



**The Emotional Effect of Tooth Loss and Its Association with Depression in Edentulous Individual among Moradabad Population - A Cross-Sectional Study**

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**Abstract**

To investigate the relationship between tooth loss and its emotional consequences on an individual's well-being and current state of depression.

**Aims:** To assess the emotional effect of tooth loss and its association with depression in edentulous individuals among Moradabad population.

**Materials and Method:** A total of 160 completely edentulous participant reporting to the Outpatient Department of Prosthodontics, Crown & Bridge, Kothiwal Dental College and Research Centre were examined and selected. A questionnaire aimed at assessing the emotional impact of tooth loss and to measure the depression PHQ-9 scale was asked.

**Statistical Analysis used:** All the data was collected and analyzed. The statistical software SPSS 16.0 was used for analysis of data.

**Results:** Approximately 27.5% of the group accepted their loss right away without any problems. In comparison to 0.6% of those without difficulties, around 34.4% of those with difficulties took six months to a year or more to accept losing their teeth. For majority of the participants, accepting their tooth loss proved to be challenging, and the loss of teeth had a significant emotional impact on them. Few participants experienced significant disabilities in day-to-day social activities, but there were no difficulties in interaction with friends and family.

**Conclusion:** For the majority of the participants, accepting their tooth loss proved to be challenging and those experiencing difficulties had minimal to mild depression had significant correlation with emotional factors.

**Keywords:** Depression, edentulous Moradabad population, emotional effects, tooth loss

## Introduction

One of a person's greatest assets is a bright, dazzling grin that displays natural healthy teeth, as the mouth is constantly the center of focus. A beautiful smile is a sign of happiness, health, and youth<sup>1</sup>. Oral health is multifaceted, encompassing physical, psychological, emotional, and social spheres that are essential to general health and welfare.

Losing teeth is an incredibly painful event. Loss of teeth is related to growing old. Tooth loss relates to morphological changes in jaw bone, facial height and distortion of soft tissue with different degree of functional insufficiency. An emotional breakdown might be triggered by tooth loss. It's a common misconception that losing teeth will mean less affection and devotion from family members<sup>2</sup>. Majority of patient view tooth loss as a mutilation which leads them to seek dental treatment for maintaining healthy dentition and to be socially acceptable<sup>3</sup>.

Losing teeth can elicit various responses, including feelings of grief, diminished confidence, concerns about appearance and self-image, the inclination to conceal tooth loss, or the perception of it as a sensitive subject best kept private. Patient with loss of tooth find difficulty to chew, which modify their dietary choice and digestive system makes eating less enjoyable and cause embarrassment<sup>2,3</sup>. Edentulism affects the esthetic sequelae, functional, psychological and social life of

people, ranging from feelings of inconvenience to severe handicap.

Globally, edentulism affects the senior population at a very high incidence (between less than 20% and 60%), yet in Western nations, there has been a 10% drop in cases over the past ten years<sup>3</sup>. According to research indicates that severe tooth loss, defined as having fewer than 9 teeth, ranks as the 36th most prevalent condition globally, affecting an estimated 2% of the population. Increased tooth loss rates are linked with alcohol consumption, smoking, and tobacco product use<sup>4-9</sup>.

Loss of a tooth can range from a little loss to a serious, catastrophic psychological state. Emotional imbalance in the elderly is exacerbated by tooth loss in addition to the negative feelings associated with regular ageing. An individual's emotional state is a complicated psychological experience that arises from the interaction between their thoughts and their surroundings. An altered sense of self-worth, disturbances to daily routines, and physical changes are among the emotional effects of tooth loss<sup>10,11</sup>.

As far as our understanding goes, there has been limited exploration of the emotional and depression consequences attributed to tooth loss in existing research. This study aims to investigate the relationship between tooth loss and its emotional consequences on an individual's well-being and current state of depression. Furthermore, it aims

- To explore the emotional reaction of tooth loss.
- To screen for current depressive symptoms.
- To find if there is correlation between emotional reaction and depressive symptoms associated with tooth loss.

## Materials and Method

A questionnaire was prepared based on the previous literature on emotional effects of tooth loss<sup>12,13</sup>. Later, it

was translated into vernacular language (Hindi) [Refer to Annexure IV]. The questionnaire asked about the causes of natural tooth loss, emotional responses to tooth loss, confidence loss, social performance, and productivity. The interview was carried out by a single trained postgraduate from the department of prosthodontics to minimize inter-operator variability.

Introduced in 2002 by Kroenke and Spitzer<sup>14</sup>, PHQ is a newly created screening tool designed to provide standard-based diagnoses of depression and other mental disorders. It is frequently applied in contexts including primary care. Although it is noticeably shorter than many other depression evaluation instruments, the PHQ depression scale, generally known as the PHQ-9, exhibits comparable sensitivity and specificity. It includes the nine criteria (Spitzer et al., 1999) that are used to diagnose depressive disorders according to the DSM-IV. The nine-item test consists of four response categories for each question, with a numerical value assigned to each option: 0 for "not at all," 1 for "several days," 2 for "more than half the days," and 3 for "nearly every day." The total score for a participant is derived from the sum of points across all items, ranging from 0 to 27. This score enables the assessment of major depression and the severity of depression using predefined cut-off points.

Inclusion criteria include 1) only those patients, who were in the process of getting new dentures 2) completely edentulous in both arches 3) those who were able to read or at least understand (through verbal explanation) 4) resident of Moradabad. Patients with communication difficulties and cognitive impairment were excluded from the study

The interviewer in this study is the examiner. The examiner received training from the project supervisor on how to administer and interpret the surveys. The

training was done for the examiner in both English and Hindi language. Data collection was done by the examiner after training by the study supervisor. To guarantee proper protocol implementation and strict adherence to the interview format, field checks were conducted.

Following a vital sign check by a specialist dentist, the participants are enlisted at the departmental outpatient department. All patients who satisfied the inclusion criteria were enrolled in the research. The study excluded participants who were unwilling to engage, had cognitive impairment, or had trouble communicating.

The questionnaire was given by the examiner to each participant individually during an interview conducted in the operatory or a convenient public location. Subjects were comfortably seated in front of the examiner and their responses were easily validated. A small conversation about the general health of the participant was initiated to make them comfortable. The purpose and the nature of the research procedure to be performed were explained adequately in the subject's own language and a signed informed consent were obtained.

The examiner administered the Sociodemographic questionnaire, questions exploring the emotional reactions toward tooth loss and PHQ-9. The participants were asked to fill the questionnaire. For those participants with difficulty to read, assistance is provided by the researcher in explaining the questionnaire. Each participant received gratitude for their participation, reassurance, and appreciation for their efforts to express themselves after completing the questionnaire, even though they may have found the process challenging overall. The performer contained a summary of all the derived responses. The collected data will undergo statistical analysis and be put via a comparison review process.

All the data was collected and analysed. The statistical software SPSS 16.0 was used for analysis of data.  $P < 0.05$  was considered to be statistically significant.

## Results

The present study was performed in the department of Prosthodontics and Crown & Bridge at Kothiwal Dental College & Research Centre. The study aimed to assess the emotional effect to tooth loss and its association with depression in edentulous individuals among Moradabad population who volunteered to participate in the study. Following are the findings of the assessment:

Table 1: Characteristics and attitudes

Characteristics	Frequency (N)	Percent (%)
Gender		
Male	111	69.4
Female	49	30.6
Q1. Response to tooth loss (self-reported)		
Periodontal problem	92	57.5
Carries	30	18.8
Others	38	23.8
Q2. Denture wearer		
No	160	100.0
Q3. Do you visit a dentist only if you have a problem?		
Yes	128	80.0
No	32	20.0
Q4. Do you consider tooth loss as a part of the normal ageing process?		
Yes	108	67.5
No	52	32.5
Q5. Do you think dentures as good substitute for the natural teeth?		
Yes	111	69.4
No	49	30.6

**Result:** Table 1 shows that there was a total of 111 males and 49 females among the respondents. Response to tooth loss, 57.5% reported periodontal problems, 18.8% had carries and 23.8% had other problems. There

was no respondent use Denture wearer. 80% respondent visited dental clinic when they had a problem. 67.5% respondent had considered tooth loss as a part of the normal ageing process. 69.4% respondent think dentures as good substitute for the natural teeth.

Graph: 1 Reason of tooth loss

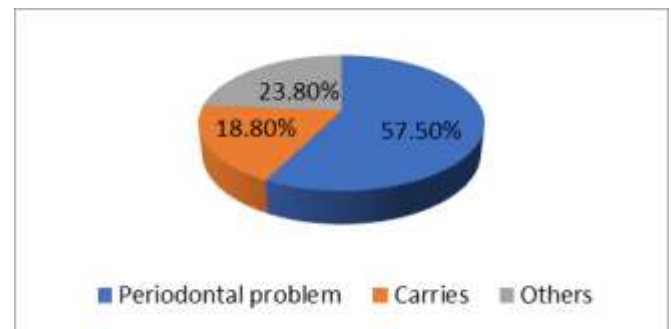
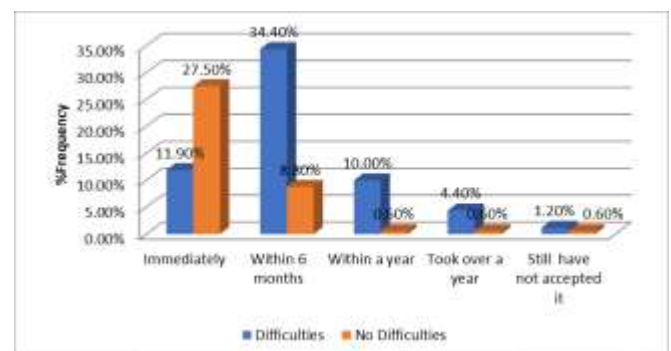


Table 2: Time – Related to Accepting Tooth Loss

Responses	Number or responses	Chi square	P value
Difficulties		No Difficulties	
Immediately	19	44	9.219 0.002**
Within 6 months	55	14	24.362 < 0.001**
Within a year	16	1	13.325 < 0.001**
Took over a year	7	1	4.500 0.034*
Still have not accepted it	2	1	0.333 0.564NS

Graph 2: % Frequency distribution response of Time – Related to Accepting Tooth Loss with difficulty & no difficulty

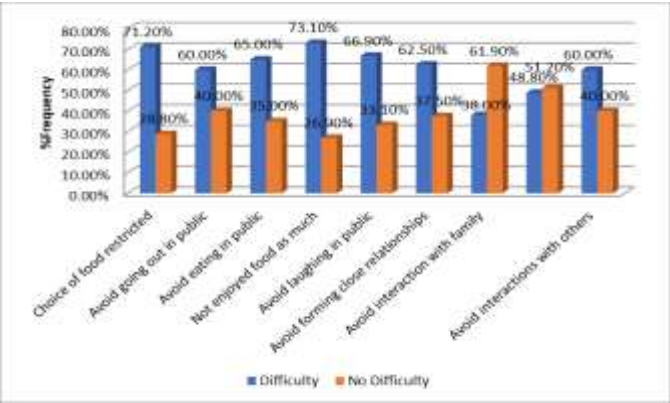


**Result:** Table 2 Individuals who experienced difficulty accepting losing teeth need more time to adjust than those who did not ( $P < 0.001$ ). Approximately 27.5% of

the group accepted their loss right away without any problems. In comparison to 0.6% of those without difficulties, around 34.4% of those with difficulties took six months to a year or more to accept losing their teeth.

Table 3: Activities restricted due to tooth loss

Statement	Number or responses		Chi square	P value
	Difficulties	No Difficulties		
Choice of food restricted	114	46	28.900	< 0.001**
Avoid going out in public	96	64	6.400	0.011*
Avoid eating in public	104	56	14.400	< 0.001**
Not enjoyed food as much	117	43	34.225	< 0.001**
Avoid laughing in public	107	53	18.225	< 0.001**
Avoid forming close relationships	100	60	10.000	0.002**
Avoid interaction with family	61	99	9.025	0.003**
Avoid interaction with friends / co workers	78	82	0.100	0.752NS
Avoid interactions with others	96	64	64.000	0.011*



Graph 3: % Frequency distribution response of Activities Restricted due to Tooth Loss with difficulty & no difficulty

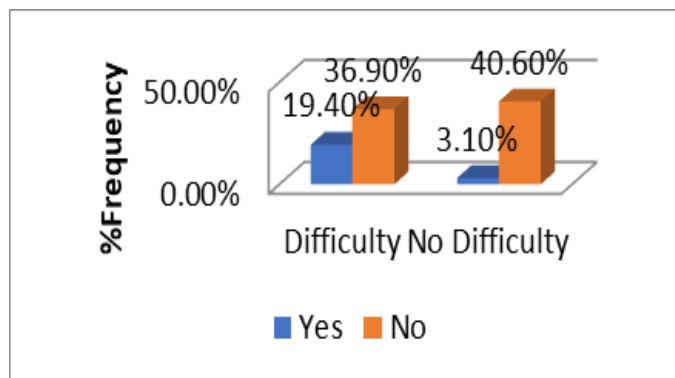
Result: [Table 3, Graph 4].

Respondents who experienced no difficulty limited their food choices (28.8%), avoided going out in public (40%), avoided eating in public (35%), reduced their food enjoyment (26.7%), avoided laughing in public (33.10%), avoided forming close relationships (37.5%), avoided interacting with friends and coworkers (44.8%), and avoided interacting with others (40%). Individuals who had trouble accepting losing their teeth were more likely to avoid social situations (P = 0.011), avoid eating (P < 0.001), find it harder to enjoy their meals (P < 0.001), and find it harder to laugh in front of others (P < 0.001). Additionally, they avoided building intimate relationships (P =.002), interacting with family (P = 0.003), and with others (P = 0.011) and felt more constrained about their eating choices (P = <0.001). For every activity, there were statistically significant differences between the two groups, with the exception of avoiding friends and coworkers (P = 0.072).

Table 4: Tooth Loss and Self Confidence

Responses	Number or responses		Chi square	P value
	Difficulties	No Difficulties		
Yes	31	5	18.778	< 0.001**
No	59	65	0.290	0.590NS

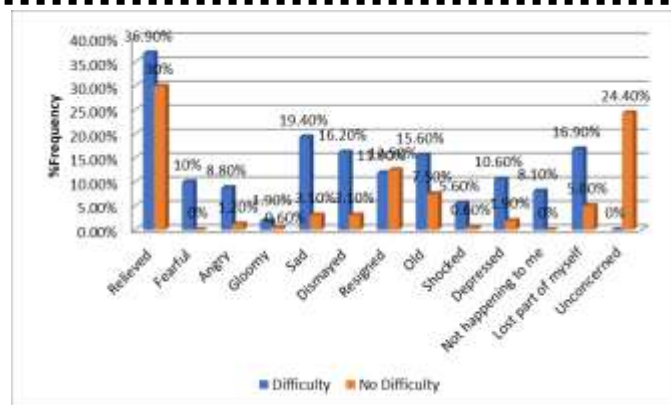
**Result:** According to Table 3, 3.1% of individuals without difficulties thought their confidence was harmed by tooth loss, but 19.4% of those with difficulties felt the opposite ( $P < 0.001$ ). [Ref. Graph 4]



Graph 4: % Frequency distribution response of Tooth Loss and Self Confidence with difficulty & no difficulty

Table 5: Feelings is Associated with Losing the Last Remaining Tooth

Responses	Number or responses		Chi square	P value
	Difficulties	No Difficulties		
Relieved	59	48	1.131	0.288 <sup>NS</sup>
Fearful	16	0	Not Calculate	Not Calculate
Angry	14	2	9.000	0.003**
Gloomy	3	1	1.000	0.317 <sup>NS</sup>
Sad	31	5	18.788	< 0.001**
Dismayed	26	5	14.226	< 0.001**
Resigned	19	20	0.026	0.873 <sup>NS</sup>
Old	25	12	4.568	0.033*
Shocked	9	1	6.400	0.011*
Depressed	17	3	9.800	0.002**
Not happening to me	13	0	Not Calculate	Not Calculate
Lost part of myself	27	8	10.314	0.001**
Unconcerned	0	39	Not Calculate	Not Calculate



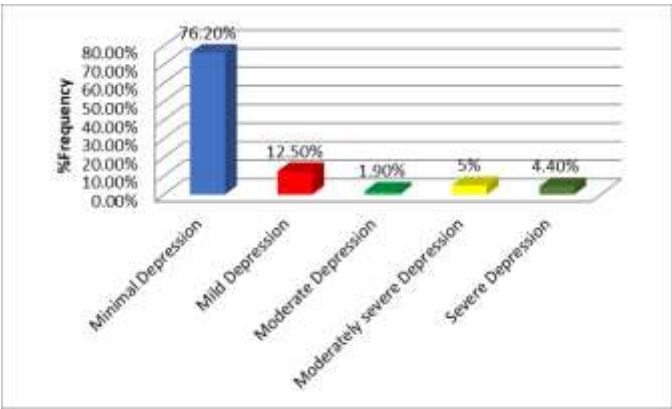
Graph 5: % Frequency distribution response of Feelings is Associated with Losing the Last Remaining Tooth with difficulty & no difficulty

Table 6: Patient Health Questionnaire (PHQ- 9)

	Frequency (N)	Percent (%)	Chi square	P value
Minimal Depression	122	76.2	321.438	<0.0001**
Mild Depression	20	12.5		
Moderate Depression	3	1.9		
Moderately severe Depression	8	5.0		
Severe Depression	7	4.4		
Total	160	100.0		

**Result:** The screening of PHQ 9 score revealed that 76.2% respondent had minimal depression, 12.5% had mild depression, 1.9% had moderate depression, 5.0% had moderately severe depression and 4.4% had severe depression. By Pearsons' Chi square test minimal depression is significantly higher than other depression, ( $p < 0.001$ ). [Ref. Graph 6]





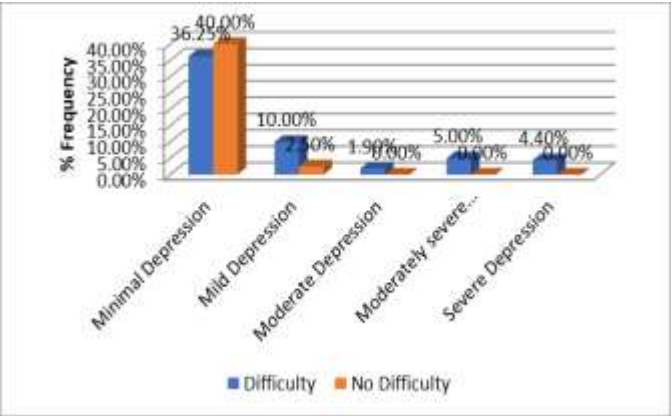
Graph 6: %Frequency distribution of depression

Table 7: Frequency N (%) of response and Association of PHQ (9) score with Difficulties and No difficulties

PHQ(9) Score			Total	Chi square	P value
	Difficulty	No Difficulty			
Minimal Depression	58 36.25%	64 40.00%	122 76.25%	22.399	<0.001**
Mild Depression	16 10.0%	4 2.5%	20 12.5%		
Moderate Depression	3 1.9%	0 0.0%	3 1.9%		
Moderately severe Depression	8 5.0%	0 0.0%	8 5.0%		
Severe Depression	7 4.4%	0 .0%	7 4.4%		
Total	92	68	160		

**Result:** According to the PHQ-9 depression screening results, 36.25% of the participants had none to minimal depression, 12.5% (10.0% with difficulties, 2.5% with no difficulties) had mild depression, 1.9% with difficulties had moderate depression, 5.0% with difficulties had moderately severe depression, and 4.4% with difficulties had severe symptoms. Compared to the group that did not have any issues, the group that had trouble accepting tooth loss was more likely to show

signs of depression [Graph- 7]. Significant correlation existed ( $P < 0.001$ ).



Graph 7: Frequency distribution of depression with emotional reaction

Table 8: Dichotomous data of (PHQ) -9 with Emotional Reaction

				Total
		Difficulties	No Difficulties	
(PHQ) -9	No Depression	74	68	142
	Depression	18	0	18
Total		92	68	160

Discussions

Teeth play an essential role in chewing, aesthetics, and speaking, making them the most significant portion of the oral cavity<sup>11</sup>. Several factors contribute to tooth loss, such as dental ailments, patient perspectives, dentist-patient interactions, accessibility to services, and dental treatment ideologies<sup>15</sup>. Long-term tooth loss can negatively impact an individual's quality of life, leading to depression, speech and aesthetic issues, and feelings of inferiority owing to the absence of a key body component<sup>11</sup>. Frustration arises when individuals begin to encounter the challenges associated with tooth loss, leading them to fully appreciate the value of what they have lost. A complete rehabilitation with full dentures may partially restore the lost functional abilities resulting from natural

tooth loss. This prompts the question of whether it also reinstates the emotional sentiments lost due to the absence of natural teeth<sup>11</sup>.

The result showed that the group which had difficulties accepting tooth loss was more likely to exhibit depressive symptoms than the group with no difficulties that were in accordance with the studies conducted by **Ehrenthal et al<sup>16</sup>; Rouxel et al<sup>17</sup>; Yamamoto et al<sup>18</sup>**.

Earlier reports have not elucidated the reason that underlies the connection linking tooth loss and depression. Hence, the purpose of the study is to evaluate the emotional reaction of tooth loss, to screen for current depressive symptoms and to test if emotional reaction to tooth loss is associated with depressive symptoms among such participants. The present study has been conducted to explore the emotional reaction to tooth loss and its association to depression in edentulous patients among Moradabad population visiting for prosthodontic services in the dept of Prosthodontics & Crown & Bridge, Kothiwal dental college and Research Center, Moradabad.

The emotional response questionnaires utilised in this investigation were reliable and verified tools. Because of its comparable sensitivity and specificity, simplicity, and criterion validity, the PHQ-9 depression scale has proven to be a useful instrument for both diagnosis and severity evaluation of depressive disorders<sup>14</sup>. It is generically applicable across specialisations and cultural backgrounds, and it is particularly effective for the older population. PHQ-9 that has already been certified into Hindi was used for this investigation<sup>19</sup>.

Tooth loss is a common occurrence that increases with age. Around the age of forty, tooth loss starts to become increasingly common. It then increases quickly in those 75 years of age and beyond, with many of them losing all of their teeth. This phenomenon arises from the fact

that teeth retaining longer time in oral cavity have increased chance of dental decay, which ultimately results in loss of tooth<sup>20,21</sup>. 68% of the participants consider tooth loss as part of normal aging process, in comparison to social stigma prevalent in Western countries. This is in accordance with the study conducted by **Scott et al<sup>22</sup>; Naik et al<sup>23</sup>; Fiske et al<sup>24</sup>**.

Out of the respondents, 99 individuals, equivalent to 61.9%, reported experiencing challenges in accepting their tooth loss, whereas 61 respondents (38.1%) stated that they encountered no difficulties. These people took longer to accept the situation than those who did not; they were more likely to keep it a secret, they thought it was inappropriate to talk about it, they observed changes in other people's behaviour after losing a tooth, they felt less confident, they were unable to participate in certain social activities, and they were upset about their altered appearance. These discoveries is in correlation to a quantitative study conducted in the UK<sup>22,37</sup>. Due to the COVID-19 pandemic has profoundly impacted global health, economies, and daily life worldwide many of the participants were unable to get prosthetic services. On the other hand, 2011 research by Naik et al.<sup>23</sup> discovered that among the individuals, 23% Struggled to come to terms with the loss of their teeth., 64% did not, and 13% were unsure.

Approximately 34.4% of those who experienced difficulties thought that losing teeth had harmed their confidence, whereas only 7.1% of those who did not. This aligns with the findings from research conducted by **McMillan et al<sup>25</sup> Dable et al<sup>10</sup>**.

Consequently, tooth loss presents a significant challenge for aging individuals, impacting not only their nutritional intake and physical health but also their overall mental well-being<sup>1,17,22,28,36,37</sup>. 71% felt that their choice of



food is restricted ( $P < 0.001$ ) which is in accordance to the study by **Aslan et al<sup>26</sup>**.

In our study 65% avoided eating out in public, 73% not enjoyed their food, while 67% avoided eating in public and 17 participants felt depressed. This finding is in line with the study conducted by **Okoje et al<sup>27</sup>** in Nigeria, where up to 6.4% of the surveyed respondents reported feeling depressed due to tooth loss.

In contrast to this, the majority of participants had no difficulty discussing tooth loss with family and friends, indicating societal acceptance of this condition. These results align with the research of **Agnihotri et al<sup>28</sup>**; **Shah et al<sup>29</sup>**; **Davis et al<sup>13</sup>**; **Fiske et al<sup>24</sup>**.

About feelings of tooth loss among participants 59 with difficulties and 48 without difficulties experienced relief. Among individuals experiencing difficulties, a broader spectrum of responses was observed, with other commonly expressed emotions including sadness, old, a sense of losing part of oneself, dismay, and a sense of resignation were (31, 25, 27, 26, 19 respectively) and 39 were unconcerned and had no problem with losing teeth. These were similar to study conducted by **Shah et al<sup>29</sup>**.

The results of the PHQ-9 depression test showed that majority of the participant experienced minimal depression and they had no problem in doing day to day work, taking care of matters at home or developing good relations with others. On the contrary, few participants experienced varying degree of depression with difficulty in doing the same.

For better interpretation, we have dichotomous data into two group and the result showed that 18 participants experienced moderate to severe depression with difficulty compared to 68 people experienced minimum to mild difficulties with no difficulties in doing day to day work.

The current research has certain limitations including dependence on self-reported data, and psychological variables were not taken into consideration of such participants. We propose that future investigations should be employ with large samples including other regions of the country.

### Conclusion

Considering the limitations of the study, the following conclusions were reached:

- For the majority of the participants, accepting their tooth loss proved to be challenging, and the loss of teeth had a significant emotional impact on them.
- There were noticeable difficulties and significant disabilities in day-to-day social activities, but there were no difficulties in interaction with friends and family.
- Participant experiencing difficulties with tooth loss had a significant correlation with emotional and depressive symptoms.

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