

# Influence of socioeconomic status on psychological distress and treatment satisfaction levels among patients undergoing prosthetic rehabilitation following maxillectomy: An observational study

## ABSTRACT

**Aim:** The aim of this study was conducted to evaluate the effect of socioeconomic status (SES) on psychological distress and treatment satisfaction levels of patients who underwent maxillectomy and rehabilitation with obturator prosthesis.

**Settings and Design:** Prospective, observational, analytic study.

**Materials and Methods:** Forty-three patients undergoing maxillectomy were enrolled and divided into upper, middle, and lower SES groups, according to the updated Kuppuswamy SES scale. Psychological distress levels were assessed using Hospital Anxiety and Depression Scale (HADS) before maxillectomy (T0) and at 3 weeks after delivery of definitive obturator (T1). Treatment satisfaction levels with obturator prosthesis were assessed using Obturator Functioning Scale (OFS) at T1. HADS and OFS scores were then correlated with the SES of the participants.

**Results:** Out of 43 participants, 7 were lost to follow up. The total number of participants in upper, middle, and lower SES groups was 14, 11, and 11, respectively. Before surgery, there was no significant difference in anxiety levels ( $P > 0.05$ ) among different SES groups. However, the depression levels were the highest in the lower SES and decreased significantly with increasing SES. Prosthetic rehabilitation led to statistically significant ( $P < 0.05$ ) fall in the levels of both anxiety and depression assessed at 3 weeks after delivery of prosthesis. The upper SES group was found to be less anxious and depressed compared to middle and lower SES groups after prosthodontic rehabilitation. Treatment satisfaction level was found to be significantly low ( $P = 0.005$ ) in lower SES group as compared to upper SES group while no difference was found in between the middle SES when compared to higher or lower SES groups.

**Conclusions:** SES has a profound impact on the patient's psychosocial well-being and treatment satisfaction. Patients of lower SES reported with higher psychological distress and lesser treatment satisfaction compared to those belonging to upper SES.

**Keywords:** Maxillectomy, obturator prosthesis, psychological distress, socioeconomic status, treatment satisfaction

## INTRODUCTION

The most frequent treatment modality for patients diagnosed with maxillary tumor includes surgical removal of the tumor and involved structures. These patients reportedly experience psychological suffering, including anxiety and depression due to loss of function and esthetic damage that accompanies oral cancer treatment.<sup>[1,2]</sup> Usually, 15%–50% of head-and-neck cancer patients suffer from major depressive disorders, which is higher than all other types of cancers.<sup>[3]</sup>


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The most important aspect of treatment concern after maxillary resection is reconstruction of the defect and restoration of oral and nasal functions and facial contours.<sup>[4,5]</sup> Maxillectomy defects can be reconstructed either surgically with local soft-tissue pedicle flap or free flaps or osseocutaneous flap<sup>[6-8]</sup> or by prosthodontic rehabilitation (obturator).<sup>[9-11]</sup> The decision whether to reconstruct or to obturate depends on patient characteristics such as age, type of tumor, medical history, and defect size, surgeon's technical expertise, and patient's preference.<sup>[12-14]</sup> The success of obturator prosthesis is influenced by the size of the defect, availability of hard and soft tissues in and around the defect area to provide support for the prosthesis, patient's attitude, occupation, psychological status, systemic conditions, and the patient's ability to adapt to the prosthesis.<sup>[15,16]</sup>

For success of any dental treatment, not only operator's objectives have to be met with, but also most importantly, the patient has to be satisfied. Many factors may dictate patient's satisfaction from prosthodontic treatment such as chosen modality of treatment, previous experiences, and psychosocial well-being. Patient's expectations also vary from one patient to the other as well as between different socioeconomic backgrounds.<sup>[17]</sup> Although income is an important aspect of socioeconomic status (SES), other factors such as education level, the number of children living in the household, and occupation also play a vital role in determining one's psychological health.<sup>[18]</sup> Patient itself is best reporter for assessment of success of prosthesis because they experience the full range of functional issues presented by the obturator on a daily basis, for example, difficulty in chewing foods, change in voice after surgery, and upper lip feeling numb.<sup>[4,19,20]</sup>

In past, various studies have been done to assess the effect of cancer on patients' psychological status with time and improvement in quality of life of maxillectomy patient after prosthodontic rehabilitation, but the literature is scanty regarding the influence or role of SES on psychological distress levels and treatment satisfaction with obturator in maxillectomy patients.<sup>[1-4,20]</sup> Hence, this observational study was conducted to evaluate the effect of SES of maxillectomy patients on psychological distress level and treatment satisfaction after their prosthodontic rehabilitation. Our research hypothesis was "SES influences the psychological distress and treatment satisfaction levels of patients undergoing prosthetic rehabilitation after maxillectomy".

## MATERIALS AND METHODS

Ethical clearance was obtained from the Institution's Ethic Sub Committee before starting the study (Ref. No.

IESC/T-254/21.06.2014). Convenience sampling method was used for recruitment of patient for study, in which all the patients who were planned for maxillectomy (age range 20–65 years) and attended dental outpatient department from July 2014 to December 2018; irrespective of gender and cause of cancer were selected. Patients, who were completely edentulous, with associated soft palate or mid facial defects, planned for resection of mandible or tongue, had any drug history for psychological illness, or not willing to participate, were excluded from the study.

Forty-three patients were enrolled for the study following inclusion and exclusion criteria. Each patient was explained in detail about treatment procedure and its consequences, prosthetic rehabilitation and duration of the study, followed by signing of written informed consent forms. Out of 43 patients enrolled in the study, 36 patients reported for follow-up till the completion of the study. Among the seven dropouts, one patient did not undergo maxillectomy due to psychological fear, two patients underwent surgical reconstruction, in two patients some part of mandible were also removed, one patient died, and another one reported with recurrence during the course of rehabilitation. All procedures performed in the study were conducted in accordance with the ethical standards given in 1964 declaration of Helsinki, as revised in 2013.

### Treatment protocols

Before surgery (T0), all enrolled participants were divided in five socioeconomic groups according to updated Kuppaswamy SES scale for year 2014.<sup>[21]</sup> At the same time, psychological distress levels of all the participants were also assessed using Hospital Anxiety and Depression Scale (HADS). Following the standard protocol of obturator fabrication, surgical, intermediate, and definitive obturators were fabricated for each patient according to healing status of the defect and need of the patient. All obturators were fabricated by a single trained prosthodontic resident under supervision of experienced faculty member who evaluated the patients clinically at all steps.

When patients got adapted with definitive obturator prosthesis (3 weeks after insertion of definitive prosthesis/T1), their psychological distress levels were again assessed using same HADS scale. At the same time, obturator acceptance was also assessed using Obturator Functioning Scale (OFS). Both questionnaires were filled by patient or his attendant and helped by a staff nurse who was blinded about the procedure but could understand and speak both English and Hindi languages. Data were entered into the SPSS software (version 15.0 for windows) for the statistical analysis as per statistician's instructions [Flow Chart 1].

## Questionnaires

Kuppuswamy's SES scale was first proposed by Kuppuswamy<sup>[22]</sup> in 1976. This scale takes into account education, occupation, and income of the family to categorize families into five classes namely upper, upper middle, lower middle, upper lower, and lower SES. Out of the three variables, education and occupation do not change frequently with time. However, the steady inflation and the resultant devaluation of the rupee necessitate periodic revisions of the income variable. In this study, we used updated version of scale for year 2014.

HADS is a valid and reliable self-rating scale that measures anxiety and depression in both hospital and community settings.<sup>[23]</sup> In this study, Hindi version of HADS scale was used. The survey comprises seven items related to anxiety (HADS-A) and 7 items related to depression (HADS-D), permitting the evaluation of depression uninfluenced by physical condition. Each item is scored from 0 to 3, with a diagnosis of the respective symptoms made according to the following scale: 0–7 points indicate no symptoms present, 8–10 points indicate possible affliction, and 11–21 points indicate that symptoms are present.

OFS is a 15-item scale, designed by Kornblith *et al.*<sup>[4]</sup> to assess eating ability, speech, and cosmetic satisfaction. All items are rated on a 5-point Likert scale ranging from 1 to 5, with anchoring points specific to each item. Total scale and subscale scores range from 1 to 5, reflecting the mean score of the scale's items, with higher scores reflecting greater difficulties with obturator functioning. For easier data evaluation, scale was converted in percentile of 100 in this study.

## RESULTS

### Subject characteristics

Evaluation of Kuppuswamy SES scale score revealed that after excluding the dropouts there were 5 patients in upper, 9 in upper middle, 11 in lower middle, 10 in upper lower, and 1 in lower socioeconomic group. For easier and meaningful data evaluation, we merged upper and upper-middle as one, namely upper socioeconomic group and upper-lower and lower as one namely lower socioeconomic group. Therefore, all enrolled participants were divided in three socioeconomic groups: upper, middle, and lower. Demographic details of each group are given in Table 1.

### Statistical analysis

The data collected were analyzed using the SPSS software (version 15.0 for Windows). The Chi-square test was used to determine the change in anxiety and depression score before surgery and 3 weeks after insertion of definitive obturator in each socioeconomic group. Kruskal–Wallis

**Table 1: Demographic characteristics of all enrolled participants**

Characteristics	Total patients	Upper class	Middle class	Lower class
Number of subjects enrolled	36	14	11	11
Gender				
Male	23	14	7	2
Female	13	0	4	9
Age groups				
20–34	12	6	2	4
35–50	10	1	7	2
51–65	14	7	2	5
Education				
Illiterate to middle school	13	0	3	10
Up to intermediate	10	1	8	1
Graduate or above	13	13	0	0
Occupation				
Unemployed	14	0	5	9
Laborer	3	0	3	0
Shop owner/clerk/farmer	9	4	3	2
Professional	10	10	0	0
Marital status				
Single	8	6	2	0
Married	25	7	7	11
Widow	3	1	2	0
Type of tumor				
SCC	20	8	7	5
Ameloblastoma	3	2	1	0
ACC	5	2	0	3
Others	8	2	3	3
Aramany's classification				
I	12	2	5	5
II	18	10	4	4
III	4	2	2	0
IV	2	0	0	2
Radiotherapy				
Yes	27	10	10	7
No	9	4	1	4

ACC: Adenoid cystic carcinoma, SCC: Squamous cell carcinoma

equality-of-populations rank test was used to compare the mean values of anxiety, depression, and OFS among different socioeconomic groups. In this study,  $P < 0.05$  was considered statistically significant.

### Evaluation of Hospital Anxiety and Depression Scale score

Evaluation of anxiety and depression scores revealed that each socioeconomic group patients had psychological distress before surgery. Statistical analysis for anxiety scores showed that before surgery there was no statistically significant difference ( $P > 0.05$ ) in anxiety level in between different socioeconomic groups, whereas statistical analysis for depression scores showed that patients in upper socioeconomic group had significantly lower level of depression as compared to middle ( $P = 0.034$ ) and lower ( $P < 0.001$ ) socioeconomic groups and patients in lower socioeconomic

group had significantly higher level of depression compared to middle ( $P = 0.0005$ ) socioeconomic group [Tables 2 and 3].

Anxiety and depression scores both were significantly reduced in each socioeconomic group 3 weeks after insertion of definitive obturator ( $P < 0.05$ ). Statistical analysis for both anxiety and depression scores showed that patients in upper socioeconomic group had significantly lower level of anxiety and depression compared to middle ( $P = 0.001$  for anxiety and  $P = 0.005$  for depression) and lower ( $P < 0.001$  for anxiety and  $P = 0.001$  for depression) socioeconomic groups while comparison of middle to lower socioeconomic group showed no significant

difference in both anxiety and depression ( $P = 0.228$  and  $P = 0.485$ , respectively) [Tables 2 and 3].

### Evaluation of Obturator Functioning Scale score

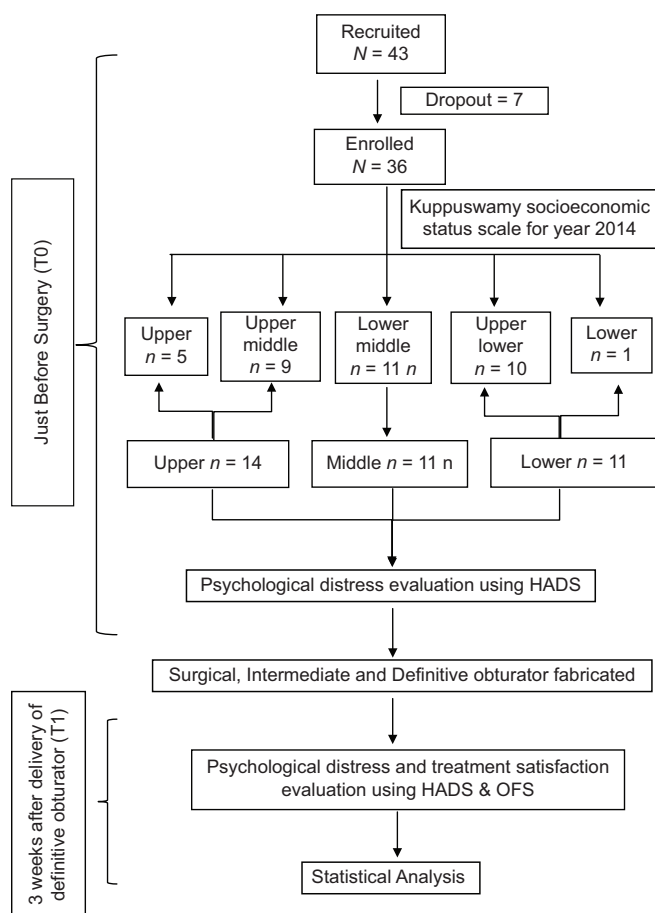
Mean OFS score for upper, middle, and lower socioeconomic groups was 23.63, 31.89, and 35.8, respectively. Evaluation of these OFS score revealed that patients in each socioeconomic group had little difficulty with their obturator after 3 weeks of insertion of definitive obturator prosthesis. In each socioeconomic group, mostly patients reported with somewhat difficulty in questions related to speech, esthetics, and numbness in upper lip. Statistical analysis of OFS score showed that middle socioeconomic group had no statistical difference for obturator acceptance compared to upper ( $P = 0.078$ ) and lower ( $P = 0.915$ ) socioeconomic groups while upper socioeconomic group had significantly higher level of obturator acceptance as compared to lower socioeconomic group ( $P = 0.005$ ) [Table 3].

### DISCUSSION

#### Evaluation of psychological distress level

The results of our study found that patients belonging to any socioeconomic group had at least some level of psychological distress (anxiety and depression) before surgery. The findings of this study have been supported by previous studies in the literature.<sup>[24,25]</sup>

The comparison of level of psychological distress in different socioeconomic groups showed that before surgery all patients suffered from definitive symptoms of anxiety irrespective of their SES. Anxiety before surgery was high in all socioeconomic groups, since all the patients often picture themselves with significant alterations in function and physical appearance resulting from the maxillectomy.<sup>[26]</sup> While in terms of depression, patients of upper and middle socioeconomic groups had possible afflictions of depression and lower socioeconomic group had definitive symptoms of depression before surgery. This may be attributed to the facts that patient of upper and middle socioeconomic groups have better social and financial support to counteract with



Flow Chart 1: Flowchart for subject recruitment and selection

Table 2: Intra-group comparison of Hospital Anxiety and Depression Scale score in different socioeconomic groups at different time intervals

Socioeconomic groups	HADS score					
	Anxiety			Depression		
	T0 median (minimum-maximum)	T1 median (minimum-maximum)	Intra-group comparison (P)	T0 median (minimum-maximum)	T1 median (minimum-maximum)	Intra-group comparison (P)
Upper (n=14)	16 (8-20)	1.5 (1-4)	0.001	9 (5-11)	1 (0-4)	0.001
Middle (n=11)	17 (13-20)	4 (2-6)	0.003	10 (8-13)	3 (1-7)	0.003
Lower (n=11)	17 (16-21)	5 (3-7)	0.003	13 (12-19)	5 (2-7)	0.003

HADS: Hospital Anxiety and Depression Scale, T0: Just before surgery, T1: 3 weeks after delivery of definitive obturator

**Table 3: Intergroup comparison and correlation of patients' socioeconomic status with Hospital Anxiety and Depression Scale scores and Obturator Functioning Scale score using Kruskal-Wallis equality-of-populations rank test**

	Intergroup comparison (P)					
	Upper-middle		Middle-lower		Upper-lower	
	T0	T1	T0	T1	T0	T1
HADS-A	0.542	0.001	0.506	0.228	0.348	<0.001
HADS-D	0.034	0.005	0.0005	0.485	<0.001	0.0006
OFS score	-	0.078	-	0.915	-	0.005

HADS-A: Hospital Anxiety and Depression Scale-Anxiety, HADS-D: Hospital Anxiety and Depression Scale-Depression; OFS: Obturator Functioning Scale; T0: Just before surgery, T1: 3 weeks after delivery of definitive obturator

depression while in lower socioeconomic group, disease comes with a financial burden which leads to more depression in patients.<sup>[27-29]</sup>

Our study showed that 3 weeks after insertion of definitive obturator, none of the patient had any symptoms of anxiety or depression according to HADS score. This suggests that improvement occurred in patients' psychological distress levels in each socioeconomic group. Although no psychological support was provided to any socioeconomic group in this study, scores improved after insertion of definitive prosthesis; indicating possible adaptation of patients to the situation and the prosthesis with time. De Graeff *et al.*<sup>[30]</sup> also observed an improvement in emotional functioning of cancer patients with time, probably as a result of adaptation and coping processes.

Intergroup comparisons showed that upper socioeconomic group had lesser psychological distress compared to middle and lower. There are some factors such as adverse life events, poorer coping styles and somewhat weaker social support; those are associated with middle or lower SES and may be the cause of variation in anxiety and depression levels. Education status is also relevant for emotional well-being, because it represents development of personal characteristics such as critical thinking and problem-solving which install a sense of control over one's life and thereby protect against anxiety and depression.<sup>[27,31]</sup>

Comparison of psychological distress levels of middle socioeconomic group with that of lower showed that there was no difference in psychological distress 3 weeks after prosthodontic rehabilitation. Most of the patients in this study belonged to middle socioeconomic group. They were single earning source of their family and left job as a consequence of disease which led to change in patient's SES to lower. It may be the cause of same observation in middle and lower socioeconomic groups after prosthodontic rehabilitation. Patients of upper socioeconomic group either continued their occupation or were dependent on their family for their live

hood. Hence, disease did not affect their SES much. Hence, we can suggest on the basis of these observations that income is one of the most important variables which affect patient's psychological well-being. The findings of our study have also been supported by Lorant *et al.*<sup>[28]</sup>

### Evaluation of treatment satisfaction with obturator prosthesis

The findings of the present study suggested that all patients adapted quite well with obturator prosthesis as scores reported were in range of "very little difficulty" for each socioeconomic group. These findings suggested that patients with maxillofacial tumors develop coping strategies to adapt to the new situation and most patients after considering the severity of the disease agreed that being alive outweighed the disadvantages of obturator therapy. Study conducted by Kornblith *et al.*,<sup>[4]</sup> Irish *et al.*,<sup>[20]</sup> Depprich *et al.*<sup>[32]</sup> also stated that psychosocial adaptation of maxillectomy patients occurred favourably after rehabilitation with obturator prosthesis.

The present study showed that patients of lower socioeconomic group had lesser satisfaction with their obturator prosthesis compared to upper socioeconomic group. These findings suggest that patients of lower socioeconomic group have difficulty in understanding the limitation of prosthesis and have lesser coping mechanism. Baran *et al.*<sup>[33]</sup> also found that level of satisfaction increased with increase in SES, which may be due to either better awareness or better income to fulfil the desires of day-to-day life. Various other studies also found the same findings that level of education, self-perception of esthetics and SES, and quality of life are all related to patient satisfaction.<sup>[17,18,34]</sup>

Due to some of limitations of our study such as small sample size for each socioeconomic group, short observation period, defect limited to hard palate only, unequal distribution (age and gender) of samples in each group; authors suggest that there is a good scope for research to investigate whether there is any association between SES, and other factors such as gender and age of patients, size of the defect, cause of cancer, whether benign or malignant etc., with patient's psychological distress and satisfaction with obturator prosthesis.

### CONCLUSIONS

Within the limitations of this study, it can be concluded that SES has profound impact on patient's psychosocial well-being and treatment satisfaction. Patients of lower SES have higher psychological distress and lesser treatment satisfaction compared to upper. As clinicians, our role is not restricted

just to fabricate obturators. Rather, it's our moral duty to ensure complete physical and psychological rehabilitation of the cancer patients. This can be done by providing special psychological counselling to the needy patients as and when required to help them cope better with the disease. Some extra time can be kept for the appointments of such patients to ensure a smooth practice. All these efforts will surely help in better treatment outcome, satisfaction level of the patients and their early social reintegration.

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### Conflicts of interest

There are no conflicts of interest.

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