J Indian Prosthodont Soc (July-Sept 2012) 12(3):161–167
DOI 10.1007/s13191-012-0126-9

ORIGINAL ARTICLE

Prosthetic Status and Prosthetic Need Among the Patients Attending Various Dental Institutes of Ahmedabad and Gandhinagar District, Gujarat

Vrinda R. Shah · Darshana N. Shah · Chaitanya H. Parmar

Received: 5 April 2011 / Accepted: 17 May 2012 / Published online: 4 June 2012

Abstract The oral health being an integral part for the healthy living, necessity of disability limitation and rehabilitation in oral health has taken a paramount role. To assess the prosthetic status and to evaluate the prosthetic needs of the patients attending various institutes of Ahmedabad and Gandhinagar district. A total of 510 (264 males and 246 females) subjects at various dental institutes were examined in the study. A survey proforma was prepared with the help of WHO oral health assessment form (1997). Prosthetic status and prosthetic treatment need was recorded. Out of 510, any type of Edentulousness was 322 (63 %). Among them, 254 (49.8 %) were partially edentulous while 68 (13.3 %) were completely edentulous. Only 69 (13 %) were having any prosthesis in upper arch while only 80 (16 %) were having any prosthesis in lower arch. Need for any type of prosthesis in upper and lower arch was 55 and 60 % in males and females, respectively. In lower social class group need of prosthesis in upper and lower arch was 62 and 63 %, respectively. It was found that prosthetic status and prosthetic treatment need increased with increase in age. Steps should be taken to overcome this disparity and more emphasis should be given to meet the felt need of the people through government and non government organizations to improve the oral health. The unmet prosthetic treatment need should be met to rehabilitate needy people so that their disability may be limited.

Keywords Prosthetic status · Prosthetic treatment need · Socioeconomic group

V. R. Shah · D. N. Shah (✉) · C. H. Parmar
Department of Prosthodontics and Crown and Bridge, 301/Sangini Complex, Near Parimal Railway Crossing, Ellis bridge, Ahmedabad 380006, India
e-mail: darshnil@gmail.com

Introduction

Edentulism is defined as the loss of all permanent teeth [1] and is the terminal outcome of a multifactorial process involving biologic processes like caries, periodontal disease, pulpal pathology, trauma and oral cancer.

The distribution and prevalence of complete and partial edentulism between developed and less-developed countries may be associated with a complex interrelationship between cultural, individual access to care, and socioeconomic factors. World Health Organization databanks indicate that caries is still prevalent in the majority of countries internationally, severe periodontal disease is estimated to affect 5–20 % of the population, and the incidence of complete edentulism has been estimated between 7 and 69 % internationally [2]. In India, prevalence of edentulism varies from 60 to 69 % of 25 years and above age group [3].

Out of many issues concerning the quality of life, oral health is one of the major issues. In people, oral health contributes significantly towards quality of life. Poor oral health and loss of teeth not only adversely affect the dietary intake, nutritional status and phonetics, but also compromise the general health. It denies them the pleasure of taking food of their choice.

Edentulism is an independent risk factor for significant weight loss [4] and is associated with systemic and chronic diseases among the population, becoming an important public health issue as a large proportion of elderly people are edentulous [5].

The estimation of treatment need is an important requirement in oral health care planning. One of the first steps in planning dental services is therefore, the collection of up to date information on the prevalence of oral diseases in a given population. With this information it is possible to assess future treatment needs and demands for services [6].

The standard treatment for tooth loss involves prosthetic devices such as full or partial dentures [7]. The present study was planned to assess the level of Edentulousness, prosthetics needs in the community and to study the correlation between oral health parameters and socio-demographic variables and body mass index (BMI) amongst the western part of Indian population.

From the extensive review of literature it was found that in India only few studies are performed to assess prosthetic status and needs [8] hence, this study was conducted with aim of assessing the prosthetic status and needs among patients attending various institutes of Ahmedabad and Gandhinagar district in Gujarat.

Objectives of our study were:

(1) To collect the data regarding prosthetic status and needs by using WHO 1997 methodology [8].
(2) To assess the prevalence of edentulism.
(3) To compare the prosthetic status and needs among males and females.
(4) To compare the prosthetic status and needs based on the socioeconomic status.
(5) To assess the adverse habit.
(6) To provide any recommendation if required.

Materials and Methods

This cross-sectional survey was conducted in 2010(June–September) to determine the prosthetic status and prosthetic need among the patients attending the various dental institutes in Ahmedabad, Gujarat. Total 510 subjects above 18 years of age were surveyed. As per the National oral health survey and Fluoride mapping 2002 (DCI 2004) [10] it was found that the prevalence of complete edentulous in both upper and lower arch in Ahmedabad district for 65–74 years was 14.6 %. Considering the prevalence rate of 14.6 % and the level of precision at 2 % the sample size was calculated by using formula of Sample size. The sample size estimated was 510 by keeping the power of study at 80 %.

Before conducting the survey, the investigators visited all the dental institutes situated in Ahmedabad. Prior permission for carrying out the survey was taken from the Dean of respective dental colleges in the city. The aim of the study was explained; their approval was sought and obtained. Subjects had been informed of the nature of the investigation.

A pretested proforma was used for data collection. It consisted of two parts—the first part recorded data on socio-demographic factors (age and gender), while the second part contained a section of the World Health Organization (WHO) Oral Health Assessment Form (1997) to record the prosthetic status and prosthetic need (i.e., denture wearing and need for dentures) of the population.

Statistical Analysis

Data was analyzed by using the statistical package for the social sciences (SPSS) Version 17.0. Differences in proportions were compared using the chi-square test. A difference was considered to be of statistical significance if the P value was <0.05.

Results

This cross-sectional survey was conducted to determine the prosthetic status and prosthetic need among the patients attending the various dental institutes in Ahmedabad and Gandhinagar district in Gujarat. There were 510 study subjects having age range from 18 to 82 with mean age of 45.5 ± 14.2 years. The maximum number of study subjects [135 (26.5 %)] belongs to 35–44 years of age. There were 264 (51.8 %) males and 246 (48.2 %) females. Socioeconomic status were assessed by Kuppuswami classification, according to this classification 387(75.3 %) were belonging to lower socioeconomic class (Upper lower + Lower) (Table 1).

Out of 510 study subjects, 254 (49.8 %) were partially edentulous while 68 (13.3) were completely edentulous. Overall prevalence of any type of Edentulousness was 322 (63 %) (Fig. 1). Age wise distribution of Edentulousness (both complete and partial) showed that, out of 322 patients who were edentulous (complete and/or partial), one fourth (25.3 %) were belonging to Age group 45–54 years (Fig. 2).

Effect of socioeconomic class on the prosthetic status was assessed. There was statistically significant difference between the prosthetic status of upper and lower socio economic class. Lower socioeconomic class was having less prosthesis in both the arch (Table 2). Distribution of study subjects according to socioeconomic class and the prosthetic need of their upper and lower arches were carried out. The difference between two classes was highly significant. ($P < 0.001$) The prosthetic need was more in lower socioeconomic class in both the arch (Table 3). Effect of aging on Edentulousness showed that as the age increases, edentulism also increases (Fig. 3).

Distribution of study subjects according to gender and the prosthetic status of their upper and lower arches illustrate that females were having comparatively less prosthesis in both arch than males and the difference was statistically significant ($P < 0.05$) (Table 4). On comparing the gender and the prosthetic need of their upper and lower arches, it was found that Prosthetic need was more in male. The difference was significant ($P < 0.001$) (Table 5). Those who needed the prosthesis, need for multi unit prosthesis was more in both upper and lower arch in both

Table 1 Socio-Demographic characteristics of study population ($n = 510$)

Age group	Frequency	Percent
15–24	30	5.9
25–34	84	16.5
35–44	135	26.5
45–54	115	22.5
55–64	89	17.5
65–74	41	8.0
>75	16	3.1
Sex		
Female	246	48.2
Male	264	51.8
Social class (Kuppuswamy classification)		
I (Upper)	5	1.0
II (Upper middle)	50	9.8
III (Lower middle)	68	13.3
IV (Upper lower)	275	53.9
V (Lower)	112	22.0

gender. Need for complete denture was also more among the males as compared to females. Out of 322 subjects who were edentulous partial or complete, 44 (14 %) were not willing for the treatment. Most common reason for non willingness was financial constraint (43.1 %). Low felt need was seen among 27.3 % (Fig. 4).

Comparison between Body mass index (BMI) and Edentulousness was done. Relationship between BMI and Edentulousness was found to be statistically insignificant ($P > 0.05$) (Table 6). Out of 510 subject, 173 (33 %) were having habit of tobacco in any form. Among these 173 individuals, 121 (70 %) were edentulous. The difference between edentulism and addiction was highly significant ($P < 0.001$) (Table 7).

Discussion

Total 510 study subjects were surveyed. Among them 264 (51.8 %) were males and 246 (48.2 %) were females. Socio economic status of the subjects showed that 387 (75.3 %) were belonging to lower socioeconomic class (Upper lower + Lower) according to Kuppuswamy's socio-economics status scale [9]. As the treatment was provided at low cost in the dental institutes lower class found to be in the larger proportion.

Prevalence of Edentulism

In present study prevalence of any type of Edentulousness was 322 (63 %), out of these 178 males and 144 females

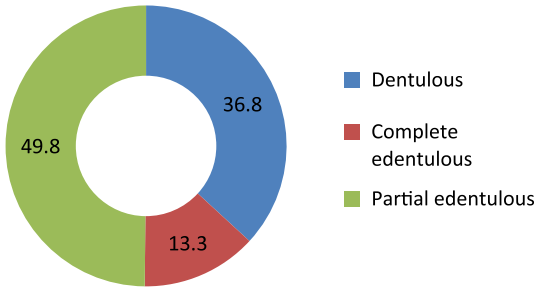

Fig. 1 Prevalence of Edentulousness

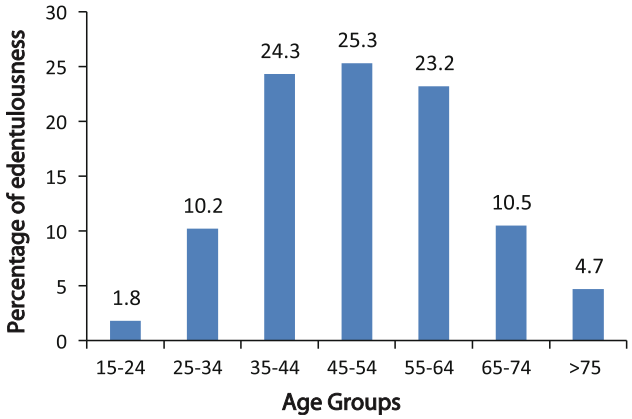

Fig. 2 Age wise distribution of Edentulousness (both complete and partial)

were edentulous. Among 322 subjects, 254 (49.8 %) were partially edentulous while 68 (13.3 %) were completely edentulous. Prevalence of edentulism in study carried out by Shamdol et al. [7] was 55.9 %. In present study Partial Edentulousness was seen in all age group. This is in agreement with the study by Shetty et al. [11] in India. Out of 322 patients who were edentulous (complete and/or partial), 25.3 % were belonging to age group 45–54 years. Complete edentulism was more in the age group 64–75 years.

Periodontal problems were found to be the leading cause for tooth loss in completely edentulous patients, while caries was found to be the leading cause in partially edentulous patients (51 %). These finding agreed with study carried out by Prabhu et al. [12].

Relationship between BMI and Edentulousness was studied but it was found to be statistically insignificant. This finding was same as in study conducted by Shah et al. [13].

Among the study subjects, 173(33 %) were having habit of taking tobacco in any form. Edentulousness was present in 69 % of them. The difference between edentulism and addiction was highly significant. These showed that tobacco consumption leads to loss of teeth.

Table 2 Distribution of study subjects according to socioeconomic class and the prosthetic status of their upper and lower arches

Prosthetic status	Upper arch		Lower arch	
	Upper socio-economic class (*n*%)	Lower socio-economic class (*n*%)	Upper socio-economic class (*n*%)	Lower socio-economic class (*n*%)
No prosthesis	99 (80.5)	344 (88.9)	74 (60.1)	335 (86.5)
Bridge	13 (10.6)	14 (4.8)	25 (20.3)	22 (5.6)
More than one bridge	5 (4.1)	3 (0.7)	8 (6.5)	4 (1.1)
Partial denture	1 (0.7)	3 (0.7)	6 (4.8)	3 (0.8)
Full removable denture	5 (4.1)	22 (5.6)	10 (8.3)	22 (5.6)
Not recorded	0	1 (0.3)	0	1 (0.4)
Total	123	387	123	387

χ^2 4.8, $P < 0.05$

Table 3 Distribution of study subjects according to socioeconomic class and the prosthetic need of their upper and lower arches

Prosthetic need	Upper arch		Lower arch	
	Upper socio-economic class (*n*%)	Lower socio-economic class (*n*%)	Upper socio-economic class (*n*%)	Lower socio-economic class (*n*%)
No prosthesis needed	86 (69.9)	188 (48.6)	74 (60.1)	167 (43.1)
Need for one unit prosthesis	3 (2.5)	30 (7.8)	8 (6.5)	45 (11.4)
Need for multiunit prosthesis	18 (14.6)	84 (21.7)	25 (20.3)	94 (24.4)
Need for combination of one and/or multiunit prosthesis	8 (6.5)	29 (7.5)	6 (4.8)	22 (5.7)
Need for full prosthesis	8 (6.5)	55 (14.2)	10 (8.3)	58 (14.9)
Not recorded	0	1 (0.2)	0	1 (0.3)
Total	123	387	123	387

For upper arch χ^2 12.4, P value <0.001; for lower arch χ^2 19.2, P value <0.001

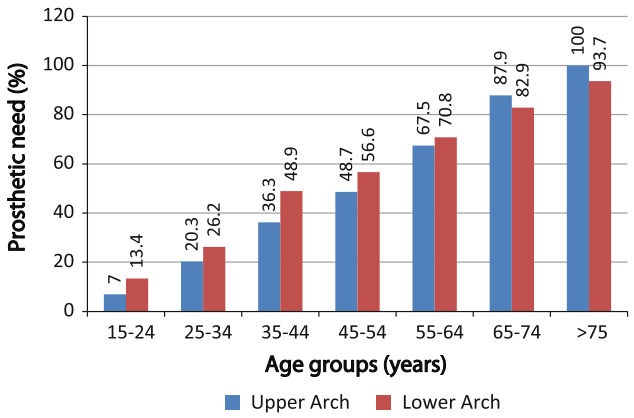

Fig. 3 Age wise distribution of study subjects according to prosthetic need of *upper* and *lower arch*

Prosthetic Status

Out of 322 edentulous (complete or partial) subjects, only 69 (13 %) were having any prosthesis in upper arch while only 80 (16 %) were having any prosthesis in lower arch. This result was almost similar to the study done by Ettinger et al. [14] in 1984, in which every 1,000 persons, 156 (15.6 %) were wearing dentures in one or both arches. Prosthetic status among the study subject was very poor which suggest that awareness regarding prosthetic treatment among the population needed to be generated.

Out of 178 males, 14.8 and 17.1 % were having any types of prosthesis in upper and lower arch, respectively. Out of 144 females 11.4 and 15.1 % were having prosthesis in upper and lower arch, respectively. Females were having comparatively less prosthesis in both arches than males. These may be because female members usually depend on male members of their families to take them for the treatment.

Out of 59 edentulous subjects in upper socioeconomic class, 19.5 and 24.3 % of them were having any prosthesis in their upper and lower arch respectively, whereas out of 263 edentulous subjects from lower socioeconomic class, only 11.1 and 13.4 % were having any prosthesis in upper and lower arch, respectively. Lower socioeconomic group had very low prosthetic status. Difference between the prosthetic status of upper and lower socioeconomic class was significant statistically. These findings clearly showed that individuals with greater financial resources had better access to dental care. Result was similar to study done by, Shah [13], Phillip et al. [15] and Florian et al. [16] .

Table 4 Distribution of study subjects according to gender and the prosthetic status of their upper and lower arches

Prosthetic status	Upper arch		Lower arch	
	Male (*n*%)	Female (*n*%)	Male (*n*%)	Female (*n*%)
No prosthesis	225 (85.2)	218 (88.6)	219 (82.9)	209 (84.9)
Bridge	11 (4.1)	16 (6.5)	15 (5.4)	25 (10.2)
More than one bridge	5 (1.8)	3 (1.3)	8 (3.1)	3 (1.3)
Partial denture	2 (0.8)	2(0.8)	1 (0.3)	2 (0.8)
Full removable denture	21 (7.1)	6 (2.4)	21 (7.3)	6 (2.4)
Not recorded	0 (0)	1 (0.4)	0 (0)	1 (0.4)
Total	264	246	264	246

For upper arch χ^2 15.5, $P < 0.05$; for lower arch χ^2 17.3, $P < 0.05$

Table 5 Distribution of study subjects according to gender and the prosthetic need of their upper and lower arches

Prosthetic need	Upper arch		Lower arch	
	Male (*n*%)	Female (*n*%)	Male (*n*%)	Female (*n*%)
No prosthesis needed	119 (45.1)	155 (63.1)	106 (40.1)	135 (54.8)
Need for one unit prosthesis	20 (7.5)	13 (5.3)	26 (9.8)	27 (10.9)
Need for multiunit prosthesis	55 (20.8)	47 (19.1)	70 (26.5)	49 (19.9)
Need for combination of one and/or multiunit prosthesis	26 (9.8)	11 (4.4)	14 (5.3)	14 (5.7)
Need for full prosthesis	44 (16.8)	19 (7.7)	48 (18.3)	20 (8.1)
Not recorded	0	1(0.4)	0	1 (0.6)
Total	264	246	264	246

For upper arch χ^2 23.2, *P* value <0.01; for lower arch χ^2 19.1, *P* value <0.01

Prosthetic Need

Age wise distribution of prosthetic need showed that as the age increases the need for prosthesis increases in both upper and lower arch. These result had similarity with study done by Kuo et al. [17]. In males the need for any type of prosthesis in upper and lower arch was 55 and 60 % respectively. It was quite similar with the survey held by Montal et al. in France [18] and Shigali et al. in India [19]. In female subjects, need for prosthesis in upper and lower arch was 37 and 46 %, respectively.

Gender-wise differences for prosthetic need were highly significant. Male were having higher prosthetic need as compared to female. The need for multiunit prosthesis was more in both upper and lower arch in both gender. This observation was similar to the study done by Shenoy and Hegde in Manglore [20]. Need for complete denture was more among the males as compared to females. These might be due to tobacco related habits which are common in male. This was similar to the study conducted by Shah [13].

In upper socio economic class group need of prosthesis in upper and lower arch was 30 and 40 % respectively. While in lower social class group need of prosthesis in upper and lower arch was 62 and 63 %, respectively. The difference between two classes was highly significant. Observation was similar to that of the study conducted by Ettlinger et al. [14], Phillip et al. [15] and kumar et al. in Hariyana [21]. Lower socio economic class can not afford the cost of treatment and awareness is also less among them.

Willingness to Treatment

Out of 322 who were in need of any prosthesis 44 (14 %) were not willing for the treatment. Most common reason for non willingness was financial constraint (43.1 %) and Low felt need was seen among 27.3 %. It was very high as compare to the similar study done by Shigli et al. in Belgaum [22]

Conclusion

The findings of this study clearly demonstrate a high unmet need for prosthetic care among the institutionalized

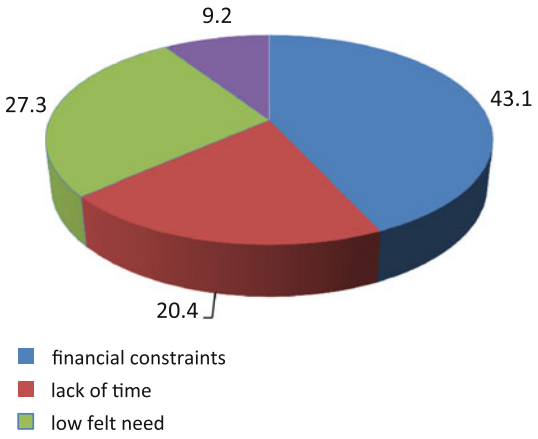

Fig. 4 Reasons behind non willingness to the treatment

Table 6 Comparison between body mass index (BMI) and Edentulousness

BMI	Dentulous	Edentulous	Total
<18.4 (Underweight)	6	9	15
18.5–24.9 (Normal)	130	223	353
25-29.9 (Pre obese)	47	79	126
>30 (Obese)	5	11	16
Total	188	322	510

$\chi^2 = 0.2$, $P > 0.05$

Table 7 Relationship between Edentulousness and addiction or other oral habits

Addiction	Edentulousness		Total
	Present	Absent	
Yes	121 (70 %)	52 (30 %)	173
No	201 (59.6 %)	136 (40.4 %)	337
Total	322	188	510

χ^2 4.7, $P < 0.05$, df 1, odds ratio: 1.56

population surveyed. These results may serve as a baseline reference for the future evaluation of prosthetic status and prosthetic need among the population at larger scale.

Results also show that prosthetic status is very poor. Out of 63 %, only 13 % of edentulous individuals were having prosthesis. So awareness regarding prosthodontic treatment, need to be generated among the population. Edentulism should declare as a disease and also the consequences of Edentulousness should be described to the population. Results from this study may contribute to the development of an oral health care protocol for the population to increase their dental awareness, improve their oral health.

Acknowledgments I humbly than k Dr Mihir Shah, dean of Ahmedabad dental college who has given me the permission to conduct this study in all dental in stitutes. I also thankful to dean of all the dental institutes for allowing me to examine patients attending their institutes. It is my privilege and honor to express gratitude to Dr Sujal Parker senior lecturer Department of community dentistry, Ahmedabad dental college for his most valuable suggestions, constructive criticism, constant encouragement.

Appendix

Kuppuswamy's socioeconomic status scale [9]

A	Education	Score
1	Professional or honours	7
2	Graduate or post graduate	6
3	Intermediate or post high school diploma	5
4	High school certificate	4
5	Middle school certificate	3
6	Primary school certificate	2
7	Illiterate	1
B	Occupation	Score
1	Professional	10
2	Semi-professional	6
3	Clerical, shop/farm owner etc.	5
4	Skilled worker	4
5	Semi-skilled worker	3
6	Unskilled worker	2
7	Unemployed	1
C	Family income per month (in rupees)	Score
1	19575 and above	12
2	9788–19574	10
3	7323–9787	6
4	4894–7322	4
5	2936–4893	3
6	980–2935	2
7	Below 979	1
	Total score	Socio economic Class
	26–29	Upper (I)
	16–25	Upper middle (II)
	11–15	Lower middle (III)
	5–10	Upper lower (IV)
	5 and below	Lower (V)

References

1. Academy of Prosthodontics (2005) Glossary of prosthodontic terms. J Prosthet Dent 94:10–92
2. Petersen PE, Bourgeois D, Ogawa H et al (2005) The global burden of oral diseases and risks to oral health. Bull World Health Org 83:661–669

3. Chawdhari R, Chawdhari N (2011) Need of implant dentistry at undergraduate dental curriculum in Indian dental colleges. Indian J Dent Res 22:436–439
4. Ritchie CS, Joshipura K, Silliman RA et al (2000) Oral health problem and significant weight loss among community-dwelling older adults. J Gerontol A Biol Sci Med Sci 55(7):M366–M371
5. Petersen PE (2003) The World Oral Health Report 2003: continuous improvement of oral health in the 21st century—the approach of the WHO Global Oral Health Programme. Commun Dent Oral Epidemiol 31(Suppl 1):3–23
6. Dunning JM (1970) Principles of dental health, 2nd edn. Harvard University Press, Cambridge
7. Shamdol Z, Ismail NM, Hamzah NT, Ismail AR (2008) Study on prevalence and associated factors of edentulism among elderly muslims in Kota Bharu, Kelantan, Malaysia. J Indian Med Assoc 40:143
8. Oral health basic survey method WHO Methodology (1997) WHO, Geneva
9. Kumar N, Shekhar C, Kumar P, Kundu AS (2007) Kuppuswamys socio-economic status scale—updating for 2007. Indian J Pediatr 74(12):1131–1132
10. Bali RK, Mathur VB, Talwar PP, Chanana HB (2004) National Oral health Survey and Fluoride mapping 2002. Dental Council of India (DCI)
11. Shetty P, Bhargava K (2001) Edentulousness and prosthetic needs of a rural population in southern India. J Indian Prosthodont Soc 1
12. Prabhu N et al. (2009) Partial edentulousness in rural population based on Kennedy's classification: an epidemiological study. J Indian Prosthodont Soc 9(1): 18–23
13. Shah N, Parkash H, Sunderam KR (2004) Edentulousness, denture wear and denture needs of Indian elderly: a community-based study. J Oral Rehabil 31(5):467–476
14. Ettinger RL, Beck JD, Jakobsen J (1984) Removable prosthodontic treatment needs: a survey. J Prosthet Dent 51(3):419–427
15. Marcus PA, Joshi A, Jones JA, Morgano SM (1996) Complete edentulism and denture use for elders in New England. J Prosthet Dent 76:260–266
16. Mack F, Mundt T, Budtz-Jorgensen E, Mojon P, Schwahn C, Bernhardt O, Gesch D, John U, Biffar R (2003) Prosthodontic status among old adults in Pomerania, related to income, education level, and general health (results of the Study of Health in Pomerania, SHIP). Int J Prosthodont 16(3):313–318
17. Kuo HC, Yang YH, Lai SK, Yap SF, Ho PS (2009) Association between health-related quality of life and prosthetic status and prosthetic needs in Taiwanese adults. J Oral Rehabil 36(3):217
18. Montal S, Tramini P, Triay JA, Valcarcel J (2006) Oral hygiene and the need for treatment of the dependent institutionalised elderly. Gerodontology 23(2):67–72
19. Shigli K, Hebbal M, Angadi GS (2007) Attitudes towards replacement of teeth among patients at the institute of Dental Sciences, Belgaum, India. J Dent Educ 71(11):1467–1475
20. Shenoy RP, Hegde V (2011) Dental prosthetic status and prosthetic need of the institutionalized elderly living in geriatric homes in mangalore: a pilot study. ISRN Dent, Article ID 987126. doi:10.5402/2011/987126
21. Kumar A et al. (2009) Oral health status and treatment needs of rural population of Ambala, Haryana, India. Internet J Epidemiol 8:2
22. Shigli K, Hebbal M, Angadi GS (2009) Prosthetic status and treatment needs among patients attending the prosthodontic department in a dental institute in India. Eur J Prosthodent Restor Dent 17(2):85–89