



## A research review on healthy lifestyle of university students through statistical approach

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### Abstract

This paper shows different methods to analyse the survey questions that related to healthy lifestyle or the factors affect it. The factors included eating habits, health factors, exercise and entertainment. The steps normally start with survey method which there are many types of method to undergo data collection and then undergo the pilot study. In descriptive summary, it is needed to obtain the essential part of information in the whole study first before undergo analysis. Data analysis included some statistical tests are done to know the association within variables. There are also some methods that were used to measure the satisfaction level of the consumers in the organisations.

**Keywords:** statistical analysis, healthy lifestyle, healthy, satisfaction level

### 1. Introduction

In the opinion of Divine & Lepisto (2005) <sup>[8]</sup>, healthy lifestyle can be defined as an introduction towards a healthier life and prevent having disease in future due to the unhealthy habits in our daily life. Healthy lifestyle consists of many kinds of habits of our daily life. Eating habits, health factors, exercise and entertainment play an important role in order to prove that he or she are following a healthy lifestyle. In other way, we can say that if we are following a healthy lifestyle like working out, eating a balanced diet, keeping up a sound weight and have a good sleeping habit, our bodies can be in a healthier situation (Al-Naggar *et al.*, 2013) <sup>[1]</sup>.

Besides that, a good eating habit is an important determinant of healthy lifestyle. Nowadays, bad eating habits became one of the major health concern among the university students in Malaysia especially when they are in condition of stress and do not have time to eat properly. Some of the bad eating habits of nowadays people are skipping meals, eating outside food and fast food and always eating snacks. University students are more likely to make their choice of eating according to the available food at that time and the price of the food. However, most of them do not have enough understanding about what kinds of food will bring better effects toward their health status (Ganasegeran *et al.*, 2012) <sup>[12]</sup>. Thus, it might cause them choose the food wrongly and cause their bodies are not capable to absorb enough nutrients.

Physical activity is also very important for our bodies as well. According to Penedo & Dahn (2005) <sup>[17]</sup>, they claimed that when we do not do any single exercise, the probability of getting sick will be doubled. Even though when comparing with the other habits like smoking and overweight, working out will be a more important determinant of health as when do not working out at all will even cause our lifespan being shorten.

Health factor is also very important which can be divided into

physical factor and mental factor. Psychological factors which like stress, anxiety and happy can affect the health of our bodies even though we did not notice it. For example, Torres & Nowson (2007) <sup>[21]</sup> mentioned that when we feel very stress in a long time, it could cause us to have the mental health problem. For the university students, there are many situations that could cause us to have these kinds of problems like when they are facing the examinations or when they are trying to complete some assignments. Physical factor including the weight problem which normally we use the level of Body Mass Index (BMI) to express it. Nowadays, there are more people that are facing the problem of obesity. In the opinion of University Malaysia Sarawak (UNIMAS) Department of Community Medicine and Public Health associate professor, Dr. Zafar Ahmed claimed that the Malaysian did not see the problem of obesity as a very serious issue but in fact it could cause a massive health problem like Cardiovascular Disease (CVD) and stroke. He thought that Malaysian should be able to control their obesity and when they able to do it successfully, they can be healthier (Star 2, 30<sup>th</sup> July, 2017).

When we are watching television, surfing internet or going out with our friends, it is actually can give us some benefits toward our mental health but in the condition of we are doing it in the right way or for the right amount. For example, watching television show can bring good and bad effects towards the watchers. This means depends on what do they watch and if their television viewing is too frequently. If watching television show caused the university students addicted to it, this will be a bad issue as this will limit their time to do other useful things (Canadian Paediatric Society, 2003) <sup>[3]</sup>.

When we are still young, our health habits right now will affect our health status in future. Thus, it is very important for us to have a preparation start from right now and find out what factors will really affect the health habits so that we can make

some changes in our daily life. University students composed a large part in the young adult population (Von Bothmer & Fridlund, 2005) [28]. There are only very less research that had been conducted before to determine whether the university students are healthy or not, which mostly were about the comparison between sexes. Moreover, there is no research done before in order to identify the satisfaction level towards the factors that affect healthy lifestyle which they can use this method to measure whether their respondents are healthy or not. Therefore, a survey is conducted to investigate the factors that affect healthy lifestyle of university students. Thus, they can know what kind of habit that will cause them to have disease and they can improve their healthy behavior and be a healthier citizen.

## 2. Literature Review

The satisfaction level towards healthy lifestyle can be affected by many types of factors. Since the satisfaction index can be ranked from scale of very dissatisfied to very satisfied, we need to know the frequency of each answer. It may be valuable to ask the opinion of respondents about how do they think about the survey and the result, which is it useful for them or not and are they satisfied? Thus, we can apply the opinions or the recommendations that given by them in the future research or repeat survey (Garcia & McCarthy, 2000) [13].

## 3. Survey Method

There are many kinds of survey methods that have been applied by researchers around the world. In the opinion of Garcia & McCarthy (2000) [13], we can undergo a survey through the five types of methods which are of postal interviews, face to face interviews, telephone interviews, rapid assessment and data gathered by General Practitioners. After that we can do a pilot study to test the questionnaire before the main survey starts.

The data was acquired by three stages. First stage is a face-to-face interview with the smokers and people who try to quit to smoke. In second stage, it required to add in some other smokers to answer the questions along with the participants in the first stage. At last, in stage three, there was a subset of respondents from stage two was being chosen to be interviewed again (Burton *et al.*, 2015) [2].

Torres & Nowson (2007) [21] used the cross-sectional studies, retrospective studies and longitudinal studies in their research paper. The retrospective survey was used to investigate how the stress can affect the United States Marine's eating habits. The cross-sectional studies were undergone to find out whether male of female will likely to eat so that they can cope with stress during their job is undergoing and about how the stress can cause the respondents to have a weight gain due to the increase of fat and sugar intake. For longitudinal study, the respondents are children from seven years old to 11 years old. The researchers were trying to find out within these three years, was there any relationship between the stress and their weight gain.

## 4. Pilot Study

Before starting a proper analysis of our data collected, it is necessary for us to conduct a pilot study first so that we can

make sure that our questionnaire does not consist of any problem. In this research, it showed how to use a simple formula to find the sample that needed for a pilot study which depends on the confidence level selected by the researchers themselves (Viechtbauer *et al.*, 2015) [26].

$$P(x > 0) = 1 - (1 - \pi)^n \quad (1)$$

Where

$n$  = number of participants for a pilot study

$x$  = number of participants (out of  $n$  participants)

$\pi$  = probability of problem occurs

Thus,

$$n = \frac{\ln(1 - \gamma)}{\ln(1 - \pi)} \quad (2)$$

Where

$\gamma$  = confidence level

Cocks & Tororgerson (2013) [5] showed another method which is by using confidence interval method to find the sample needed for a pilot study. The researchers thought that 80 percent of confidence interval was already enough for the pilot study which did not require 95 percent of confidence interval so that did not need to waste a lot of money.

## 5. Descriptive Statistics

Before move on to the analysis part, we need to use the descriptive statistics to obtain the essential highlights of the information in a study. For example, which in order to know the difference between sex for each categorical variable, the researchers used frequency and percentage while for the continuous variables and they used mean and standard deviation (WY *et al.*, 2011) [29].

Noor (2002) [16] used the percentage to describe the predominance of obesity among variables of gender and living areas which are rural and urban according to the trends in food intake in a day and the nutrients inside the food. Reeves & Rafferty (2005) [19] used the percentage to show the which kind of people in United States were more likely to adopt a healthy lifestyle according to four criteria of healthy lifestyle which were not smoking, having a diet of more fruits and vegetables, working out and keeping up a sound weight.

Faught *et al.* (2017) [10] used percentage to describe behavior of healthy lifestyle among school-aged pupils which include factors of body mass index (BMI), sleep, physical movement, dietary factor scores, rest and screen time. After that, they used those data to measure the association between those factors with the academic performance by using odd ratio and confidence interval of ordinal logistic regression.

It used the line graph and also the stacked bar chart to describe the dietary patterns of Malaysians whether their bodies are absorbing which kind of nutrients more in this year, whether is it increasing or decreasing. By using those graphs, it allows the researchers to know whether is there more Malaysians are having balanced diet or not. The researchers also used those charts to express the occurrences of non-communicable

diseases related to lifestyle (Tee, 1999) [20].

Ramírez *et al.* (2013) [18] used descriptive statistics to describe the health behavior of their respondents after they done the survey. In the descriptive statistics, they used average and percentage to show how many respondents that actually do some changes in their daily life after they got the information. They also used the histogram to show whether the respondents more likely wanted to take the advice about what kind of health behavior which included diet, eating more fruits and vegetables and work out.

In the result, the researchers used percentage and mean to analyze the data that gathered during the survey. These descriptive statistics were presented in 95 percent of confidence interval. The percentage was used to observe whether is there any getting better or getting worse of the health behavior for men and women from year 1990 until year 2000 while mean is used to describe is there any updating of beliefs in adopting healthy lifestyle in these 10 years (Steptoe *et al.*, 2002) [24].

## 6. Statistical Tests

There are many types of statistical tests that can be used for the analysis. For personality factors, Vingerhoets *et al.* (1990) [27] the average and standard deviation to describe the difference in result for female and male which female scored a higher mark than male. For health behavior, by using the item analysis, the result showed that male had less good health behavior.

A survey was carried out to measure the association between health habits and psychological variables. During the statistical analysis, a health behavior index was built according to 16 types of health habits and the gender difference of the scores was identified which the result show that female had a better health habits rather than male. The gender difference was then analyzed by using analysis of variance. When undergoing the partial correlation analysis, the researchers found out that the psychological factors are not associated with the health habits (Steptoe *et al.*, 1997).

In the statistical analysis, the researchers used Chi-square test to find out is there any difference for the response of male and female when they were answering the questions about the eating habits and exercise and the why did they do the exercise. Before that, it used the percentage to describe the frequency of respondents for answering each question (Silliman *et al.*, 2004) [23].

The researchers used the Chi-squared statistic to know either male or female had a better health habits and inspiration to follow a healthy lifestyle and to determine the relationship between self-evaluated health and inspiration to adopt a healthy lifestyle (Von Bothmer, & Fridlund, 2005) [28]. King, Mainous & Geesey (2007) [14] used Chi-square test to determine what kind of people will eventually live out a life that follows healthy lifestyle based on four criteria which are working out, eating a balanced diet, keeping up a sound weight and not smoking.

For the measurement of independency between the categorical variables, Deshpande, Basil & Basil (2009) [7] used Chi-square test of independence to measure that whether the Health Belief model (HBM) fits which gender group data better regardless the sample size for female and male groups.

They also used One-way ANOVA to know the difference between the averages of HBM variables by sex.

A survey was carried out to measure the association between healthy lifestyle habits and having the practice of yoga among the Australia female. The lifestyle habits are about having the habits of smoking, drinking alcohol, having marijuana and drugs, working out regularly and having balanced diet. Chi-square tests were used to do a comparison on the women who always practiced yoga with the women who did not practice yoga to know whether this practice affects the health habits or not. The results showed that there is a positive relationship between the lifestyle habits with the practice of yoga (Cramer *et al.*, 2017) [6].

A study was undergone in order to find out the association between body condition in both mental and physical and their health habits. In this research, for the body condition of mental part, the researchers were more concern on anxiety. They used the chi-square test, student's t-test and one-way ANOVA to show the association of body weight, nutrition level, health habits, and anxiety condition. They also compared the result between demographic factors which were gender, age, marital status (Sanlier *et al.*, 2018) [22].

## 7. Customer Satisfaction

In research of Fornell *et al.* (1996) [11] mentioned that they introduced American Customer Satisfaction Index (ACSI) to measure and evaluate the performance of the companies or industries which by identifying the level of customer satisfaction. ACSI can also be used to determine whether the quality of a product provided is in good condition or not.

There are already exist of many countries try to use ACSI method in many areas including Malaysia. Nazi (2010) [15] used ACSI to find out My HealtheVet consumers' satisfaction level. In this research paper, the author thought that the result of it allowed the readers could have a better understanding about attributes, requirements and inclinations of consumers through this survey. Through this research paper, it can also allow the My HealtheVet to know about their strength and weakness and make some improvement so that the satisfaction level can be higher.

According to the quantitative analysis, Zuhaimy Ismail *et al.* (2016) [30] used the Mineful Customer Satisfaction Index (MCSI) and ACSI to measure the satisfaction level of Malaysians according to many elements. The formula of MCSI is shown below.

$$CSI = \frac{100}{m-1} \sum_{i=1}^n \sum_{j=1}^q (x_{ij} - 1) w_i \quad (3)$$

where

$n$  = The number of element or question groups

$q$  = The number of respondent

$m$  = The highest scale value in the questionnaire

$w_i$  = The weight value in percentages for each  $i$ - th element

Those elements were economics, safety, governance, education, social integration, development, environment, housing, happy life, patriotism and well-being. Each of the element was given a weighting value according to their importance. At the end, the researchers found out that for

every state in Malaysia, the satisfaction level were all at the stage of moderate.

In the research of Dutta, Chauhan, & Chauhan (2017) mentioned how to use ACSI method to measure the overall satisfaction level of the online travel customer in India. It measured the level from many aspects which are quality provided by the agencies, prices, services given, were the

customers satisfied and did the agencies meet the requirement of the customers so that they can make some improvement.

### 8. Discussion

In this chapter, the methods that used by those authors and what are they lack of will be discussed and summarized in the Table 1.

**Table 1:** Summary

Author	Year	Technique	Research Problem
Garcia & McCarthy	2000	Survey Method	<ul style="list-style-type: none"> <li>To give some basic information about how to keep an eye on our health behavior in our daily life.</li> <li>It is more focus on the survey method but did not show how to measure the satisfaction level.</li> </ul>
Burton <i>et al.</i>	2015	Survey Method	<ul style="list-style-type: none"> <li>To find out that what are the reasons cause the people to smoke and also provide the consequences of smoking.</li> <li>It used the interview method instead of questionnaires which require the respondents to recall back and might be not so accurate.</li> </ul>
Torres & Nowson	2007	Survey Method	<ul style="list-style-type: none"> <li>To investigate how the stress can affect the eating habits or a person and whether the eating caused by stress will leads to the increase of weight gain.</li> <li>This research paper only used the observational method, which did not do a survey to find out their satisfaction level.</li> </ul>
Viechtbauer <i>et al.</i>	2015	Pilot Study	<ul style="list-style-type: none"> <li>To identify a simple formula to find out the sample needed for pilot study.</li> <li>This research paper only used one method to find the sample needed but elaborate what is the other possible method that can be used.</li> </ul>
Cocks & Torgerson	2013	Pilot Study	<ul style="list-style-type: none"> <li>To show the use of suitable confidence interval to find the sample of pilot study.</li> <li>This research paper only showed what were the effects if they used 80 percent confidence interval but did not try the others.</li> </ul>
WY <i>et al.</i>	2011	Descriptive Statistics	<ul style="list-style-type: none"> <li>To know the differences in eating practices, dietary admission, weight status, and body creation amongst male and female college understudies.</li> <li>It only focused on the food intake and do the comparison between male and female but did not consider other factors.</li> </ul>
Noor	2002	Descriptive Statistics	<ul style="list-style-type: none"> <li>To allow us to know more about the association between provide a better understanding of the link between demographic factors and trends of food intake which can be related to nutrition inside the food.</li> <li>It only showed the result in percentage form according to the exist data without a survey.</li> </ul>
Reeves & Rafferty	2005	Descriptive Statistics	<ul style="list-style-type: none"> <li>To let the readers to know that is the prevalence according to the four criteria of healthy lifestyle.</li> <li>At the end, it only managed to show the prevalence of those four criteria of healthy lifestyle but did not manage to have a conclusion of whether the people are health or not.</li> </ul>
Faught. <i>et al.</i>	2017	Descriptive Statistics	<ul style="list-style-type: none"> <li>To know the association between behavior of lifestyle and academic performance.</li> <li>It only consists of a few factors only to relate with the academic performance which might be not so accurate as not so detail.</li> </ul>
Tee	1999	Descriptive Statistics	<ul style="list-style-type: none"> <li>To let Malaysian know where the health of Malaysian is heading, whether is it getting better or getting worse?</li> <li>It did not undergo a survey to ask the Malaysian whether they satisfied or not with their healthy behavior likes that.</li> </ul>
Ramírez <i>et al.</i>	2013	Descriptive Statistics	<ul style="list-style-type: none"> <li>To allow the readers know that how searching information from outside world can affect our health-related behavior.</li> <li>It did not ask the respondents whether they are satisfied with their own health behavior after they applied those information that they had gathered.</li> </ul>
Steptoe <i>et al.</i>	2002	Descriptive Statistics	<ul style="list-style-type: none"> <li>To find out is there any improvement for the health behavior and updating of health beliefs from year 1990 until year 2000.</li> <li>It did not have a conclusion about whether the people were really became healthier during these 10 years.</li> </ul>
Vingerhoets <i>et al.</i>	1990	Statistical Tests	<ul style="list-style-type: none"> <li>To identify the relationship between the health behaviors and personality variables.</li> <li>It more focus on the relationship between the health behaviors and personality variables but not the satisfaction level.</li> </ul>
Steptoe <i>et al.</i>	1997	Statistical Tests	<ul style="list-style-type: none"> <li>To identify the shape of distribution of health habits index and measure the association between health habits and psychological variables.</li> <li>It only focus on the association between health habits and psychological variables but did not investigate the satisfaction level of the respondents towards their health habits.</li> </ul>
Silliman <i>et al.</i>	2004	Statistical Tests	<ul style="list-style-type: none"> <li>To find out whether the college students follow a healthy lifestyle based on the eating habits and exercise and whether there is a difference in eating habits and exercise between male and female.</li> </ul>



			<ul style="list-style-type: none"> <li>It did not conclude that whether those respondents are healthy or not at the end.</li> </ul>
Von Bothmer & Fridlund	2005	Statistical Tests	<ul style="list-style-type: none"> <li>To find out is there any difference in the response of male and female in their health habit and their inspiration to adopt a healthy lifestyle and also any relationship between self-evaluated health and inspiration to adopt a healthy lifestyle.</li> <li>It did not ask the respondents about their satisfaction level of their health habits.</li> </ul>
King <i>et al.</i>	2007	Statistical Tests	<ul style="list-style-type: none"> <li>To find out how many persons who really adopt a healthy lifestyle from 45 years old to 64 years old which is the middle age and determine the effect of following a healthy lifestyle towards mortality and coronary heart disease.</li> <li>It did not ask about satisfaction index of the respondents of having healthy lifestyle.</li> </ul>
Deshpande <i>et al.</i>	2009	Statistical Tests	<ul style="list-style-type: none"> <li>To test the prescient capacity of the HBM on the probability of eating healthy in the following two-week time frame among undergrads.</li> <li>It only focuses on comparing between male and female and whether which one is healthier according to their eating habits.</li> </ul>
Ganasegeran <i>et al.</i>	2012	Statistical Tests	<ul style="list-style-type: none"> <li>To know the association between psychological factors with the eating habits.</li> <li>It did not ask the students whether they are satisfied or not about their eating habits.</li> </ul>
Cramer <i>et al.</i>	2017	Statistical Tests	<ul style="list-style-type: none"> <li>To measure the association between healthy lifestyle habits and having the practice of yoga among the Australia female.</li> <li>It only focus on the association between lifestyle habits and practice of yoga but not whether the respondents are healthy or not.</li> </ul>
Sanlier <i>et al.</i>	2018	Statistical Tests	<ul style="list-style-type: none"> <li>To measure association between healthy lifestyle habits, body condition and anxiety level.</li> <li>This study is more focus on the effect of the factors towards the anxiety condition.</li> </ul>
Fornell <i>et al.</i>	1996	Customer Satisfaction	<ul style="list-style-type: none"> <li>To allow the readers to have a deeper understanding about the properties and the use of ACSI method.</li> <li>This study focus on the findings of ACSI model but did not focus on the health level.</li> </ul>
Nazi	2010	Customer Satisfaction	<ul style="list-style-type: none"> <li>To allow the My HealtheVet to know the satisfaction level of consumers.</li> <li>It only used ACSI only to do the statistical analysis but did not try any other statistical test.</li> </ul>
Zuhaimy Ismail <i>et al.</i>	2016	Customer Satisfaction	<ul style="list-style-type: none"> <li>To measure the satisfaction level of Malaysian.</li> <li>It focused on the satisfaction level of Malaysians but did not specify in the area of healthy lifestyle.</li> </ul>
Dutta <i>et al.</i>	2017	Customer Satisfaction	<ul style="list-style-type: none"> <li>To determine the variables that will influence overall satisfaction level of the online travel customer in India.</li> <li>It focus on the travel sector only but did not show the factor of health.</li> </ul>

There are some improvements that can be done and the contributions of this research will be shown at table below.

**Table 2:** Contributions of the Research

Ong Ai Lee	2018 and 2019	Satisfaction index	<ol style="list-style-type: none"> <li>To measure the satisfaction level of UTHM students towards healthy lifestyle.</li> <li>To determine whether UTHM students are healthy or not.</li> <li>To identify the factors that will affect healthy lifestyle.</li> <li>To determine which factor has a higher weighting value in determining healthy lifestyle.</li> <li>To help UTHM students to follow a healthy lifestyle.</li> <li>To allow UTHM students know what factors that they are lack of to become healthier.</li> <li>Do a pilot study before a formal study started.</li> <li>Do the descriptive statistics to let the reader to understand easier.</li> </ol>
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**9. Conclusion**

For a survey, methods of satisfaction index and statistical tests are parts of statistical analysis which the researchers normally will undergo a data collection, pilot study and do a descriptive summary first before they do the statistical analysis. ACSI methods are the main methods used which can help their organisations to measure the satisfaction level of their customers. However, there is no research that have been done before which focus on identifying the satisfaction level of consumers to towards their lifestyle behavior in order to see whether they are healthy or not. Moreover, the researchers showed that the association within the variables especially the relationship between the variable and gender can be identified through many kinds of statistical tests and it can be very useful as they can know whether female or male are healthier.

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