

# Factors affecting tooth loss among diabetic patients at an academic institution

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## Objective

While studies have reported that diabetic individuals are at greater risk for periodontal disease and tooth loss, few studies have examined whether periodontal disease is the primary factor affecting tooth loss in diabetic individuals. The purpose of this retrospective study was to investigate factors affecting tooth loss among diabetic individuals in comparison to nondiabetic ones.

## Methods and Materials

202 participants were included after screening 298 ones with extractions completed in 2022. The exclusion criteria were as follows; 1) only third molar extraction performed and 2) only remaining roots left. Patient- and tooth-related data were collected. Descriptive statistics were prepared for each independent variable such as age, gender, periodontal, smoking and diabetes status. The multiple linear regression (MLR) model was built to investigate the association between the number of remaining teeth and selected predictors.

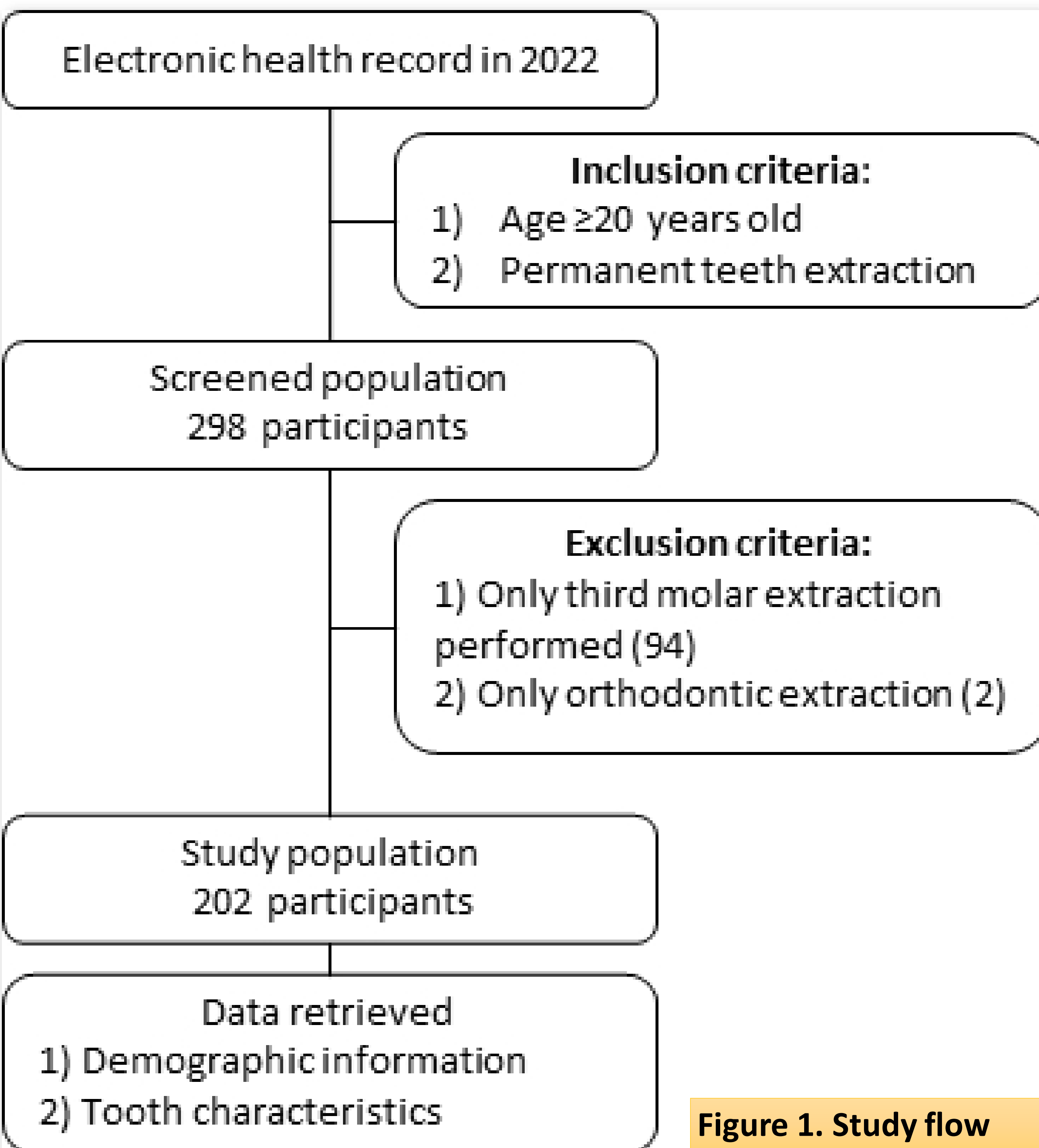


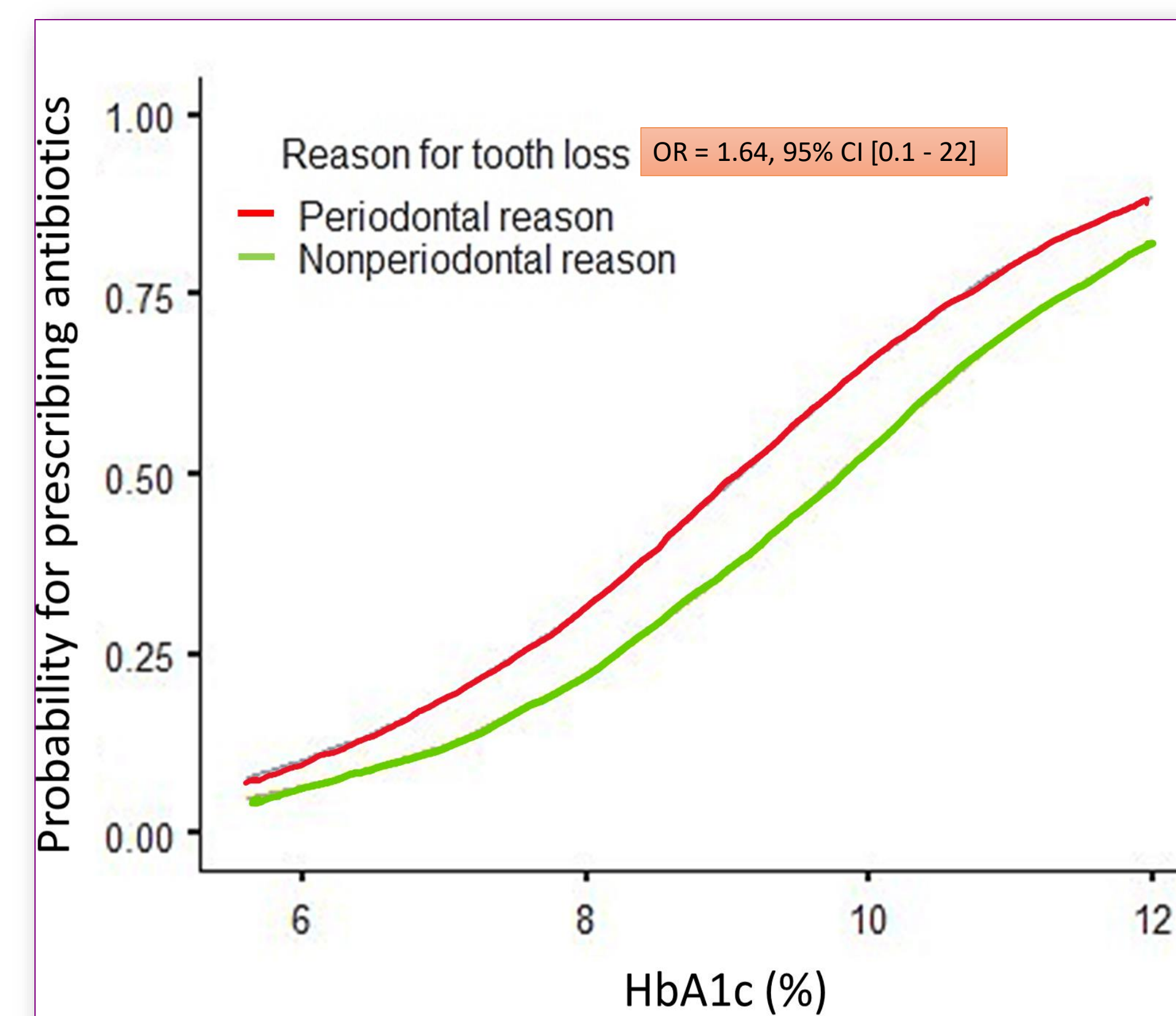
Figure 1. Study flow

## Results

- The study population includes 48 diabetic (24%) and 154 nondiabetic individuals. The diabetic group was significantly older, exhibited more periodontitis, and retained significantly fewer teeth compared to the nondiabetic group.
- 187 participants (90%) lost their teeth due to nonperiodontal reasons: there was no difference in the reasons for tooth loss between the diabetic and nondiabetic groups.

Table 1. Descriptive statistics between the diabetic and nondiabetic groups

		Diabetic (n = 48)	Nondiabetic (n = 154)	Total (N = 202)	p value
Gender	F	22	89	111	0.18 <sup>a</sup>
	M	26	65	91	
Age	Mean (SD)	65.5 (12)	53.8 (16)	56.6 (16)	<0.001 <sup>b</sup>
	Median	67	54		
Smoking	Nonsmoker	35	104	139	0.85 <sup>a</sup>
	Smoker	12	45	57	
	Marijuana	1	5	6	
Periodontal Diagnosis	Periodontitis	45	107	152	<0.001 <sup>a</sup>
	Gingivitis	3	47	50	
Reason for tooth loss	Nonperiodontal	43	138	181	1 <sup>a</sup>
	Periodontal	5	16	21	
Antibiotics prescription	No	40	147	187	<0.01 <sup>a</sup>
	Yes	8	7	15	
Complication	No	47	151	198	1 <sup>a</sup>
	Yes	1	3	4	
The number of remaining teeth	Mean (SD)	16 (7.5)	17.7 (8)	17.3 (8)	0.04 <sup>b</sup>
	Median	17	20		
HbA1c (%)	n = 36				<sup>a</sup> Fisher exact test <sup>b</sup> Wilcoxon test
	Mean (SD)	7.3 (1.4)	NA		
	Range	5.6 - 12	NA		



- While there was no difference in the prevalence of post-extraction complication between the two groups, the HbA1c level (OR = 2.02, 95% CI [1.1-3.7]) significantly affected the probability of prescribing postoperative antibiotics.

Figure 3. Probability of prescribing postoperative antibiotics following extractions

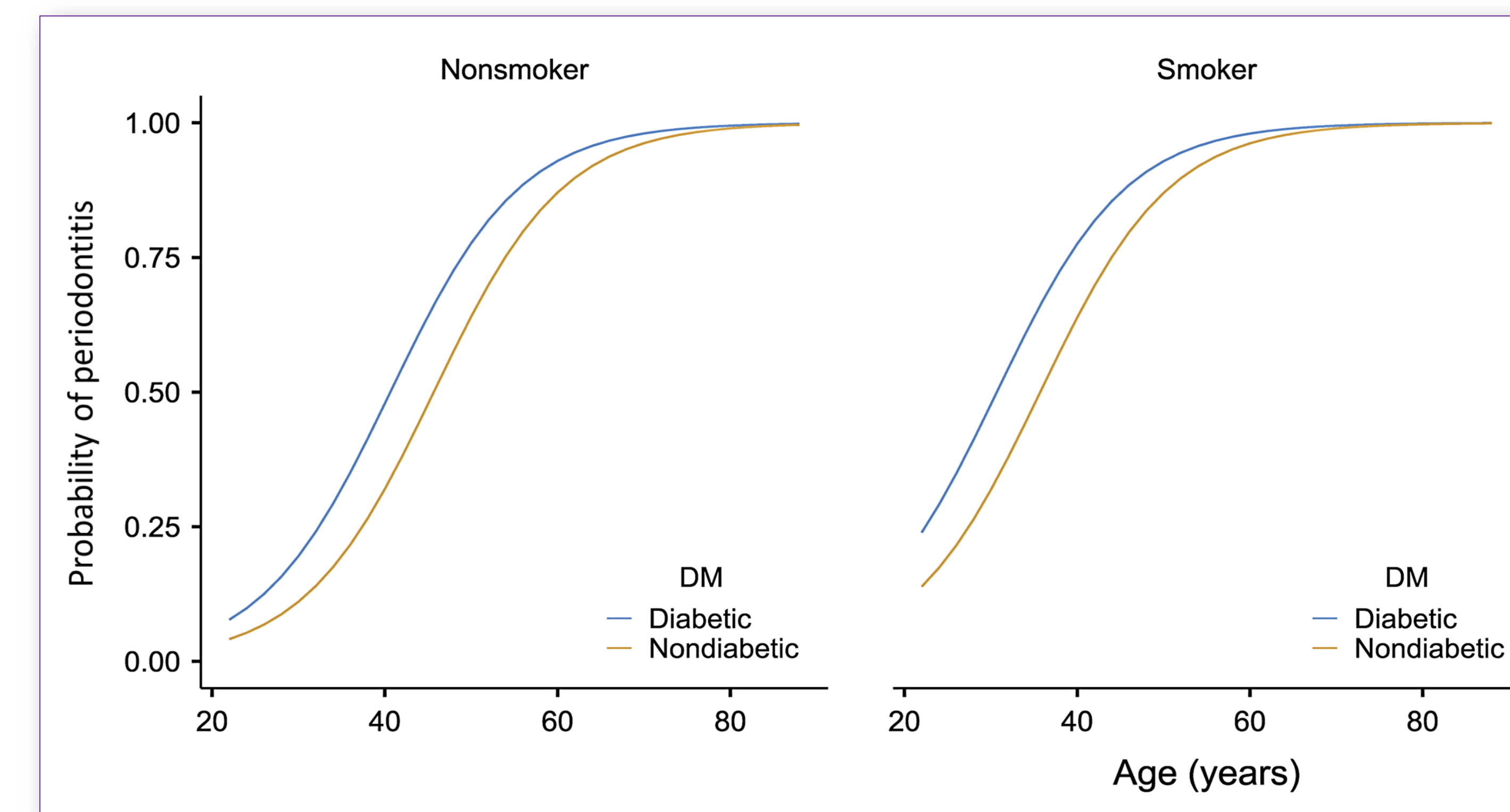


Figure 2. Probability of having periodontitis with respect to age, DM, and smoking

- When age and smoking were considered, diabetic status did not significantly affect the odds of having periodontitis (OR = 0.5, 95% CI [0.13 - 2.1]).
- The OR for having a periodontitis was 1.14 as age increased.
- The OR for having a periodontitis in smokers (vs nonsmokers) was 3.75.

Table 2. Analysis of Variance for remaining teeth number

Age vs Remaining teeth number	<.0001 (Pearson's r)
Gender vs Remaining teeth number	0.27 (Wilcoxon)
Diabetes vs Remaining teeth number	0.04 (Wilcoxon)
Smoking vs Remaining teeth number	0.005 (Kruskal-Wallis)
Periodontitis vs Remaining teeth number	<.0001 (Wilcoxon)

- Age, Diabetic Status, Smoking, and Periodontitis significantly affected the number of remaining teeth, based on individual analyses of variance

Table 3. General Linear Regression

Predictor	Estimate	SE	t value	p-value
Outcome	Number of remaining teeth			
Model diagnostics	F = 7.74, df1 = 5, df2 = 196, p <.001			
Intercept	22.1	3	7.3	<.001
Age (years)	-0.15	0.04	-3.5	<.001
<b>Diabetic status:</b>				
Nondiabetic vs Diabetic	-0.05	1.29	-0.04	0.967
<b>Smoking</b>				
Nonsmoker vs Smoker	4.9	1.19	4.14	<.001
Marijuana smoker vs Smoker	2.4	3.18	0.76	0.449
<b>Periodontal diagnosis</b>				
Gingivitis vs Periodontitis	1.19	1.5	0.78	0.436

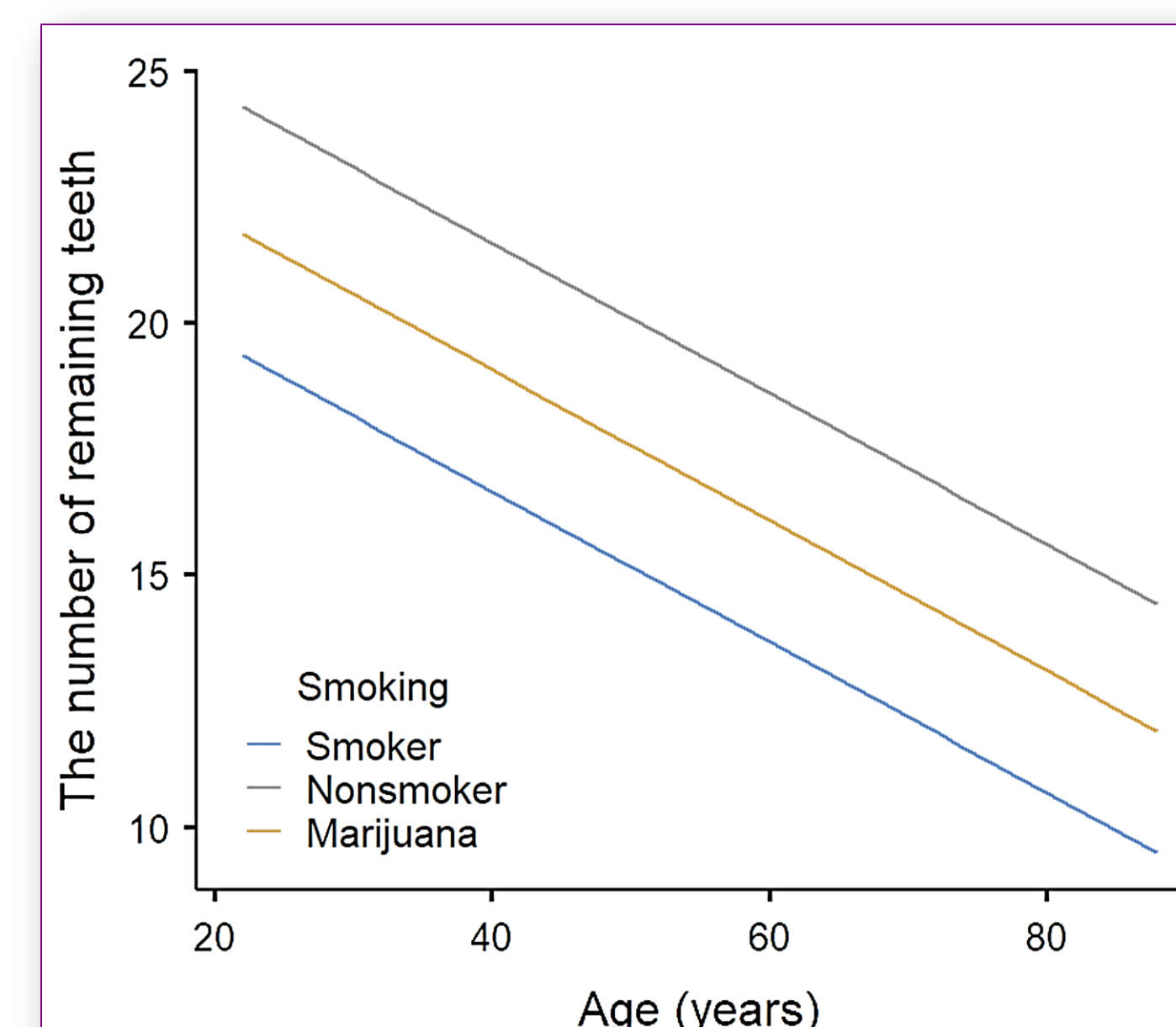


Figure 4. Estimated marginal means with respect to age and smoking

- However, when Age, Diabetes, Smoking, and Periodontitis were collectively considered, Diabetic status ( $p = 0.97$ ) and Periodontal diagnosis ( $p = 0.44$ ) did not significantly affect the number of remaining teeth.
- Age ( $p < 0.001$ ) and Smoking status ( $p < 0.001$ ) were significantly affected the number of remaining teeth based on the General Linear Regression Model.

## Conclusion

Factors other than periodontal disease contributed more substantially to tooth loss in both groups. Age and smoking were significant factors affecting the remaining teeth number, regardless of periodontitis and diabetic status.