CHAPTER V

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

Currently in Thailand there is a vast amount of promotion by the media and many pharmaceutical companies promoting the usage of vitamins and mineral supplements. According to many news articles, the usage of vitamins or mineral supplements is continuing to grow. This research is aimed to look at the socio-demographic factors and consumption of vitamins and mineral supplements in Chulalongkorn University supporting staff members. A total of 324 respondents who were currently working at Chulalongkorn University as members of the supporting staff were studied in this study.

5.1 Discussion

5.1.1 Asses the knowledge level about vitamins or mineral supplements of the supporting staff at Chulalongkorn University.

The study area, which was selected to perform this study, is leading Thai university. Therefore at this university all of the members of the supporting staff have an education of at least secondary school. The knowledge section of the structured questionnaire was aimed to analyze the knowledge level of the supporting staff at Chulalongkorn University understand and knowledge about vitamins or mineral supplements. The knowledge section of the questionnaire, the question had two parts. The first part test the source of vitamin or mineral, and the second part test the knowledge about the benefit of the vitamin or minerals.

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Each question only has one correct answer, and table 1.14 illustrates the number of people that answer correctly for each question. Questions that were answered correctly were questions that were either related to vitamin C, vitamin A or calcium. For questions that were related to vitamin C had a 70.1 percent and an 83 percent correct response rate. Questions that were related to vitamin A also had a very high correct response rate where 63.3 percent of the respondents had answered the source of vitamin A correctly. Another mineral, which also had a high correct response rate, was calcium. The question related to calcium had 82.2 percent correct response rates. These three items had the high correct response rates when compared to other minerals or vitamins. On the other hand, questions that had a very high incorrect response rate were questions that were related to folic acid, or vitamin E. A possible reason why, these two dietary supplements may have a very low correct response rate when mentioning the source or the benefit is because, there may be very little or limited knowledge for the media, regarding these two vitamins. For example, we could see form results (table 4.15) that the questions regarding the source and benefit of folic acid, had an incorrect response rate of 78.1 percent when asking about the source and 46.9 percent when asking about the benefit of folic acid. There reason why there maybe a very low correct response because the lack of knowledge and understanding of minerals that are normally promoted by the media. From this part of the data analysis it can be said that the media has a very important role in the understanding of vitamin or mineral supplement for users. Almost all of the supplements that are promoted by the media have a high correct response rate.

When comparing the knowledge scores between consumers and non-consumers of vitamins or mineral supplements in the supporting staff at

Chulalongkorn University, the mean score from the knowledge section for consumers was 9.47 (table 4.32) and for the non-consumers of vitamin or mineral supplement their knowledge score from was 8.70 (table 4.32). A t-test was performed to see the whether there is an association between these two groups and the knowledge of vitamins and minerals. From the results of the t-test there is no association between these two groups and knowledge about vitamin or minerals. The t-test revealed that the p-value for this test was 0.082 (table 4.32). From the results of this test, we must reject our research hypothesis that consumers of vitamins or mineral supplements would have more understanding and knowledge of vitamins and or minerals. In addition it can also be said that knowledge level between consumers and non-consumers is equal.

5.1.2 Asses the attitude about vitamins or mineral supplements ofthe supporting staff at Chulalongkorn University

The main purpose of the attitude section of the structured questionnaire was to analyze and to look at the attitude, of the supporting staff at Chulalongkorn University regarding vitamins or mineral supplements. The attitude section covered 5 different aspects of preference. Each statement that was asked was related to either: Affordability preference, Brand preference, Convenience preference, and Personal preference and Satisfaction preference. The purpose of each statement was to find out the reason why the supporting staffs at Chulalongkorn Univeristy choose to consume vitamins or minerals or why they did not choose to consume vitamins or mineral supplements.

According to the table of results 4.16, this table summarizes the result of the 324 respondents' entire attitude of the supporting staff at Chulalongkorn University

regarding vitamins and mineral supplements, concerning the 5 type of preferences mentioned above. Table 4.16 illustrates the detailed information about each statement and the percentage and number of people, that what answered for each statement. Table 4.16 also gives the means score for each statement, the minimum mean score was 2.84 and the maximum mean score was 4.11. The statement that had the minimum mean score was statement ten "Even though vitamins or mineral supplements are expensive they are worthwhile". For this statement, they mean score had fell into "somewhat agreed" category according to the likert scale mention in chapter two. The statement with the highest mean score was statement eight with a score of 4.11 "Some vitamins or minerals supplements are overpriced" . For this statement according to the likert scaled it would fall into the category of "agree". From statement 8 and 10 we can see that affordability preference plays a major role in the attitude of the supporting staff members have regarding vitamin or mineral supplement consumption.

When comparing the attitude scores between the consumers and non-consumers of vitamin or mineral supplements in the supporting staff at Chulalongkorn University, there is a significance difference between the score of these two groups. According to table 4.33, shows that the p-value from the t-test of these two variables was 0.047 (table 4.33). For this correlation the p-value is significant enough to accept the research hypothesis and reject the alternative hypothesis. In addition, there are also several statements that show a significant p-value different when comparing the answers between consumers and non-consumers. For example, statement 5 "Consumption of vitamins or mineral makes me feel in trend", the p-value for this statement is 0.023. Statement 5 shows a very high significance of p-value, statement 5

would categorize as brand preference. Statement 5 is about brand preference because it talks about the how the media may influence as a motivating factor when deciding to consume vitamins or mineral supplements. Another example, of a significant difference in the between consumers and non-consumers was Statement 3 "Vitamin or mineral supplements will prevent chronic disease", for this statement the p-value was 0.003. This statement had the highest significance when compared to the other statements. The reason maybe that consumer of vitamins or mineral supplements may have a higher concern for health and have a higher personal preference when compared to non-consumers. The last statement in the attitude section of the structured questionnaire that had a significance difference was statement 10. Statement 10 "Even though vitamins or mineral supplements are expensive they are worthwhile", this statement has a significant difference between the two groups (consumer vs. non-consumer) because consumers of vitamins or mineral supplements may feel that vitamins or mineral supplements are necessary even though they are expensive. Therefore it can be said that attitude between these two groups (consumer vs. non-consumer) is different, in this case we accept our research hypothesis.

5.1.3 The effect of socio-demographic factors that may affect the consumption of vitamins or mineral supplements.

Gender, in our study the number of males and females that were consuming vitamins or mineral supplements did not have much difference, when considering current consumption (table 4.18). The results of this part of the study were different from previous studies, which show that more woman consumed vitamins or mineral supplements (Block et al.,1987; 2003 ;Rock et al.,2003; Mazlan et al,.2001)that woman were more likely to be consuming vitamins or mineral supplements when

compared to men. Although when looking at the willingness to consume vitamins or mineral supplements by gender(table 4.19.1), it showed that woman who were not currently consuming vitamins or mineral supplements were more willingly to try or to consume vitamins when compared to men. The results of this part of our study were consistent with previous studies that also looked at willingness of consumption in non-consumers (Block et al., 1987, 2003; Rock et al., 2003; Mazlan et al, .2001). When looking at the socio-demographic details of woman who were willing to consume vitamins or mineral supplements they were younger and had at least a bachelor degree in any related field. Therefore it can be said, that education has a very high influential factor towards the consumption of vitamin or mineral supplement consumption in every aspect.

The majority of the supporting staff at Chulalongkorn University have not been consuming vitamin or mineral supplements for a long time when compared to previous studies (Block et al, 1987; Block et al, 2003; Rock et al, 2003). The majority of the consumers of vitamin or mineral supplements at Chulalongkorn University had been consuming vitamins or mineral supplements for less than 6 months(table 4.20), while those that have been consuming vitamins or mineral supplements for more 1 year constitute 17.92 percent of the studied population (table 4.20). as for those that have been consuming vitamin or mineral supplement for more than 3 years only constitute 19.8 of the studied population. When there was careful analysis of the socio-demographic factors of the consumers of more than 3 years were those that were older in age. In addition, we must also consider the fact that vitamin or mineral supplement was introduced into the Thai market for approximately 10 years therefore,

the rate of consumption still be slow, although it is started to increase in the past few years (Child thai, 2007; Thannnews, 2007)

Education, in many other studies have been highly associated with vitamins or mineral supplement consumption (Block et al, 1987; Block et al, 2003; Rock et al, 2003). The study population of supporting staff members at Chulalongkorn University of them had at bachelor degree, to be exact 63.9 percent of the studied population had a bachelor degree in any related field (table 1.7). The majority of the respondents had a high education profile maybe because the study was conducted in a university environment. If the study was not conducted in a university environment the data, may vary more and their maybe less respondents with a bachelor degree. When performing a t-test to test the association between vitamins or mineral supplement consumption with the education level the t-test revealed that there is a high association between vitamins or mineral supplement consumption and education level (table 4.35). The p-value for the test is ($p=0.044$), therefore it can be said that we can accept our hypothesis that there is an association between education and consumption of vitamins and mineral supplements. Since our study location was conducted in a university environment, the results from our study are rather consistent with previous studies that have been done worldwide that the higher the education the more likely will there be consumption of vitamin or mineral supplements (Balluz et al., 2003; Hoggatt et al., 2000; Ishihara et al.,2000; Lyle et al., 1998).

Alcohol, exercise and smoking maybe one of the contributing factors to vitamin or mineral supplement consumption.

Many previous studies have shown that there may (Block et al., 1987) or may not be a an association with vitamin or mineral consumption with alcohol (Rock et al.,2000).

For the studied population the majority of the population of supporting staff at Chulalongkorn University the percentage of those that are currently consuming alcohol at the time of study, regardless of frequency was 50.9 percent (table 4.10), whereas the population of supporting staff that were not consuming any form of alcohol at the time of the study was 49.1 percent (table 4.10). After performing a t-test to see whether there is an association between the consumption of alcohol and vitamin or mineral supplement usage, the test revealed a p-value of .959 (table 4.34). The p-value has no significance, and there is no association between the consumption of alcohol and vitamin or mineral supplement usage. Although, we may also have to consider that this study population is rather conservative and if the same study was conducted in another working environment such as central world office building the number of people that consume alcohol and take vitamin or mineral supplement maybe higher and there may be an association between these two factors. We can conclude that we must reject our research hypothesis that there is an association between alcohol consumption and vitamin or mineral supplement usage in the supporting staff members at Chualalongkorn University.

Exercise is also known as one of the confounding factors that have been associated with usage of vitamins or mineral supplements (Ishihara et al., 2003; Rock et al., 2000). The percentage of studied population of supporting staff at Chulalongkorn University that exercise on a daily basis is about 46.9 percent, whereas the studied population that does not exercise on a daily basis is 53.1 percent (table 4.11). Performing a t-test, with the association between vitamin or mineral supplement usage and exercise showed that the p-value of 0.085. The p-value of

0.085, is above the significance therefore it can be said that there is no association between exercise and vitamin or mineral supplement consumption (table 1.35).

Smoking is another socio-demographic factor that is sometimes associated with the consumption of vitamin or mineral supplements (Block et al., 1987; Rock et al., 2000). The studied populations of supporting staff at Chulalongkorn University 13.9 percent of the population studied are current smokers (table 4.9). Whereas 77.2 percent of the studied populations of supporting staff are non-smokers and 9 percent of the studied are former smokers (table 4.9). Performing a t-test will show whether or not there is an association between smoking and vitamin or mineral supplement usage. According to table 4.34, the p-value was 0.34; there is no significance between smoking and vitamin or mineral supplement usage. On the other hand, smoking status is also quiet similar to alcohol consumption, the reason is because since our study was conducted in a conservative environment and the majority of the respondents were woman it may have meant that the number of smokers would be less. If our study was conducted at an office building, with a less-conservative environment there may have been more smokers and usage of vitamins or mineral supplements maybe higher. The results of this hypothesis are consistent with those from previous studies (Block et al., 1987; Rock et al., 2000).

Income is known to be one of the highly associated factors that influence the choice to consume vitamins or mineral supplements. In many studies it states that those who come from a high income family or have high income will more likely consume vitamins or mineral supplements when compared to those from a lower income (Block et al., 1987; Block et al, 2003; Kim et al., 2000; Kim et al., 2003). The results of this study showed that 41. 7 percent of the studied population had a

household income of 10-29,999 baht per month (table 4.8). After performing a t-test to test the relationship between vitamins or mineral supplement usage and income, the t-test revealed the p-value of 0.423 (table4.36). From the t-test we can say that for the supporting staff at Chulalongkorn University income and consumption of vitamin or mineral supplement has no association (table 4.36). Therefore we must reject our hypothesis that those with a higher income would be more likely to consume vitamins or mineral supplements. The results of our study were not similar with those from previous studies (Block et al, 1987, 2003; Kim et al., 2000; Kim et al, 2003).

5.2 Conclusion

The key finding of the study found that 32.7(106 supporting staff) percent of the studied population of supporting staff at Chulalongkorn University that was studied is currently consuming vitamins or mineral supplements. Even though the other 67.3 percent (218 supporting staff) of the studied population were not currently consuming vitamins or mineral supplements at the time of the study, 79.35 percent (173 non-consumers) were willing to consume vitamins or mineral supplements in the nearby future. Although the knowledge scores of the consumers (9.47) and non-consumers of vitamin or mineral supplements (8.70), there is a need for the government and for the educators to improve the understanding and knowledge of vitamin or mineral supplements for the general public.

The main factor or reason why the majority of the consumers of vitamins or mineral supplements in the supporting staff at Chualongkorn University choose to consume vitamins or mineral supplements is to "preserve or to maintain good health". Thirty three point three percent of the supporting staff at Chulalongkorn University sampled, main reason for consumption was because of health reasons. When

purchasing vitamins or mineral supplements, the most important factor emphasizes is the characteristic of the vitamins (21.6 percent), whereas the main decision to consume vitamins or mineral supplements had come from either the media (8.95 percent) or themselves (8.95 percent).The majority of the consumers of vitamins and mineral supplements were willing to continue usage (29.01 percent) and have recommended others to take vitamin or mineral supplements (26.54 percent).

In conclusion, this study is a guideline of information and data that could be used for future studies, the data collected is only from a sample group of people of Thai people, therefore could not be used to represent Bangkok.

5.3 Scope and limitation of the study

This study was conducted during a short period of time, for approximately two months and the data was limited to the supporting staff at Chulalongkorn University only. In addition, the study group was rather homogenous therefore it did not represent any other form of people, including those from other universities.

Since the study environment was conducted in a university, the working atmosphere of the study population and of the respondents were rather conservative. There were not a lot of people that smoked or drank alcohol. If the same study was performed in a less conservative working environment, than the data may been more disperse and a variety of data would be able for analysis. In addition, there were more females that participated in the study when compared to males. This factor can lead to bias of the data and results of the study, since several of the tables and statistical analysis was performed to study the difference in gender.

Another limitation of the study was that, some of the terms used in the study. For example, the question that was related to the perception of health, this question was

asked so that the respondents could rate their own health. Although there was no standardized method of measuring the health status of each respondent, this may have cause bias or un-true data collection and analysis of the results.

Gender was also another limitation of the study. The majority of the data collected had come from females. Out of the 324 questionnaires that were able to be used in the process of data analysis 216 out of 324 were females, where as only 108 of them were males (table 1.3). The reason why more females were collected could have been for several reasons. The first reason maybe that there are more women working in Chulalongkorn University as supporting staff than men. The second reason maybe that woman were easier to approach and more willing to participate in the questionnaire when compared to the men. Although since more women were questioned than men and majority of the data collected were from women there maybe some form bias when analyzing the data. Therefore for this study we must not consider gender as an influential factor in our study with vitamin or mineral supplement consumption.

The study was one of the first studies in Thailand, which looked at vitamin or mineral supplement consumption and its confounding factors, so there is no significant comparison that could be made with other studies in the Thailand. Apart from the fact that the study looked at several associating factors with vitamin or mineral supplement the results could not rule out any confounding factors on vitamin or mineral supplement satisfaction. In addition, the methods of data analysis of chi-square and t-test could not fully assess the relative importance of the independent variables found in this study.

5.4 Recommendations

5.4.1 Provide education about vitamins and minerals to the public

5.4.1.1 Provide education and understanding about vitamins, minerals and vitamins and mineral supplements to the public.

Given the results of the knowledge section of the structured questionnaire, along with the finding of the mean score for each of the consumers and non-consumers the score of knowledge about vitamins and minerals is very low. If there is more education or understanding of vitamins and minerals not only will the public have better health, they will know ways of improving their own health by simple measures. From the knowledge section the majority of the questions that were answered correctly were questions related to vitamin C; other vitamins had a very low correct response rate. This is especially true for questions related to minerals other than calcium. If Thai people have a better and fully understand the source and benefits of each vitamin and mineral not only will their health improve they will also know what vitamins or mineral supplements to take and what is necessary and what is not.

A practical approach can be done by advertisements or commercials by the ministry of public. Knowledge about vitamins or minerals can be provided through informative brochures.

A public policy will also be a good approach to improve the knowledge and understanding of the public about vitamin or mineral supplements. The ministry of public health could make awareness to the public by a campaign, which provides information about the nutritional content of everyday food that Thai people consume, therefore the public will be more aware of their nutritional intake and also be aware of the nutrients that they lack and what additional dietary

supplements they should consume and, which one will be beneficial towards the human body.

5.4.2 Standardized terminology

5.4.2.1 Terms used must have an accurate measuring scale.

One of the flaws of this study that may have caused biased towards the results of the study is the question regarding the respondent's personal health status. The respondents who participated in the study were asked how they perceived their personal health status; they were given a choice of four different levels. The highest level was "extremely healthy", "health", "fairly health" and "un-healthy". The respondents would then tick their health status, which they thought they were in. There may have been bias and the results of this question may not be used as accurately as it should have been because the results depended solely on the respondent's personal opinion. The opinion of one respondent's perception of being healthy may vary between respondents. Therefore this factor was one of the flaws of the study, which could be solved by using a standard way measuring the perception of health. For example, for future studies Body Mass Index score could be used as one of the measurement tools to measure the status of health of the respondent.

5.5 Recommendations for further study

5.5.1 Change the study population into a more diverse group of people

Further study should be done but with a more diverse group of people. By diversifying the group of people the results of our study would vary so that we would have a more broad idea of the attitude of Thai people towards vitamin or mineral supplement usage. Since our study population was confided to small study population the data was rather homogenous. If the same study was conducted in an office

building with different types of people working in that building we would have range of attitudes and knowledge about vitamins or mineral supplements. The data would then be more useful, and could possibly be used to represent the working population of Bangkok.

An in depth interview would also be very useful for this topic, because by performing an in depth interview, the researcher would have a detailed opinion from the respondents. With more detailed answers from the respondents there would be a chance for more understanding of the attitude towards vitamins or mineral supplements. An in depth interview would also provide more detailed information about the practice or usage of vitamin or mineral supplements.

5.5.2 Further research on knowledge of vitamins or minerals

For further research we could also conduct a study on the knowledge of vitamins or mineral supplements in university students. This study could be conducted at the faculty of pharmacy at Chulalongkorn University. The purpose of this further study would be to analyze whether or not the knowledge level of vitamins or minerals has improved over a period of 6 month period of studying as a pharmacy student.

5.5.3 Further research in vitamin or supplement usage in teenagers and young adults

For further research in this topic there could be done in teenagers or young adults in a university environment. The same study could be done, at Chulalongokrn University but in the students at every faculty. By performing the same study we would have an understanding of what teenagers and young knowledge of vitamin or mineral supplement, their attitudes, and the practice among them.

5.5.4 Further research on living location and consumption of vitamins and mineral supplements.

For research there could be a comparison between the living location or different provinces and the usage of vitamin or mineral supplement. There can be a cross-sectional study studying the difference in usage and knowledge in two different

5.5.5 Further research on the knowledge, attitude and practice of vitamin or supplement usage in Bangkok.

For further research there could be a test performed to look at the knowledge, attitude and practice of vitamins or mineral supplement usage in the whole of Bangkok, Thailand. This study will be rather large and will be time consuming but, if we are able to conduct a study this type it will provide an in-depth understanding of the usage of vitamin or mineral supplement usage in Bangkok.

5.5.6 Further research on the before and after affects of vitamin or mineral supplement usage in a controlled environment.

For further research, a clinical research can be performed to look at the long-term effects of vitamin or mineral supplement usage, to look whether or not there is an improvement in health or the effects of the consumption of vitamins or mineral supplements has on the consumer's body.