CHAPTER 7

CONCLUSION AND RECOMENDATIONS

This chapter presents the conclusion for this study, based on results presented in Chapter 5. Finally, recommendations for future studies are also forwarded to provide a greater insight of the many factors involved in the development of oral cancer in Indonesia.

7.1 Conclusion

With the increasing incidence of oral cancer worldwide (Parkin et al., 2005), attributable to life-style factors such as smoking, alcohol drinking, betel quid chewing, dietary habit as well as genetic susceptibility, it appears that there is a need to carry out research in oral cancer in Indonesia in order to get a preliminary picture as well as to provide baseline data of oral cancer in Indonesia. Indonesia is one of the most populous countries in the world with people of diverse ethnicity. Due to the social acceptance of tobacco use, especially smoking, it is also one of the leading consumers of tobacco. This may predispose them to various risk factors. It is well documented that tobacco, alcohol and betel quid chewing are the main factors in the development of oral cancer. Additionally, through epidemiology studies, the role of diet and genetic susceptibility of environment genes have been shown to have a role in enhancing the risk of development of oral cancer. Thus this study was conducted mainly to investigate the risk factors including genetic polymorphism of GSTM1, GSTT1 and CYP1A1 in developing oral cancer in the Jakarta population, Indonesia, as well as to see the correlation between the risk factors in association to oral cancer.

7.1.1 Tobacco smoking

This study provides empirical support that smoking habit is positively associated with oral cancer. Smoking is the most common habit practiced in the study population. Among cases and controls subjects who smoked, there is a two-fold increase in the risk of developing oral cancer, compared to non-smokers after allowing for confounding factors. This trend of increasing risk to oral cancer is also evident with numbers of sticks (11-20) smoked per day, duration of smoking >10 years and in moderate as well as heavy smokers (OR for stick/day 2.78, 95%CI 1.16-6.65, OR for duration >10 years 2.98, 95% CI 1.30-6.83; OR for moderate smoker 4.47, 95% CI 1.42-14.11 and OR heavy smoker 4.80, 95%CI 1.10-20.95 respectively). In addition, *kretek* was the most preferred type of tobacco smoked in this study population and displayed doubling of risk of developing oral cancer (OR 2.57, 95%CI 1.20-5.48) after adjusting for confounding factors.

7.1.2 Alcohol drinking

This study found that alcohol drinking did not significantly increase the risk of developing oral cancer in the study population ($p>0.250$, for univariate analysis). The crude odds ratios of oral cancer among former and current drinkers were 2.58 (95%CI 0.79-8.57) and 1.11 (95%CI 0.29-4.25) respectively. This observation may be due to the very small number of subjects (less than 10%) among cases and controls who claimed to have practiced this habit. However, in terms of types of alcohol consumed, this study found that wine consumption results in higher risk to oral cancer (OR 11.71, 95%CI 1.39-98.77) compared to other types.

7.1.3 Betel quid chewing

This study found that subjects who chewed betel quid, consumed 1-10 quids/day and consumed betel quid combination of betel leaf, tobacco, areca nut and lime had significantly ($p<0.05$) increased risk of oral cancer before and after adjusted for smoking and alcohol consumption (adjusted OR 6.14, 95% CI 1.11-34.01; adjusted OR 5.97, 95% CI 1.08-33.04; adjusted OR 4.74, 95% CI 1.13-19.89 respectively). However, duration of chewing (>1 year) was not shown to be statistically significant (adjusted OR 3.99, 95% CI 0.90-17.58). This may be due to the very small number of subjects (less than 10%) among cases and controls who practiced this habit.

7.1.4 Genetic polymorphism of GTSM1, GSTT1 and CYP1A1

In regards to genetic polymorphism of genes associated with metabolizing enzyme, this study found that genetic polymorphism of GSTM1, GSTT1 or CYP1A1 isoleusin-valine and/or valine-valine are not risk factors in the development of oral cancer in the study population (OR 1.19, 95% CI 0.70-2.02, OR 1.19, 95% CI 0.72-2.05, OR 0.70, 95%CI 0.39-1.25 respectively). In addition, the risk to oral cancer remained insignificant among cases and controls who practiced smoking or betel quid chewing.

7.1.5 Dietary pattern

This study provides empirical support that dietary pattern is positively associated with oral cancer. The dietary pattern identified among the studied population defined through factor analysis showed that the “preferred food” pattern, characterized by the consumption of fast food, fermented food, canned food, snacks high in fat and sugar, cooked and raw vegetables, and seafood, was the

most important components in this study which accounted for more than 27% of the total variance. Consumption in the highest tertile of the “preferred food” pattern showed twice the risk of developing oral cancer. The highest tertile intake of “chemical related” pattern increased the risk almost three-times. The last component called “traditional” accounted for 8% of the total variance was also associated with increasing risk of oral cancer after adjusting for confounding factors. In contrast the “combination” pattern which is characterized by dairy product, red meat, white meat and fruit and which accounted for 11% of the total variance, was associated with a decrease in the risk to oral cancer in this population.

7.2 Recommendations

There are several possible directions for future research that would broaden and improve on the data set for oral cancer, especially on risk factors and their association with oral cancer in Indonesia.

7.2.1 The Indonesia population comprised of a very diverse ethnic mix. Hence future studies should involve the major ethnic groups which represent the Indonesian population in order to improve generalization of the findings. The sample location will have to be broadened to represent more of the Indonesian population as an entity and that the sample size be increased and duration of data collection be extended.

7.2.2 Future research also needs to increase attention to methodological considerations such as the selection of controls. As hospital-based controls can bias the gene-

environment interactions, it is recommended that community controls be used in the future studies.

7.2.3 As failure to demonstrate a relationship between genotypes and cancer risk may partly be due to a lack of statistical power, a larger sample size is important for future design of case control studies using population-based controls.

7.2.4 For future research it is suggested to develop and validate a structured questionnaire to suit the needs for Indonesian people which includes detail information on nutritional content and its amount in the food consumed.