CHAPTER VI

RESULTS OF THE STUDY

There were 180 patients enrolled in this stucy , 60 patients as cases and 120 patients as controls. All recruited cases came from two university hospitals in Thailand. Fourty six cases were selected from Siriraj Hospital in Bangkok and 14 cases from Srinagarind Hospital in Khon-kaen. Controls were selected from the same hospital by age within 5 years to each case and they were chosen from different diagnoses in the lists as shown in Table 6.1.

The demographic data distributions (age , marital status, years of education, areas of inhibitant, occupations and incomes) were similar in both groups. From Tables 6.2 and 6.3 , most cases (71.67%) and controls (75%) were in the sixth and seventh decades with their ages ranged from 45 to 80 years. Cases and controls were also recruited from the same geographic area . Among cases and controls, 68.33% and 67.5% of them respectively were from central region; whereas 25% and 29.17% respectively were obtained from the north eastern part of Thailand. The major occupations for cases were agriculture, non - skilled labors and merchants (73.33%). In control group , these top 3 occupations were composed to be 66.67%. The median incomes in both cases and controls were also similar in this study.

Table 6.1 Distribution of diagnoses among control patients

Diseases	Controls (N=120)	%
1. Cataract	35	29.16
2. Glaucoma	32	26.67
3. Corneal ulcer	15	12.50
4. Retinal detachment	5	4.17
5. Uveitis	3	2.50
6. Thyroid ophthalmopathy	2	1.67
7. Optic neuropathy	1	0.83
8. Elective surgical cases (Hernia , hemorrhoid , gall stones)	8	6.67
9. Emergency surgical cases (Upper GI hemorrhage, appendicitis)	2	1.67
10. Fracture of lower extremities	7	5.83
11. Hearing loss	7	5.83
12. Hypertension and epistaxis	2	1.67
13. Voice abused vocal nodule	1	0.83
Total	120	100.00

Table 6.2 Age distribution among laryngeal cancer cases and controls

Age group (yrs)	Cases n (%)	Controls n (%)
40 - 49	1 (1.67)	5 (4.17)
50 - 59	18 (30.00)	33 (27.50)
60 - 69	25 (41.67)	57 (47.50)
70 - 80	16 (26.66)	25 (20.83)
Total	60 (100.00)	120 (100.00)

Table 6.3 Distribution of selected sociodemographic factors among laryngeal cancer cases and controls

Demographic factors	Cases n (%)	Control n (%)	OR (95% CI) [χ_1^2 for trend , P value]
Marital status			
Married	49 (81.67)	103 (85.53)	1.00
Separated & divorced	6 (10.00)	4 (3.33)	3.15 (0.70 - 15.80)
Widowed	4 (6.67)	8 (6 67)	1.05 (0.22 - 4.15)
Single	1 (1.67)	5 (4 16)	0.42 (0.01 - 3.92)
Total	60 (100.00)	120 (100.00)	
Education (yrs)			
< 4	43 (71.67)	75 (62.50)	1.00
5 - 10	13 (21.67)	25 (20.83)	0.91 (0.39 - 2.08)
11 - 12	1 (1.66)	6 (5.00)	0.29 (0.01 - 2.54)
> 12	3 (5.00)	14 (11.67)	0.37 (0.07 - 1.46)
Total	60 (100.00)	120 (100.00)	[2.985 , 0.01]
Geographic area			
Central	41 (68.35)	81 (67.50)	1.00
North - east	15 (25.00)	35 (29.17)	0.85 (0.39 - 1.82)
Lower North	3 (5.00)	3 (2.50)	1.98 (0.25 - 15.33)
Others	1 (1.67)	1 (0.83)	1.98 (0.02 - 156.96)
Total	60 (100.00)	120 (100.00)	

Table 6.3 (cont.) Distribution of selected sociodemographic factors among laryngeal cancer cases and controls

Demographic factors	Cases n (%)	Controls n (%)	OR (95% CI) [χ_i^2 for trend , P value]
Occupation			
Unemployed	1 (1.67)	5 (4 17)	1.00
Agriculture	23 (38.33)	46 (38.33)	2.50 (0.26 - 123.86)
Unskilled labour	14 (23.33)	24 (20.00)	2.92 (0.28 - 147.64)
Skilled labour	5 (8.33)	8 (6.67)	3.13 (0.22 - 176.88)
Merchant	7 (11.67)	10 (8.33)	3.50 (0.28 - 188.78)
Truck driver	3 (5.00)	6 (5.00)	2.50 (0.13 - 157.07)
Professional	7 (11.67)	21 (17.50)	1.67 (0.14 - 89.93)
Total	60 (100.00)	120 (100.00)	
Incomes (Baht)			
0 - 2,500	20 (33.33)	37 (30.83)	1.00
2,501 - 5,000	21 (35.00)	35 (29.17)	1.11 (0.48 - 2.57)
5,001 - 10,000	10 (16.67)	27 (22.50)	0.69 (0.25 - 1.85)
> 10,000	9 (15.00)	21 (17.50)	0.79 (0.27 - 2.26)
Total	60 (100.00)	120 (100.00)	[0.021 , 0.43]
Median	4000	4150	
range	0 -50000	500 -200000	

The associations between laryngeal cancer and sociodemographic factors by univariate analysis were also shown in Table 6.3. Marital status , years of education, geographic areas , occupations and incomes were found to be not significantly associated with laryngeal cancer.

Table 6.4 showed the crude odds ratio for laryngeal cancer in relation to smoking. Men who ever smoked or quit smoking less than 15 years appeared to have increased risk of developing laryngeal cancers. (OR = 9.9 and 95% CI = 3.6 - 33.7)

The crude odds ratio for laryngeal cancer in relation to different smoking status were shown in Table 6.5. Current smokers appeared to have higher increased risk of developing laryngeal cancer (OR = 11.7 with 95% CI = 4.1 - 40.4) as compared to ex-smokers who quit smoking within 15 years. (OR = 6.7 and 95% CI = 1.9 - 26.5).

Table 6.6 demonstrated the crude odds rat o for laryngeal cancer in relation to different types of cigarette. Hand -rolled tobacco was found to have more increased risk of developing the cancer (OR =16.4 , 95% CI= 4.9 - 62)as compared to commercial cigarettes, both filtered and non filtered, with OR of 14.3 and 95% CI of 3.8 - 57.9. However, any type of smoking both hand - rolled tobacco and commercial cigarrettes or other types of tobacco were not significantly associated with laryngeal cancer.

For those who smoked, 83.34 % of cases strarted smoking before the age of 21 (age ranged from 8 - 35 years) and 73.8% of controls (age ranged from

Table 6.4 Association between smoking and laryngeal cancer

Smoking status	No. Cases	No. Controls
Never	5	57
Ever	55	63
Total	60	120

Crude odds ratio = 9.9 , 95% CI = 3.6 - 33.7

Table 6.5 Associations between smoking status and laryngeal cancer

	No. Cases	No. Controls	Odds ratio	95% CI
Non - smoker	5	57	1	—
Ex - smoker	13	22	6.7	1.9 - 26.5
Current - smoker	42	41	11.7	4.1 - 40.4

Table 6.6 Associations between types of tobacco and laryngeal cancer in current smokers

	No. Cases	No. Controls	Odds ratio	95% CI
Non smoker	5	57	1	—
Hand - rolled tobacco	23	16	16.4	4.9 - 62
Manufactured cigarettes	15	12	14.3	3.8 - 57.9
Mixed	4	13	3.5	0.6 - 18.6

11 - 33 years) and the number of cigarettes smoked per day was significantly associated with laryngeal cancer in current smokers. Table 6.7 showed the crude odds ratio for laryngeal cancer in relation to different levels of cigarette smoking. Those who consumed less than 10 and between 11 to 20 cigarettes a day showed the increased relative risk of 7.6 (95% CI = 2.1 - 30.6) and 15.2 (95% CI = 4.6 - 56.8), respectively whereas those who smoked more than one pack of cigarette a day had increased risk of developing laryngeal cancer with OR of 13.7 and 95% CI of 2.5 - 82.5.

The association between laryngeal cancer and duration of smoking was shown in Table 6.8. Men who smoked between 21 - 40 years had a significant risk of laryngeal cancer (crude OR = 13.7 and 95% CI = 3.9 - 53.3) However , those who smoked more than 40 years of cigarettes appeared not to have any different increased risk as compared to the prior group (crude OR of 11.4 and 95% CI of 3.6 - 41.8).

Table 6.9 showed the crude odds ratio for laryngeal cancer in relation to alcohol consumption. For one who ever drank alcohol either regularly or occasionally appeared to be significantly associated with laryngeal cancer. (OR of 4.9 and 95% CI of 2.3 - 10.7).

The association between amount of alcohol consumed and laryngeal cancer was showed in Table 6.10 . The OR increased as the amount of alcohol consumed increased from 3.9 to 8.9 with statistical significance. For regular drinkers, the mean amount of alcohol in cases was 100.64 gram per day whereas in controls , it was 91.16 gram per day .

Table 6.7 Associations between smoking levels and laryngeal cancer in current smokers

No. cigarette per day	No. Cases	No. Controls	Odds ratio	95%CI
Non	5	57	1	—
1 - 10	12	18	7.6	2.1 - 30.6
11 - 20	24	18	15.2	4.6 - 56.8
> 20	6	5	13.7	2.5 - 82.5

Table 6.8 Associations between duration of smoking and laryngeal cancer

Years of smoking	No. Cases	No. Controls	Odds ratio	95% CI
Non	5	57	1	–
1 - 20	0	2	–	–
21 - 40	18	15	13.7	3.9 - 53.3
> 40	24	24	11.4	3.6 - 41.8

Table 6.9 Association between alcohol consumption and laryngeal cancer

Drinking status	No. Cases	No. Controls
Never	13	69
Ever	47	51
Total	60	120

Odds ratio = 4.9 , 95% CI = 2.3 - 10.7

Table 6.10 Association of amount of alcohol consumption with laryngeal cancer in regular drinkers

Amount of alcohol (gram) per day	No. cases	No. controls	Odd ratio	95% CI
Non	17	76	1	-
<80	20	23	3.9	1.6 - 9.3
81 - 160	17	18	4.2	1.7 - 10.8
> 160	6	3	8.9	1.7 - 59

Dietary factors in relation to laryngeal cancer were also addressed in Table 6.11. Meat, egg, vegetable, fruit, pickle vegetable , chilly and salted meat were not found to be significantly associated with laryngeal cancer by univariate analysis.

The multivariate analysis for relative risk of laryngeal cancer in relation to selected factors was shown in Table 6.12. The model included factors which had statistically significant associations with the risk of laryngeal cancer from univariate analysis. These factors included smoking and alcohol drinking together with other dietary factors which were reported by other studies of increasing the risk. The result indicated that tobacco smoking and alcohol drinking remained to be the two factors which had an increased risk effect for laryngeal cancer development. The adjusted OR for smoking was 8.9 with 95% CI of 2.8 -28.6. The adjusted OR for alcohol consumption, however, was only 2.9 after controlling for other confounding factors with its 95% CI being 1.3 - 6.7 . The adjusted OR for hand-rolled tobacco and manufactured cigaettes were 15.6 , 10.7 and 95% CI of 4.8 - 50.4 , 3.1 - 37.2, respectivey. The OR for current smokers and ex - smokers after adjusting for acohol and other dietary factors were 10.2 and 6.3 with 95% CI of 3.1 - 33.8 and 1.6 - 24.9, respectively. Others showed a non - significant association with this disease.

Table 6.13 showed the positive dose - response relation between tobacco smoking and laryngeal cancer. One tobacco - year unit was referred to smoking one cigarette per day every day for one year. When alcohol and dietary factors were adjusted , people who smoked less than 300 tobacco years of cigarettes (mild smokers) demonstrated a slightly significant increase risk of 4.7 (95% CI =1.1

Table 6.11 Association between laryngeal cancers and various dietary factors

Dietary factors	Cases n (%)	Controls n (%)	OR (95% CI) [χ_1^2 for trend , P-value]
Meat consumption			
No or low	3 (6.52)	1 (1.09)	1.00
Moderate	13 (28.26)	19 (20.65)	0.23 (0.01 - 3.33)
Heavy	30 (65.22)	72 (78.26)	0.14 (0.00 - 1.85)
Total	46 (100.00)	92 (100.00)	[3.94 , 0.04]
Egg			
No or low	11 (23.91)	29 (31.52)	1.00
Moderate	20 (43.48)	43 (46.74)	1.23 (0.47 - 3.22)
Heavy	15 (32.61)	20 (21.74)	1.98 (0.68 - 5.82)
Total	46 (100.00)	92 (100.00)	[1.92 , 0.17]
Vegetable			
No or low	2 (4.35)	2 (2.17)	1.00
Moderate	5 (10.87)	15 (16.31)	0.33 (0.02 - 6.03)
Heavy	39 (84.78)	75 (81.52)	0.52 (0.04 - 7.47)
Total	46 (100.00)	92 (100.00)	[0.02 , 0.89]
Friut			
No or low	11 (23.91)	19 (20.65)	1.00
Moderate	18 (39.13)	33 (35.87)	0.94 (0.33 - 2.68)
Heavy	17 (36.96)	40 (43.48)	0.73 (0.26 - 2.07)
Total	46 (100.00)	92 (100.00)	[0.49 , 0.48]

Table 6.11 (cont.) Association between laryngeal cancers and various dietary factors

Dietary factors	Cases n (%)	Controls n (%)	OR (95% CI) [χ_i^2 for trend , p-value]
Pickle vegetable			
No or low	36 (78.26)	78 (84.78)	1.00
Moderate	7 (15.22)	11 (11.96)	1.38 (0.44 - 4.26)
Heavy	3 (6.52)	3 (3.26)	2.17 (0.3 - 16.86)
Total	46 (100.00)	92 (100.00)	[1.13 , 0.28]
Chilly			
No or low	9 (19.57)	13 (14.13)	1.00
Moderate	1 (2.17)	22 (23.91)	0.07 (0.00 - 0.60)
Heavy	36 (78.26)	57 (61.96)	0.91 (0.32 - 2.61)
Total	46 (100.00)	92 (100.00)	[0.63, 0.42]
Salted meat			
No or low	30 (65.22)	63 (68.48)	1.00
Moderate	13 (28.26)	22 (23.91)	1.24 (0.51 - 3.01)
Heavy	3 (6.52)	7 (7.61)	0.90 (0.14 - 4.30)
Total	46 (100.00)	92 (100.00)	[0.04 , 0.84]

Table 6.12 Unconditional stepwise logistic regression analysis of odds ratios of laryngeal cancer in relation to selected risk factors

Factors	OR	95% CI
Model I		
Smoking*	8.9	2.8 - 28.6
Alcohol*	2.9	1.3 - 6.7
Model II		
Current smokers+	10.2	3.1 - 33.8
Ex - smokers+	6.3	1.6 - 24.9
Model III		
Hand - rolled tobacco **	15.6	4.8 - 50.4
Manufactured cigarette **	10.7	3.1 - 37.2
Mixed**	2.2	0.5 - 9.7

* Adjusted for various dietary factors

\+ Adjusted for various dietary factors and alcohol consumption using non-smoker as the referrence group.

** Adjusted for alcohol

Table 6.13 Odds ratios, adjusted for varicus dietary factors , alcohol , of laryngeal cancer in relation to different levels of tobacco exposed

Level of tobacco exposed (Tobacco - year)	OR	95% CI
Non exposure	1	–
1 - 300	4.7	1.1 - 20.9
301 - 600	6.3	1.7 - 23.9
601 - 900	12.8	3.3 - 50.2
> 900	19.4	4.1 - 93.2

- 21) . Whereas those who smoked 301 to 600 tobacco years of cigarettes (moderate smokers) showed a significant association with laryngeal cancer (OR = 6.3 and 95% CI =1.7 - 23.9). For heavy smokers (smoking between 600 to 900 tobacco year of cigarettes and higher) , the risk effect of the development of laryngeal cancer was 12.8 (95% CI = 3.3 - 50.2) and 19.4 (95% CI = 4.1 - 93.2) respectively.

Table 6.14 demonstrated the odds ratio for laryngeal cancer in relation to interaction of smoking and alcohol consumptions. There appeared to be an synergistic risk effect of smoking and alcohol drinkings for the development of laryngeal cancer in most strata .

Table 6.14 Odds ratios of laryngeal cancer in relation to smoking and drinking alcohol . Values were given as OR (95% CI) with the number of cases and controls , respectively , in brackets below

Alcohol	Non - smoker	Ex - smoker	Current Smoker	
			< 20 / day	> 20 / day
Never	1 [1 , 43]	17.20 (1.4 - 865.8) [4 , 10]	19.55 (2.4-867.3) [10 , 22]	86 (1.9-5,169.4) [2 , 1]
Ever	12.3 (1.1- 618.6) [4 , 14]	32.3 (3.6-1,444.8) [9 , 12]	79.9 (10.5- 3346.5) [26 , 14]	43 (2.86-2,162.1) [4 , 4]