

Original Research Article

A study on denture needs and their fulfilment in Indian geriatric population

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Abstract: Context: The dental needs of elderly are changing and growing. Prosthetic rehabilitation can positively impact the quality of life of an elderly edentulous patient.

Aims: 1) Estimate denture needs by analysing number of edentulous patients requiring dentures and the factors depriving them for the complete denture rehabilitation. 2) Analyse the quality of dentures and relate it to their satisfaction with prosthetic rehabilitation.

Materials & Methods: This study was conducted on 847 patients over a period of 10 months. The sample size was divided into the edentulous patients deprived of dentures and the denture user groups. Each group was examined clinically and interviewed with a separate close ended, prevalidated multiple choice questionnaire. The questionnaires were available in English as well as Hindi to promote better understanding.

Statistical Analysis: Discrete (categorical) data were summarized in frequency and compared by using chi-square (χ^2) test, with $P < 0.05$ considered statistically significant.

Results: 1) 68% of the sample were deprived of removable complete denture and 53% denture wearer were unsatisfied with their existing denture. 2) Significant association between gender and distance of dental facility from residence of patients. 3) Difficulty in eating was the prime reason for complete denture requirement (38.55%). 4) (38.89%) patients, wearing denture needs relining or rebasing.

Conclusion: Strategies are to be planned by health care providers to make oral health care and denture treatment available to this unprivileged section of the society.

Keywords: Edentulism; Prosthetic rehabilitation; Geriatric population; Denturist.

1. Introduction

India being a large country with varied cultures, beliefs and attitudes; requires large number of prospective studies to improve the oral health condition of its elder population which constitute 8% of its population [1]. Statistics released by the Union ministry of health and family welfare show that life expectancy in India has gone up by five years, from 62.3 years for males and 63.9 years for females in 2001-2005 to 67.3 years and 69.6 years respectively in 2011-2015 [2]. The prevalence and extent of tooth loss has decreased significantly in many developed countries during recent decades. Some studies have reported that the incidence of teeth loss correlates with educational level and income status, with those in lower levels exhibiting higher risks of becoming totally edentulous. Even though the rate of edentulism is decreasing rapidly due to conservation of remaining teeth, many areas of the country do require strategic and systematic approach to combat illiteracy and scarcity of dental health care measure [3-5].

Therefore the basic aims of the study were to analyze the hospital visiting elderly edentulous and denture user population to:

1. Estimate denture needs by analyzing number of edentulous patients requiring dentures and the factors depriving them for the complete denture rehabilitation.
2. Analyze the quality of dentures and relate it to their satisfaction with prosthetic rehabilitation.

2. Materials and Methods

This cross sectional study was conducted in Indian geriatric population. Completely edentulous patients without any systemic disease were included in the study. Each patient was first taken through informed consent process, the details and purpose of study were first explained to them and assured that all information collected would be strictly confidential. The study was done by means of two sets of questionnaires and clinical examination and conducted over a period of 10 months. Out of the 900 patients who were approached, 53 had excluded from study either due to systemic disease or dissent to participate in the study.

The sample size was divided into the edentulous patients deprived of dentures and the denture user groups. Each group was examined clinically and interviewed with a separate close ended, prevalidated, multiple choice questionnaire. The questionnaires were available in English as well as Hindi to promote better understanding.

The first part in both sets of questionnaires was identical and dealt with the biosocial (name, age, gender), socioeconomic (educational status and average monthly income) and demographic (estimated distance of patient residence from hospital) characteristics. The socioeconomic groups were based on the modified Kuppuswami scale [6].

For denture deprived group, the second part of questionnaire consisted of recording period of edentulism and reason for not undergoing dental rehabilitation. For wearers, the second part consisted of span of denture wear, satisfaction with present denture, whether denture was made by a quack or qualified dentist and reason for dissatisfaction with present denture.

For clinical examination pre-autoclaved sets of diagnostic instruments were used to assess edentulism in denture deprived group and dentures in respect of fabricating materials, extensions, occlusion and oral conditions of the denture wearer group.

2.1. Statistical Analysis

Discrete (categorical) data were summarized in frequency and compared by using chi-square (χ^2) test, with $P < 0.05$ considered statistically significant.

3. Results

Table 1 showed age, gender, education, income and prosthetic rehabilitation status of the study sample. 68% of the samples were deprived of removable complete denture and in denture wearer group 53% were unsatisfied with their existing denture.

Table 2 showed a significant association between gender and distance of dental facility from residence of patients ($\chi^2=35.32$, $p<0.00001$). Female patients for more than 5km were significantly less. For the distance of more than 5 km (D3), the proportions of all age groups were lesser than other two nearer distance groups (D1 and D2). In education groups the overall proportion of graduate or above (E2) was higher than other two groups and more educated subjects were ready to come from greater distances. A significant lower proportion of patients were observed with complete denture for distances of more than 5 km ($\chi^2=33.22$, $p<0.00001$).

Table 3 showed that difficulty in eating was the prime reason for complete denture requirement (38.55%), followed by influenced by others (26.38%) and social and esthetic concerns (23.61%). Social and esthetic concern was significantly higher (18.40%) for female patients ($\chi^2=91.63$, $p<0.00001$) as well as for younger age group ($\chi^2=147.21$, $p<0.00001$). For higher educated patients difficulty in eating was most significant reason (28.47%) for complete denture requirement, while in patients who were educated upto intermediate were significantly influenced by others (14.24%, $\chi^2=98.10$, $p<0.00001$) to get their own dentures. Higher income group patients were significantly influenced by others (19.44%, $\chi^2=126.03$, $p<0.00001$) as a reason for denture requirement while in lower income group difficulty in eating was the prime reason (14.93%).

Table 4 showed that in patients with their unsatisfied dentures the greatest proportion (38.89%) needs relining or rebasing. A major proportion of unsatisfied users (38.19%) emerged as faulty dentures made by unqualified professionals in terms of materials, extent of coverage and occlusion. Greater proportion of females (18.06%) visited to quacks for denture fabrication and they too had more denture related pathologies (2.78%) than males (1.39%). Elder patients (A2 and A3) showed greater proportions of dentures to be either replaced or needs relining/ rebasing. Educational status had a significant association ($\chi^2=46.97$, $p<0.00001$) with unqualified professionals visiting population. Uneducated and lesser educated patients (E0 and E1) were

among the major proportions to be get treated by dentist. Similarly lower income groups were also among highly visited proportions to dentist.

Table 1. General characteristics of study sample (n=847)

Characteristics	Category	Number (n)	Percentage (%)
Gender	Male (M)	458	54
	Female (F)	389	46
Age	<60 years (A1)	339	40
	60-65 years (A2)	322	38
	>65 years (A3)	186	22
Education	Uneducated (E0)	127	15
	Up to 12 (E1)	271	32
	Graduate or above (E2)	449	53
Income	<Rs. 3000pm (I1)	152	18
	Rs. 3000-Rs. 10,000pm (I2)	254	30
	>Rs. 10,000pm (I3)	441	52
Denture status	Without denture (W)	576	68
	With denture (X)	271	32
	Satisfied with denture	127	47
	Unsatisfied with denture	144	53

Table 2. Comparison of variables with distance of dental facility from residence of patients. (n=847)

Characteristics	<2 km (D1)	2-5 km (D2)	>5 km (D3)	Total
Comparison of gender with distance of dental facility from residence of patients				
Male (M)	200 (23.61%)	169 (19.95%)	89 (10.51%)	458 (54%)
Female (F)	192 (22.67%)	175 (20.66%)	22 (2.60%)	389 (46%)
$\chi^2=35.32, p<0.00001$				
Comparison of age with distance of dental facility from residence of patients				
<60 years (A1)	145 (17.12%)	129 (15.23%)	65 (7.67%)	339 (40%)
60-65 years (A2)	169 (19.95%)	129 (15.23%)	24 (2.83%)	322 (38%)
>65 years (A3)	78 (9.21%)	86 (10.15%)	22 (2.60%)	186 (22%)
$\chi^2=23.96, p=0.000081$				
Comparison of educational status with distance of dental facility from residence of patients				
Uneducated (E0)	67 (7.91%)	50 (5.90%)	10 (1.18%)	127 (15%)
Up to 12 (E1)	136 (16.06%)	123 (14.52%)	12 (1.42%)	271 (32%)
Graduate or above (E2)	189 (22.31%)	171 (20.19%)	89 (10.51%)	449 (53%)
$\chi^2=39.70, p<0.00001$				
Comparison of average monthly income with distance of dental facility from residence of patients				
<Rs. 3000pm (I1)	75 (8.85%)	65 (7.67%)	12 (1.42%)	152 (18%)
Rs. 3000-Rs. 10,000pm (I2)	107 (12.63%)	106 (12.51%)	41 (4.84%)	254 (30%)
>Rs. 10,000pm (I3)	210 (24.79%)	173 (20.43%)	58 (6.85%)	441 (52%)
$\chi^2=6.82, p=0.145604$				
Comparison of denture status with distance of dental facility from residence of patients				
Without denture (W)	240 (28.34%)	236 (27.86%)	100 (11.81%)	576 (68%)
With denture (X)	152 (17.95%)	108 (12.75%)	11 (1.30%)	271 (32%)
$\chi^2=33.22, p<0.00001$				

Table 3. Comparison of variables with reason of denture requirement in without denture group (n=576)

Characteristics	Difficulty in eating (R1)	Social or esthetic concern (R2)	Both R1 and R2 (R3)	Influenced by others (R4)	Total
Comparison of gender with reason of denture requirement in without denture group					
Male (M)	151(26.22%)	30 (5.21%)	50 (8.68%)	65 (11.28%)	296 (51.39%)
Female (F)	71 (12.33%)	106 (18.40%)	16 (2.78%)	87 (15.10%)	280 (48.61%)
$\chi^2=91.63, p<0.00001$					
Comparison of age with reason of denture requirement in without denture group					
<60 years (A1)	43 (7.47%)	106 (18.40%)	27 (4.69%)	34 (5.90%)	210 (36.46%)
60-65 year(A2)	85 (14.76%)	23 (3.99%)	19 (3.30%)	63 (10.94%)	190 (32.99%)
>65 years (A3)	94 (16.32%)	7 (1.22%)	20 (3.47%)	55 (9.55%)	176 (30.56%)
$\chi^2=147.21, p<0.00001$					
Comparison of educational status with reason of denture requirement in without denture group					
Uneducated(E0)	30 (5.21%)	16 (2.78%)	8 (1.39%)	33 (5.73%)	87 (15.10%)
Up to 12 (E1)	28 (4.86%)	48 (8.33%)	21 (3.65%)	82 (14.24%)	179 (31.08%)
Graduate (E2)	164(28.47%)	72 (12.50%)	37 (6.42%)	37 (6.42%)	310 (53.82%)
$\chi^2=98.10, p<0.00001$					
Comparison of avg. monthly income as reason of denture requirement in without denture group					
<Rs.3000pm(I1)	86 (14.93%)	6 (1.04%)	9 (1.56%)	9 (1.56%)	110 (19.10%)
Rs. 3000-Rs. 10,000pm (I2)	60 (10.42%)	47 (8.16%)	4 (0.69%)	31 (5.38%)	142 (24.65%)
>Rs.10,000pm (I3)	76 (13.19%)	83 (14.41%)	53 (9.20%)	112 (19.44%)	324 (56.25%)
$\chi^2=126.03, p<0.00001$					

Table 4. Comparison of variables with complete denture evaluation in unsatisfied denture wearer group.(n=144)

Characteristics	Made by dentist (XP1)	Needs relining/ rebasing (XP2)	Needs replacement (XP3)	Denture related pathologies (XP4)	Total
Comparison of gender with complete denture evaluation in unsatisfied denture wearer group					
Male (M)	29 (20.14%)	37 (25.69%)	11 (7.64%)	2 (1.39%)	79 (54.86%)
Female (F)	26 (18.06%)	19 (13.19%)	16 (11.11%)	4 (2.78%)	65 (45.14%)
$\chi^2=6.24, p=0.100508$					
Comparison of age with complete denture evaluation in unsatisfied denture wearer group					
<60 years (A1)	30 (20.83%)	15 (10.42%)	5 (3.47%)	1 (0.69%)	51 (35.42%)
60-65 years (A2)	24 (16.67%)	40 (27.78%)	19 (13.19%)	3 (2.08%)	86 (59.72%)
>65 years (A3)	1 (0.69%)	1 (0.69%)	3 (2.08%)	2 (1.39%)	7 (4.86%)
$\chi^2=28.22, p=0.000085$					
Comparison of educational status with complete denture evaluation in unsatisfied denture wearer group					
Uneducated (E0)	11 (7.64%)	4 (2.78%)	13 (9.03%)	3 (2.08%)	31 (21.53%)
Up to 12 (E1)	41 (28.47%)	25 (17.36%)	11 (7.64%)	2 (1.39%)	79 (54.86%)
Graduate or above (E2)	3 (2.08%)	27 (18.75%)	3 (2.08%)	1 (0.69%)	34 (23.61%)
$\chi^2=46.97, p<0.00001$					
Comparison of average monthly income with complete denture evaluation in unsatisfied denture wearer group					
<Rs. 3000pm (I1)	20 (13.89%)	4 (2.78%)	7 (4.86%)	2 (1.39%)	33 (22.92%)
Rs. 3000-Rs. 10,000pm (I2)	29 (20.14%)	31 (21.53%)	18 (12.50%)	3 (2.08%)	81 (56.25%)
>Rs. 10,000pm (I3)	6 (4.17%)	21 (14.58%)	2 (1.39%)	1 (0.69%)	30 (20.83%)
$\chi^2=23.96, p=0.000532$					

4. Discussion

The geriatric population which comprises 7.7% of the total population suggests that India is in a phase of demographic transition. By 2050, as estimated by the UN Population Division, geriatric population will double in Africa and treble in Asia with one-sixth population residing in developing countries [6]. Studies show that the sociodental approach for assessing dental needs for prosthodontic treatment indicate much lower levels of treatment needs than the normative approach. The sociodental approach is most of the times considered for dental workforce planning [7].

In this study, large numbers (68%) of edentulous elderly people were without denture rehabilitation, gender variable was negligible. Patients aged more than 65 years (22%) and uneducated patients (15%) were seem to be reluctant in hospital visit for their oral health. Financial constraint appeared to play a major role in oral rehabilitation, only 18% patients were observed in lower income group to visit hospitals (Table 1). Distance of the patients residence from the dental hospital emerged as a potential barrier in their hospital visit. Patients seeking prosthetic rehabilitation were significantly lesser (13.11%) in the greater than 5 km distances. Greater distances as an obstacle were seen prominently in females and older age group patients (Table 2). These remote patients have to be face the trouble/ expenses of traveling along with the need of any caretaker for such long distances. These all inter related factors coerce many elder patients to be get treated by their nearest available untrained professionals [8].

While considering the reasons for seeking prosthodontic rehabilitation social/ esthetic concern came next to masticatory difficulty and was found to be of significant importance in younger, female, more educated and higher income subjects (Table 3).

Patients who were already denture wearer, 53% of denture users were unsatisfied with their dentures, main reason being that they were made by unqualified quacks (Table 4). The quacks charge less for the treatment and the short term satisfaction attracts a majority of the group to fall for quacks. The high cost of dental treatment, illiteracy, lack of awareness, poor accessibility to dental clinics, repeated dental appointments along with uneven geographical distribution of dental colleges in the country are few of the many reasons for which most patients rely on these quacks [9]. Majority of dentures examined clinically needs either replacement (18.75%) or relining/rebasing (38.89%), which clearly indicates that these denture users were either unaware of average denture life, regular follow ups for denture examination or the sociodemographic barriers prevent them to do so. 4.16% of the patients showed various lesions associated with denture use like stomatitis, epulis fissuratum etc on clinical examination. The main reasons for these pathologies are the poor denture hygiene, denture wear at night, xerostomia, denture being used for more than their expected life and improperly extended dentures. It was also found that the patients hardly went to the dentist for regular check up of their oral cavity [10,11].

The present study showed that a substantial proportion of the older adult population needed dentures, and may indicate that individuals have gaps in their dental treatment, such as a lack of restorative treatment, implants or fixed partial dentures [12]. This study has helped us to find out the socio dental factors affecting the number of elderly edentulous people availing denture treatment. It has also helped us to formulate a strategic plan with consensus to arrive on decision regarding treatment concessions to senior citizens, frequent treatment and motivation camps in rural areas and old age homes [13].

A limitation of this study was the hospital based sample; the result may not be representative of the population at large. It should be noted that the cross-sectional design does not allow analysis of the cause-effect relationship between the variables studied.

5. Conclusions

1. Strategies are to be planned by health care providers to make oral health care and denture treatment available to this unprivileged section of the society.
2. Policies to be planned for the periodic workshops, treatment and evaluation camps and concessions in treatment cost.
3. Meetings to be planned with the social workers and insurance companies to devise schemes to uplift the standard of living for these senior citizens.
4. Dental awareness and encouragement for denture rehabilitation from qualified practitioners to be reinforced by frequent visits to these people.

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References

- [1] Shah, N., Parkash, H., & Sunderam, K. R. (2004). Edentulousness, denture wear and denture needs of Indian elderly-A community-based study. *Journal of Oral Rehabilitation*, 31(5), 467-476.
- [2] <https://timesofindia.indiatimes.com/india/Lif-expectancy-in-India-goes-up-by-5-years-in-a-decade/articleshow/29513964.cms>
- [3] Hassel, A. J., Koke, U., Schmitter, M., & Rammelsberg, P. (2006). Factors associated with oral health-related quality of life in institutionalized elderly. *Acta Odontologica Scandinavica*, 64(1), 9-15.
- [4] Tickle, M., Craven, R., & Worthington, H. V. (1997). A comparison of the subjective oral health status of older adults from deprived and affluent communities. *Community Dentistry and Oral Epidemiology*, 25(3), 217-222.
- [5] Mack, F., Mundt, T., Budtz-Jorgensen, E., Mojon, P., Schwahn, C., Bernhardt, O., ... & 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). *International Journal of Prosthodontics*, 16(3), 313-8.
- [6] Bremner, J., Frost, A., Haub, C., Mather, M., Ringheim, K., & Zuehlke, E. (2010). World population highlights: Key findings from PRB's 2010 world population data sheet. *Population Bulletin*, 65(2), 1-12.
- [7] Ryu, J. I., Tsakos, G., & Sheiham, A. (2008). Differences in prosthodontic treatment needs assessments between the standard normative and sociodental approach. *International Journal of Prosthodontics*, 21(5), 425-32.
- [8] Goyal, S., Kansal, G., & Deepika, X. X. (2013). Quackery in dentistry: An overview. *J Dent Peers*, 1(2), 150-58.
- [9] Sandesh, N., & Mohapatra, A. K. (2009). Street dentistry: Time to tackle quackery. *Indian Journal of Dental Research*, 20(1), 1-2.
- [10] Nitschke, I., & Müller, F. (2004). The impact of oral health on the quality of life in the elderly. *Oral Health & Preventive Dentistry*, 2, 271-275.
- [11] Moskona, D., & Kaplan, I. (1995). Oral health and treatment needs in a non-institutionalized elderly population: experience of a dental school associated geriatric clinic. *Gerodontology*, 12(2), 95-98.
- [12] Listl, S. (2012). Denture wearing by individuals among the older segment of European populations. *International Journal of Prosthodontics*, 25(1), 15-20.
- [13] Divia., Arpan., Gupta, C., & SimratdeepKaur. (2015). Beware of quackery: unqualified dental practice in India. *International Journal of Recent Scientific Research*, 6,3428-3430.



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