45	4.17	2.90	1.69	9.7880	0.1340
Missing teeth	13.79	29.17	17.39	11.02		
All of the above	82.76	66.67	79.71	87.29		
Implants are more often made of?						
Titanium	68.97	79.17	97.10	93.22	27.8680	0.0001*
Hydroxyapatite	13.79	6.25	0.00	0.85		
Stainless steel	17.24	14.58	2.90	5.93		
Which is the absolute contraindication for implant procedure?						
Systemic hematologic disorders	37.93	22.92	27.54	20.34	16.7150	0.0530
Renal disorders	6.90	8.33	5.80	2.54		
Osteoporosis	41.38	54.17	65.22	68.64		
Parafunctional habits	13.79	14.58	1.45	8.47		
Do you know the trade name of implants?						
Yes	17.24	27.08	37.68	41.53	7.7400	0.0520
No	82.76	72.92	62.32	58.47		
Are you aware of parts of implants?						
Yes	58.62	45.83	62.32	96.61	59.9610	0.0001*
No	41.38	54.17	37.68	3.39		
Are you aware of various body designs of implants?						
Yes	31.03	39.58	59.42	82.20	42.9910	0.0001*
No	68.97	60.42	40.58	17.80		
Are you aware of Branemark's theory of osseointegration?						
Yes	31.03	16.67	33.33	76.27	65.7030	0.0001*
No	68.97	83.33	66.67	23.73		
What are the factors that determine the success of dental implants?						
Shape of the alveolar ridge	0	0	0	0		
Site of edentulous area	0	0	0	0		
Density of alveolar bone	17.24	4.17	10.14	4.24	7.4860	0.0580
All	82.76	95.83	89.86	95.76		

(Contd...)

**Table 3:** (Continued)

Items	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	Interns	$\chi^2$	P-value
What is the main advantage of dental implants as compared tooth replacement modalities?						
Esthetic	20.69	16.67	31.88	11.02	27.7560	0.0010*
More conservative	17.24	14.58	11.59	16.95		
Longevity	55.17	56.25	50.72	72.03		
Do not know	6.90	12.50	5.80	0.00		
What do you think is the most important factor for implant success?						
Case selection	20.69	22.92	40.58	69.49	56.8430	0.0001*
Implant type and material	34.48	39.58	33.33	9.32		
Surgical technique	27.59	22.92	13.04	5.08		
Experience of the operator	17.24	14.58	13.04	16.10		
Do you feel that dental implants need additional oral hygiene maintenance and care by the patient and dentist?						
No, are cleaned like natural teeth	13.79	43.75	30.43	27.97	35.5990	0.0001*
Yes, need more care than natural teeth	37.93	25.00	49.28	61.02		
No, needless care than natural teeth	6.90	8.33	5.80	1.69		
Do not know	41.38	22.92	14.49	9.32		
What is the life span of implants?						
2–5 years	6.90	4.17	2.90	1.69	20.5770	0.0150*
5–10 years	27.59	16.67	18.84	33.05		
10–20 years	31.03	52.08	63.77	52.54		
Do not know	34.48	27.08	14.49	12.71		

\* $P < 0.05$  indicates statistical significance

among them 94.32% knew about dental implants as a treatment modality. Significantly higher number of students participated were female (85%) when compared to males (15%), which is because of the reason that more females were more in the BDS course. Although less number of male students participated in the study, awareness and knowledge regarding the dental implants is comparatively high.

Out of the different academic years, 100% of the interns were aware of the implants compared to final year (89.86%), 3<sup>rd</sup> year (91.67%), and 2<sup>nd</sup> year (86.21%) which were statistically significant. This indicates that the awareness and knowledge of implants is greater with increase in levels of education. In a study in Bhopal by Saxena *et al.*, 88.75% of students were insightful of dental implants and 41.3% of final year students were aware of implants than rest of the students.<sup>[7]</sup>

Most of the students (51.14%) responded that the dental course syllabus does not have sufficient information regarding implant-based treatment procedures. Among them, 17% of the 2<sup>nd</sup> year, 33%

of the 3<sup>rd</sup> year, and 38% of final year majority of the students responded in a similar manner. This suggests that the dental curriculum should include more hours of implant treatment procedures. The present study shows that 75.42% of students know about basic knowledge of implants regarding father of implantology, 87.29% of students about indications of implants. About 93.22% of students know about implant materials. By our study, basic knowledge regarding dental implants is greater in higher academic levels.

Majority of dental students 62.12% said about absolute contraindication of implant procedure is systemic hematologic disorders, 4.92% said renal disorders. In a study by Sudhakar *et al.*, 15% of students said parafunctional habits as a contraindication.<sup>[8]</sup>

Majority of students (64.77%) are not aware of implant trade names, 74.24% were aware of parts of implants, and 62.88% were aware of designs of implant body and types, in which majority of students are from interns followed by final year students. This is because of the inclusion of basic

knowledge about implants in their curriculum and thus the results were statistically substantial.

Majority students, 50.76% are unaware of Branemark's theory of osseointegration. About 90% of interns said that they were aware of this than the remaining students.

Density of alveolar bone, site of edentulous area, and shape of the alveolar ridge are the few factors that determine the success of implants. Majority of students 92.80% believed that the above factors determine the success.

Longevity of the implant plays a key role for the success and acceptance of the implant treatment. About 61.74% of students believed that longevity is the main advantage of implants as compared with the other treatment modalities.

Evidence suggests that the most important factor for implant success is case selection.<sup>[9-11]</sup> The present study also shows that 48.11% of students and highest percentage of interns and final years also answered that case selection is the important factor for implant success. In a study by Sharma *et al.*, 31.9% said that "implant type and material" is the important factor.<sup>[12]</sup>

The present study shows 48.86% of students emphasized that implants need more care than natural teeth in terms of oral hygiene maintenance and care by the patient and dentist. Tapper *et al.* reported from a survey of 1000 patients that only 4% said an implant requires less care than natural teeth, 4.6% believed more extensive care than natural teeth.<sup>[13]</sup> In a study in Bhopal by Saxena *et al.*, 2% of students expected lower need for care of implants compared with natural teeth. About 4.4% of students expected greater care than natural teeth as implants do not have a biological zone. Another study by Rustemeyer and Bremerich, 7% of the patients expected that less care would be needed, 31% expected that less care is not needed than natural teeth.<sup>[14]</sup>

Majority of students (62%) expected that life span of an implant is 10–20 years and 2% of students expected it to be around 2–5 years. This is analogous to the study by Saxena *et al.* where 43.75% of students expected to be between 10 and 20 years.<sup>[7]</sup> In a study by Sharma *et al.*, 34.5% expected the life span to be around 10–20 years.<sup>[12]</sup> In a study by Rustemeyer and Bremerich, only 3% of the patients expected durability of implants to be <10 years. As compared to other studies, the present

study showed that the level of knowledge among undergraduate students is not adequate. Minimal exposure to implant dentistry in their curriculum is the major factor that is limiting the knowledge among undergraduates. Introducing implantology right from the 1<sup>st</sup> year BDS in academic as well as the practical training by structured implant education protocol is important in sculpting the dental graduate to compete with the present scenario.

## CONCLUSION

The present survey among undergraduate students showed that a good number of the students had basic knowledge on implants and implant treatment but exhibited deficiency in other aspects of implant treatment modalities. By the present study, it is evident that awareness and knowledge of implants should be enhanced among undergraduates by conducting CDE programs, more structured teaching programs, so that it will provide impact on practitioners for future clinical practice as well as for preparing for competitive exams.

## Limitations

Lopsided male and female participants ratio and confining the study to one institution are the limitations of the present study.

## REFERENCES

1. Mish CE. The importance of dental implants. *Gen Dent* 2001;49:38-45.
2. Tomnick CO, Ozkur-kayahan Z, Sencift K. Patients knowledge and awareness of dental implants in a Turkish Sub-population. *J Adv Prosthodont* 2014;6:133-7.
3. Malik A, Afridi JI, Ehsan. A Knowledge, perception and choice of dental implants as a treatment option for patients visiting the University College of dentistry, Lahore-Pakistan. *Pak Oral Dent J* 2014;4:3622-6.
4. Barias PA, Lee DJ, Yuan JC, Sukotjo C, Campbel SD, Knoernschild KL. Retrospective analysis of dental implants placed and retrieved by advanced prosthodontic residents. *J Prosthodont* 2013;22:157-63.
5. Awooda EM, Ettayed AS, Hussain SA, Dayelnaum SI, Abdel Hamied MA, Muhamed LA, *et al.* Knowledge, attitude and acceptance of dental implants among patients attending Kahrtoum dental teaching hospital. *IOSR J Dent Med Sci* 2014;13:19-23.
6. Sakshi, Makkar P, Yadav A, Bajaj P, Sharma K. Knowledge and awareness of dental implants among undergraduate dental students. *IP Ann Prosthodont Restor Dent* 2018;4:628.
7. Saxena V, Lohiya J, Bhambal A, Vanka S, Talreja N,

- Kankana N. Outlook of undergraduate dental students on dental implants in Bhopal, Central India. *Int J Sci Stud* 2014;1:2-8.
8. Sudhakar U, Prakaash GK, Nijanthan A, Pragadeeshwari V. Knowledge, attitude, awareness and perception of dental implants among undergraduate dental students'. *Int J Innov Sci Res Technol* 2019;4:864-7.
  9. Hatim NA, Al-Rawar RY, Tawfeeq BA. Criteria for selection of implants cases. *Al-Rafidain Dent J* 2006;6:161-770.
  10. Abullais SS, Alqahtani NA, Kudyar N, Priyanka N. Success of dental implants: Must know prognostic factors. *J Dent Implants* 2016;6:44-8.
  11. Herrmann I, Lekholm U, Holm S, Kaltje C. Evaluation of patient and implant failures. *Int J Oral Maxillofac Implants* 2005;20:220-30.
  12. Sharma A, Shrestha B, Chaudhari BK, Suwal P, Singh RK, Niraula SR, *et al.* Preferred source and perceived need of more information about dental implants by the undergraduate dental students of Nepal: All Nepal survey. *Int J Dent* 2018;2018:6794682.
  13. Tepper G, Haas R, Mailath G, Teller C, Zechner W, Monov G, *et al.* Representative marketing oriented study on implants in the Australian population I Level of information, sources of information and need for patient information. *Clin Oral Implants* 2003;14:621-33.
  14. Rustemever J, Bremerich A. Patients knowledge and expectation regarding dental implants assessment by questionnaire. *Int J Oral Maxillofac Surg* 2007;36:814-7.