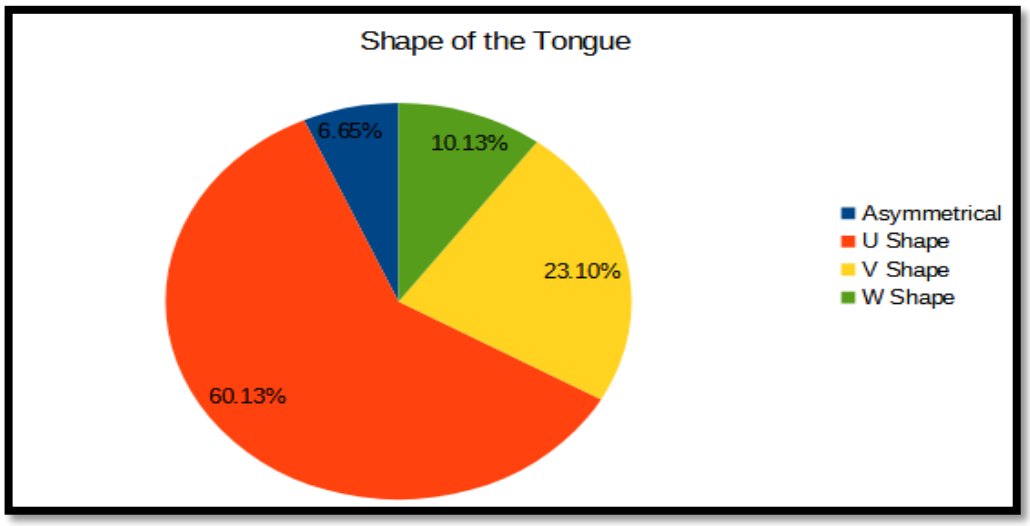
STATISTICAL ANALYSIS AND RESULTS

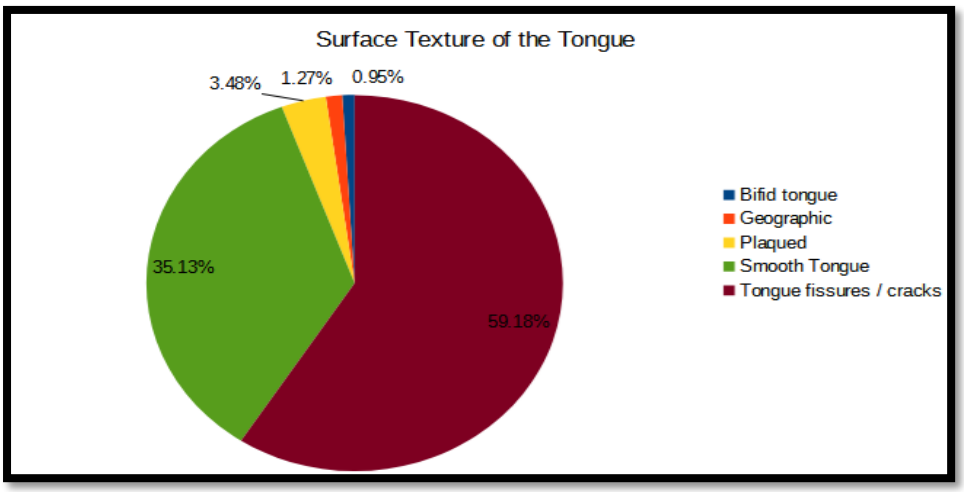
Shape of the Tongue:

The original data collected for the shape of the Tongue comprised of: acute triangular, asymmetrical, ellipsoid, obtuse triangular. Ovoid, rectangular, U shape, V shape and W shape. However, the data was merged into four categories: Asymmetrical, U shape, V shape and W shape. Fig 1 presents the distribution of the respondents on the basis of these shapes of the tongue. It can be seen that about 60% of the respondents have U shape tongue, about 23% of them have V shape tongue, about 10% have W shape and about 7% have asymmetrical shape of the tongue.



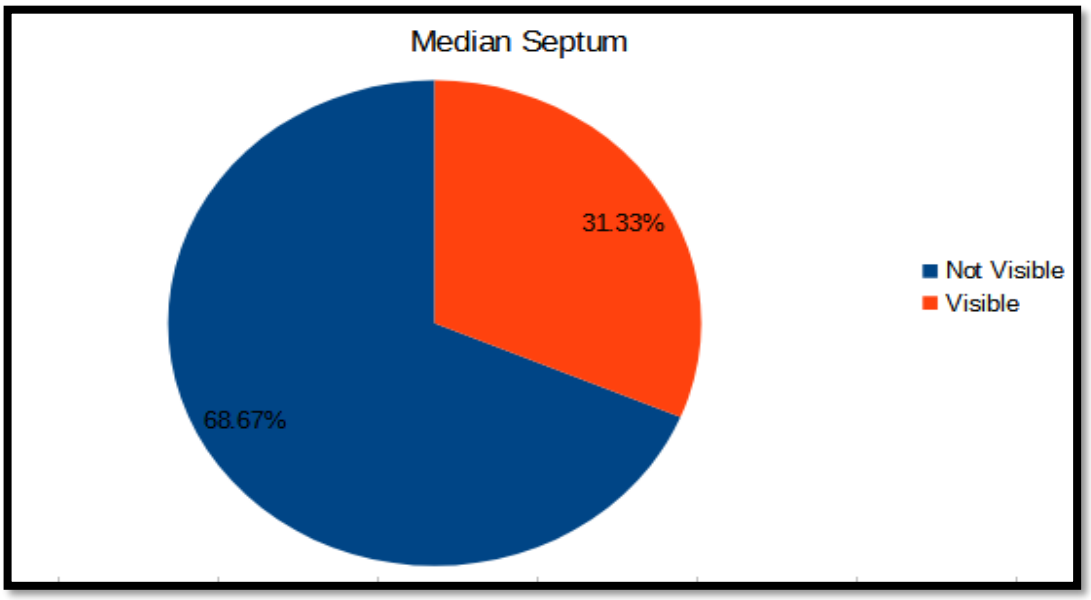
Surface Texture of the Tongue:

Fig 2 presenting the distribution of the respondents on the basis of the surface texture of the tongue shows that “Tongue fissures/cracks” (59% app) and “Smooth Tongue” are the two prominent surface textures amongst all the respondents. “Plaqued” (3%), “Geographic” (1%) and “Bifid” (1%) surface textures of the tongue are found in very less respondents.



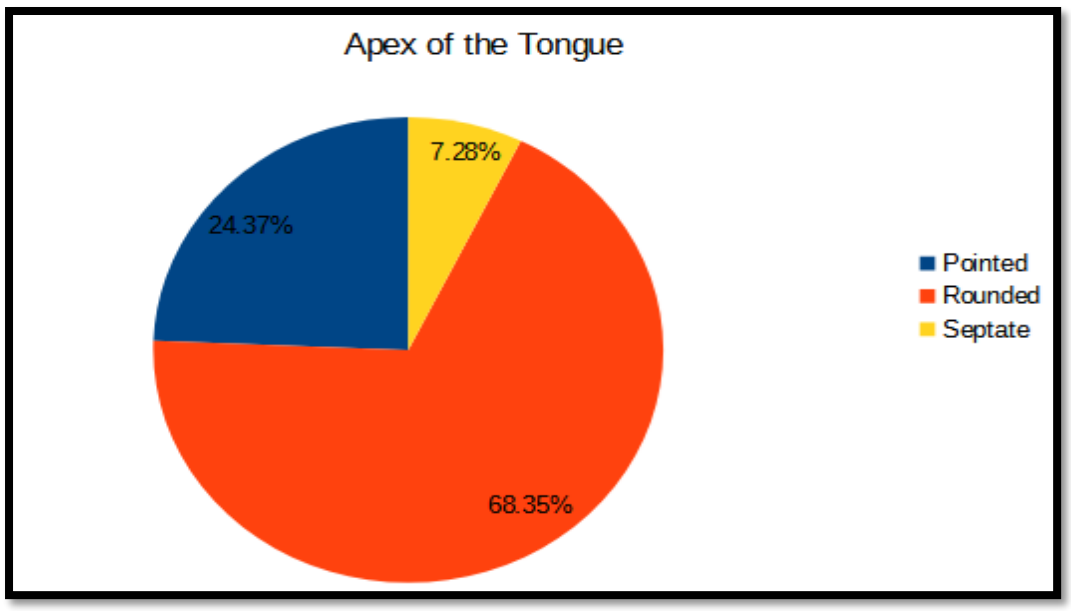
Median Septum of the Tongue:

Fig 3 presenting the distribution of the respondents on the basis of the median septum of the tongue shows that in about 69% of the respondents, median septum is not visible in the tongue while in remaining 31% of the respondents, median septum is visible in the tongue.



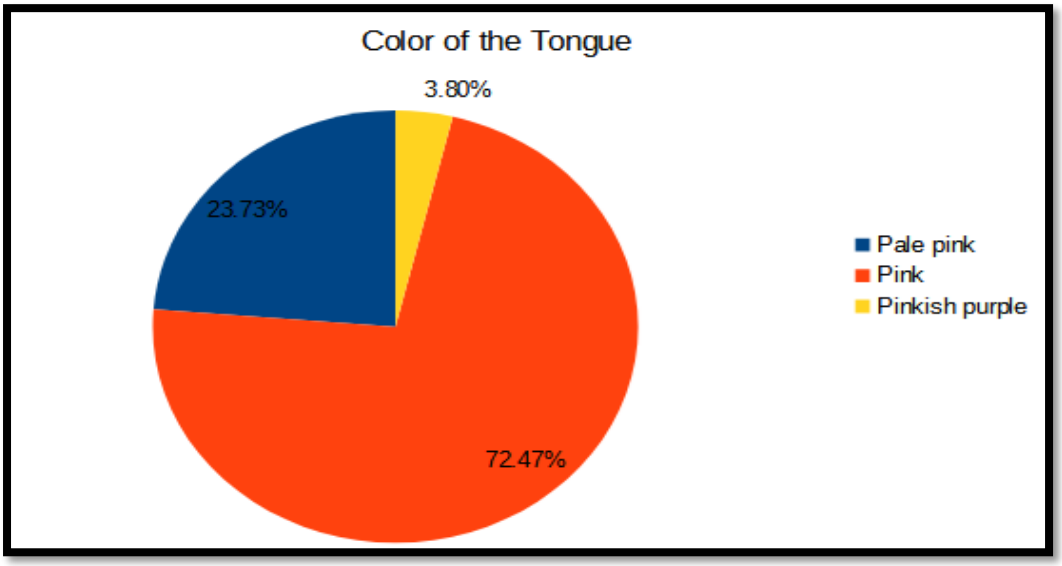
Apex of the Tongue

Fig 4 presenting the distribution of the respondents on the basis of the apex of the tongue shows that in about 68% of the respondents, the apex is rounded. In another 24% of the respondents, the apex is pointed while in remaining 7% of the respondents, the apex is septate.



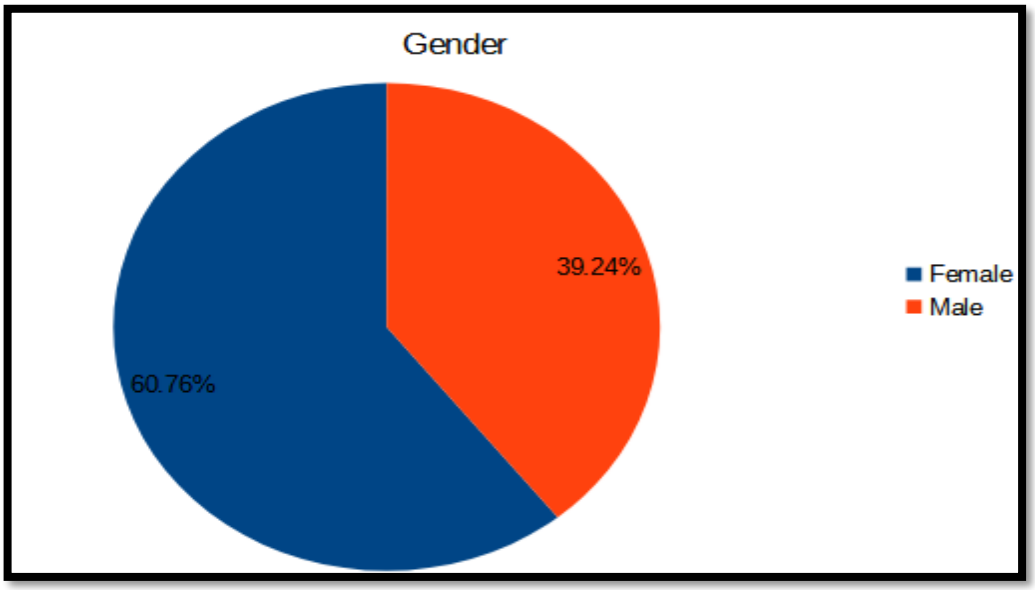
Color of the Tongue:

The original data collected for the color of the Tongue comprised of: baby pink, pale pink, pink, pinkish purple, pinkish red, pinkish white, purple, purplish pink, red, reddish pink and whitish pink. However, the data was merged into three categories: pale pink, pink and pinkish purple. Fig 5 presents the distribution of the respondents on the basis of these colours of the tongue. It can be seen that about 72% of the respondents have pink colour tongue, about 24% of them have pale pink tongue and remaining about 4% have pinkish purple tongue.



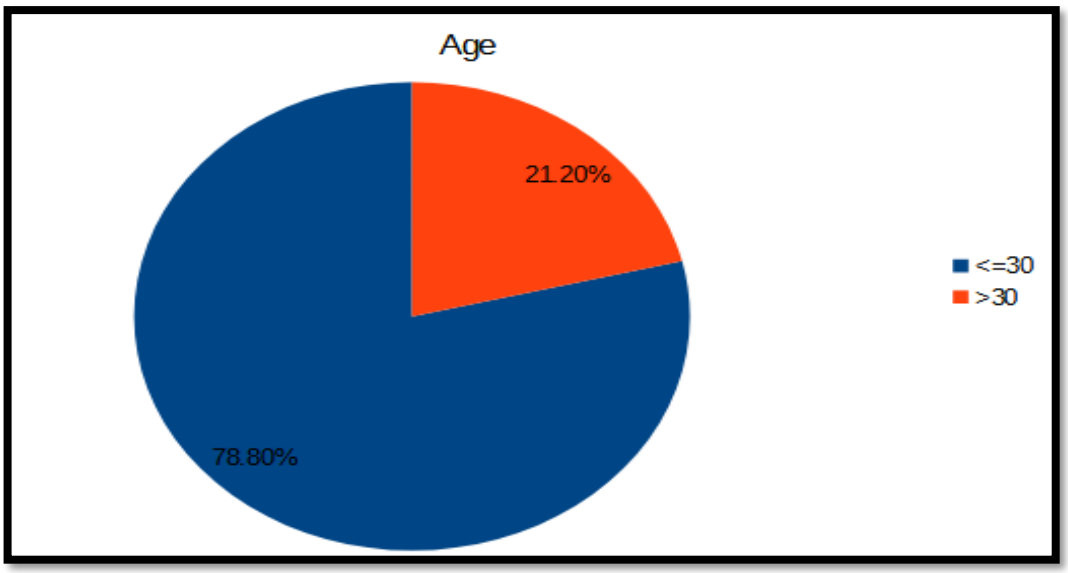
Gender:

Fig 6 presenting the pie chart on the basis of the gender shows that about 61% of the respondents are female while in remaining 39% of the respondents are male.



Age Groups:

The data for age was categorized into binary variable using less than equal to 30 years and greater than 30 years age groups. Fig 7 presenting the pie chart for age groups shows that about 79% of the respondents are less than equal to 30 years while remaining 21% of the respondents are more than 30 years.



Shape of the Tongue by Gender:

Fig 8 presenting the column chart for shape of the tongue by gender shows that of the female respondents, about 5% respondents have asymmetrical shape, 61% have U shape, 27% have V shape and 7% have W shape. While amongst the male respondents, about 9% respondents have asymmetrical shape, 59% have U shape, 17% have V shape and 15% have W shape. Table 1 shows that p-value of Chi-square test is 0.016 which concludes that the shape of the tongue differs based on gender.

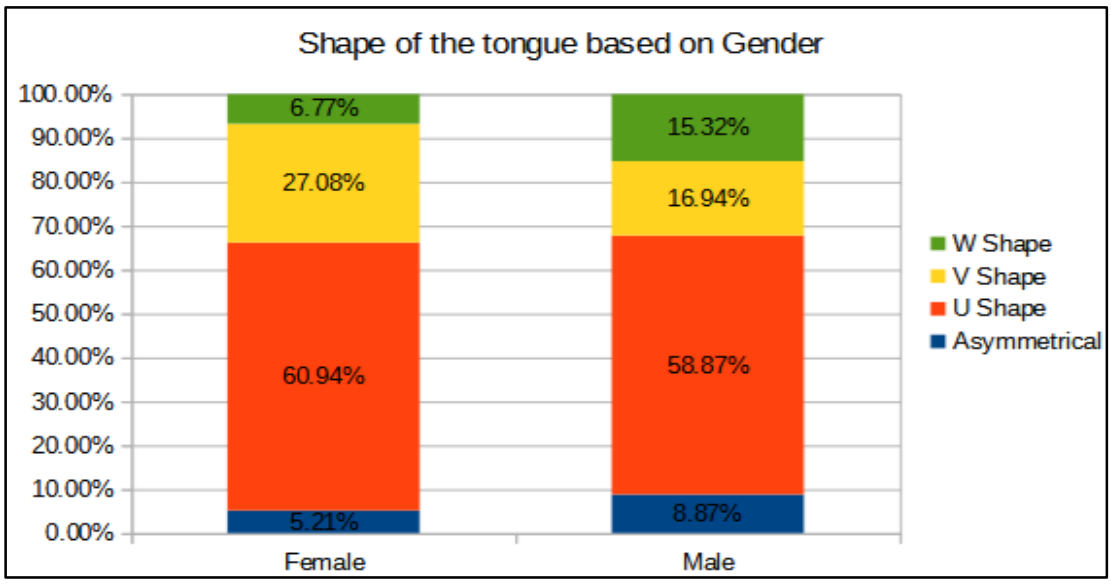


Table 1: Shape of the Tongue by Gender

	Asymmetrical	U Shape	V Shape	W Shape	Total	Sig
Female	10	117	52	13	192	0.016
Male	11	73	21	19	124	
Total	21	190	73	32	316	

Surface Texture of the Tongue by Gender:

Fig 9 presenting the column chart for surface texture of the tongue by gender shows that of the female respondents, about 53% respondents have tongue fissures / cracks, 44% have smooth tongue, and only 3% of the remaining female respondents have plaqued, geographic or bifid tongue. While amongst the male respondents, about 69% respondents have tongue fissures / cracks, 22% have smooth tongue, and about 9% of the remaining male respondents have plaqued, geographic or bifid tongue. Table 2 shows that the p-value of Chi-square test is 0.001 which concludes that the surface texture of the tongue differs based on gender.

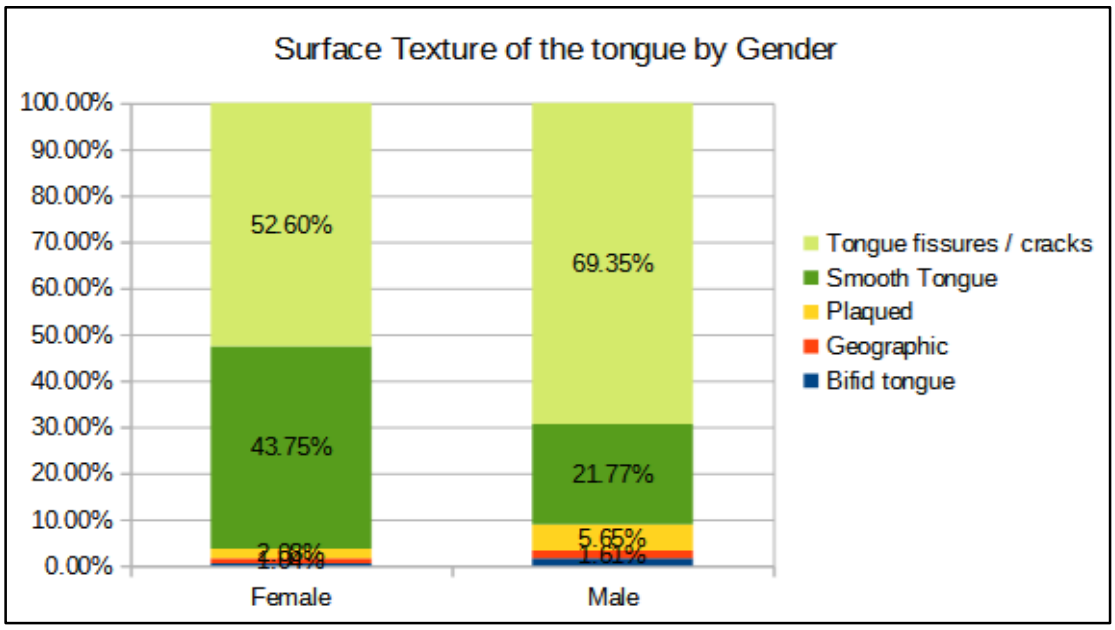


Table 2: Surface Texture by Gender

	Bifid tongue	**Geographic**	**Plaqued**	**Smooth Tongue**	**Tongue fissures / cracks**	**Total**	**Sig**
Female	1	2	4	84	101	192	0.001 (HS)
Male	2	2	7	27	86	124	
Total	3	4	11	111	187	316	

Median Septum by Gender:

Fig 10 presenting the column chart for median septum by gender shows that of the female respondents, for about 28% respondents median septum is visible while for remaining 72% female respondents median septum is not visible. The percentage is higher for male respondents where for about 36% respondents median septum is visible and for remaining 64% male respondents median septum is not visible. Table 3 shows that the p-value of Chi-square test is 0.137 which concludes that the median septum does not differ based on gender.

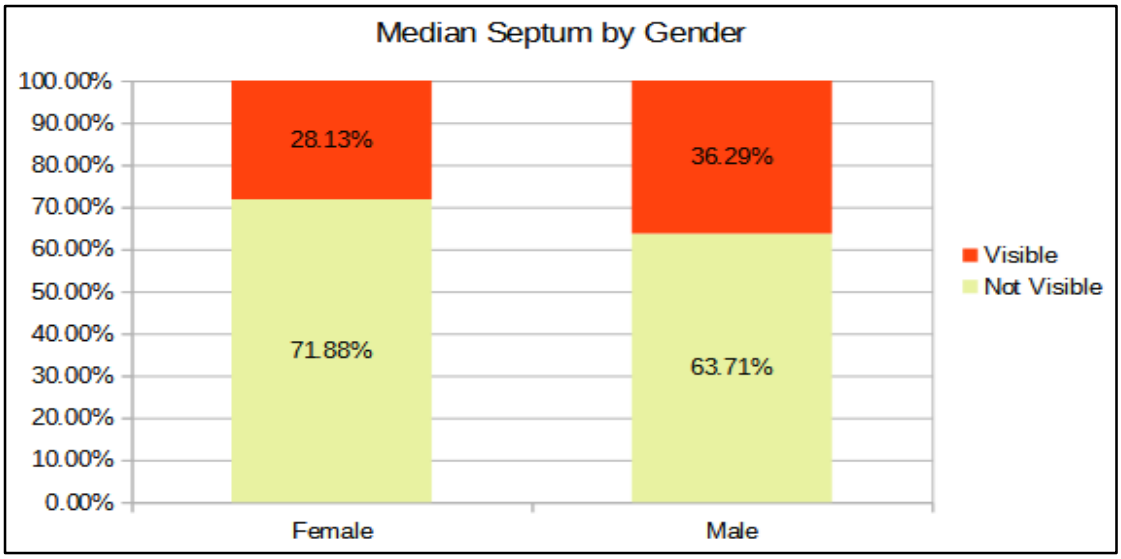


Table 3: Median Septum by Gender

	Not Visible	Visible	Total	
Female	138	54	192	0.137 (NS)
Male	79	45	124	
Total	217	99	316	

Apex of the Tongue by Gender:

Fig 11 presenting the column chart for apex of the tongue by gender shows that of the female respondents, about 69% respondents have rounded apex, 26% have pointed apex, and only 5% of the remaining female respondents have septate apex of the tongue. While amongst the male respondents, about 67% respondents have rounded apex, 22% have pointed apex, and only 11% of the remaining male respondents have septate apex of the tongue. Table 4 shows that the p-value of Chi-square test is 0.077 which concludes that the apex of the tongue differs based on gender.

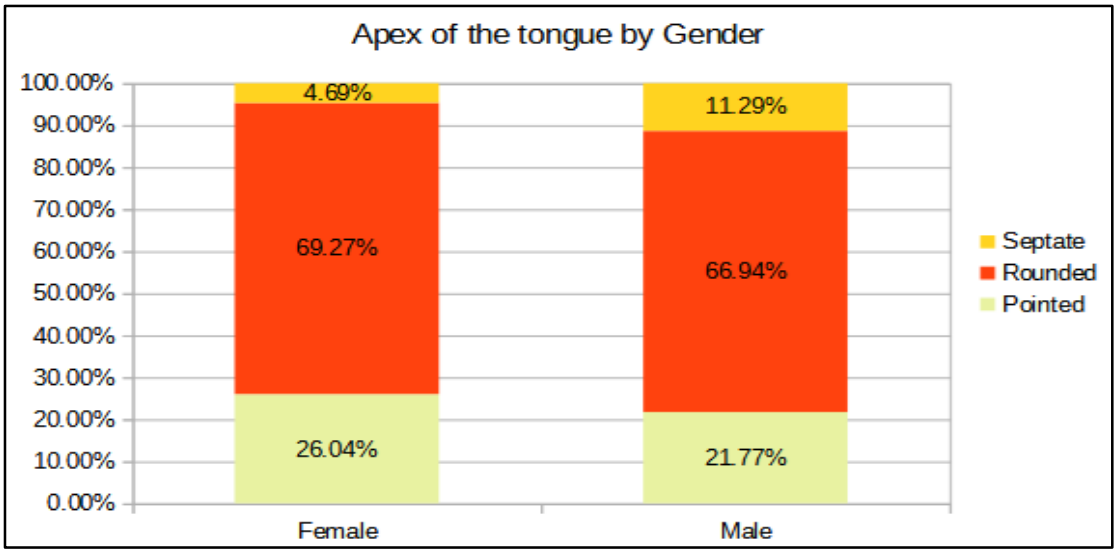


Table 4 : Apex of the tongue by Gender

	Pointed	Rounded	Septate	Total	Sig
Female	50	133	9	192	0.077 (NS)
Male	27	83	14	124	
Total	77	216	23	316	

Color of the Tongue by Gender:

Fig 12 presenting the column chart for color of the tongue by gender shows that of the female respondents, about 75% respondents have pink, 21% have pale pink, and only 4% of the remaining female respondents have pinkish purple. While amongst the male respondents, about 69% respondents have pink, 27% have pale pink, and only 4% of the remaining male respondents have pinkish purple. Table 5 shows that the p-value of Chi-square test is 0.443 which concludes that the color of the tongue differs based on gender.

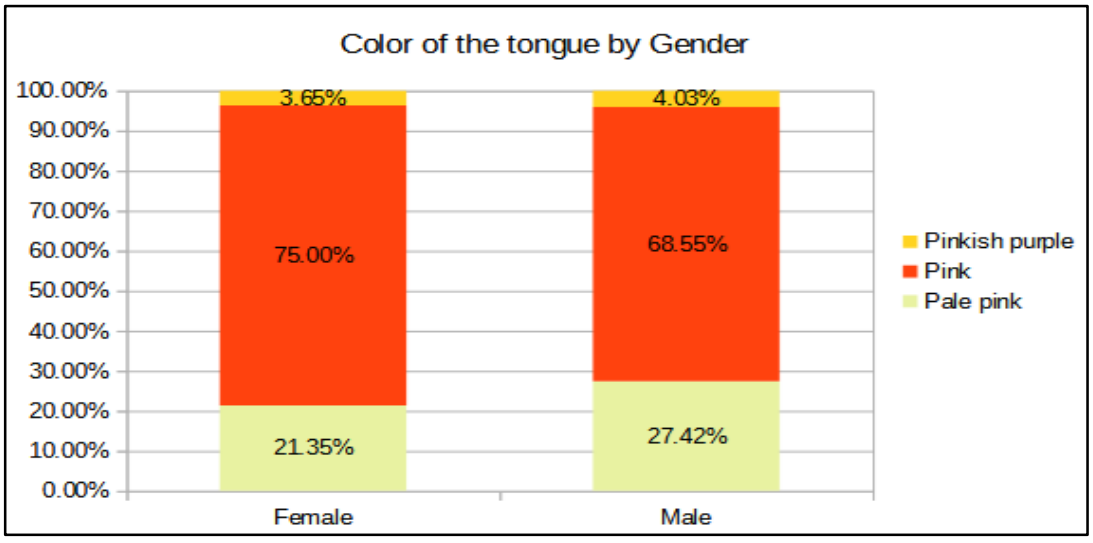


Table 5: Colour of the tongue by Gender

	Pale pink	Pink	Pinkish purple	Total	Sig
Female	41	144	7	192	0.443 (NS)
Male	34	85	5	124	
Total	75	229	12	316	

Shape of the Tongue by Age groups:

Fig 13 presenting the column chart for shape of the tongue by age groups shows that of the younger respondents, about 6% respondents have asymmetrical shape, 60% have U shape, 24% have V shape and 10% have W shape. While amongst the middle age respondents, about 9% respondents have asymmetrical shape, 60% have U shape, 19% have V shape and 12% have W shape. Table 6 shows that the p-value of Chi-square test is 0.69 which concludes that the shape of the tongue does not differ based on age groups.

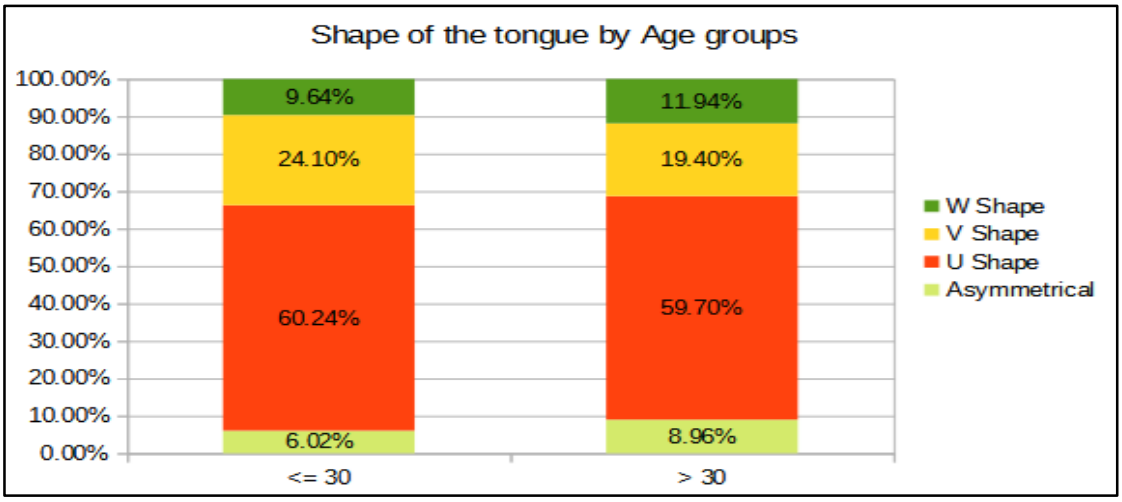


Table 6: Shape of the tongue by age groups

	Asymmetrical	U Shape	V Shape	W Shape	Total	Sig
<= 30	15	150	60	24	249	0.69 (NS)
> 30	6	40	13	8	67	
Total	21	190	73	32	316	

Surface Texture of the Tongue by Age groups:

Fig 14 presenting the column chart for surface texture of the tongue by age groups show that of the younger respondents, about 59% respondents have tongue fissures / cracks, 37% have smooth tongue, and only 4% of the remaining younger respondents have plaqued, geographic or bifid tongue. While amongst the middle aged

respondents, about 61% respondents have tongue fissures / cracks, 30% have smooth tongue, and about 9% of the remaining male respondents have plaqued, geographic or bifid tongue. Table 7 shows that the p-value of Chi-square test is 0.283 which concludes that the surface texture of the tongue does not differ based on age groups.

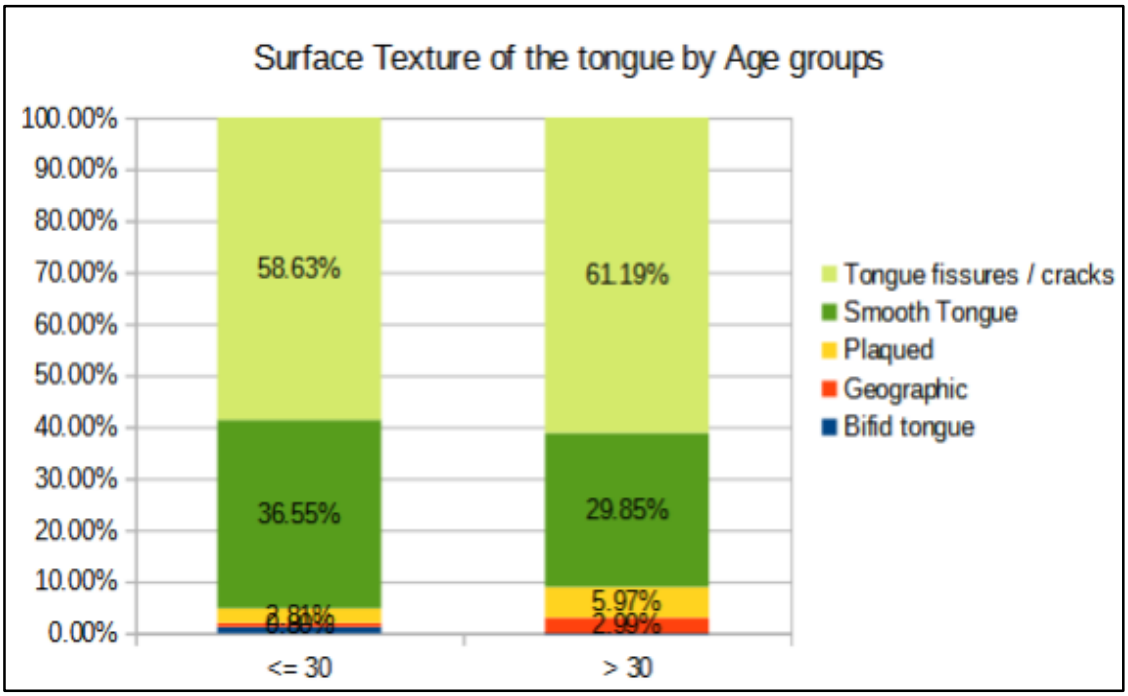


Table 7: Surface Texture of the tongue by age groups

	Bifid tongue	Geographic	Plaqued	Smooth Tongue	Tongue fissures / cracks	Total	Sig
<= 30	3	2	7	91	146	249	
> 30	0	2	4	20	41	67	0.283(NS)
Total	3	4	11	111	187	316	

Median Septum by Age groups:

Fig 15 presenting the column chart for median septum by age groups show that of the younger respondents, for about 33% respondents median septum is visible while for remaining 67% younger respondent's median septum is not visible. The percentage is lower for middle aged respondents where for about 27% respondent's median septum is visible and for remaining 73% middle aged respondents median septum is not visible. Table 8 shows that the p-value of Chi-square test is 0.375 which concludes that the median septum does not differ based on age groups.

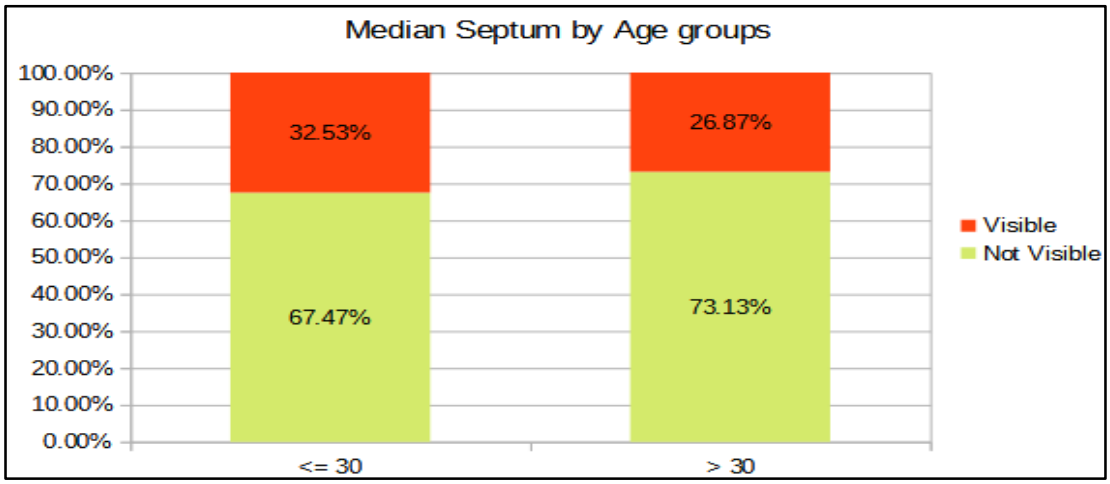


Table 8: Median Septum by age groups

	Not Visible	Visible	Total	Sig
<= 30	168	81	249	
> 30	49	18	67	0.375 (NS)
Total	217	99	316	

Apex of the Tongue by Age groups:

Fig 16 presenting the column chart for apex of the tongue by age groups show that of the younger respondents, about 68% respondents have rounded apex, 26% have pointed apex, and only 6% of the remaining younger respondents have septate apex of the tongue. While amongst the middle aged respondents, about 69% respondents have rounded apex, 19% have pointed apex, and only 12% of the remaining middle aged respondents have septate apex of the tongue. Table 9 shows that the p-value of Chi-square test is 0.183 which concludes that the apex of the tongue does not differ based on age groups.

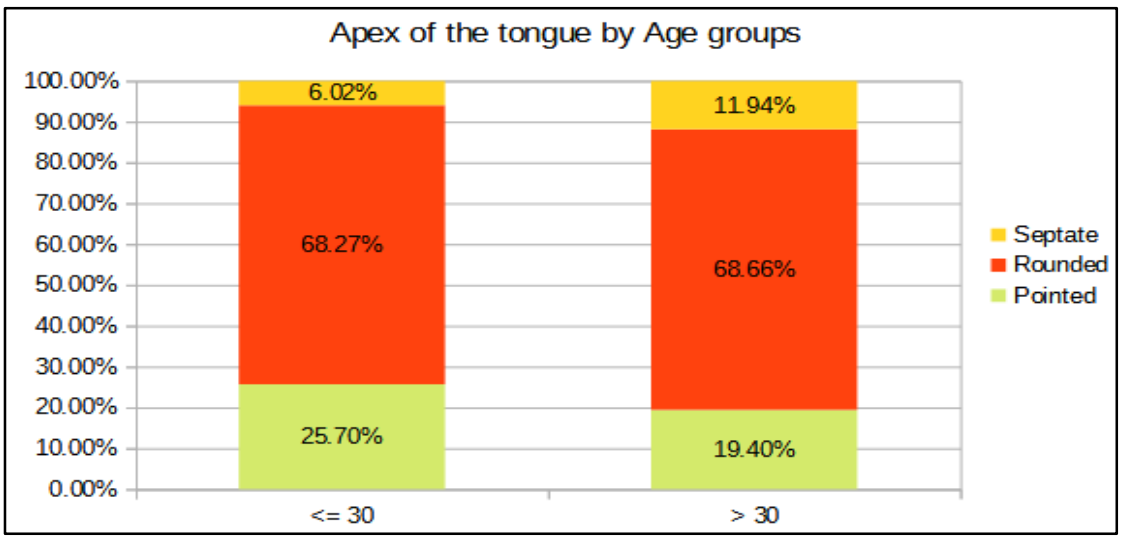


Table 9: Apex of the tongue by age groups

	Pointed	Rounded	Septate	Total	Sig
<= 30	64	170	15	249	
> 30	13	46	8	67	0.183 (NS)
Total	77	216	23	316	

Color of the Tongue by Age groups:

Fig 17 presenting the column chart for colour of the tongue by age groups show that of the younger respondents, about 78% respondents have pink, 18% have pale pink, and only 4% of the remaining younger respondents have pinkish purple. While amongst the middle-aged respondents, about 54% respondents have pink, 45% have pale pink, and only 2% of the remaining middle-aged respondents have pinkish purple. Table 10 shows that the p-value of Chi-square test is 0 which concludes that the colour of the tongue differs based on age groups.

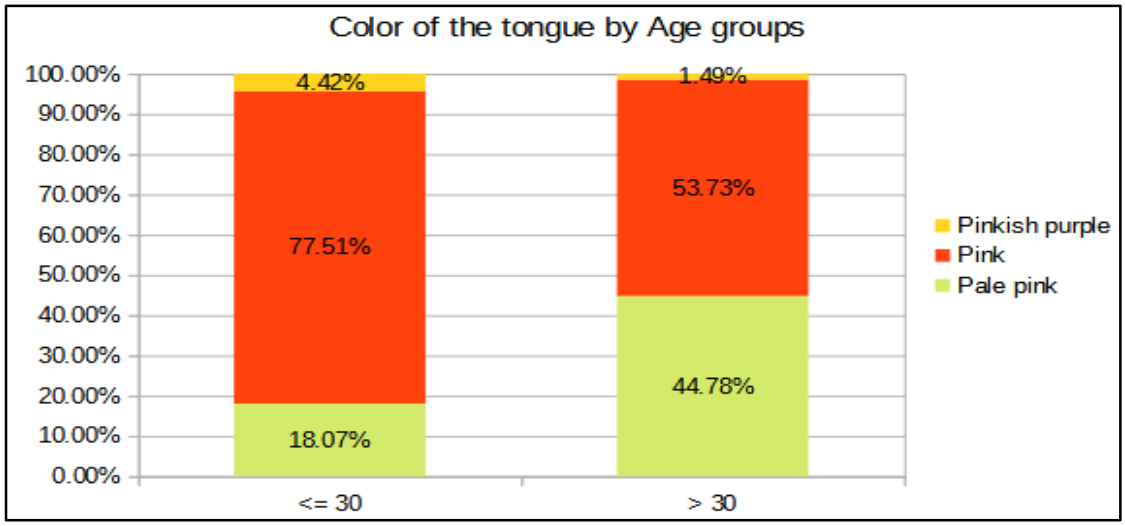
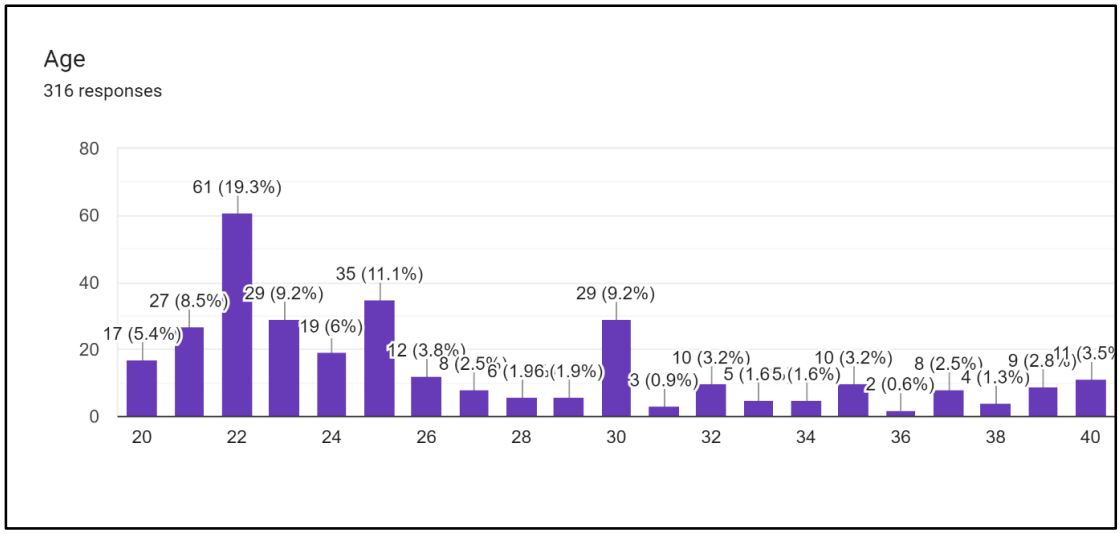
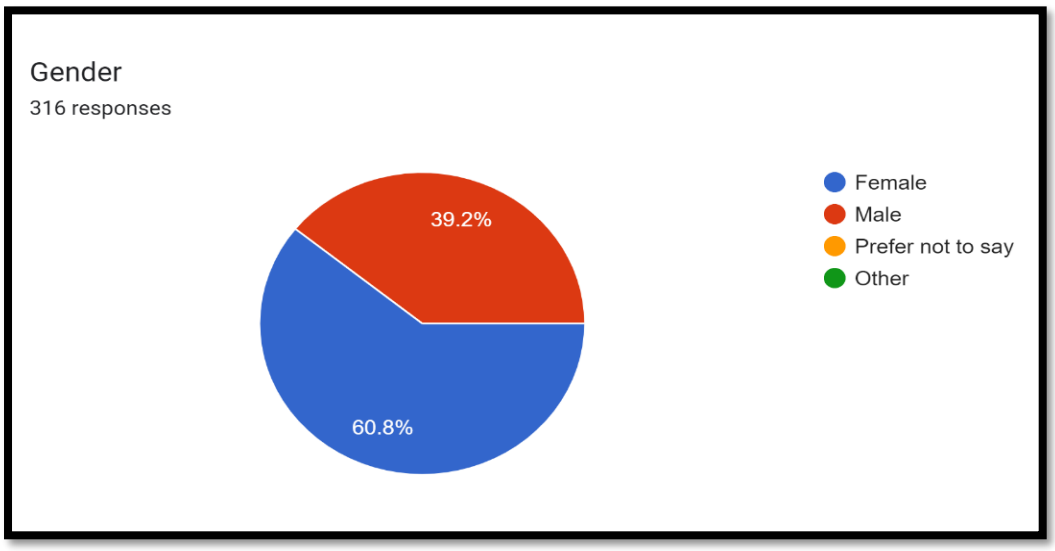


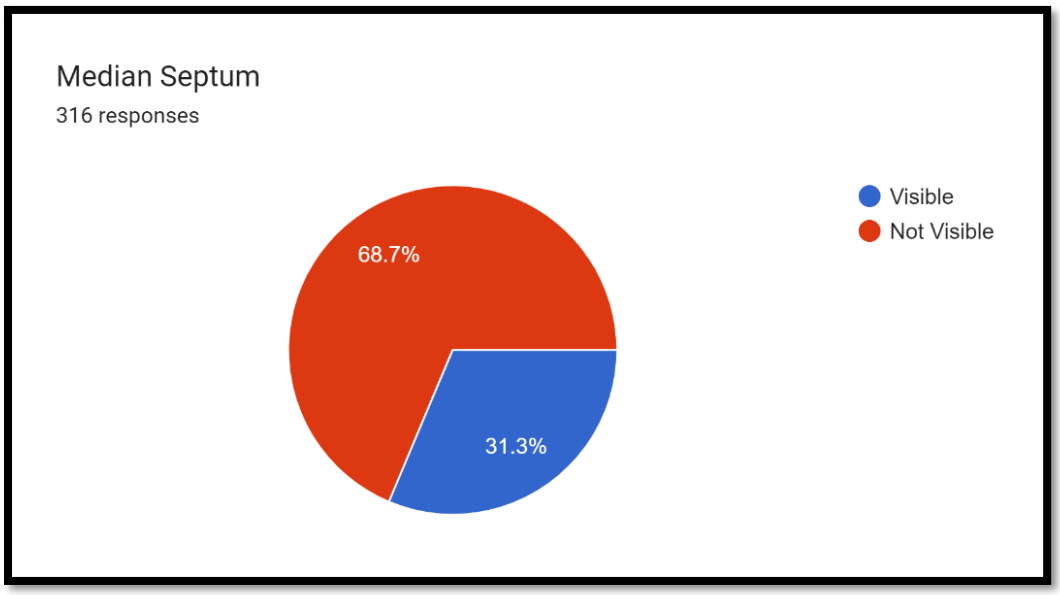
Table 10 : Color of the tongue by age groups

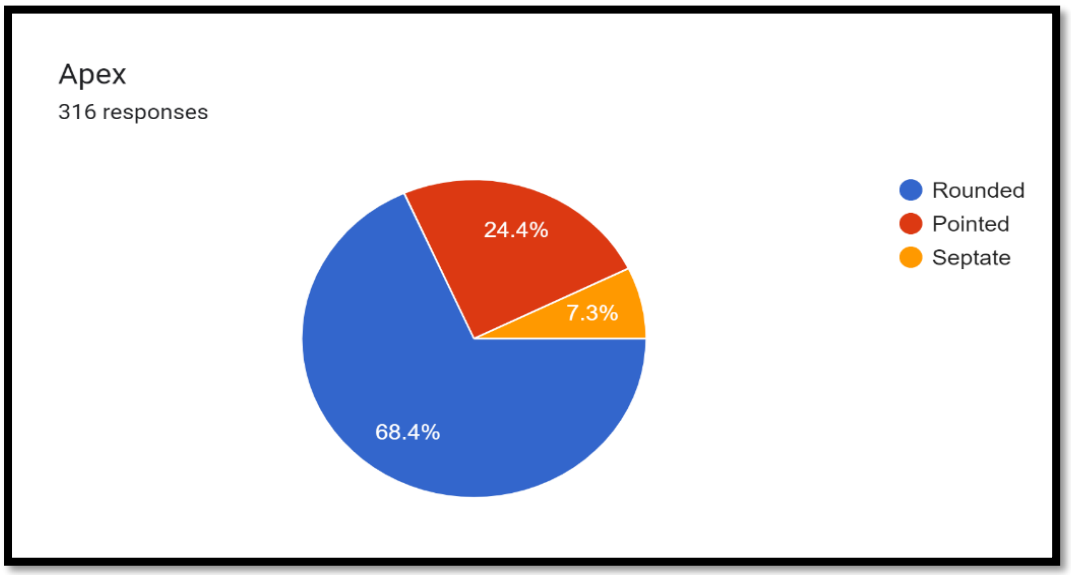
	Pale pink	Pink	Pinkish purple	Total	Sig
<= 30	45	193	11	249	
> 30	30	36	1	67	0 (HS)
Total	75	229	12	316	

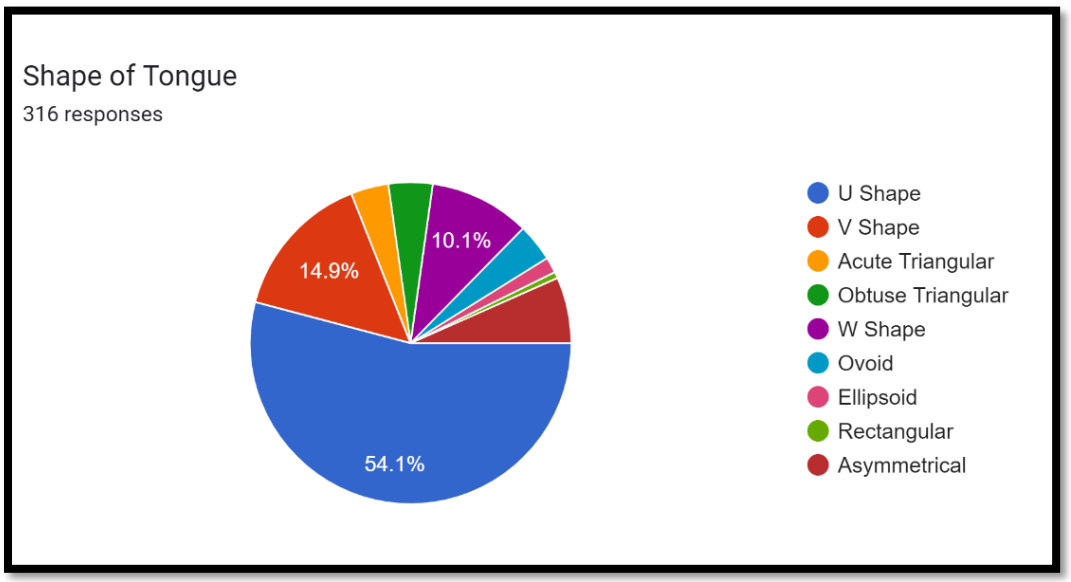
DATA COLLECTED FROM GOOGLE FORMS:

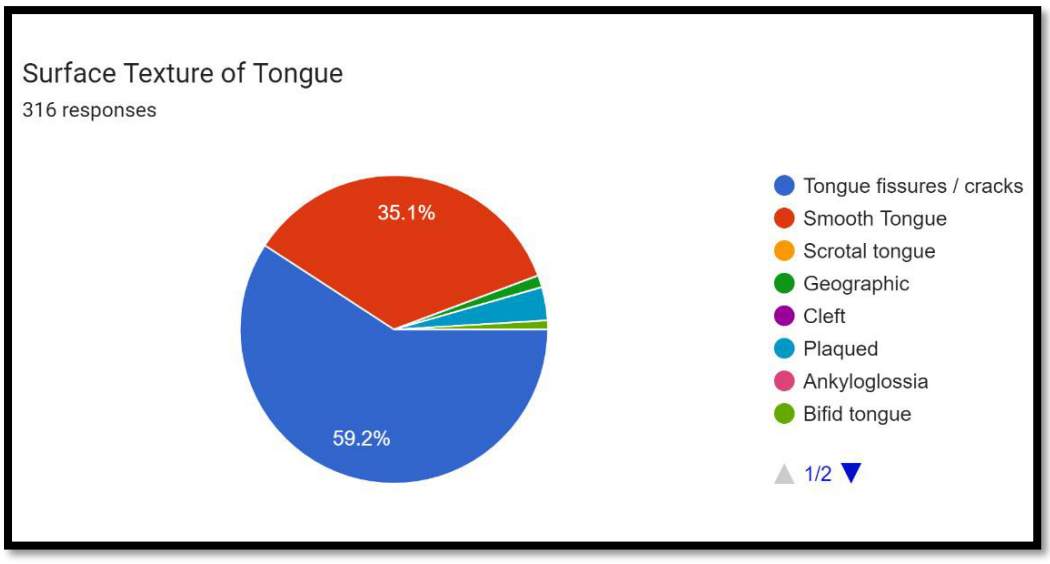


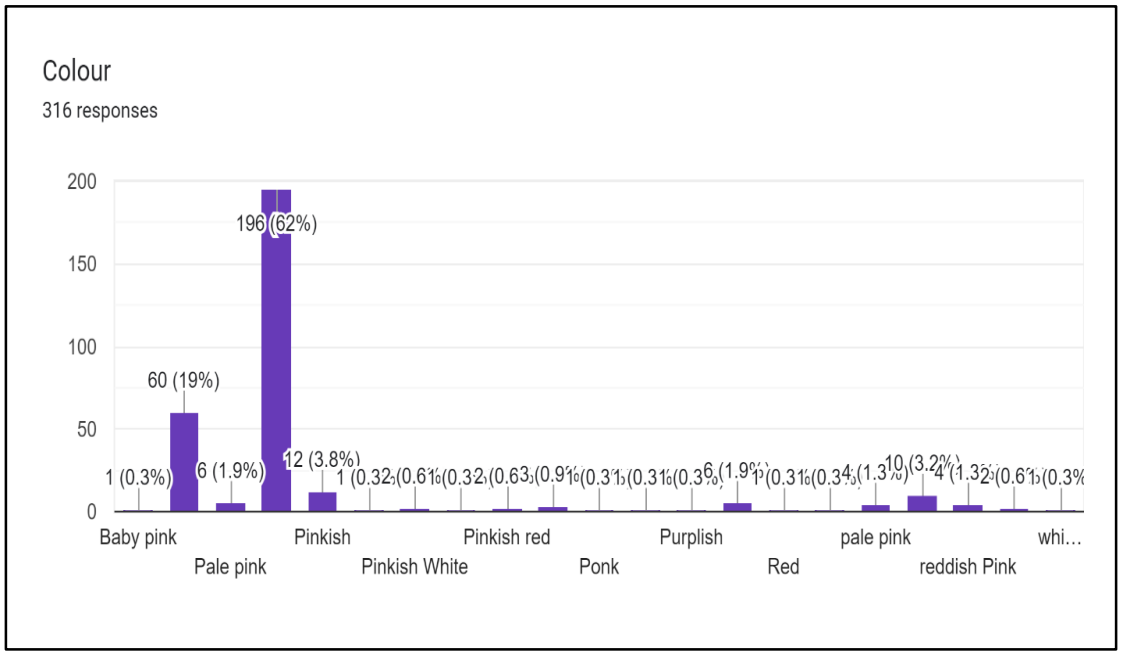


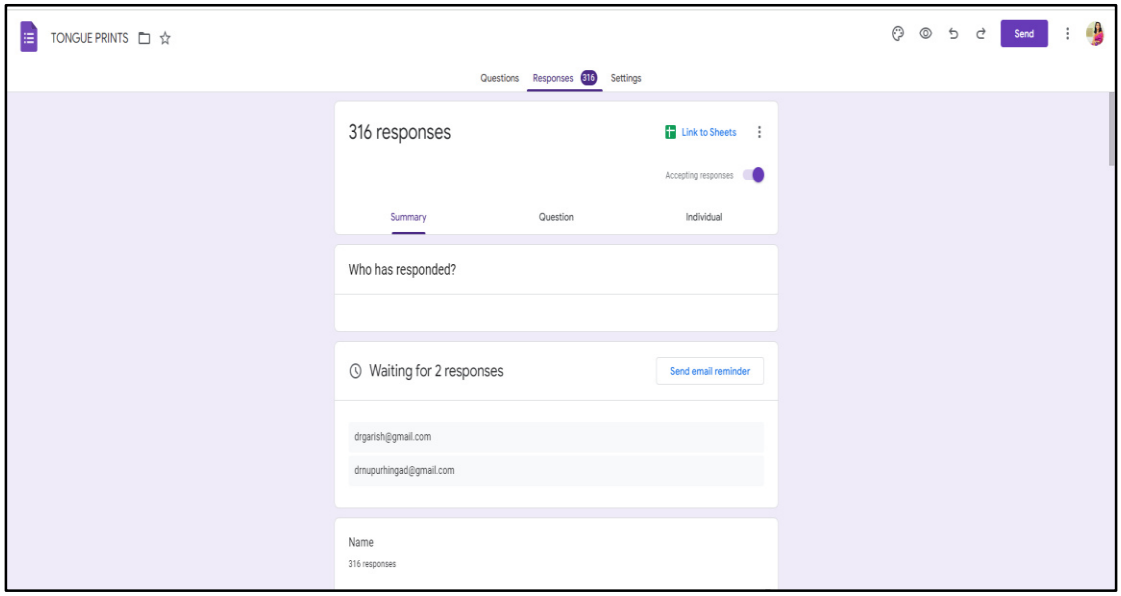



Apex
316 responses
24.4%
7.3%
68.4%
Rounded
Pointed
Septate


Shape of Tongue
316 responses
14.9%
10.1%
54.1%
U Shape
V Shape
Acute Triangular
Obtuse Triangular
W Shape
Ovoid
Ellipsoid
Rectangular
Asymmetrical


Surface Texture of Tongue
316 responses
35.1%
59.2%
Tongue fissures / cracks
Smooth Tongue
Scrotal tongue
Geographic
Cleft
Plaqued
Ankyloglossia
Bifid tongue
1/2





SUMMARY OF RESULTS AND CONCLUSION

Shape of the Tongue:

The original data comprised of: acute triangular, asymmetrical, ellipsoid, obtuse triangular. Ovoid, rectangular, U shape, V shape and W shape. The data was merged into four categories: Asymmetrical, U shape, V shape and W shape. [Figure 1a] shows that *about 60% of the respondents have U shape tongue, about 23% have V shape tongue, about 10% have W shape and about 7% have asymmetrical shape of the tongue.*

Surface Texture of the Tongue:

[Figure 1b] shows that "Tongue fissures/cracks" (59% app) and "Smooth Tongue" are the two prominent surface textures amongst all the respondents. "Plaqued" (3%), "Geographic" (1%) and "Bifid" (1%) surface textures of the tongue are found in very less respondents.

Median Septum of the Tongue:

[Figure 1c] shows that in about 69% of the respondents, median septum is not visible in the tongue while in remaining 31% of the respondents, median septum is visible in the tongue.

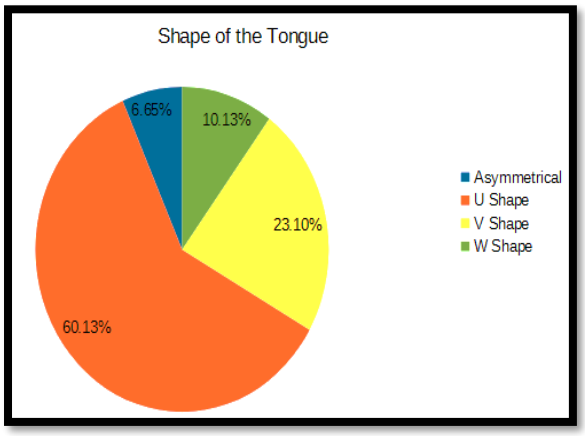
Apex of the Tongue:

[Figure 1d] shows that in about 68% of the respondents, the apex is rounded. In another 24% of the respondents, the apex is pointed while in remaining 7% of the respondents, the apex is septate.

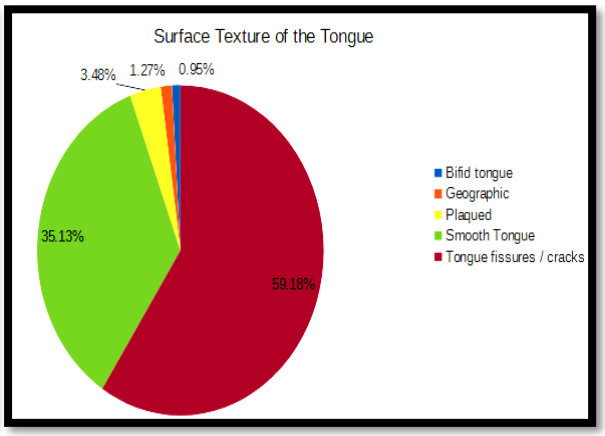
Color of the Tongue:

The original data comprised of: baby pink, pale pink, pink, pinkish purple, pinkish red, pinkish white, purple, purplish pink, red, reddish pink and whitish pink. The data was merged into three categories: pale pink, pink and pinkish purple. [Figure 1e] *shows that about 72% of the respondents have pink color tongue, about 24% of them have pale pink tongue and remaining about 4% have pinkish purple tongue.*

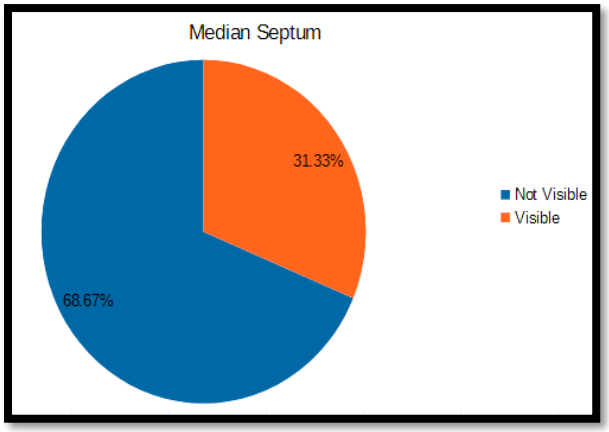
[Figure 1a]



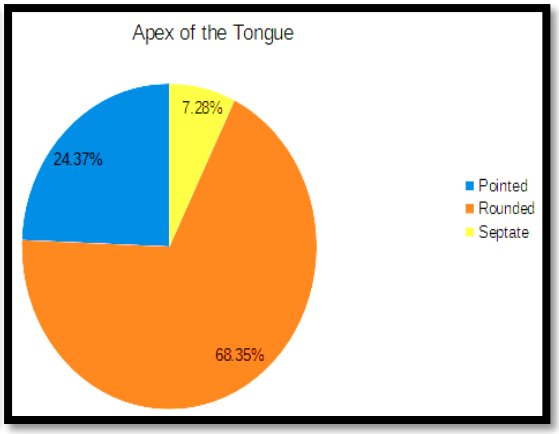
[Figure 1b]



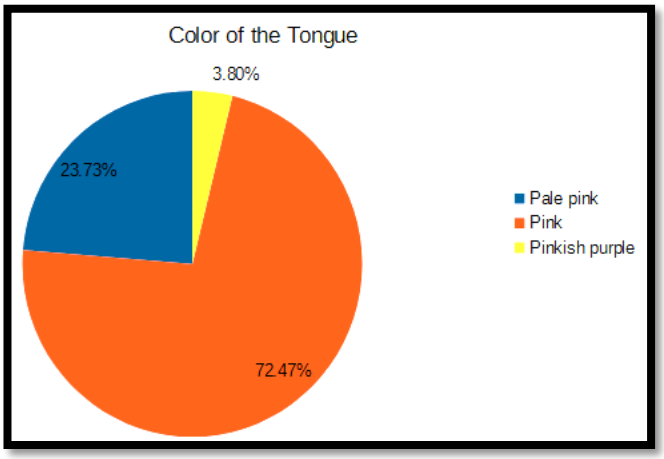
[Figure 1c]



[Figure 1d]



[Figure 1e]



[figure 1 a – figure 1e]

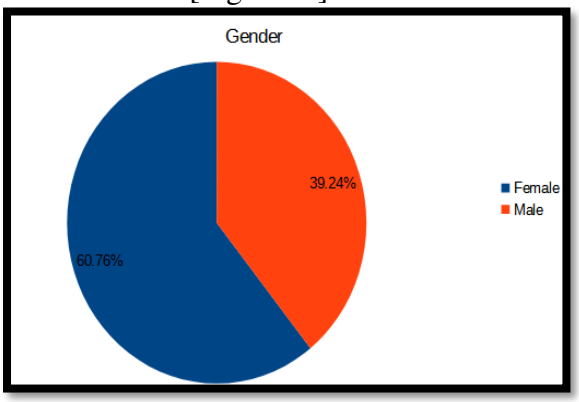
Gender:

[Figure 1f] shows that about 61% of the respondents are female while in remaining 39% of the respondents are male.

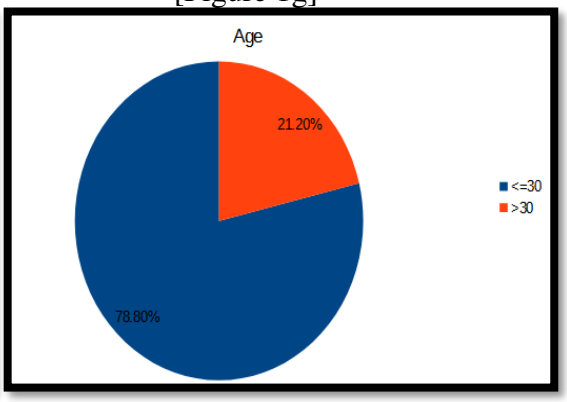
Age Groups:

Age variable was categorized into binary variable using less than equal to 30 years and greater than 30 years age groups. [Figure 1g] shows that about 79% of the respondents are less than equal to 30 years while remaining 21% of the respondents are more than 30 years.

[Figure 1f]



[Figure 1g]



Shape of the Tongue by Gender:

Figure 2a shows that of the *female* respondents, about 5% respondents have asymmetrical shape, 61% have U shape, 27% have V shape and 7% have W shape. While amongst the *male* respondents, about 9% respondents have asymmetrical shape, 59% have U shape, 17% have V shape and 15% have W shape. Chi-square results from [Table – 1a] ($p<0.05$) *concludes that the shape of the tongue differs based on gender.*

Surface Texture of the Tongue by Gender:

Figure- 2b shows that of the female respondents, about 53% respondents have tongue fissures / cracks, 44% have smooth tongue, and only 3% of the remaining female respondents have plaqued, geographic or bifid tongue. While amongst the male respondents, about 69% respondents have tongue fissures / cracks, 22% have smooth tongue, and about 9% of the remaining male respondents have plaqued, geographic or bifid tongue. Chi-square results from [Table -1b] ($p<0.05$) *concludes that the surface texture of the tongue differs based on gender.*

Median Septum by Gender:

Figure 2c shows that of the female respondents, for about 28% respondents median septum is visible while for remaining 72% female respondents median septum is not visible. The percentage is higher for male respondents where for about 36% respondents median septum is visible and for remaining 64% male respondents median septum is not visible. Chi-square results from [Table - 1c] ($p>0.05$) *concludes that the median septum does not differ based on gender.*

Apex of the Tongue by Gender:

Figure 2d shows that of the female respondents, about 69% respondents have rounded apex, 26% have pointed apex, and only 5% of the remaining female respondents have septate apex of the tongue. While amongst the male respondents, about 67% respondents have rounded apex, 22% have pointed apex, and only 11% of the remaining male respondents have septate apex of the tongue. Chi-square results from [Table – 1d] (p=0.077) *concludes that the apex of the tongue differs based on gender.*

Color of the Tongue by Gender:

Figure 2e shows that of the female respondents, about 75% respondents have pink, 21% have pale pink, and only 4% of the remaining female respondents have pinkish purple. While amongst the male respondents, about 69% respondents have pink, 27% have pale pink, and only 4% of the remaining male respondents have pinkish purple. Chi-square results from [Table – 1e] (p=0.443) *concludes that the color of the tongue differs based on gender.*

Shape of the Tongue by Age groups:

Figure 2f shows that of the younger respondents, about 6% respondents have asymmetrical shape, 60% have U shape, 24% have V shape and 10% have W shape. While amongst the middle age respondents, about 9% respondents have asymmetrical shape, 60% have U shape, 19% have V shape and 12% have W shape. Chi-square results from [Table - 1f] (p=0.69) *concludes that the shape of the tongue does not differ based on age groups.*

Surface Texture of the Tongue by Age groups:

Figure 2g shows that of the younger respondents, about 59% respondents have tongue fissures / cracks, 37% have smooth tongue, and only 4% of the remaining younger respondents have plaqued, geographic or bifid tongue. While amongst the middle aged respondents, about 61% respondents have tongue fissures / cracks, 30% have smooth tongue, and about 9% of the remaining male respondents have plaqued, geographic or bifid tongue. Chi-square results from [Table - 1g] (p=0.283) *concludes that the surface texture of the tongue does not differ based on age groups.*

Median Septum by Age groups:

Figure 2h shows that of the younger respondents, for about 33% respondents median septum is visible while for remaining 67% younger respondent's median septum is not visible. The percentage is lower for middle aged respondents where for about 27%

respondent's median septum is visible and for remaining 73% middle aged respondent's median septum is not visible. Chi-square results from [Table-1h] (p=0.375*) concludes that the median septum does not differ based on age groups.*

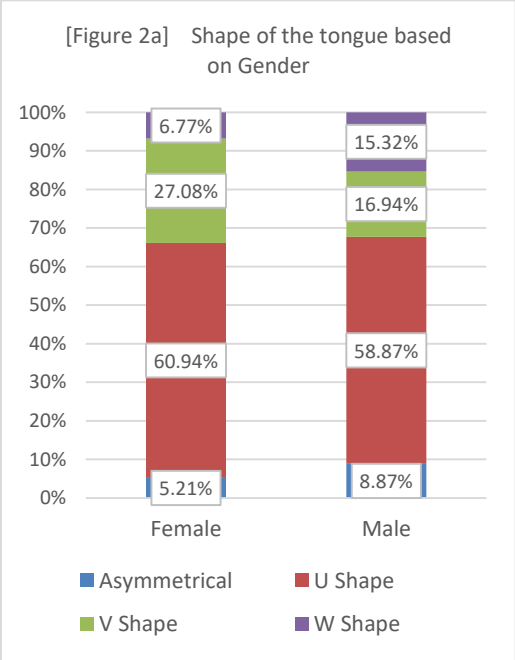
Apex of the Tongue by Age groups:

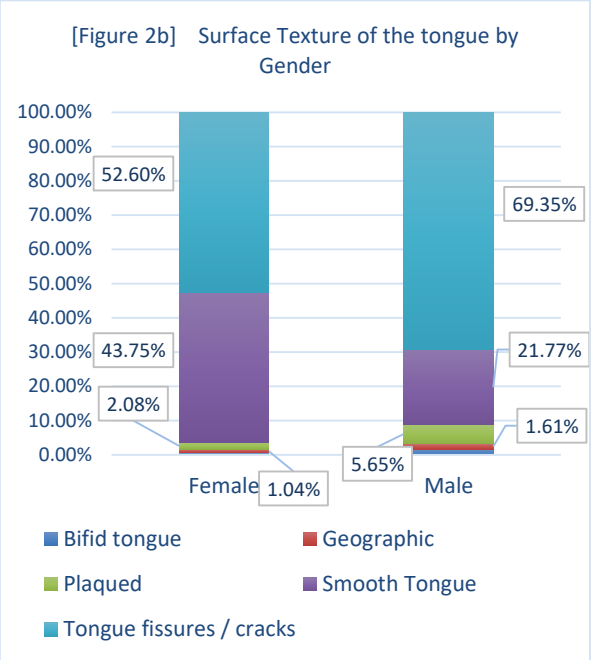
Figure 2i shows that of the younger respondents, about 68% respondents have rounded apex, 26% have pointed apex, and only 6% of the remaining younger respondents have septate apex of the tongue. While amongst the middle-aged respondents, about 69% respondents have rounded apex, 19% have pointed apex, and only 12% of the remaining middle-aged respondents have septate apex of the tongue. Chi-square results from [Table - 1i] (p=0.183) *concludes that the apex of the tongue does not differ based on age groups.*

Color of the Tongue by Age groups:

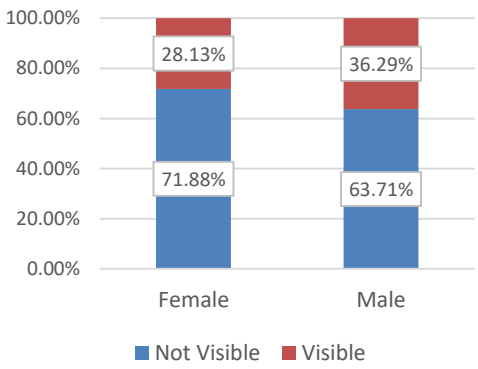
Figure 2j shows that of the younger respondents, about 78% respondents have pink, 18% have pale pink, and only 4% of the remaining younger respondents have pinkish purple. While amongst the middle-aged respondents, about 54% respondents have pink, 45% have pale pink, and only 2% of the remaining middle-aged respondents have pinkish purple. Chi-square results from [Table - 1j] (p<0.05) *concludes that the color of the tongue differs based on age groups.*

[FIGURE 2a – FIGURE 2j]

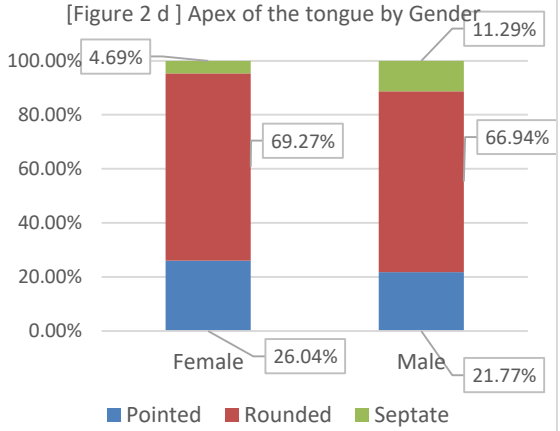




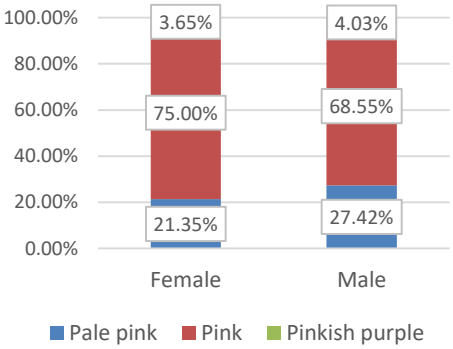
[Figure 2 c] Median Septum by Gender



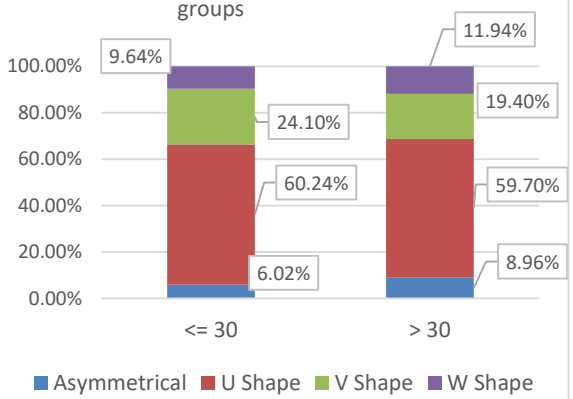
[Figure 2 d] Apex of the tongue by Gender



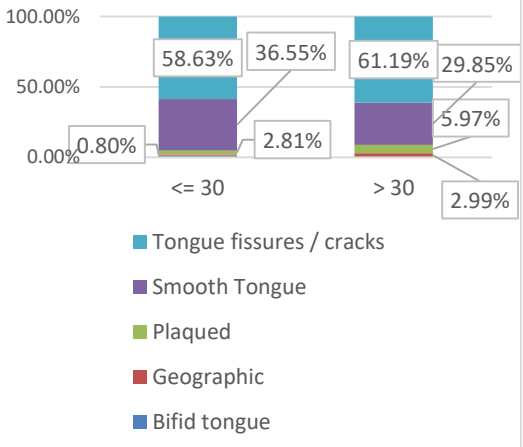
[Figure 2 e] Color of the tongue by Gender



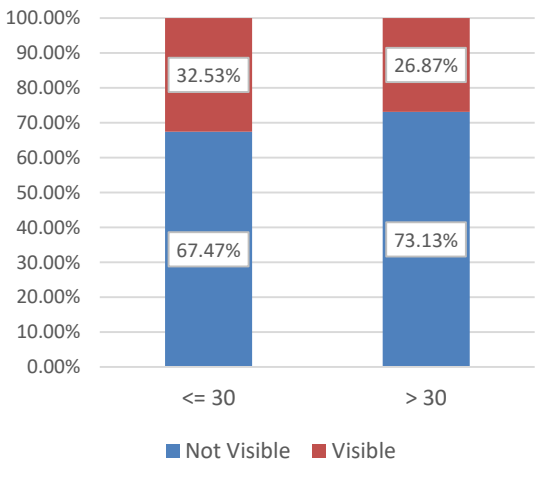
[Figure 2 f] Shape of the tongue by Age groups

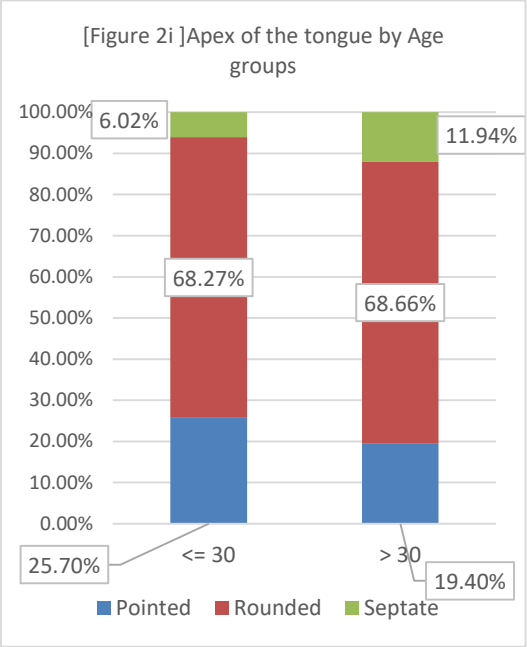


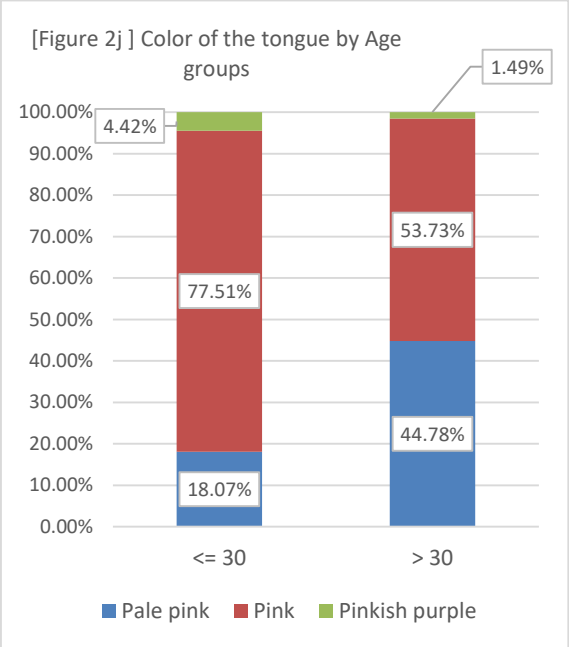
[Figure 2 g] Surface Texture of the tongue by Age groups



[Figure 2h] Median Septum by Age groups







SUMMARY OF RESULTS AND CONCLUSION

[Table – 1a] : Shape of the Tongue by Gender

	Asymmetrical	U Shape	V Shape	W Shape	Total	Sig
Female	10	117	52	13	192	0.016
Male	11	73	21	19	124	
Total	21	190	73	32	316	

[Table – 1b] : Surface Texture by Gender

	Bifid tongue	Geographic	Plaqued	Smooth Tongue	Tongue fissures / cracks	Total	Sig
Female	1	2	4	84	101	192	0.001 (HS)
Male	2	2	7	27	86	124	
Total	3	4	11	111	187	316	

[Table – 1c]: Median Septum by Gender

	Not Visible	Visible	Total	Sig
Female	138	54	192	0.137 (NS)
Male	79	45	124	
Total	217	99	316	

[Table – 1d]: Apex of the tongue by Gender

	Pointed	Rounded	Septate	Total	Sig
Female	50	133	9	192	0.077 (NS)
Male	27	83	14	124	
Total	77	216	23	316	

[Table - 1e]: Color of the tongue by Gender

	Pale pink	Pink	Pinkish purple	Total	Sig
Female	41	144	7	192	0.443 (NS)
Male	34	85	5	124	
Total	75	229	12	316	

[Table - 1f] : Shape of the tongue by age groups

	Asymmetrical	U Shape	V Shape	W Shape	Total	Sig
<= 30	15	150	60	24	249	0.69 (NS)
> 30	6	40	13	8	67	
Total	21	190	73	32	316	

[Table - 1g]: Surface Texture of the tongue by age groups

	Bifid tongue	Geographic	Plaqued	Smooth Tongue	Tongue fissures / cracks	Total	Sig
<= 30	3	2	7	91	146	249	0.283 (NS)
> 30	0	2	4	20	41	67	
Total	3	4	11	111	187	316	

[Table - 1h]: Median Septum by age groups

	Not Visible	Visible	Total	Sig
<= 30	168	81	249	0.375 (NS)
> 30	49	18	67	
Total	217	99	316	

[Table - 1i]: Apex of the tongue by age groups

	Pointed	Rounded	Septate	Total	Sig
<= 30	64	170	15	249	0.183 (NS)
> 30	13	46	8	67	
Total	77	216	23	316	

[Table - 1j]: Colour of the tongue by age groups

	Pale pink	Pink	Pinkish purple	Total	Sig
<= 30	45	193	11	249	0 (HS)
> 30	30	36	1	67	
Total	75	229	12	316	

[TABLE -1] [TABLE – 1 a – TABLE- 1j]