Influence of Attitude, Subjective Norms, and Perceived Behavioral Control on Intention to Perform Cardiovascular Disease Preventive Behaviors among Young Adults in Bangladesh

Jahura Khatun

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Author	Mrs. Jahura Khatun
Major Program	Nursing Science (International Program)

Major Advisor:	**Examining Committee**:
……	……..…….....Chairperson
(Asst. Prof. Dr. Umaporn Boonyasopun)	(Asst. Prof. Dr. Wongchan Petpichetchian)
	…….....
Co-advisor:	(Asst. Prof. Dr. Umaporn Boonyasopun)
……..	……
(Asst. Prof. Dr. Piyanuch Jittanoon)	(Asst. Prof. Dr. Piyanuch Jittanoon)
	……
	(Asst. Prof. Dr. Saifon Aekwarangkoon)
	……
	(Dr. Hathairat Sangchan)

The Graduate School, Prince of Songkla University, has approved this thesis as partial fulfillment of the requirements for the Master of Nursing Science (International Program).

……

(Assoc. Prof. Dr. Krerkchai Thongnoo)

Dean of Graduate School

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ABSTRACT

Intention to perform Cardiovascular Disease (CVD) preventive behaviors has been investigated but received less attention to investigate in young adult population. The aim of this study was to examine the level of intention to perform CVD preventive behaviors and its predictors and to determine the predictive ability of those predictors. The subjects comprised of 119 young adults in Bangladesh. Self-administered questionnaires were used to collect data which included demographics and past history of CVD preventive behaviors, intention to perform CVD preventive behaviors and its predictors. The data were analyzed by both descriptive and inferential statistics. Descriptive statistics were employed for demographics data, level of attitude, subjective norms, perceived behavioral control, and intention. Multiple regression analysis was used to determine the predictors of intention to perform CVD preventive behaviors.

Consistent with the theory of planned behavior, hierarchical multiple regression analysis revealed that attitude, subjective norms and perceived behavioral control together accounted for 20% of variance in intention to perform CVD

preventive behaviors. Both the attitude and subjective norms jointly predicted 18 % of variance in intention to perform CVD preventive behaviors ($p<.01$). Perceived behavioral control contributed 2 % change of variance to intention ($p<.05$). Subjective norms was the best predictor followed by perceived behavioral control (β =.36, $p<0.01$, β=.18, $p<.05$, respectively). However, attitude failed to significantly predict the intention (β = .01, $p > .05$).

Thus, the findings identified the predictors of intention to perform CVD preventive behaviors among young adults, which could enable nurses and health personnel to develop a theoretical-based intervention program for promoting healthy behaviors among young adults.

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Jahura Khatun (Jui)

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

CONTENTS (Continued)

Page

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

This chapter describes the background and significance of the problem, objectives of the study and research questions.

Background and Significance of the Problem

Cardiovascular Disease (CVD) is recognized as a leading cause of death worldwide over the last 50 years despite the dramatic medical advancement. According to the World Health Organization (WHO, 2009), it was estimated that 17.5 million people had died because of CVD in 2005, representing 30 % of all global deaths. Nearly 80 % of these deaths occurred in developing countries. If the current trend continues, the rate of death may reach up to 20 million people by the year of 2015 due to CVD around the world (Boutayeb, 2006; Yusuf, Reddy, Ounpu, & Anand, 2001).

In Bangladesh, CVD has been recognized as a primary health problem and rising cause of death (Uddin et al., 2007). WHO Bangladesh reported that 130,006 peoples had died due to CVD in 2002 (as cited in the Heart Care Foundation of Bangladesh, 2006). Thus, it is the matter of fear that this figure will highly increase in the coming future. The CVD prevalence was rapidly growing for all ages, but young adults were higher among population (Deb, Hossain, Dey, Das, & Debnath, 2007). The situations of CVD disabilities, human resources burden, and economic loss are increasing day by day more than other types of diseases (Shahabuddin et al., 2007).

The actual number of increasing CVD incidence and its causes in Bangladesh are quite unknown due to the lack of reliable data. CVD experts believed that rapid

globalization and increasing economic changes influence the young adults to give less preference to their health. In addition, high cholesterol and fast food consumption, physical inactivity, childhood obesity, overweight, psychological stress, smoking, and alcohol drinking may be the causes of developing CVD in Bangladesh (Square, 2006). Without promoting the CVD preventive behaviors, there will be a tremendous loss of life, adverse impact on young adults' productive life, families, and societies (Malik, 2007; Uddin et al., 2007).

Gordon, Thomson, Madhok, and Capell (2002) and Kristina (2007) stated that more than 60 % of CVD risk factors are remarkably preventable by healthy behaviors. Since CVD among young adults are increasing very fast in Bangladesh, therefore preventive behavioral program is essential. To develop the CVD preventive behavioral program, health care professionals need to understand clearly of the predictors of CVD preventive behaviors.

Various theoretical models were developed to explain health related behaviors. Most of them were developed based on western society, which might not be applicable for Asian culture because of socio-cultural context and with various behaviors (Choyhirun, Suchanxaya, Chontawan, & Kantawang, 2008). One of the model which has been widely applied to many health behaviors in Asian culture (Choyhirun et al., 2008; Chuebang, 2002; Zhang, Middlestadt, & Ji, 2007) is the Theory of Planned Behavior (TPB) which was developed by Icek Ajzen in 1985 (Marcoux, & Shope, 1997). Therefore, this model was applied as a guideline in this study to identify the predictors of CVD preventive behaviors in Bangladesh. The TPB is a social cognitive framework that aims to explain how expectation, judgments,

beliefs and intention lead to human behaviors. The focal concept of the model is behavioral intention that reflects person's motivational orientation towards a given behavior (Ajzen, 1991). This model can be considered as a deliberative process through which individuals make behavioral decisions based on careful consideration of available information (Armitage & Conner, 2001).

The TPB proposes that intention is an immediate antecedent of a behavior and a function of attitude, subjective norms and perceived behavioral control (Ajzen, 2006b). Intention is proposed to mediate the influence of socially cognitive variables, attitude, subjective norms and perceived behavioral control on behavior. Intention or willingness or plan of young adults to perform the CVD preventive behaviors can facilitate their mental readiness to put efforts towards CVD preventive healthy behaviors. Attitude towards a behavior is defined as a person's general feeling of favorableness or unfavorableness for a particular concept (Ajzen, 2006a). Similarly, attitude towards intention can be assumed as feeling and judgment of young adults' towards CVD preventive behavior and its outcomes.

Ajzen (1991) stated that people were influenced by their significant person's opinions and values that they felt important for them, namely, subjective norms. Fila and Smith (2006) considered subjective norms as parents, teachers, and friends and their opinion about healthy behaviors for youth. It also acts as a source of motivation for youth to comply such behaviors towards their opinion. Sangperm, Phuphibul, Tilakskulchai, Vorapongsathon, and Stein (2008) found that subjective norms was the best predictor for intention to eating healthy diet Thai adolescents

Perceived behavioral control refers to people's perception to their ability to perform and degree of confidence to perform a given behavior (Ajzen, 2006a). The young adults' ability to perform and degree of confident towards CVD preventive behaviors can infer as perceived behavioral control. Thus, the TPB was suitable to use in this study because it is concerned with individual motivational factors such as determinants of performing a specific behavior. It is based on the relations among young adults' belief, subjective norms, confidence of perceived ability and intention.

In Bangladesh, CVD emerged as a threatening issue for country's healthcare, particularly for young adults and adequate preventive behavioral program has not yet been established (Malik, 2007). In addition, no study has tested the TPB in relation to CVD preventive behaviors among the young adults in Bangladesh. Therefore, employing the TPB to examine the predictors of CVD preventive behaviors would enhance the health care personnel to understand the psychological antecedents of behaviors. The findings shed the light on an understanding what factors might contribute the young adults to perform CVD preventive behaviors. These could enable nurses and health care personnel to develop a theoretical-based intervention program for promoting healthy behaviors among young adults.

Objectives of the Study

1. To describe the level of attitude, subjective norms, perceived behavioral control and intention to perform CVD preventive behaviors.

2. To determine the predictive ability of attitude, subjective norms, and perceived behavioral control on intention to perform CVD preventive behaviors.

Research Questions of the Study

1. What are the levels of attitude, subjective norms, perceived behavioral control, and intention to perform CVD preventive behaviors?

2. What is the extent to which the attitude, subjective norms, and perceived behavioral control predict the intention to perform CVD preventive behaviors?

Conceptual Framework of the Study

The conceptual framework of this study was derived from the Theory of Planned Behavior (TPB) proposed by Ajzen in 1985 (Ajzen, 1985; Marcoux & Shope, 1997). TPB provides a useful framework for understanding and predicting of social behaviors in general and health behaviors in particular (Armitage & Conner, 2001). This theory is based on the assumptions that health-related behaviors are controlled by decisions or intentions. In addition, human beings are quite rational decision makers and make systematic use of the information available to them in deciding what action to take (Ajzen, 2006b; Downs & Hausenblas, 2005). TPB is widely examined for determining factors influencing young adults' healthy behaviors. In many aspects, the study findings guided by this theory were used to improve the effectiveness of the interventional program designed for promoting healthy behaviors (Choyhirun et al., 2008; Sangperm et al., 2008). According to this theory, the most important determinant of human behavior is intention, which is influenced by attitudes, subjective norms, and perceived behavioral control. Intention is the cognitive representation of person's readiness to perform a given behavior, and considered an immediate antecedent of performing a particular behavior. The attitude towards the

behavior refers to individual's positive or negative evaluation of performing the particular behavior. It is determined by the total set of accessible behavioral beliefs linking with behaviors to various outcomes and attributes (Ajzen, 1991). The subjective norms refers to person's self-judgment about others' significant preferences and support for performing or not performing the specific behavior. Perceived behavioral control refers to the degree to which an individual feels about performing or not performing the particular behavior in the questions of his or her under volitional control (Ajzen, 2006a).

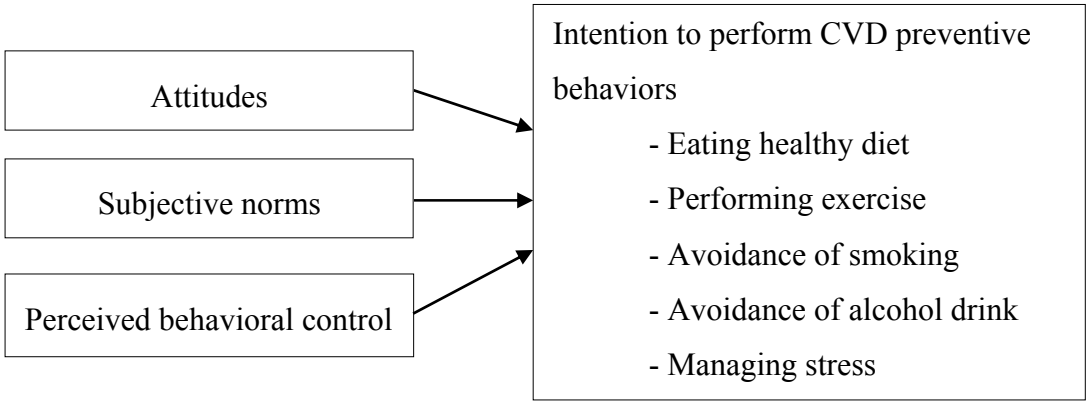

Figure 1

The Conceptual Framework of the Study.

In the present study, the TPB was used to identify factors, predicting behavioral intention of young adults to perform the CVD preventive behaviors (Figure 1). Intention to perform CVD preventive behaviors (healthy eating, exercise, avoid smoking, avoid alcohol drinking, and stress management) was expected to be influenced by three predictors including attitude, subjective norms and perceived behavioral control. Young adults' attitude towards the intention to perform CVD preventive behaviors is a function of their positive opinion or evaluation and its

outcomes of healthy eating, exercising, avoid smoking, avoid alcohol drinking, and stress management. The young adults' opinion or feeling about their significant persons (people who are important to them such as parents, teachers and friends) opinion and inspiration to comply the above stated CVD preventive behaviors was conceptualized as subjective norms in this study.

Moreover, feeling of self-control ability in young adults and degree of confident to perform the stated CVD preventive behaviors is an important part for the practicing of CVD preventive behaviors. It was conceptualized as young adults' perceived behavioral control over the eating healthy diet, performing of exercise, avoidance of smoking, and alcohol drinking, and practicing of stress management. The researcher hypothesized that if the young adult had positive attitude, and respect to the subjective norms, and had a greater perceived behavioral control over the stated CVD preventive behaviors; he / she would be more likely to have a strong intention to perform the CVD preventive behaviors.

Hypothesis of the Study

There is a significant contribution of attitude, subjective norms, and perceived behavioral control on intention to perform CVD preventive behaviors.

Definition of Terms

Attitude towards CVD preventive behaviors referred to young adults' positive or negative appraisal or feeling and judgment towards CVD preventive behaviors and the outcome of these behaviors. The CVD preventive behaviors included eating

healthy diet, performing exercise, avoidance of smoking; avoid alcohol drinking and managing stress. Young adults' attitude towards CVD preventive behaviors was measured by Attitude Subscale of the Factors Influencing on Intention Scale developed by the researcher. The higher scores indicated the positive attitude towards CVD preventive behaviors and its outcome.

Subjective norms toward CVD preventive behaviors referred to perception of young adult towards significant person's judgment and opinion that encouraged them to perform or not to perform CVD preventive behaviors including eating healthy diet, performing exercise, avoidance of smoking, and alcohol drinking and managing stress. Young adults' subjective norms towards CVD preventive behaviors were measured by Subjective Norms Subscale of the Factors Influencing on Intention Scale developed by the researcher. The higher scores indicated the higher perception towards subjective norms

Perceived behavioral control towards CVD preventive behaviors referred to young adults' perception of their ability or confidence to perform the CVD preventive behaviors including eating healthy diet, performing exercise, avoidance of smoking, and alcohol drinking and managing stress. Young adults' perceived behavioral controls towards CVD preventive behaviors were measured by Perceived Behavioral Control Subscale of the Factors Influencing on Intention Scale developed by the researcher. The higher scores indicated the higher perceived behavioral control.

Intention towards CVD preventive behaviors referred to the young adults' willingness or conscious plan or decision to perform or not to perform the CVD preventive behaviors including eating healthy diet, performing exercise, avoidance of

smoking, and alcohol drinking and managing stress. Young adults' intention towards CVD preventive behaviors was measured by Intention Subscale of the Intention to Perform CVD Preventive Behaviors Scale developed by the researcher. The higher scores indicated the higher intention.

Scope of the Study

The study was conducted at Government Bangla College, Dhaka, Bangladesh. The subjects in the present study were first year college students studying in the three departments of Bangla, Mathematics, and Accounting. The data were collected during the period of November 2009 to January 2010.

Significance of the Study

The outcomes of this study can provide a better understanding of the factors influencing attitude, subjective norms, and perceived behavioral control on intention to perform CVD preventive behaviors among young adults. The study was guided by the TPB. This theory is one of the models that provides some useful guidelines for improving healthy behaviors. This study finding provides a significant contribution to an understanding of the predictors of behavioral intention to perform CVD preventive behaviors among young adults in Bangladesh. The findings of this study can be used as reference materials of community health nurses or health care professionals for further study to determine the relationship between the component of the TPB and influencing factors for preventive behaviors of other modifiable diseases.

Community health nurses play a significant role in the promotion and protection of health status of the communities and prevention of disease (Manitoba Health, 1998). They are also accounted as largest number of health care professionals in the community. The community health nurses can implement this concept by educating the young adults by school health education program or focus group education in community setting about the benefits of CVD preventive behaviors. The young adults are more willing to accept opinion for performing the behaviors from subjective norms including their parents, teachers, caregivers, peers, and siblings. The community health nurses can facilitate the opportunities, resource availabilities and remove obstacle of young adults for performing CVD preventive behaviors by co-operation with young adults' subjective norms.

On the other hands young adults' perception of their ability and degree of performance are very essential for controlling self to perform CVD preventive behaviors. The community health nurse can arranged healthy food canteen or sport program at school for performing of physical exercise to increase the young adults' confidence towards CVD preventive behaviors. In addition, they are encouraged to arrange the no-smoking and no-alcohol drinking activities and to provide the opportunities for yoga practice in managing the stress. In addition, this study may help learning more about the TPB that nurse can utilize this knowledge for designing the intervention plan for CVD prevention in early.

CHAPTER 2

LITERATURE REVIEW

This chapter presents a comprehensive review of the related literature relevant to the present study. Specifically, the literature review included concept of young adult, overview of CVD, its risk factors, and preventive measures. In addition, an overview of application of the theory of planned behavior and factors related to intention to perform CVD preventive behaviors were also included. The literature review was divided into four main aspects and its sub categories are as follows:

1. Concept of Young Adult
2. Overview of Cardiovascular Disease
    - 2.1 Risk of Cardiovascular Disease
    - 2.2 Prevention of Cardiovascular Disease
3. Cardiovascular Disease Preventive Behaviors
    - 3.1 Healthy Eating
    - 3.2 Exercise
    - 3.3 Avoidance of Smoking
    - 3.4 Avoidance of Alcohol Drinking
    - 3.5 Stress Management
4. Overview of Theory of Planned Behavior
    - 4.1 Intention to Perform Cardiovascular Disease Preventive Behaviors
    - 4.2 Factors Related to Intention to Perform Cardiovascular Disease Preventive Behaviors.

Concept of Young Adult

Young adult is generally a person between the age of 18 to 25 years. Young adult is a transition period from adolescent to adulthood (Murray & Zenter, 2001). It is characterized by tremendous biological, cognitive, psychological and sexual changes that begin with the onset of fully puberty and final stage of maturation (WHO, 1997). The definitions and opinions about young adult vary from person to person. A successful transition to young adulthood will form a foundation for the individual in future stages of development and transitions. During this period, the individual is typically required to make major adjustments, to develop new skills, or to learn in coping with new experiences (Lenz, 2001).

Transition period is a turning point of human life that provides an opportunity for changing from negative to more positive and developmental pathways in subsequent developmental periods. Young adult in human development is a stage prior to adulthood. They strive to become an independent person, take responsibility by themselves, and make their own decisions (WHO, 1997). There are a number of challenges that young adults must face in different areas if they have successfully entered adult life. Finding their place in society, choosing a profession, developing a value system, developing personal relationships, and building lasting partnerships are some of these challenges (WHO, 1997).

Young adults comprise social bonds or connections with others in the form of friendships and neighborhood relationships. They share intimacy and have close relationship with adequate number of friends and a high quality of intimate love, romantic, or sexual relationships; and frequently interact with parents, partners, and

peers (Hawkins, Oesterle, Karl, & Hill, 2004). During this stage, young adults think in mature manner and take issues more seriously. They are neither children nor adults who have changes in hormonal levels, and are desperate to figure out who they are, what they believe, what their capabilities are, how to trust themselves and what are their purpose and the meaning of life, and they are afraid of death (Briner, 2006).

In conclusion, young adult is a miraculous group. Their prime natures are eager to learn, full of energy, curious, ready for adventure, sociable, trusting, honest, and ready to solve the problems of the world. The majority of young adults are in their school life, college or university. Some may start doing physical works in different organizations during this period. The young adults can be both delightful and challenging for teachers to motivate, hold their attention, and channel their enthusiasm and energy into real learning.

Overview of Cardiovascular Disease

Cardiovascular disease (CVD) is a public health concern around the world, particularly the coronary or ischemic heart disease (CHD), hypertensive heart disease, and rheumatic heart disease. CVD is a circulatory system disease that affects the heart and blood vessels. It is an abnormal condition characterized by dysfunction of the heart and blood vessels, which is caused by narrowing of the inside layer of blood vessels and a reduction of blood supply to the heart (Dokken, 2008).

The cause of CVD is related to multiple risk factors. The followings are the most common risk factors of CVD: family history of coronary heart disease, high cholesterol level in the blood, abuses of tobacco, obesity or over weight, high blood

pressure (hypertension), and history of diabetes (Park, 2002). In addition, unhealthy behaviors including physical ineffectiveness or less exercise, high-fat diet intake and emotional stress are also considered the associated causes of CVD (Tunstall-Pedoe, 1997).

The common symptoms of CVD are: a) Chest pain on exertion (angina pectoris); b) Shortness of breathing or exertion; c) Jaw, back or arm pain-either during exertion or at rest; d) Palpitations (rapid or very rapid heart beats); e) Dizziness, light-headedness, or fainting; f) Weakness on exertion or at rest; and g) Irregular heart beat (Luepker, 1998).

The most important ways to reduce the risk of developing CVD are as follows: a) Changing lifestyle, which is the most powerful way for preventing heart disease and reducing the risk of getting heart disease; b) Eating a heart-healthy diet; c) Lowering of fat intake: calories from fat should be less than 30% of total calorie intake per day or less than 60 grams of fat per day for an adult; d) Lowering the blood cholesterol at the recommended level, especially, the LDL cholesterol; e) Engaging in regular exercise: Exercise strengthens the heart, makes it more efficient and helps in lowering the blood pressure and bad cholesterol (LDL), and raises the good cholesterol (HDL); f) Quitting of smoking; and g) Controlling of high blood pressure and diabetes (Park, 2002; Tunstall-Pedoe, 1997).

Cardiovascular Disease Risk Factors

CVD affects millions of people globally each year. According to National Heart Foundation, USA (2006) there are many dietary and lifestyle factors that may

increase the risk of developing CVD including overweight, high blood pressure, sedentary lifestyle, smoking, alcohol drinking, etc. (as cited in Gidding, 2006). There is a consensus which stated that the risk factors of CVD can be divided into three categories: fixed or non-modifiable group, modifiable group, and others. The fixed or non-modifiable risk factors include family history of heart disease, aging, sex, and ethnicity. The modifiable factors include smoking, hypertension, sedentary lifestyle, and hypercholesterolemia. Other factors such as diabetes, obesity, social class, type 'A' personality, alcohol drinking, infection and other medical conditions are responsible for the development of CVD (Blackburn, 2006; Jamrozik, 2004).

The CVD risk factors among young adults can start from childhood and manifest in adulthood. The principle risk factors for the development of CVD in young adults are physical inactivity, smoking, obesity, unfavorable level of lipids, insulin resistance, diabetes, hyperlipidaemia, and high blood pressure (Wang, 2004).

In conclusion, risk factors for development of CVD have multiple factors, and most of them are behavioral factors. Family history and congenital history of CVD risk are not modifiable whereas behavioral factors are modifiable. Lifestyle modification and practicing healthy behaviors can control and prevent the CVD risk. If the risk factors are detected in the early stage then the further development of CVD can be controlled.

Physical Inactivity

Physical inactivity is a term used to identify people who do not have the recommended level of regular physical activity. Level of energy expenditure close to a resting of metabolic rate contributes to the high prevalence of overweight people

and obesity. Physical inactivity contributes to premature mortality, morbidity, and increasing prevalence of overweight and obesity in industrialized countries (Fotheringham, Wonnacott, & Owen, 2008). Physical inactivity and sedentary lifestyle predispose individuals to numerous chronic diseases including CVD and its related disease (Prasad & Das, 2009). Several epidemiological studies signify that the physical inactivity is directly associated with CVD development (Kruger, Venter, & Vorster, 2003; Waxman, 2004).

WHO (2002) estimated that 22% of global deaths from the total deaths due to ischemic heart disease are related to physical inactivity and the overall of 1.9 million deaths were attributable to physical inactivity (as cited in Trinh, Nguyen, Dibley, Phongsavan, & Bauman, 2008). According to Scher (2007), in the year of 2003 in South Africa, 62% of men and 48% of women at the age of 15 years or more had found sedentary or physically inactive lifestyle. In South Africa, African adolescents spend too much time for watching the television or computer and too few times for exercising in the gym or on the sports field or even walking.

Inactive people have twice the risk of suffering a heart attack and three times a chance of dying immediately after heart attack (Prasad & Das, 2009). Caroline, Andrem, Paulam, and Roney (2004) conducted an observational study to examine the causal relationship of a physical inactivity or sedentary lifestyle and the mortality of CVD. The result showed that 64% of deaths were attributable by a physically inactive or sedentary lifestyle within high risk of CVD of individuals among U.S adults. The condition of physical inactivity is increasing day by day among the number of young adults (Fotheringham et al., 2008).

There are several causes of physical inactivity among young adults including extensive use of computer, watching television instead of playing outdoors games. Young adults get less chance in physical education at school, and also increased use of automobiles and buses for transportation, increased frequency of eating, increased serving sizes, socioeconomic status and increased soft drink beverage consumption, and inconsistent meal patterns and its consequence such as weight gain (Fotheringham et al., 2008).

A study was conducted to determine the prevalence of physical inactivity and associated factors in adult population and found that 41.1% of physical inactivity was associated with individual age, food habits, lack of knowledge and socioeconomic status (Hallal, Victora, Walls, & Lima, 2003). In addition, the study stated that a number of CVD risk factors were significantly associated with physical inactivity, especially in overweight subjects.

In conclusion, physical inactivity is an independent risk factor for CVD development. The main causes of physical inactivity are less movement, high calorie intake, and alcohol drinking. It can be prevented and controlled by regular vigorous or light to moderate exercise and recommended healthy eating.

Obesity

Obesity is a condition that describes the excess body weight in the form of fat. It is associated with many illnesses and directly related to increase mortality and shorter life expectancy. Overweight and obesity is defined as BMI (Body Mass Index) of ≥ 25 kg/m^2 and BMI ≥ 30 Kg/m^2, respectively. WHO (1997) defined obesity as a condition with excessive fat accumulation in the body, to the extent that health and

well-being are adversely affected (as cited in Farajian, Rentiand, & Manios, 2008). The incidence and prevalence of obesity is increasing year by year among people and becoming a significant public health problem at an accelerating rate during past several years in the world (Plourde, 2002).

Obesity is becoming a global epidemic issue among adults and children and it is directly related to hypertension and dyslipidemia (Lavie, Milani, & Ventura, 2009) and it has important ramifications on adult health. It is also an independent risk factor and bears more predictive importance in older than younger adult. This condition is considered as a disease for young adult or warning sign of disease. According Lavie et al., obese people are five times more vulnerable for developing CVD and its associated disease than normal-weighted people. It has a positive correlation with fasting triglyceride and increasing cholesterol levels among young adult to increase CVD (Farajian et al., 2008).

Hamidi et al. (2006) investigated that the frequency of cardiovascular risks factors and their association with severity of obesity in a sample of Iranian 13,086 obese children. They found that 81.9% of obese children and 75.4% of overweight children had at least one risk factor for developing early CVD. A total of 12.9% of obese children had four or five risk factors, while this figure had 8.3% for overweight children. They also found a significant relationship between BMI and systolic blood pressure ($r = .30$, $p < .001$), and BMI and diastolic blood pressure ($r = .24$, $p < .001$). The researcher emphasized on the need of prevention and control of obesity from early stage.

Obesity is a complex condition and may involve a variety of influences including biological, genetic, social, culture and behavioral. The main causes of obesity among young adults are lack of physical exercise, watching too much television, and high consumption of caloric diet (Miller, Rosenbloom, & Silverstein, 2004). Other causes include preferring of drinking soda and juice to of water, preferring of eating sugar including sugar-containing juice; and eating junk foods, cereals, and snacks that increase the total calorie intake.

A study was conducted by Kim, Park, Kim, Kim, and Park (2006) to determine the association between obesity and CVD risk factors among 2, 272 Korean children and adolescents aged between 10-18 years. The results showed that from 1998 to 2001, prevalence of overweight boys increased from 5.4% to 11.6%, and girls from 5.3% to 10.9% ($p < .001$). In 2001, the overweight children and adolescents showed a strong association with systolic hypertension, high total cholesterol, high LDL cholesterol, low HDL cholesterol, and high triglycerides. These findings suggested that overweight Korean children and adolescents might have an increased risk of CVD mortality and morbidity in adulthood.

The consequences of being overweight or obese among young adults are shorter life expectancy, unhealthy, and more risk to develop CVD and its related diseases and problems (Lavie et al., 2009). It can affect the young adult's psychological and emotional well-being and can cause a low self-esteem. Therefore, to keep them healthy and to prevent from those above consequences, they require practicing regular physical exercise, increasing energy expenditure, and eating healthy diet (Koo, 2009).

In conclusion, the early identification of young adult obesity is important for designing an intervention plan to avert the long-term consequences against the risk of CVD. The young adults can prevent their obesity by avoiding of sugar-filled snacks, soda and other junk foods, replacing with fruits and vegetables, good protein sources such as low-fat yogurt and raw eggs, regular exercising and control of weight. The young adults who are overweight and obese need half an hour of daily exercise of at least three times per week which can help them free from CVD risk.

Hypertension

Hypertension or high blood pressure refers to repeatedly elevated blood pressure exceeding 140 and 90 mmHg. A systolic pressure is above 140 with a diastolic pressure above 90 mmHg is called hypertension. It is a condition where the pressure of the blood in the arteries is too high, which makes the heart work harder and increases risk for developing CVD (Park, 2002).

There are two types of hypertension: essential hypertension and secondary hypertension. Essential hypertension, also known as primary hypertension, has no clear cause and is thought to be linked to genetics, poor diet, lack of exercise and obesity that increases the risk of cerebral, cardiac and renal events. In 90 to 95 percent of high blood pressure cases in adults, there's no identifiable cause and it tends to develop gradually in the upcoming future. On the other hand, secondary hypertension is high blood pressure which is caused by another medical condition and it differs from the usual type of high blood pressure (essential hypertension), but it is often referred to as high blood pressure (Texas Heart Institute, 2010). Approximately 5 to 10 percent of high blood pressure cases are caused by an underlying medical

condition or factors. It tends to appear suddenly and causes higher blood pressure than primary hypertension does. Various conditions and medications can lead to secondary hypertension and these conditions can also make high blood pressure more difficult to control (Carretero & Oparil, 2000).

Hypertension affects one quarter of the adult population, approximately 50 millions of young adults in the world (Nesbitt, Vongpatanasin, & Victor, 2004). It is a single biggest risk factor for the development of CVD and plays a significant role in heart attacks (Havas, Roccella, & Lenfant, 2004). It is also a contributing factor to the eventual thickening of walls of blood vessels. This increases the possibility of heart attacks and strokes. Hypertensive cardiovascular disease is one of the leading killers at present; around 7 people out of every 1000 suffer from this disease (Park, 2002).

A study was conducted to examine whether prehypertension was associated with increased cardiovascular disease (CVD) mortality risk and the association of blood pressure with CVD outcome is modified by social demographics or hypertension treatment and control. The result strongly supported that there was a significant and independent association of elevated blood pressure and CVD mortality risk (Gu, Burt, Paulose-Ram, Yoon, & Gillum, 2004). A similar study had been conducted by Vasan et al. (2001) to determine the association between blood pressure category at baseline and the incidence of cardiovascular disease on follow-up among 6,859 participants in the Framingham heart study. The result revealed that high blood pressure was associated with an increased risk of cardiovascular disease. Even though hypertension is not curable, but literature strongly emphasized that the effective role

of healthy life and life style modification can control and prevent the problem as well as reduce the mortality and morbidity from CVD.

Smoking

Smoking is a practice to take a substance, most commonly tobacco, then burn and taste or inhaled the smoke. Nicotine in cigarette is the most important component; it plays a major role for increasing cardiac output, heart rate, and blood pressure and increases the risk of myocardial infarction (Ambrose & Barua, 2004). Vast evidence supports the conclusion that cigarette smoking causes various adverse cardiovascular events and acts synergistically with hypertension and dyslipidemia to increase the risk of coronary heart disease (Primatesta, Falaschetti, Gupta, Marmot, & Poulter, 2001). To investigate the differences in blood pressure between smokers and nonsmokers among the English adult (≥ 16 years old) population, a study was conducted by Primatesta et al. (2010). The result showed that among women, light smokers (1 to 9 cigarettes /day) tended to have lower blood pressure than heavier smokers. Among men, a significant association was observed between BMI, level of the blood pressure and smoking habits.

Cigarette smoking elevates heart disease risk by multiple mechanisms. It increases blood pressure and makes the blood more likely to clot and the carbon monoxide in smoke can damage the lining of the arteries. It links to elevated blood triglyceride levels and lower levels of high-density lipoprotein (HDL) cholesterol (Primatesta et al., 2001). It also links with endothelial dysfunction in healthy young adults that contributes to the early development of CVD risk factors (atherosclerosis) with higher serum levels of cholesterol. There is an evidenced that the influence of

smoking is independent of, but synergistic with other risk factors. The major effects of smoking on cardiovascular system are stimulation of central nervous system by nicotine and displacement of oxygen from hemoglobin by carbon monoxide. In addition, smoking affects a repetitive toxic injury to the endothelial cells by smoke, thereby accelerating atherogenesis (Bagchi et al., 2001).

Deaths from smoking continue to rise around the world. In 2000, 4.83 million premature deaths were linked to smoking, 2.41 million were in developing countries, and 2.43 million were in industrialized countries. According to WHO's report, the leading cause of death from smoking was cardiovascular diseases, which was about 1.69 million. Out of 300 million people who started smoking habit during adolescence period, 150 million people died of smoking related causes later in life. Lastly, in 2003 almost 5 million died prematurely each year because of smoking (WHO, 2002).

Smokers are two to four times more susceptible to develop coronary heart disease, two times for risk in stroke and ten times for developing the other CVD related diseases than non-smokers (Primatesta et al., 2001). Jenei et al. (2000) conducted a comparative study to determine the contrast between the smoker and non-smokers on major CVD risk factors. The study outcome revealed that there was a strong association and increasing risk with smoker ($p < .001$) for developing high blood pressure than nonsmoker.

A case control study was conducted by Bagchi et al. (2001) to examine the association between CVD risk in smoker and non-smoker group in medical college hospital in Calcutta among cardiology and surgery department. The result revealed that there was a statistical association of smoking and coronary heart disease.

Smokers were 5.06 times greater in developing CVD than non-smokers ($p < .001$). Similarly, Freedland, Carney, and Skala (2005) conducted a study to examine the relationship of smoking and coronary heart disease and the finding showed that smoking had direct effect on morbidity and mortality in CVD.

The causal factors that lead to smoking in early young adults include the adolescent themselves, close relatives, neighbors, friends, and the environment. The young adult period is transitional period from childhood to adulthood (Faucher, 2003). Smoking behavior of young adults often becomes consolidated and continues into adulthood, playing a crucial role in lifetime health and well-being.

In conclusion, it was found that smoking is the significant risk factor for the development of CVD among young adults. Prevention and cessation of smoking among young adults should be considered and given priorities, as an important emerging health problem for them. Evidence-based smoking prevention program in community setting, school health educational program and family therapy can prevent young adults' smoking habit in earlier stage.

Alcohol Drinking

Drinking alcohol abuse is a major public health issue that has no socioeconomic, ethnic, educational, or geographic boundaries. It is a leading cause of morbidity, premature mortality, and loss of productivity (Jones, Modeste, Anderson, Lee, & Lim, 2007). There is a strong connection between alcohol drinking and consequences of CVD morbidity, and also between heavy alcohol consumption and the elevation of blood pressure (Murry et al., 2002). According to Rehm, Gmel, Sempos, and Trevisan (2003), carefully analyzing the connection between alcohol

and cardiovascular disease is important because it damages the heart muscle, elevates blood pressure, increases atherosclerosis, increases heart rate, and serum cholesterol level. Alcohol also creates plaques in coronary arteries.

There are several internal and external factors that influence young adults to drink alcohol. The internal factors are gender, personality, and biological traits. The external factors include social norms, physical availability, and prices of alcoholic beverages. Gender and age are important factors, affecting drinking behavior. In almost every society, young adult males drink more often than young adult females (Slutske, 2005).

Alcohol drinking is the most commonly abused substance among adolescents or young adults. The rates of alcohol drinking among college students and young adults are also increased by peer influence on alcohol drinking (Schoor, Bot, Rutger, & Engels, 2008). A comparative study found that college students were more tempted to drink alcohol than the non-college attending peers (Slutske, 2005). The young adult college students are often undergoing through a stage of transition such as moving away from the family for the first time, residing with other students, and experiencing reduced adult supervision and that may increase the risk of drinking alcohol and abuse. They also frequently live in different physical and social environments and meet new social and institutional factors (e.g., college parties, football weekends) that may foster heavy alcohol drinking (Windle, 2003).

A relatively high intake of alcohol was shown to be associated with elevated blood pressure and increased risk of cardiovascular disease. Drinking more than four drinks per day has a direct toxic effect on the heart. According to Mukamal et al.

(2003), high number of drinks (3 to 4 or 5 to 7 drinks/ day in a week) has been linked with risk of developing CVD. Similarly, Tanasescu, Hu, Willett, Stampfer, and Rimm (2001) found that alcohol drinking was associated with risk of CVD in men. In conclusion, the risk of coronary disease and alcohol intake has a significant relationship.

Stress

Stress is defined as an individual state of high arousal and displeasure. It is an independent risk factor for heart disease and a large number of literatures indicated the strong relationship between stress and CVD (Bunker et al., 2003). It creates the flow of adrenaline and blood clot more swiftly, and by getting insufficient support for pumping of blood through the heart it increases the risk of developing CVD (Frydenberg & Lewis, 2004). A study was conducted by Nielsen et al. (2006) to examine the association between psychological stress and CVD and found that perceived stress affects the incidence of CVD related disease (ischemic heart disease). The study also found that high stress was associated with a higher rate of admissions to hospitals with suffering of CVD.

There are three main components of stress with CVD in young adults which are, type A behavior pattern or hostile attitudes, time urgency or impatience, and achievement striving or competitiveness. Anger and hostility are also related to an increased risk of CVD. The association of anger with heart disease may be mediated acutely through catecholamine release and increased cardiovascular reactivity (Chang, Ford, Meoni, Wang, & Klag, 2002). In addition, some continual factors have an influence on stress among young adults in their daily such as exams, arguments,

homework, being harassed, being left from the group, moving to a new school and taking on a new responsibility (Frydenberg & Lewis, 2004). A study was conducted to determine the association between anger, stress from studying, and CVD causality among young adult male medical students. The study found that higher level of anger and study stress was associated with increased incidence of CVD (Chang et al., 2002).

In conclusion, a strong and substantial relation exists between self-reported stress and self reported symptoms of coronary heart disease. Individuals with a general tendency toward negative perception of different aspects of life may report both higher level of stress and more cardiovascular symptoms

Prevention of Cardiovascular Disease

A global CVD epidemic is rapidly evolving. Even though the advancement of medical science is ongoing in developed counties, but for CVD, it is still a major problem in developing countries (Gaziano, 2007). Most developed countries have large-scale programs to improve prevention and management of CVD, but the content and focus of these programs vary substantially. For instance, some programs focus on improving the management of chronic care for patients with established CVD, including lifestyle change and pharmaceutical treatment (Lieshout, Wensing, Cambell, & Grol, 2009). The program for prevention of CVD in developing countries is in the state of infancy compared to pharmacological management in developed countries. Prevention and control is the most cost effective method of reducing morbidity and mortality, which can prevent disability and early death. Moreover,

changing life style and management of major CVD risk factors are very essential (Baker, Little, & Brownell, 2003).

There are many risk factors associated with the development of cardiovascular disease. Some risk factors that contribute to the development of CVD can be prevented, and some cannot. Among these risk factors, high blood pressure, high blood cholesterol, overweight, and obesity, less physical activity, tobacco consumption, and alcohol drinking are preventable.

Lifestyle and medical management options exist for primary and secondary prevention of cardiovascular disease, yet risk reduction. Individual lifestyle modifiable factors are associated with lower risk for developing CVD and its associated diseases (Chiuve, McCullough, Sacks, & Rimm, 2006). Therefore, it is important to identify the appropriate risks of individual. After the detection of risky individual, it will be easier to design a way for prevention before clinical appearance of CVD. Individual perception and awareness regarding preventive measure have strong effect on CVD prevention.

Understanding of cardiovascular disease, risk factors, symptoms, and preventive practice are an important pre-requisite for an individual to implement behavioral changes leading towards CVD prevention. Even with increased knowledge about the risk factors and improved treatment option, CVD remains the leading cause of death and greater concern due to less positive attitude and behaviors towards healthy lifestyle (Collins, Dantico, Shearer, and Mossman, 2004). Collins et al. analyzed college students' attitude about heart disease risks and preventive strategies at Arizona State University. The result revealed that the students were unable to

identify the most important risk factors for developing heart disease owing to the low level of knowledge about heart disease. This finding suggested that adequate knowledge and information are essential to identify the risk factors for CVD development which can lead to increase awareness of CVD preventive behavior.

Similar study was conducted to assess the awareness, level of knowledge, and perception of CVD among adolescents. The findings revealed that adolescents' lack of knowledge is a major concern in preventing the development of CVD in latter and only 14% adolescent were able to recognize the risk of CVD (Vanhecke, Miller, Franklin, Weber, & McCullough, 2006).

According to Wills and Naido (1998), three levels of interventions are typically promoted for the prevention of cardiovascular diseases which are primary, secondary, and tertiary level. Primary prevention is the strategy of prevention of CVD risk before onset among asymptomatic people. Secondary prevention is the strategy of preventing the progression of CVD risk among symptomatic people by identifying and reducing risk behaviors. Tertiary prevention is also the strategy for prevention of avoidable complication of CVD and its related condition. CVD can be prevented through maintenance of healthy life styles. Many healthy life styles including eating healthy food, doing regular exercise, body weight maintenance, avoidance of smoking and alcohol drinking and stress management may individually lower the risk of CVD development.

Cardiovascular Disease Preventive Behaviors

CVD preventive behaviors are any activities undertaken by an individual to keep oneself healthy for the purpose of preventing or detecting the development of

CVD. The prevention of CVD ideally consists of both lifestyle improvement and disease management. The improvement of health-related behaviors is a foremost component for preventing the CVD in public health (Glanz, Lewis, & Rimer, 1997). CVD health promoting behaviors are eating healthy food, maintaining normal body weight by regular exercising, controlling blood pressure and cholesterol level, avoiding unhealthy behaviors (smoking, drinking alcohol) and managing psychological stress (Park, 2002).

Aforementioned healthy behavioral practices are not only to prevent CVD-related disease but also to maintain, improve health condition and help the restoration of health. This type of practice can be either voluntary or involuntary. Healthy eating and lifestyle modification are more important for the prevention of CVD risk. The young adults can promote their health by consumption of homemade food, doing regular sports/exercise, performing meditation and spiritual practice for controlling stress from studying and keeping away from unhealthy behaviors. Preventive health behavior generally follows from a belief that such behavior will benefit for good health and improve or enhance health. This type of behavior includes both primary prevention and early detection (Sande et al., 2001).

Healthy Eating

A healthy diet contains a balance of food groups and all the nutrients necessary to promote good health (Temple, Wilson, & Jacobs, 2006). Healthy eating is important to the nurturance of health and plays a major role in preventing disease and creating capacity for energetic and productive life (Pender, Murdaugh, & Parsons,

2006). It can help keeping blood cholesterol low and decreasing the chance of developing heart disease. To prevent cardiovascular disease and promote weight loss, low fat diet (particularly saturated fat) and high complex carbohydrate were recommended. Several evidences suggested that healthy dietary pattern can reduce CVD by modifying risk factors such as obesity, dyslipidemia, and hypertension (Zarraga & Schwarz, 2006).

Even though cardiovascular disease is the number one killer disease in both age groups of people, but to stop the incidence of an unhealthy heart, the first thing a person should do is eating heart healthy diet in early stage which can help restraining the incidence of an unhealthy heart (Temple et al., 2006). It is not just for people with existing health problems but it is also suitable for anyone. There is evidence which supported that eating healthy diet can reduce the risk of different illnesses such as obesity, hypertension, and heart disease (Hoekstra, Beulens, & Schouw, 2009).

Low Fat and Low Calorie Diet

Eating low fat diet which is low in saturated fat helps reducing the amount of fatty deposits that are building up in blood vessels. It is an important causative factor for having a heart attack (Temple et al., 2006; Walker & Reamy, 2009). An epidemiological study found that diets low in saturated fat is associated with lower level of LDL, low cholesterol level and decreased blood pressure. Low fat diet has many effects on weight loss for prevention of CVD risk.

Another study was conducted to evaluate the effects of low and moderate fat diets to the CVD risk factors (weight loss, changes on lipid and lipoprotein). The result showed that moderate fat consumption group elicited favorable changes in the

lipoprotein profile, weight loss and improves CVD risk profile (Pelkman et al., 2004). A comparative study was conducted by Lovejoy et al. (2003) to determine the effects of low fat containing food on risk for heart disease. The result showed that consumption of low fat containing diet for 9 months had made a significant change in reducing the risk of CVD. American Heart Association recommends low calorie and low fat diet with an energy intake of 1500 kcal per day for women and 1800 kcal per day for men, with 30% of calories from fat, 10% of calories from saturated fat. In addition, cholesterol intake of 300 mg per day can reduce the risk of developing cardiovascular diseases (Shai et al., 2008).

Low Sugar or Low Carbohydrate Diet

High intake of carbohydrates can raise plasma fasting triacylglycerol, and can also reduce HDL and thus creates an adverse lipid profile. Low carbohydrate diet refers to the absence of adequate carbohydrate. It produces nutritional ketosis and begins diuretic effect which leads to weight reduction. It has a great role in reduction of fasting serum for a significant CVD risk prevention. Some study had shown that very low carbohydrate diets can result in greater reductions in body mass and affects the composition of weight loss and distribution of fat loss (Liu et al., 2000b; Sondike, Copperman, & Jacobson, 2003; Volek et al., 2004).

A cohort was study conducted by Liu et al. (2000b) to valuate the relations of the amount and types of carbohydrates with risk of coronary heart disease (CHD) of 75, 521 women aged 38-63 years with no previous history of CVD and diabetes mellitus in Boston with a 126-item semi quantitative food-frequency questionnaire that included detailed assessment of carbohydrate-containing foods. The study

findings suggested that a high intake of rapidly digested and absorbed carbohydrate increases the risk of CVD and independent of conventional risk factors for the development of coronary disease.

More Vegetables and Fruits

Fruits and vegetables contain much essential nutrition such as dietary fiber, potassium, and antioxidants, which have been associated with reduced risk of CVD. Fruits and vegetables are rich in fiber, less fat, and antioxidants, which help decreasing the risk of heart disease and obesity. The antioxidant helps preventing LDL cholesterol that blocks up arteries. Svendsen, Blomhoft, Holme, and Tonstad (2007) assessed the effect of an increased consumption of vegetables and fruit on body weight, risk factors for CVD and antioxidant defense. The result showed that more intakes of vegetables are a significant contributor to the change in weight and reduced systolic and diastolic blood pressure.

Dietary fiber comes exclusively from plants in which the fiber provides structural strength for the plant. There are two types of fiber: soluble and insoluble. Soluble fiber is found in beans, oat bran, and psyllium, while insoluble fiber is found in vegetables and fruits of all sorts. Dietary fiber is an important function to control appetite and body weight and Psyllium is effective in lowering LDL cholesterol by ≥ 10%. Epidemiologic studies supported that dietary fiber intake can help preventing obesity (Liu et al., 2000a). A study was conducted by Salvin (2005) to find out the effect of dietary fiber on weight loss and weight maintenance. The result showed a significant outcome of dietary fibers which can decrease the body weight and food intake.

Another study was designed to examine the higher intake of dietary fiber which was inversely related to the risk of CVD. The result showed that higher intake of dietary fiber was associated with a lower risk of CVD (Liu et al., 2000a). These data generally support that current dietary recommendation needs to increase the consumption of fiber rich whole grains, fruits, and vegetable as a primary preventive measure against CVD. Finally, high consumption of fruits and vegetables, particularly green leafy vegetables, has a positive effect in prevention of the risk of developing CVD. Several study recommended that consumption of abundance fruits and vegetables can prevent CVD early.

Low Salt Intake

A high sodium intake is associated with increased cardiac death, and a major cause of systolic hypertension, and an independent predictor of sudden death. Several prospective studies found that high dietary sodium might lead to cardiovascular events such as heart attack, coronary heart disease, stroke, and myocardial infarction directly even in the absence of hypertension (Morgan, 2000).

The daily requirement of salt for adult is 6 grams, 5 grams per day for children aged 7 to 10 years, and 3 grams for children aged 4 to 6 years. Dietary salt intake is linearly associated with increased blood pressure. Blood pressure is the most powerful predictor of cardiovascular events. Reduced sodium intake approximately 100 mmol/day can prevent high blood pressure and can potentially prevent CVD event among overweight individuals (He & MacGregor, 2003). A prospective study revealed that the higher intake of salt increased the incidence of cardiovascular events (Cappuccio, 2007). The researcher suggested that lowering sodium intake may have

adverse effects on the vascular endothelium through stimulation of the rennin-angiogenesis system and adverse effects on serum total and LDL cholesterol levels.

A study was conducted by Cook et al. (2007) to examine the effects of reduction in dietary sodium intake on cardiovascular events. The result found that the risk of a cardiovascular event was 25% lower among those in the intervention group whose took less sodium. A meta-analysis was conducted by He and MacGregor (2003) to determine the effect of salt reduction on blood pressure and found that after 4 weeks of 78 mmol salt reduction within 24 hours, the systolic and diastolic blood pressure was decreased among hypertensive (7.11/4 mmHg, $p < .001$) and non hypertensive (3.57/2 mmHg, $p < .05$) respectively.

In conclusion, it is found that the reduction of dietary sodium can significantly lower the blood pressure of person with hypertension or without hypertension. The effect of the reduction in dietary sodium on blood pressure tends to persist over time with lower risk of further CVD development.

Exercise and Physical Activity

Physical activity is defined as any bodily movement produced by skeletal muscles which results in energy expenditure beyond resting expenditure in order to improve one's health (Prasad & Das, 2009). Exercise is a subset of physical activity, which is planned, structured, repetitive, and purposeful in the sense that improves and maintains of physical fitness (Thomson et al., 2003). Regular physical activity is essential for healthy and energetic life, psychological stability, and it also assists high

level of individual for a productive life. It also decreases the risk of obesity, heart disease, hypertension and its associated CVD (Pender et al., 2006). American College of Sport Medicine recommended that adults accumulate at least 30 minutes a day of moderate intensity activity on most days, and preferably all days of the week or 3 times per week and vigorous endurance exercise for at least 20 minutes, three or more times per week (as cited in Manson et al., 2002). Physical exercise and activity are important components for weight loss. Study evidenced that maintaining long-term weight loss is a significant healthy behavior for controlling blood pressure, reducing risk of heart disease (Thompsom et al., 2003).

Three types of physical activities- occupational, leisure, and lifestyle activity produce CVD adaptations through increased exercise capacity, endurance, and skeletal muscle strength. These activities may require light, moderate, or vigorous effort. The moderate and high level of physical activity helps producing a beneficial effect on reducing CVD risk directly. A study was conducted by Mora, Cook, Buring, Ridker, and Lee (2007) to determine the association between higher level of physical activity and CVD events and the result revealed that risk of CVD had decreased linearly with higher level of physical activity.

Leisure time physical activity is a physical activity undertaken during flexible or optional time. It is associated with reduced risk of CVD and cardiovascular mortality in both men and women and in middle-aged and older individuals. Exercise is leisure time physical activity conducted with the intention of developing physical fitness (Pender et al., 2006). Jogging, swimming, and dancing are leisure time exercise. A hospital based case control study was conducted by Rastogi et al. (2004)

in India to determine the relationship between leisure-time exercise, sedentary activity and risk of CVD. The study was conducted in a hospital in New Delhi and Bangalore, which involved 350 cases of acute myocardial infarction and 700 controls matched on age, gender, and their ages were between 21-74 years. The result revealed that leisure-time exercise group had less risk of CVD than sedentary lifestyle group. The subject performed leisure-time activity as brisk walking for 35-40 minutes per day.

Lifestyle physical activity is characterized as integration of numerous short bouts of moderate activity into daily living. Walking briskly, gardening, and bicycling are the lifestyle physical activity. Lifestyle activities such as walking and vigorous exercise are associated with substantial reductions in the risk of CVD events (Pender et al., 2006). An observation study was conducted by Manson et al. (2002) among 73,743 subjects to examine the total physical-activity score, walking, vigorous exercise and hours spent sitting as predictors of the incidence of coronary events and total CVD events. The result revealed that the increasing physical-activity score had a strong association with the lower risk of both coronary events and total CVD events ($p < .01$).

Physical activity appears to be an important factor in both primary and secondary prevention of CVD (Wannamethee & Shaper, 2001). It is recommended for people aged 18-65 years to participate in moderate-intensity of aerobic exercise for a minimum of 30 minutes on five days each week to reduce the risk of cardiovascular diseases. In addition, walking 30 minutes and jogging for 20 minutes for two days per week are supporting factors for reducing CVD risk. Therefore, it can be concluded that higher levels of physical activities are associated with lowering risk of CVD.

Avoidance of Smoking

Smoking is a high risk factor for heart disease because the carcinogen present in cigarette is part of the connection between smoking and heart disease. These chemicals get absorbed into the blood stream when one smokes or breathes in second hand cigarette smoke. These chemicals will contaminate the heart and other organs as they circulate around the body. When the nicotine from the cigarettes builds up in the blood stream, the blood becomes thick and is more prone to clotting. Nicotine will also build up in the valves leading to the heart; affect their functions, which can cause a heart attack (Unal, Critchley, & Capewell, 2003).

Many heart disease patients had noticed an almost immediate improvement when they stopped smoking. Many times they needed less medication and better coping with physical exertion. Quitting smoking also reduces 25 percent of risk of a subsequent fatal heart attack. An observational study estimated that smoking cessation reduces the risk of subsequent mortality and further cardiac events among patients with CVD. Results showed that crude relative risk of mortality for patients with CVD was 36% lower those who quitted smoking compared to those who continued smoking (Critchley & Capewell, 2003). Therefore, stop smoking may have a greater effect on reducing the risk of mortality among patients with CVD who smoke than other intervention or treatment. Another study was conducted to examine the efficacy of an intervention for smoking cession with CVD patient, and the study outcome revealed that after 12 months of no-smoking, individual has less 57% chance of admission than those who smoke repeatedly (Patricia, Smith, & Burgess, 2009). A person who is concerned about CVD should not pick up smoking or should stop

smoking immediately. Early studies reported that those individuals who quit smoking had a substantial decrease in risk for cardiovascular disease as compared to those who continued to smoke (Joseph & An, 2001).

There are several important preventive behavior and activities which can prevent smoking habits early and easily among young adults. Among them, smoking behaviors can be modified by personal motivation and parental involvement of consciousness towards their young children is very important in this regards (Patricia et al., 2009). Educational environment should also be freed from smoking, prohibit of excess production, and actually, governmental initiation and periodical education program through mass media can prevent young adult from smoking addiction.

In conclusion, Smoking is a high risk factor for heart disease because the carcinogens in the cigarettes contribute to various heart problems as an independent risk factor for developing CVD. This habit can be prevented by education. Smoking among young adults can also be prevented by increase the awareness of smoking adverse effects through periodic health education program.

Avoidance of Alcohol Drinking

Drinking too much alcohol can raise the level of fats in the blood vessels. It can also lead to high blood pressure, heart failure and an increased calorie intake (American Heart Association, 2009). It was well documented that light to moderate alcohol drinking was associated with risk of major CVD events (Burger, Mensink, Bronstrup, Theirfelder, & Pietrzik, 2004). Several studies suggested that the effect of heavy alcohol drinking is an independent risk factor for CVD. The most favorable

CVD risk factor profiles among women who drinks 10–20 g alcohol/day in addition to heavier drinking is related to higher prevalence of cardiomyopathy, hypertension, and cardiac arrhythmias (Burger et al., 2004; Freeland et al., 2005).

Alcohol drinking can be prevented in many ways. The National Institute on Alcohol Abuse and Alcoholism (2005) mentioned that the following ways could prevent alcohol drinking among young adults in school and home: using alcohol-related campus incidents as teachable moments, speaking out and fostering debate on alcohol-related issues, incorporating alcohol issues into courses, helping initiate and support the development of multifaceted prevention programs. Developing specific courses or projects on alcohol issues, teaching related interpersonal and intrapersonal skills, monitoring how they personally discuss alcohol issues and the examples they set socially, and working on campus and joint campus-community coalitions (as cited in Burger et al., 2004).

In conclusion, it was found that several prospective studies have repeatedly mentioned that nondrinker of alcohol had a reduced risk of death from coronary heart disease (CHD). Alcohol drinking can be prevented by the controlling of production, distribution, sale, and consumption of alcohol in individual.

Stress Management

Stress can increase the adrenaline level which is related to an increased risk of heart disease. It makes the blood clot more readily and increases the risk of heart attacks (Frydenberg & Lewis, 2004). Stress management starts with identifying the sources of stress. People manage their stress in different ways depend on the level or

the degree of stress such as involving with different activities or keeping away from others (Lucini, Riva, Pizzinelli, & Pagani, 2007).

According to Smith, Jaffe-Gill, and Segal (2008), the successful healthier stress management strategy has four types as follows: avoid, alter, adopt, and accept. The first strategy is to the avoid unnecessary stress which includes, learning how to say no, avoiding people with stress present, controlling of stressful environment, avoiding hot-button topic and paring down to do list. The second strategy is to alter situation which is, express feeling instead of bottling them, willing to compromise others, be more assertive, and managing the time. The third strategy is to adopt the stressors, which is to reform the problems, adjusting the thought in a more positive way. The last stress management strategy is to accept the things that can't change such as don't try to control the uncontrollable, like death of the love ones, or a serious illness. Looking the on the bright side and sharing the feeling with others are very important in order to prevent stress, it helps ventilating the sorrow matter, and lastly, learning to forgive and forget about negative issues or anger.

Many psychologists stated various opinions for dealing with young adults stress management (Klotz, 2004; Scott, 2010). Broadly it can be categorized two ways: the parental roles and individual roles (Focus Adolescent Services, 2008) .Roles of the parents are encouraging the young to talk freely about what they are going through, and be willing to listen. Be a good friend to the younger and offer reassurance, encouragement, and give them support. Encouraging the young to participate in activities with enjoyment is useful for effective stress management. Parents should build a good relationship with their kids so that they feel comfortable

to get help from the parents. It provides the young adults to build a trusty relationship in the family and increase their mental stability, and predictability.

Other important practices of an individual for managing the young adult's stress are; showing assertiveness with classmate, trying to finish homework on time and learning about relaxation exercises or yoga practice with rehearsing and practicing situations. The important strategies for prevention of stress are learning about the practical and effective coping skills, trying to decrease negative self-talk and others. In addition, learning to feel good about doing a competent job for self and for the group, taking a break from stressful situations and building a network of friends can help preventing stress successfully (Focus Adolescent Services, 2008).

Overview of Theory of Planned Behavior

The theory of planned behavior (TPB) is an extended theory from the theory of reasoned action (TRA). Both theories are based on social psychology and were attempting to understand the predicted behavior. TRA was developed by Fishbein and Ajzen (1975), as a way to predict behavioral intention (Fishbein & Ajzen, 1975). The purpose of this theory was to predict and understand human behavior (Armitage & Conner, 2001). This theory is based on the notion that intention is the result of two determinants: (1) the individual's thoughts, either positive or negative, toward performing the action and (2) the person's perceptions and social pressure to perform or not to perform the behavior. These two determinants are referred in the TRA as "attitude toward the behavior" and "subjective norm" respectively (Ajzen, 1985; 1991).

According to this theory, if people evaluate the suggested behavior as positive (attitude), and if they think their significant others wanted them to perform the behavior (subjective norms), they will have higher intention and are more likely to do so. A high correlation of attitude and subjective norms to behavioral intention, and subsequently to behavior had been confirmed by many studies (Hillhouse, Turrisi, & Kastnner, 2000; Pawlak et al., 2007).

In some studies, a counter argument against the high relationship between behavioral intention and actual behavior has also been proposed and the results s of those studies do not show that behavioral intention always lead to actual behavior because of circumstantial or environmental limitations (as cited in Morisky, 2010). Ajzen in 1985, stated that behavioral intention cannot be the exclusive determinant of behavior where an individual's control over the behavior is incomplete (as cited in Leeman & Ong, 2008). Therefore, Ajzen (1985) introduced the theory of planned behavior by adding a new component "perceived behavioral control" with attitude, subjective norms. By this, he extended the Theory of Reasoned Action to cover volitional behaviors for predicting behavioral intention and actual behavior (as cited in Haksym, 2008).

The TPB postulates three conceptually independent determinants of intention. Intention is the best predictor of behavior. It is the cognitive representation of a person's readiness to perform a given behavior and it is considered as the immediate antecedent of behavior. This intention is determined by three kinds of considerations: attitudes towards the specific behavior, subjective norms and perceived behavioral control (Ajzen, 2006b).

The first is the attitude towards the behavioral intention which refers to the degree to which a person has favorable or unfavorable evaluation or appraisal of the behavior in question. The second predictor is a social factor termed subjective norm, refers to the perceived social pressure to perform or not to perform the behavior. The third antecedent of intention is the degree of perceived behavioral control that refers to the perceived ease or difficulty of performing the behavior. It is assumed to reflect experience as well as anticipated facilities, impediments and obstacles (Ajzen, 1991; Ajzen, 2006a). As a general role, the more favorable attitude and subjective norm, and greater perceived control have stronger person's intention to perform the behavior (Armitage & Conner, 2001).

Intention to Perform CVD Preventive Behaviors

People are expected to carry out their intentions when the opportunity arises. Empirical referent for the concept of intention is assumed as the capture of motivational factors that influence behavior, including people's wiliness and effort to perform the behavior. According to Bandura (1997), an intention of action originates from an actor's desires and wishes; it is influenced by motivation, emotional state, and concept of self as the active agent (as cited in Burks, 2001). Intention and behavior are hold to be strongly related when measured at the same level of specificity in relation to the action, target, context, and timeframe (Ajzen, 2006b).

Individual intention to perform given behavior is a central factor that explained the theory of planned behavior (Ajzen, 2006a). It was assumed as an immediate antecedent of behavior (Ajzen, 1991). The young adult intention to

perform CVD preventive behaviors is assumed as their mental readiness or decision and willingness to practice CVD preventive behaviors. It can be measured by whether a young adult has strong wiliness, commitment and efforts and planning to perform healthy behaviors and avoidance of unhealthy behaviors. In this regards, intention to perform CVD preventive behaviors among young adult's is an indicator of how hard they are willing and motivated to perform healthy behaviors such as eating healthy food, regular exercising, avoiding of smoking and alcohol drinking and practice stress management.

Intention to perform CVD preventive behavior is the individual's complete and strong exertion of readiness to perform behavior, based on attitude towards the behavior, subjective norm, and perceived behavioral control. Individual positive evaluation of CVD preventive behaviors and outcome of behaviors is considered as their attitude towards positive intention to perform CVD preventive behavior. Subjective norms towards intention is the young adult's feelings about their parent, teacher or friends' opinion and motivation to comply for performing CVD preventive behaviors. The theory of planned behavior stated that individual perceived ability and perceived behavioral control is held to affect intention (Ajzen, 2006b). It is the young adult's feeling about the degree of ability of performing CVD preventive behavior. The stronger the intention, the more likely the person is to perform that stated preventive behavior for CVD prevention.

Factors Related to Intention to Perform CVD Preventive Behaviors

Several factors may have an influence on a person's intention to perform healthy behaviors such as, socio-demographic factors and cognitive or psychological factors which include individual attitude or behavioral belief, normative belief or subjective norms, and perceived behavioral control (Droomers, Schrijvers, & Mackenbach, 2004; Glanz & Bishop 2010; Kearney, Kearney, Dunne, & Gibney, 2000).

Socio-demographic factors play important roles on individual behavioral intention and practice. These factors include age, gender, level of education, religious and socio-economic status (Smith, Bean, Mitchell, Speizer, & Fries, 2007). These factors may also have a significant contribution on the intention to perform CVD preventive healthy behaviors. A brief discussion about demographics factors are given as follow:

Socio Demographics Factors

Age. People in different age group shows different intention about their health practice behaviors which may contribute to the development of various diseases including CVD (Leaman & Gee, 2006; Leven, 1989). To examine predictor of smoking intentions among current adolescent non-smokers and smokers as well as risk factor associated with smoking status, a questionnaire survey was completed among the people in the age ranged from 12 though 18 years. The results showed that contribution of adolescent's non-smoking intention was significantly different. The age group from 12 to 13 years had higher (β =1.94) intention than the age group from 14 to 15 years (β =1.39). The result also showed a significant contribution towards non–smoking intention ($p < .05$) (Tyc, Klosky, Throckmorton-Belzer, Lensing, & Rai, 2004).

Gender. Study had examined and found that gender differences is the cause of different intention to perform healthy behaviors between male and female adolescent based on belief, self-ability and barrier and biological differences. In particular, the female adolescents had higher willingness to eat healthy diet, avoidance of smoking and alcohol, and participation in physical exercise than male (Diaz, Marshak, Montgomery, Rea, & Backman, 2009; Fila, & Smith, 2006).

Level of education. People with different educational level shows different perception about their intention towards healthy life style, which depends on level of education, knowledge and experience. To determine and describe the effect of educational level on the intention to continue smoking among 1,354 initially smoking participants (age > = 20 years) in the Dutch GLOBE, a study was conducted in Netherland. The result showed that higher educated people statistically quit smoking more often than lower educated people (Droomers et al., 2002).

Religious beliefs. Understanding the impact of religion on health is important for beliefs about the health and health care practice. Religion gives meaning to life, affects individual's perception on intention to practice the specific health behavior, and values about the causes of illness and its course (Schlundt et al., 2008). Religion/spirituality is important to adolescents, is usually considered a protective factor against a host of negative health outcomes, and is often included in adolescent health outcomes research (Cotton, Zebracki, Rosenthal, Tsevat, & Drotar, 2006; Schlundt et al., 2008). To examine the relationships of religious involvement and affiliation with behavioral intention of health practice, a study was conducted by Schlundt et al. (2008). The study found a positive association between religious

involvement and ratings of overall health practice behavioral intention and healthy lifestyle behaviors, healthy eating behaviors, and high-fat behaviors. These results suggested that the relationship between religion and health is complex and multifaceted.

Socio economic status. Socio economic conditions have a great contribution on the intention and practice of healthy lifestyle. A research evidenced that family income is a major determinant of standard of living, variations in health, and premature mortality (Raphael, 2006). Behavioral intention to obtain a mammogram and Pap test was statistically significantly associated with both factors associated with screening mammography in low-income women (Fernandez, Tortolero-Luna & Gold, 1998).

Attitude towards the Intention

Young adult's intention to perform a certain behavior is a function of a person's attitude towards the behavior. An attitude is the inner feeling of an individual for the tendencies to act which is influenced by person's liking or disliking. It can be measured by a person's opinion or ideas or emotions as predisposed to act in a particular way from persons own viewpoints regarding the things, situations, and issues specifically. It is the first determining factor that has an influence on intention. According to TPB, attitude towards the intention to perform behavior is defined as a person's general feeling of favorableness or un-favorableness for the concept (Ajzen, 2006a; Fishbein & Ajzen, 1975), which indicates that personal attitudes are guided by his/her belief and outcome evaluation of beliefs that leads to individual intention to perform the action.

There are several evidences that show that an individual attitude has a relationship with behavioral intention of CVD preventive behavior such as healthy eating, exercising, avoid smoking, avoid alcohol drinking etc (Hewitt & Stephens, 2007). In a cross sectional the study of Cheubang (2002), the main finding revealed that Thai female adolescents had moderately positive attitude toward healthy dietary behaviors. There were significant relationships between attitude and intention to perform healthy dietary behaviors ($r = .41$, $p<.01$). In addition, attitude was significant predictors of intention to perform healthy dietary behaviors among Thai female adolescents.

Blanchard (2008) examined the relationship between intention of performing exercise and the prediction of attitude, subjective norms, and perceived behavioral control. The result showed that attitude was significantly related with intention of exercise for CVD prevention ($p <.01$). Brickell, Chatzisarantis, and Pretty (2006) conducted a study to examine the utility of the theory of planned behavior and intention in predicting exercise behavior among 162 Canadian University College students. The result revealed that Perceived behavioral control and attitude was significant contribution to the prediction of intention exercise behaviors accounted for 56% and 35%, the variance of exercise intention to perform exercise ($p <.01$) respectively. Backman, Haddad, Lee, Johnston, and Hodgkin (2002) identified predictors of healthful dietary practices in 780 among adolescent in California. The findings demonstrated that attitude was a stronger determinant of intention to eat a healthful diet. Four behavioral beliefs contributed significantly and independently to the formation of attitude. These beliefs were: liking the taste of healthy food, feeling

good about themselves, tolerating giving up foods that they like to eat, and losing or maintaining a healthy weight.

A study was conducted by Lien et al. (2002) to investigate how well theory of planned behavior predicted frequency of consumption of fruits and vegetables among 1,406 seven graders student from Minneapolis St Paul metropolitan area, Minnesota. The question in the study was self-reported based on the frequency of consumption of fruits and vegetables and attitudes, subjective norms, barrier and intention related to this behavior. The result revealed that consumption of fruits and vegetable was 31% of variance accounted for intention to eat more fruits and vegetables.

Subjective Norms towards the Intention

Subjective norm is an individual's perception about their important person's opinion, expectation, or support towards him/her which the individual is likely to follow. It is a function of beliefs about the expectations of the individual's important people, and motivation to comply with these referents. It can be measured by person's beliefs towards important person opinion and inspiration to perform the action. It is the second determining factor that has an influence on intention to perform the behavior (Ajzen, 2006a). The subjective norm is a function of an individual's normative beliefs about performing the behavior whether those beliefs significantly motivate on complying with behavior (Ajzen, 2006b; Fishbein & Ajzen, 1975).

A study was conducted to use the TPB as framework to compare the congenital heart disease (CHD) patients' beliefs towards physical activity with non-patient support members to determine where it might explain CHD patients' physical activity intentions and behavior. Finally, the study result revealed that subjective

norms and perceived behavioral control were contributed together to the exercise intention, accounting for 69% of the variance (Prapavessis et al., 2005).

Another cross-sectional study conducted by Chuebang (2002) among Thai female adolescents intention to perform healthy dietary behaviors. There was a moderately positive significant relationships between subjective norms and intention to perform healthy dietary behaviors ($r = .43$, $p < .01$). Similar study was conducted by Sangperm et al. (2008) to determine the predictive ability of healthy eating behavior in Thai adolescents among attitudes, subjective norms intention and self-schema. Results revealed that subjective norms opinion was significantly related ($r = .46$, $p < .01$) with intention of healthy eating for all group of adolescent.

Perceived Behavioral Control towards the Intention

Perceived behavioral control refers to person's perceptions of their ability and degree of confidence to perform a given behavior. It can be defined as assessment of how difficult or easy to perform the given behavior. Perceived behavioral control can be measured by evaluating the individual's strength and beliefs towards performing the behavior. It is a final and more significant determining factor for the influence on intention to perform the behavior (Armitage & Conner, 2001).

Several studies found that self-perceived behavioral control has significant relationship with behavioral intentional to perform CVD preventive behaviors (Armitage & Conner, 2001; Lien et al., 2002; Sangperm et al., 2008). Payne, Jones, and Harris (2004) examined the effect of perceived need on intention of exercise and healthy eating using the theory of planned behavior. As a result, perceived behavioral control is predicted 10% variance for exercise intention and 2% variance for eating

intention. According to Sjoberq, Kim, and Reicks (2004), the relationship between the theory of planned behavior and fruit and vegetable intake as meaning of maintaining CVD prevention and perceived behavioral control were the most important factors in explaining both intention and intake, followed by attitudes and subjective norms. Another study was conducted on Native American youth to investigate the efficacy of the Theory of Planned Behavior to predict healthy eating behavior among youth (Fila & Smith, 2006). The result found that perceived behavioral control independently related with intention of healthy eating.

Blanchard, Courneya, Rodgers, and Murnaghan (2002), evaluated the utility of the theory of planned behavior as a framework for examining the behavioral intention among the patients with breast cancer and prostate cancer. For breast cancer patients, the results revealed that attitudes, subjective norm, and perceived behavioral control explained 66% of the variance in exercise intention. For prostate cancer patients, attitudes, subjective norm, and perceived behavioral control were together explained 57% of the variance in exercise intention.

Summary of Literature Review

In summary, several relevant literatures were reviewed in this study, which were the concept of young adults, overview of CVD, CVD preventive healthy behaviors, and overview and the application of the TPB. The significance of CVD preventive behaviors for developing countries and for young adults was also reviewed. Besides the stated above, factors related to intention of CVD preventive behaviors and its outcome was also discussed based on related literatures and books.

Since the focus of this study was the factors related to CVD preventive behavioral intention from previous studied, it was found that CVD among young adults is a significant health problem, related with numerous health behavioral intentions. Acceding to TPB, intention is an indication of an individual's readiness to perform a given behavior, which was assumed to be immediate antecedent of behavior (Ajzen, 2006b). The individual speediness to perform the behavior is based on the degree of attitude toward the behavior, compliance to subjective norm, and ability or perceived behavioral control. Each predictor weighted for its importance in relation to the behavioral interest and its outcome.

The age of young adults is a time of trying on and choosing in all aspects of life and behavior is in transition and not fixed; their feelings about the world and their place in it are tentative and changeable. During this period, they may attract with many CVD risk related behaviors. Therefore, establishing of health related behavioral patterns during this period is important; as adolescents are profoundly affected by quality of life and constructs their behavioral foundation during this period. The factors which influence young adults to perform healthy behaviors, particularly for the development of CVD, are preventable. Therefore, it is necessary to understand the specific factors that contribute to healthy behavioral intention. Several studies proved that the TPB model is a useful theory that could identify the predictors of healthy behaviors in different age groups including young adults. Thus, the study framework was constructed based on the conceptualization the TPB to determine the influencing factors of intention.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter presents the description of the research methodology. These include study design, setting, population and sample, instrumentation, data collection, procedures and data analysis.

Study Design

This study was a descriptive correlation designed to determine the level of attitude, subjective norms, perceived behavioral control, and intention. In addition, it was aimed to examine the predictor's predictive ability of intention to perform CVD preventive behaviors among the young adults in Bangladesh.

Setting

The study was conducted at a Government Bangla college in Dhaka city, Bangladesh. It is located in Mirpor zone in Dhaka city (capital) besides the government 'D' type quarter and technical college at Mirpor road. The government of Bangla College is one of the biggest and oldest university level college in Dhaka city. It was established in 1962. The college has two academic courses: masters and honors course, and seven academic divisions. Approximately 10,000 students are studying in this college.

This college fulfills the academic needs of the southwest part of Dhaka city and surrounding districts. The students of this college, both females and males, belong

to different religions. Most students come to study in this college from different districts, both urban and rural area. Many students stay in college dormitories. The subjects for this study were male and female students studied in B.Sc. honors level (first year) whose age ranged between 18-26 years. The researcher conveniently selected this study setting with the following reasons: i) it is one of the big collegiate university in central part at Dhaka city. ii) Students admitted in this college, both from rural and urban settings, so it possible to get different information with different context. iii) The first year student was selected to preserve the homogeneity of the subject regarding their age, level of education and their perceived influence of subjective norms.

Population and Sample

The target population in this study consisted of the student of Government, Bangla College, at Dhaka city in Bangladesh. In this study, the subjects were first year students from three departments: Bangla, mathematics, and accounting with the total number of six hundred.

Sample Size Estimation

The estimation of sample size in this study was calculated by using the Thorndike's formula (Thorndike, 1978, as cited in Lerdpiromluk, 2004). The formula is given below:

N = 10 IV + 50

Where, N = sample size; IV = independent variables

Three independent variables were included in this study and sample size was calculated as follows:

The sample size = (10 X 3) + 50 = 80.

The independent variables were attitudes, subjective norms, and perceived behavioral control. Based on the above formula, at least 80 subjects were needed, 40 additional subjects from the actual sample size to account for the chance of incomplete data and to ensure more generalizability and accuracy. Thus, the 120 subjects were included in the study.

Sampling Technique

A disproportional stratified random sampling was used. The first year students were stratified according to their departments: Bangla accounting and mathematics (figure 2). First, a name list of the students was prepared from each department separately. The code number was used for the subject's identity instead of their names, and then the actual number of the sample was taken from each department proportionally based on above-mentioned number. The first person was randomly selected from each department and then every 5 th number was drawn systematically.

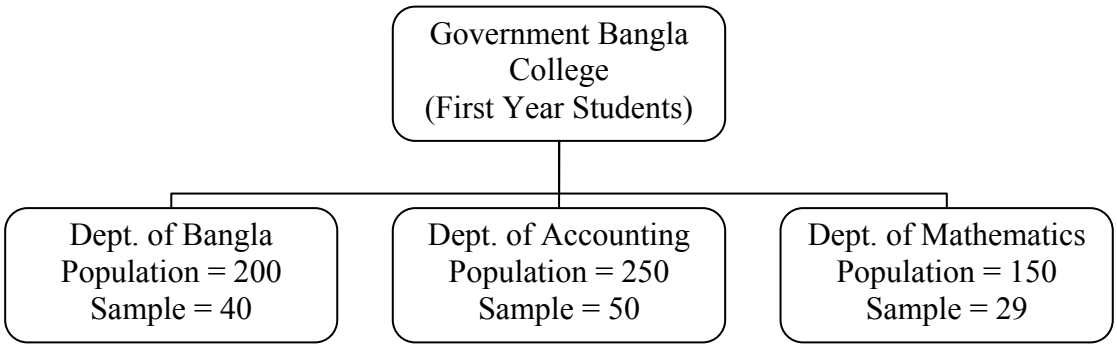

Figure: 2

The Sample Diagram of the Study

Instrumentation

Self-administered instruments were used in this study, which consisted of three sections: 1). Demographic characteristics and past history of CVD preventive behaviors. 2) Factors Influencing the Intention to Perform CVD Preventive Behaviors questionnaires. 3) Intention to Perform CVD Preventive Behaviors Scale.

Demographic Characteristics and Past History of CVD Preventive Behaviors Form

The first section was used to collect the demographic characteristics and past history of CVD preventive behaviors of the subjects. This part contained 11 items including age, sex, food habit, body weight, height, BMI, past history of daily practice exercise, history of smoking and alcohol drinking, stress history, and family history of CVD (Appendix D). This information was used for explaining the subjects' characteristics and past history of CVD preventive behaviors.

Factors Influencing towards Intention to Perform CVD Preventive Behaviors Questionnaires

The second section was used to measure the factors influencing towards the intention to perform CVD preventive behaviors. This comprised of three scales which included six parts- 1) Attitudes towards CVD Preventive Behaviors Scale, which was divided into two parts: i) behavioral belief and ii) outcome evaluation; 2) Subjective Norms towards CVD Preventive Behaviors Scale, which was also divided into two parts: i) normative belief and ii) motivation to comply of normative belief; and 3) Perceived Behavioral Control towards CVD Preventive Behaviors Scale, which was also divided into two parts: i) control belief and ii) power of control belief.

Each scale was developed by the researcher according to the question constructing guidelines of the Theory of Planned Behavior by Ajzen (2006a) and related previous studies, which had used the Theory of Planned Behavior (Choyhirun et al., 2008; Sangperm et al., 2008). Responses from negative items were recoded before calculating the total score of each scale. The total negative items of Attitude Scale were one (no, 3), Subjective Norms Scale were seven (no, 3, 8, 11, 17, 18, 20, 23,), and Perceived Behavior Control Scale were eight (no, 3, 5, 7, 13, 14, 16, 18, 20). A 5-point Likert's-type format was used for each scale, ranging from 1= strongly disagree, 2= disagree, 3= unsure, 4= agree, 5 = strongly agree.

Attitude towards CVD Preventive Behaviors Scale consisted of 20 items, measuring young adult's behavioral beliefs (10 items) and outcome evaluations of behavioral belief (10 items) towards the CVD preventive behaviors (healthy eating, exercise, avoid smoking, avoid alcohol, and stress management). The total score of Attitude towards CVD Preventive Behaviors Scale was calculated by multiplying the score of behavioral belief and corresponding with outcome evaluations. The summed product of the two parts for each item served as a measure of attitude.

Attitude = ∑behavioral belief score x outcome evaluation score, and then the average score was divided by the number of items (Appendix D). The possible scores ranged from 5-125. To explain the young adult's attitude level, the score was divided into three levels: 5-45 indicated low level of attitude, 45.1-85.1 indicated moderate level of attitude, and 85.2-125 indicated the high level of attitude. High level of attitude indicated the young adult's strong positive attitude towards CVD preventive behaviors and its outcome.

Subjective Norms towards CVD Preventive Behaviors Scale consisted of 30 items with two parts: normative beliefs (15 items) and motivation to comply of normative beliefs (15 items). Each item of normative belief questionnaire measured the young adult's opinion and feeling about their significant persons' opinion and their judgment. Items of motivation to comply measured the young adult's degree of motivation to follow the significant persons' opinion regarding the CVD preventive behaviors. The total score of Subjective Norms Scale was calculated by multiplying the score of normative belief and corresponding with motivation to comply. The summed product of two parts for each item served as a measure of subjective norms.

Subjective norms = ∑normative beliefs score x motivation to comply score then the average score was divided by the number of items (Appendix D). The possible score ranged from 7.50-187.50. To explain the degree of young adult's subjective norms level, the score was divided into three levels: 7.50-67.50, indicated low level, 67.51-127.51, indicated moderate level and 127.51-187.50 indicated high level. The high level of subjective norms indicated the young adult's strong positive belief about their parents, friends, and teacher's opinion and willingness to perform CVD preventive behaviors.

Perceived Behavioral Control towards CVD Preventive Behaviors Scale consisted of 22 items with two parts: control beliefs (11 items) and perceived power of control belief (11 items). The first part indicated the young adult's ability to perform CVD preventive behaviors and the second part indicated their degree of confidence to perform the CVD preventive behaviors about how it easy or difficulty in performing. The total score of Perceived Behavioral Control Scale was calculated

by multiplying score of control beliefs and corresponding perceived power of control belief. The sum of product of the two parts for each item served as perceived behavioral control.

Perceived Behavioral Control = ∑control belief score x power of ability score then the average score was divided by the number of items (Appendix D). The possible score ranged from 5.5-137. To explain of young adult's perceived behavioral control; the total score was divided into three levels: 5.5-49.33 indicated low level, 49.34-93.17 indicated moderate level, and 93.18-137 indicated high level. The high level of perceived behavioral control indicated that the young adults have strong positive belief about their capabilities and confidence to perform CVD preventive behaviors.

Intention to Perform CVD Preventive Behaviors Scale

This scale was used to measure the young adult's willingness or conscious plan and decision for performing the CVD preventive behaviors by 22 items of self-reported questionnaire. The researcher self developed this scale according to question construction guideline of the TPB and previous related study. A 5-point Likert's-types scale was used, which ranged from 1= strongly disagree, 2= disagree, 3= unsure, 4= agree, 5= strongly agree.

The total score of Intention to Perform CVD Preventive Behaviors Scale was calculated by the sum scores of all items (Appendix D). Responses from negative items were recoded before calculating the total score. In this scale, eight items were negative (no 3, 4, 6, 13, 14, 17, 20, & 21). The possible score ranged from 22-110. To explain the young adult's level of intention to perform CVD preventive behaviors, the

total score was divided into three levels: 22-51.33 indicated low level, 51.33-80.67 indicated moderate level, and 80.68-110 indicated high level of intention. The high level of intention indicated the young adults' high willingness and strong commitment to perform CVD preventive behaviors.

Validity of the Instruments

The instruments were validated by four experts in this field for testing the appropriateness, relevancy, and accuracy of the instruments. Two experts were from Faculty of nursing, Prince of Songkla University, Thailand and other two were from Bangladesh, one was a nurse educator and another was a public health nurse (Appendix F). The researcher revised some area of questionnaire based on the experts' recommendation and suggestion.

Translation of the Instruments

The original instruments were developed in English language, and then it was translated into Bangla language with the help of three bilingual experts (Appendix G). The first translator translated the English version instruments to Bangla version, and then the second translator translated the Bangla version instruments to English version. The third translator compared the two English versions (original and translated English) to see the consistency and appropriateness of meaning of the instruments. Finally, it was found that there was consistency between the original English version instruments and translated English instruments. The instruments were then used for data collection.

Reliability of the Instruments

The internal consistency and reliability of the instruments were tested by conducting a pilot study with 30 young adults (college students) for checking the understanding of the contents. The alpha Cronbach's coefficients were .77 for attitude, .84 for subjective norms, .80 for perceived behavioral control, and .82 for intention (Appendix A, Table 6). Thus, the alpha coefficients of the instruments demonstrated a good internal consistency.

Ethical Consideration

The permission for data collection was obtained from the Institutional Review Board (IRB), Faculty of Nursing, Prince of Songkla University, Thailand. Then, the permission was taken from the Director of Directorate of Nursing Services, Bangladesh, and the permission was taken from the college principal of Government of Bangla College and heads of departments: Bangla, Mathematics, and Accounting. Finally, the invitation letter and consent form were distributed to the selected subjects for seeking their willingness to participate in the study.

The identity of the subjects was anonymous by using codes instead of their names to ensure confidentiality and anonymity. The researcher ensured the subjects and teachers that they were allowed to withdraw from the study at any time, if they wanted. It was also assured that the results of the study did not reflect any academic performance.

Data Collection Procedures

The data collection procedures were as follows:

After obtaining all approval, the data collection started from November 2009 to January 2010. Firstly, the researcher gave a brief explanation about the study objectives, types of instruments and methods of data collection to the principal responsible teachers and representative students of the selected departments. Then, a name list of the subjects was collected from concerned departments.

The researcher requested to the head of the departments for distributing the consent form to the enlisted subjects. After returning the consent form, the subjects took the instrument from the head of the department. The process of subjects' communication with researcher was ensured. After 2 weeks from the date of distribution of the instruments, the researcher collected 120 complete answered instruments from selected departments. After finishing the data collection, the researcher started to process and compute.

Data Analysis

Descriptive and inferential statistics were employed to answer the research questions and research hypothesis. The following statistical procedures were used to analyze the data.

1. Before data analysis, one simplevariate outlier with an extreme value on score of attitude variable was detected and deleted from the data. As a result, the subjects used in this study consisted of only 119 young adults.

2. Descriptive statistics including mean, standard deviation, frequency, and percentage, range, minimum and maximum were used to present the subjects' characteristics and history of CVD preventive behaviors.

3. Attitude, subjective norms, perceived behavioral control, and intention were analyzed by descriptive statistics.

4. The assumptions underlying multivariate analysis for hierarchical multiple regression analysis were tested. The four principal assumptions of linear regression model were normality, linearity, homoscedasticity, and multicollinearity. Multivariate outliers were also examined. The following assumptions were tested:

4.1 Normality. Regression analysis assumed that all variables have normal distribution. Normal distribution of each variable in this study was tested by visual inspection of histogram, skewness, kurtosis, and normal P-P plots. Histogram is a graphical representation of normal distributions. The area under the normal curve represents probability of percentage of cases that lies within 1 standard deviation of the mean. It takes the form of a symmetric bell-shaped curve (Appendix B).

The statistical test of normality was skewness, kurtosis, standard error of skewness, and standard error of kurtosis. If the skewness coefficient was within the range of 3 (skewness divided by std. error skewness) and $Z_{kurtosis}$ (kurtosis divided by std. error kurtosis) was 3, then the distribution of data was assumed to be normal (Munro, 2001). In this study, all skewness values of the variables were less than 3, indicating that the variables were normally distributed (Appendix B, Table 7.1, Figure 3). In addition, the normality of the residuals, required for multiple regression analysis was tested, then the assumption was met (Figure 4). From the Kolmogorov-

Smimov test, it was found that all variables were normally distributed and the significance value was >.05.

4.2. Linearity. Simple inspection of scatter plot is a non-statistical method of determining whether the linearity exists in a relationship. A plot of standardized residuals against standardized estimates of the dependent variable should show a random pattern when nonlinearity is absent. In regression, the possible nonlinearity occurs when the standard deviation of the residuals exceeds the standard deviation of the dependent variable (Stevens, 2002). In the present study, the residual plot showed that no violation of this assumption had occurred (Appendix B, Figure 4).

4.3 Homoscedasticity. Homoscedasticity is defined as a constant error variance between predicted and observed score. The assumption of homoscedasticity was met by looking at a standardized residual scatter plot, which shows random pattern across the entire range. The data formed a straight line from the lower-left corner to the upper-right corner, indicating no violation of the assumption (Appendix B, Figure 5).

4.4 Testing of multicollinearity. Multicollinearity refers to the predictor variables (independent variables) having high intercorrelation. It was examined by Pearson's correlation coefficient analysis among the predictors (attitude, subjective norms, and perceived behavioral control). In addition, Tolerance and Variance Inflation Factor (VIF) were tested. The common cut-off points of multicollinearity are those, which exceed correlation coefficient of .80 (Hair, Andeson, Tatham, & Black, 1998). The result showed that correlations among predictor variables ranged from .21 to .46 and values did not exceed .80, indicating that there was no evidence of

multicollinearity (Appendix B, Table 7.2). In addition, Tolerance and VIF were also met the assumption.

It is suggested that multicollinearity would exist, if tolerance value was close to zero (0) $1\text{-}R^2$. In this study, Tolerance value ranged from .70 to .85 (Appendix B, Table 7.3). A VIF value greater than 10 indicates multicollinearity among the predictors (Munro, 2001). In this study, the value of VIF ranged from 1.17 to 1.42 (Appendix B, Table 7.3), illustrating that no multicollinearity existed among the predictor's variables.

5. A hierarchical multiple regression analysis was used to determine the predictor's predictive ability on explaining intention to perform CVD preventive behaviors among young adults.

CHAPTER 4

RESULTS AND DISCUSSION

The purposes of the study were to determine the level of attitude, subjective norms, perceived behavioral control and intention, and to determine the predictive factors on intention to perform CVD preventive behaviors among young adults in Bangladesh.

The research findings are presented in three sections. The first section displays the description of demographic characteristics of the subjects and past history of CVD preventive behaviors information. The second section illustrates the description of the level of attitude, subjective norms, perceived behavioral control and intention towards CVD preventive behaviors. The third section demonstrates the relationship among attitude, subjective norms, perceived behavioral control and intention. In addition, this section shows the predictors of intention to perform CVD preventive behaviors and their predictive ability. The discussions based on research questions and objectives of the study.

Results

Demographic Characteristics

The subjects of the study were the young adult college students from the governmental Bangla College at Dhaka, Bangladesh. A total of 119 young adults participated in this study. As shown in Table 1, most of the subjects participated in this study were young adults with the mean age of 20.79 years (SD=1.93). There were

more male than female but the difference was not large (58.8% VS 41.2%). Their mean body weight was 53.28 Kg (SD=8.76) and the mean height was 161.43 cm (SD = 11.58). The mean Body mass index (BMI) was 20.39 Kg/m^2 (SD= 2.22).

Table 1

Frequency, Percentage, Mean, and Standard Deviation of the Samples by Demographic Characteristics (N= 119)

Characteristic	Frequency	Percentage
Age (Year) M=20.79, SD=1.93, Min-Max=18-26		
18-20	66	55.40
21-23	39	32.80
24-26	14	11.80
Gender		
Male	70	58.80
Female	49	41.20
BMI (Body Mass Index) M=20.39, SD=2.22, Min-Max=15.9-28.4		
<18.5	22	18.50
18.6-22.9	84	70.60
23-27.4	12	10.10
>27.4	1	.80

Past History of CVD Preventive Behaviors

In this section, past history of CVD preventive behaviors are reported. More than half of the subjects (58.8%) had experienced vegetarian diet and had a history of

stress (54.2%). Nearly ninety percent of subjects (87.4%) informed non-smoking behavior and 100% did not have the history of alcohol drinking. More than sixty percent (61.3%) of them practiced daily exercise (Table 2). Most of them did not have family history of cardiovascular diseases (81.5%).

Table 2

Frequency and Percentage of the Subjects by Past History of CVD Preventive Behaviors (*N=119)*

CVD Preventive Behaviors	Frequency	Percentage
Food habits		
Fast food	24	20.20
Vegetarians	70	58.80
Others	25	21.00
History of stress		
Yes	64	53.80
No	55	46.20
History of smoking		
Yes	15	12.60
No	104	87.40
Practice daily exercise		
Yes	73	61.30
No	46	38.70
Family history of CVD		
Yes	22	18.50
No	97	81.50

Attitude, Subjective Norms, Perceived Behavioral Control and Intention

The level of attitude, subjective norms, and perceived behavioral control towards intention to perform CVD preventive behaviors were analyzed. The level of each predictor and intention were described as follows (Table 3).

Overall, the level of predictor variables including attitude, subjective norms, perceived behavioral control, and criterion variable of intention was at moderate level (M = 77.17, SD = 14.33, M = 114.87, SD = 24.37, M = 75.35, SD=17.78 and M = 80.49, SD = 9.13, respectively).

Table 3

Minimum, Maximum, Mean, Standard Deviation and Level of Attitude, Subjective Norms, Perceived Behavioral Control and Intention (N= 119)

Variables	Min-Max	Mean	SD	Level
Attitude	49.60-120.00	77.17	14.33	Moderate
Subjective Norms	51.33-172.80	114.87	24.37	Moderate
Perceived Behavioral Control	33.82-127.50	75.35	17.78	Moderate
Intention	61.00-110.00	80.49	9.13	Moderate

Relationship among Attitude, Subjective Norms, Perceived Behavioral Control, and Intention to Perform CVD Preventive Behaviors

The Pearson's Product Moment correlation coefficient was used to test the meaningful relationship among attitude, subjective norms, perceived behavioral

control, and intention (Table 4). The results indicated that attitude, subjective norms and perceived behavioral control were positively and statistically correlated with intention ($r = .21$, $p < .05$, $r = .44$, $p < .01$ and $r = .32$, $p < .01$, respectively).

Table 4

Bivariate Correlations (Pearson's) among the Study Variables (N=119)

Variable	1	2	3	4
1. Attitude	1.00			
2.Subjective Norms	0.46**	1.00		
3.Perceive Behavioral Control	0.22*	0.39**	1.00	
4.Intention	0.21*	0.44**	.32**	1.00

* p= .05 **p= .01 (2-tailed)

Predictors of Intention to Perform CVD Preventive Behaviors

In order to examine the predictive power of each predictor, a hierarchical multiple regression analysis was employed. Using the theory of planned behavior and a previous study (Ajzen, 1991; Brickell, et al., 2006) as a guide, a two-step hierarchical regression model was conducted (Table 5). Attitude and subjective norms were entered into the equation in first step and together were accounted for 18% of variance (Adj. R^2=.18, F =13.66, df = 2, 116, $p < .01$). In the second step, perceived behavioral control was entered into the equation. The statistical significant change of the variance added 2% (Adj. R^2 change=.20, F change= 4.10, df = 3, 115, $p < .05$). It was found that subjective norms was the best predictor ($\beta = .36$, $t = 3.70$, $p < .01$) for

intention followed by perceived behavioral control (β =.18, t= 2.02, p <.05). Attitude could not predict the intention to perform CVD preventive behaviors (β=.01, t =.06, p > 0.5).

Therefore, the best equation of regression for explaining the variance of intention to perform CVD preventive behavior was:

$y = a+b_1x_1+b_2x_2+\ldots\ldots\ldots\ldots\ldots b_nx_n+ e$

Intention = 57.54+ .14(subjective norms) +.09(perceived behavioral control) + Error or Residual

When;

y = CVD preventive behavioral intention

a = constant value =57.54

$b_1 x_1$= Regression coefficient of subjective norms = .14

$b_2 x_2$= Regression coefficient of perceived behavioral control = .09

e = Error or Residual.

Table 5

Hierarchical Multiple Regression Analyses of Attitude (AT), Subjective Norms (SN) and Perceived Behavioral Control (PBC) for Intention to Perform CVD Preventive Behaviors (N=119)

Steps	CV	Adj. R^2	B	F	F_{change}	df	β	t
Step 1	61.26	.18		13.66**		2		
AT			.01			116	.01	.16
SN [a]			.16				.43**	4.56
Step 2	57.54	.20			4.10*	3		
AT			.00			115	.01	.06
SN			.14				.36 **	3.70
PBC [b]			.09				.18*	2.02

** p <.01, *p <.05

Note: AT= Attitude, SN= Subjective Norms, PBC= Perceived Behavioral Control, CV= constant value.

Predictors: (Constant), attitude [a], and subjective norms [b]

Predictors: (Constant), attitude, subjective norms and perceived behavioral control [b]

Dependent Variable: Intention.

Discussion

This section presents the discussion of the findings corresponding to the research objectives and hypothesis. The objectives of this study were to identify the level of TPB variables (attitude, subjective norms, perceived behavioral control, and intention) and to determine the predictor's intention to perform CVD preventive behaviors among the young adults.

Level of Attitude, Subjective Norms, Perceived Behavioral Control and Intention

The results showed that the level of attitude among the young adults was at moderate level. The reason behind the moderate level of attitude for young adults is a transitional age period for both physical and psychological development (Andrews & Duncan, 1998), which is the period that they are not fully mature and don't have accurate perception to follow the healthy behaviors. With regard to this concept, Fagan, Diamond, Myers, and Gill (2008) found that 46 % of adolescents had lack of accurate perception and belief related to their obesity and healthy behaviors.

The findings of the present study reported a moderate level of attitude. The subjects' responses towards the attitudes were analyzed by the individual items. The findings revealed that 53.8 % of subjects' belief about the benefit of CVD preventive behaviors was "agree to strongly agree" that *eating extra salt can raise high blood pressure*, which was at a moderate level. Similarly, more than fifty percent (52.1%) of the subjects moderately rated the statement of "*alcohol drinking can increase hyperlipidaemia*" in terms of "agree to strongly agree", whereas 35.3% of the subjects

were unsure about the consequences of this behavior. This may be the cause of young adults' inaccurate perception about the outcomes of those behaviors in relation to the development of CVD. In addition, they might receive insufficient information about the benefits of CVD preventive behaviors from different sources which might not affect their behavioral change and may contribute to perceived moderate level of attitude towards CVD preventive behavior (Appendix A, Table 6.1).

This moderate level of attitude was consistent with a cross-sectional study of Chuebang (2002), where the researcher found that Thai female adolescents had moderately positive attitude toward healthy dietary behaviors (as cited in Choyhirun et al., 2008). Another study was conducted by Kassem, Lee, Modest, and Johnston, (2003) in North Los Angeles and found moderate level of attitude to avoid soda drinking among school students. Subjects believed that regular soda drinking made them overweight and too much caffeine consumption acts as a psychotropic stimulant to the central nervous system. Moderate attitude of the present study finding was incongruent with O'Callaghan and Nausbaum's study (2006), who found high level of attitude among adolescents in Australia about wearing of helmet that had protected them from accident and made them felt safe.

The level of subjective norms was also moderate in this study. The possible explanations behind the moderate level of subjective norms might be related to the finding that young adults were more influenced by parents but were less influenced by their peers and teachers norms. Theoretically, the adolescents are more likely to choose friends who have the same behaviors, attitude, and perception that they can share. On the other hand, according to the TPB, one is influenced to perform behavior

by significant person's opinion that he/she is close to his/her (Ajzen, 2006b). In this study, 52.1% of subjects were moderately influenced by their peer's opinion that "*performing jogging every day helps maintaining a normal blood pressure"* and subjects rated it "agree to strongly agree". Additionally, more than half (55.4%) of the subjects moderately complied towards teachers opinion that *"avoiding extra salt in each meal can reduce high blood pressure"* (Appendix A, Table 6.2).

In Choyhirun et al. study (2008), it was found that adolescents perceived moderate level of approval of significant others of eating behaviors for weight control in Thailand. This study was very similar to the present study in terms of subject's age, gender, and subjective norms (parents and friends). In this study, some confounding factors were explained as the influential factors for adolescents towards moderate level of subjective norms which included socio-environmental and personal factors.

In the findings of the present study, moderate level of subjective norms was inconsistent with O'Callaghan and Nausbaum's study (2006), which found high level of subjective norms among adolescents in Australia. The adolescents were highly influenced of wearing helmet by their peers. Another study of Fila and Smith (2006) found low level of subjective norms among Native American's adolescents towards healthy eating.

Likewise, subjects' level of perceived behavioral control was also found at moderate level in the present study. Behind the cause of subjects' moderate perception about perceived behavioral control, some internal and external confounding factors can be explained as reasons that may play an important role. The internal factors are the effort of liking or disliking to perform CVD preventive

behaviors and perceived self ability. The external factors are low facilities and resources to find healthy food when they eat outside the family, unavailability of non-smoking and non-alcohol drinking zone, unavailability of time for performing daily exercise. According to Ajzen (2006b) perceived behavioral control is thought to be an appraisal of volitional control over the behavior. It is considered as a categorization of the skills, opportunities, and resources to perform the behaviors while holding motivation constant.

With this regards "*for difficulty in avoidance of taking extra salt",* 49.60% of the subjects reported moderately in the statement for "agree to strongly agree" based on their preference. Sixty-one point four percent of them responded moderately in term of "agree to strongly agree" about *the "accessibility of healthy food"* (Appendix A, Table 6.3).

The subjects' moderate perceived behavioral control of the present study finding was consistent with O'Callaghan and Nausbaum (2006), who found moderate level of perceived behavioral control. The findings were inconsistent with Choyhirun (2008), who found high level of perceived behavioral control on healthy eating behaviors among Thai adolescents for weight control. The subjects' perceived availability of healthy food was the reason for high level of perceived behavioral control for weight control behavior.

Finally, in this study, the level of intention was also at a moderate level. According to the TPB, intention is assumed as an immediate antecedent of behavior which gives a sufficient degree of actual control over the behavior, and people are expected to carry out their intentions when the opportunity arises (Ajzen,

2006a). In the present study, moderate level of intention might be due to young adults' less internal motivation and perceived incompetent planning and low commitment towards performing the CVD preventive behaviors. The study evidenced that less than half of the subjects (41.2%) rated moderate level of willingness in the terms of "agree to strongly agree" to "*eat less amount of carbohydrate in their food in the next month"*, while 59.7% of subjects rated moderate level of plan for "*avoiding of extra salt in their meal from the next month'*. Moreover, nearly half (55.5%) of the subjects showed moderately strong commitment that they "*will avoid of drinking alcohol forever"*, whereas 22% of the subjects reported as unsure (Appendix A, Table 6.4). These data indicates the young adults' less personal motivation and commitment towards the given unhealthy behavioral intention.

Additionally, since the subjects of this study were college students and some behaviors are related to their family practice norms, such as preparation of diet. Therefore, this might have an influence on their ability and confident, whether or not they are able to continue such healthy practice like eating more vegetables, less fatty diet, low sugar and less salty diet etc. Thus, young adults' perceived facilities of healthy diet practice may have a contribution on their perceived moderate level of intention towards CVD preventive behaviors. Moreover, as a general role of behavioral intention, young adults' perceived moderate level of attitude, subjective norms and perceived behavioral control towards CVD preventive behaviors may be the ultimate cause of moderate intention. Because according to TPB, intention is the product of attitude, subjective norms, and perceived behavioral control.

The moderate intention of the present study was inconsistent with Fila and Smith (2006), who found low level of intention among adolescent in Native American for healthy eating behaviors. However, the researchers did not mention the reasons for low level of intention among adolescents towards healthy eating behavior. It was considered as very low intention, because the mean score for both sex; boys and girls was very low. It was only 0.062 for boys and 0.32 for girls.

Finally, it could be concluded that the overall moderate results for all predictors and the dependent variable intention may relate to the young adults' age related maturity or the period of transitional age that might have an influence on their commitment, less influenced by subjective norms, and perceived less facilities and availability of resources for performing CVD preventive healthy behaviors.

The Predictors of Intention to Perform CVD Preventive Behaviors

The results of this section provide an important evidence of predictive factors which influence the intention to perform CVD preventive behaviors among young adults in context of Bangladesh. The results of the current study revealed that the subjective norms was the best predictor ($\beta = .36$, $p < .01$) of intention to perform CVD preventive behaviors. This finding is consistent with the previous studies of various empirical finding (Backman, et al. 2002; Fila & Smith, 2006; Sangprem et al., 2008) in which intention to perform healthy behaviors was influenced by subjective norms. Fila and Smith found that family relationship, community support, heath education program on television, learning of healthy eating behaviors at school and peer relationship can influence the Native American youth's healthy eating behaviors.

Furthermore, Sangperm et al. found subjective norms as a significant predictor of healthy eating intention for Thai adolescents. Another study was conducted by Lee, Hubbard, O'Riordan, and Kim (2006), who revealed that subjective norms was the best predictor for quitting smoking among college students. There are several reasons in the present study which supports that the subjective norms is the best predictor of intention to perform CVD preventive behaviors.

First, in Bangladesh, culturally; the primary social unit is extended family and there is strong familial relationship among the members of the family and in the community. Therefore, a strong sense of family and community support may influence the young to perform healthy behaviors and keep away from unhealthy behaviors; like avoidance of alcohol drinking, smoking etc. In addition, based on Bangladesh social norms, the young adulthood is a time of independence period. During this period, normally they live under a close supervision of their parents, teachers or their significant persons. As a social norms, every younger obey and respect their parents, teachers, and elders opinion, especially in their schools and families which can influence them to perform a healthy behavior. Moreover, strong bonds with friends and healthy life style may also influence the young adults to perform healthy behaviors (Country Profile, 2009).

The second, majority of subjects were Muslim who perform Muslim religious practice and for Muslim, religiously alcohol drinking is prohibited. The third, the law of Bangladesh prohibits alcohol drinking and smoking in open area. Previously, a study was conducted in Thailand which mentioned the same opinion that the culture and social norms influenced the adolescent's intention to perform healthy eating

behavior including parents supervision, living with own parents, and family relationship (Sangprem et al., 2008). Finally, in the present study, subjective norm for intention of CVD preventive behaviors was assessed using a multi-item measure, covering various groups of significant others: parents, teachers and friends. The multi-items approach of the measurement of subjective norm may account to the better results in this study.

Normally, the young adults live with parents and stay in touch with their teachers and friends for a long time in a day. In each meal, parents usually prepare food for their young child and advice them to avoid smoking and drinking alcohol. This can influence the young to eat healthy food, and stay away from smoking and alcohol drinking. Simultaneously, the teachers cheer up the young college students to join the school sports or physical exercise or games and to avoid smoking and alcohol drinking as school's normal regulation. Parent's and teacher's decision and their advices have a significant impact on the adolescents' behavior. The young adults also feel enjoyment to get in touch with peers, since their thinking, beliefs, identities, and evaluation are similar regarding healthy behaviors (Trost, Saunders, & Ward, 2002).

In contrast to the present study findings, Hewitt and Stephens (2007) found that the subjective norms did not attain intention significantly to healthy eating behaviors ($p>.05$). The reason behind this is that this study was conducted in New Zealand where the contexts are far different from Bangladesh. The possible factors which found in this study about the failure of the subjective norms to predict intention ware lack of parental responsibility and concern about the food preference of the children and eating behaviors. Another study conducted by Choyhirun et al. (2008)

found that subjective norms failed significantly to predict intention for eating behavior among Thai early adolescent. This study does not investigate the reason behind the failure of subjective norms via intention. The author recommended that replication study should be well investigated to see the link between subjective norms and healthy eating behavior.

Furthermore, in the present study, perceived behavioral control was also predicted on the intention to perform CVD preventive behavior. The study finding is remarkably consistent with several research findings among adults using the TPB predictors towards intention of healthy behaviors (Choyhirun et al., 2008; Fila & Smith, 2006; Mummery, Spence & Hudec, 2000; Sangprem et al., 2008; Symons, Graham, Yang, Bargainnier, & Vasil, 2006). Choyhirun et al. explained that the availability of healthy food at home, parental encouragement and reminders to stop when adolescent eat more had influenced the Thai adolescent to eat healthy food. Another study finding was also congruent with the present study and found that perceived behavioral control was 21 % of variance towards the intention to perform healthy dietary practice in Californian adolescents (Backman et al., 2002). The study finding might have been influenced by four facilitating factors in high perceived control level such as how to eat a healthy diet, availability of healthy foods, motivation, and access to enough money.

In support of the TPB model, perceived behavioral control is a function of control belief weighted by perceived power and it can also be used to predict behavior indirectly via intention (Ajzen, 1991). It can also be determined by control beliefs such as resources, opportunities, and obstacles with perceived power of individual

perception about the degree of confidence to perform behaviors. According to Fila and Smith (2006), perceived behavioral control was expected to directly affect the behaviors by accounting from outside of an individual's control and especially for behaviors not under control of an individual. Like many health behaviors, healthy eating and physical exercise are not under complete volitional control, as a result, perceived behavioral control becomes a more important determinant of behavior (Ajzen, 2006b).

There might be some possible reasons for second predictor of perceived behavioral control in the current study for CVD preventive behaviors, which were availability of healthy food at home and performing physical exercise at college. In addition, smoking and alcohol free environment at both college and home and individual's willingness and effort influence the young adult to eat healthy food and do physical exercise.

The results of this study proved the fact that the attitude of the young adults in this study did not predict their intention to perform CVD preventive behaviors. Whereas the finding surprisingly supports that most of the samples had moderate level of attitude. This result corroborate with the findings of Ferdinand (2004), who reported that attitude was not a unique predictor of intention to engage in eating a healthy diet, although, attitude and intention were moderately correlated ($r = .68$, $p<.001$). This study showed the possible reason that only female African American student followed the healthy eating behaviors measurement whereas male student did not follow the healthy eating measure which is inconsistent with TPB variables. In addition, Choyhirun et al. (2008) and Sangprem et al. (2008) previously

conducted two studies, which showed that attitude was failed to predict the intention of eating healthy diet among adolescent. Lee et al. (2006) also found that attitude was failed to predict quitting smoking among adolescent. In Choyhirun et al. study found that attitude was failed to predict eating intention by some confounding factors such as past eating behaviors, socio-environmental factor, and personal factor that might have influenced the behavior in some instances.

In contrast to the findings of the present study, some studies found that attitude was significantly related to intention of healthy eating (Backman et al., 2002; Chuebang, 2002; Fila & Smith, 2006). Backman et al. found that attitude had significantly predicted the intention to healthy eating. Subjects had positive beliefs towards healthy eating in regards to feel good and have control on weight. According to TPB, attitude towards behavior is the degree to which the person has a favorable or unfavorable evaluation of the behavior in question (Ajzen, 2006a; Ajzen, 2006b). A positive attitude can precede intention or behavior. In the present study, attitude toward CVD preventive behavior failed to predict the intention to perform CVD preventive behavior which could be explained by the young adult's insufficient belief regarding the benefit of performing CVD preventive behaviors. There were several barriers observed for expressing the attitude towards CVD preventive behaviors. Indeed, in a low-involvement situation, individuals might not intend to put much energy in their decision process. They would be more likely to act without using much rational consideration and show their attitude after the behavior has occurred.

In addition, attitude failed to predict intention which may contribute to unstable thinking of young adults about the advantage of CVD behaviors outcome.

Some confounding factors can distress their opinion and thus can affect the clear exposure of their evaluation of CVD preventive behavioral outcome. As a result, their attitude or opinion towards intention to perform CVD preventive behaviors did not crystallize because they devalued the benefits of CVD preventive behaviors. Close supervision, identification of obstacles, and more support should be provided to the young adult, who holds a low level of attitude towards intention to perform CVD preventive behavior, in order to increase their beliefs and values for performing healthy behaviors.

In a multiple regression model, it was found that only 20 % of the variance can be explained by 2 variables which are subjective norms and perceived behavioral control for intention. Therefore, it might not be enough to influence the behavioral change in the young adult in order to practice CVD preventive behavior. Several confounding factors are important in determining whether an intention is translated into action, such as knowledge, resource availability, opportunities, past experiences and favorable situations. This suggests that other factors besides intention are driving the CVD preventive behaviors and this can be used to develop intervention program strategies for promoting healthy behavioral practices.

Nutrition professional should work with community leader and elders to provide sound nutritional knowledge to the entire community. Encouraging parents and caregivers to play a role in making the healthy food, strict school policy should be implemented by providing healthy food from confectionary which can help improving the young adult to have healthy eating behavior. Proper CVD preventive behavioral

educational program at school can raise awareness among the young adults to perform healthy behaviors.

Summary of the Discussion

In conclusion, the present study provides partial supportive evidence for predicting CVD preventive behaviors among young adults. Subjective norms and perceived behavioral control were accounted for considerable variance in actual behavior towards CVD prevention among young adults. Therefore, the intention can be predicted from the subjective norms and perceived behavioral control, but the conclusion about the link between attitude and intention needs to be further explored. From a theoretical perspective, both subjective norms and perceived behavioral control highlighted the relative importance of perceived healthy behavioral intention that could contribute to perform CVD preventive healthy behaviors. The study findings clearly suggested that TPB is a useful framework for understanding the factors linked to the intention among young adults for performing CVD preventive healthy behaviors.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

A descriptive correlational study was designed to describe the level of attitude, subjective norms, perceived behavioral control, and intention to perform CVD preventive behaviors, and also to examine factors that have an influence on the intention to perform CVD preventive behaviors. This chapter presents the conclusion, the implications, and limitations of this study, and recommendations for future research.

Summary of the Study Findings

This study was conducted at a Government Bangla college in Dhaka city Bangladesh. The subjects in this study were young adults who were first year; honors level students, studying in the following departments: Bangla, Mathematics, and Accounting. The conceptual framework of the study was based on the Theory of Planned Behavior. The total of 120 subjects were disproportionately selected. Only 119 subjects were used in the statistical analysis. Human rights and anonymity were strictly maintained throughout the data collection process. The data were collected from November 2009 to January 2010.

A pilot study was conducted to test the reliability of the instruments before collecting the real data. The reliability coefficients of the instruments were .77 for attitude, .84 for subjective norms, .80 for perceived behavioral control, and .82 for intention to perform CVD preventive behaviors. The data were analyzed by

descriptive and inferential statistics. Attitude, subjective norms, perceived behavioral and intention were found to be at moderate level.

Finally, a hierarchical regression analysis was employed and it was found that 20% of variance were accounted for intention by subjective norms and perceived behavioral control. Subjective norms was found as the best predictor, followed by perceived behavioral control, in predicting intention (β =.36, p <.01; β =.18, p <.05 respectively). However, attitude failed to predict intention to perform CVD preventive behaviors among the young adults (β =.01, p > .05).

Strengths of the Study

The strengths of this study include:

1. Subjects were recruited by a disproportionate stratified random sampling technique which ensured that there was no sampling bias during the process of sampling. First, subject was randomly selected, and then every 5th number was included.

2. The researcher collected the data by herself and the consistency was maintained throughout the data collection. The subjects could directly approach to the researcher if they had any problem during data collection.

3. The instruments used in this study were translated into Bangla language. This enhanced the subject to understand the questionnaires accurately.

4. The TPB was widely recognized as a powerful model to identify the predictors of many healthy behaviors. In this study, this model was used as a

guideline to identify the predicting factors for intention to perform CVD preventive behaviors.

Limitations of the Study

This study has also some limitations that must be stated:

1. First, the limitation of the study findings was generalization. The study was carried out only in one Government college setting and it was limited only for college students. Subjects had high level of education with socio-economical status comparing with general young adults. Thus, the results might not be generalized with general young adults in Bangladesh.

2. Second, since the subjects were general students, some medical terminologies that were used in the questionnaires such as hyperlipidaemia and plague in blood vessel might not be easily understood by the samples. Even though it was translated into the Bengali version, but the subjects might still be facing difficulties in answering sometimes.

3. A large number of items (94 items) were used in order to cover the TPB variables component of attitude, subjective norms, perceived behavioral control and intention questionnaire. Some variables components of questionnaire were quite long, which might be a burden for the samples to answer.

Implications of the Study

The findings of the study suggested the following implications for nursing practice, nursing research, and nursing education.

Nursing Practice

The findings of the study have several significant implications for nursing practice, which are as follows:

1. Understanding the predictors that influence the young adult's intention to perform CVD preventive behaviors can assist the nurses in designing an effective intervention program for promoting CVD preventive behaviors.

2. The young adults appeared to be more willing to accept and follow CVD preventive behaviors from their parents, teachers, and friends. Therefore, the health care personnel can motivate the parents, teachers, or peers to guide the young adult for performing CVD preventive behaviors.

3. The community health nurse can take initiative with college administration committee to address cardiovascular disease prevention in college health policy, Nurses can promote the students' effort and persistence towards performing physical activity, eating healthy food from healthful college canteen and getting involved in the college anti-smoking and anti-alcohol drinking activities, etc.

Nursing Research

The findings of this study have an important implication for nursing research. Specifically, the results highlighted the theoretical issues and provide basis for further nursing research. The results revealed that the young adult's attitude, subjective norms, and perceived behavioral control were at moderate level and needed to be

promoted to the higher level. The nurses should be concerned and should arrange the appropriate interventions for the young adult college students during their stay in college, such as nutritional education, behavioral change education, and make a curriculum for healthy behaviors.

The findings of this research provide important implication for nursing research in developing appropriate intervention to perform CVD preventive behaviors. Subjective norms and perceived behavioral control were the predictors of CVD preventive behaviors. Therefore, nurses can conduct an experimental study for both developing and testing effective intervention, which can promote CVD preventive behaviors among the young adults.

Nursing Education

This study supports the fact that TPB is a useful framework for understanding the psychological and cognitive determinants of CVD preventive behaviors among the young adults. Nursing educators can teach the students to apply the TPB variables for identifying the predictors of various healthy behaviors and it can reduce many preventable diseases earlier.

Recommendations for Further Study

Based on the findings and limitation of this study, recommendation for future study includes the following:

1. Further research should be conducted with more than one college with a large sample size for ensuring the representation of the population of a particular area under study.

2. Further research should also be conducted with large sample with different focus group among the young adults (e.g. working class individual, and rural setting). A wide variety of subjects' background can help exploring the similarity of the findings and identifying some confounding factors that influence the CVD preventive behaviors among young adults.

3. The researcher's self-developed scale for predicting factors towards CVD preventive behaviors was an innovative. Although, its reliability result showed an acceptable value, further validations of the construct are needed to enhance the accuracy of the instrument.

4. Further replication research is needed to build on these findings by testing whether or not an intervention that targets the predictors of CVD preventive behavior produce actual behavioral change.

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APPENDICES

APPENDIX A

Additional Analysis

Table 6

Range, Mean Scores, Standard Deviation, and Level of Attitude (AT), Subjective Norms (SN), Perceived Behavioral Control (PBC) and Intention (IN) to Perform CVD Preventive Behaviors (N=119)

variables	Possible score	Actual score	Mean	SD	level		
					Low	Moderate	High
						(n%)	
AT	5-125	49.60-125	77.17	14.32	0	71.40	28.60
SN	7.50-187	51.33-187	114.86	24.37	3.40	66.40	30.30
PBC	5.5-137	33.82-137	75.35	17.78	4.20	80.70	15.10
IN	22-110	61-110	80.49	9.13	0	51.30	48.70

Table 6.1

Frequency and Percentage of Samples by Attitude towards the CVD Preventive Behaviors Items (N=119)

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
	n (%)				
1. I think eating low fat diet (bean/fish) can reduce the plague in the blood vessel.	0 (0)	8 (6.7)	21 (17.6)	54 (45.4)	36 (30.3)
2. I think that taking everyday vegetables can reduce hyperlipidaemia.	0 (0)	3 (2.5)	9 (7.6)	67 (56.3)	40 (33.6)
3 .I don't think taking extra salt in each meal can raise high blood pressure.	28 (23.5)	36 (30.3)	21 (17.6)	23 (19.3)	11 (9.2)
8. I think that drinking alcohol can increase hyperlipidaemia.	5 (4.2)	10 (8.4)	42 (35.3)	41 (34.5)	21 (17.6)
11. Reducing the plague in the blood vessel is good for less chance of getting heart disease.	2 (1.2)	9 (7.6)	28 (23.5)	42 (35.3)	38 (31.9)
12. Decreasing hyperlipidaemia is important for keeping heart healthy.	1 (.8)	5 (4.2)	16 (13.4)	50 (42.0)	47 (39.5)
13. Raising high blood pressure is dangerous for any kind of cardiovascular disease	1 (.8)	8 (6.7)	17 (14.3)	50 (42.0)	43 (36.1)
18. Increasing hyperlipidaemia is risky to develop high blood pressure.	1 (.8)	5 (4.2)	17 (14.3)	61 (51.3)	35 (29.4)

Table 6.2

Frequency and Percentage of Subject's by Subjective Norms towards the CVD Preventive Behaviors Items (N=119)

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
	n(%)				
1. My parents say that I should eat low fat diet in everyday that can reduce my heart disease risk**.**	3 (2.5)	9 (7.6)	13 (10.9)	50 (42.0)	44 (37.0)
2. My friends think that I should take vegetables in everyday to reduce hyperlipidaemia.	4 (3.4)	10 (8.4)	6 (5.0)	46 (38.7)	53 (44.5)
3. My teachers think that I should not avoid extra salt that can't reduce the high blood pressure.	30 (25.2)	37 (31.1)	16 (13.4)	20 (16.8)	16 (13.4)
5. My friends think that I should perform jogging every day 20 minutes or al least 3 times per week for maintenance my normal blood pressure.	2 (1.7)	5 (4.2)	19 (16.0)	58 (48.7)	35 (29.4)
16. I try to eat low fat diet (bean/fish) that I feel my parents want I should do.	26 (21.8)	37 (31.1)	13 (10.9)	26 (21.8)	17 (14.3)
17. I don't attempt to eat more vegetables in every day that I feel my friends think I should not follow.	17 (14.3)	37 (31.1)	17 (14.3)	24 (20.2)	24 (20.2)
18. I don't try to avoid extra salt that I consider my teachers think I should not do.	28 (23.5)	38 (31.9)	16 (13.4)	26 (21.8)	11 (9.2)
20. I don't attempt to perform jogging for 20 minutes 3 times per week that I feel my friends say I should not do.	22 (18.5)	40 (33.6)	23 (19.3)	21 (17.6)	13 (10.6)

Table 6.3

Frequency and Percentage of Subject's by Perceived Behavioral Control towards the CVD Preventive Behaviors Items (N=119)

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
	n (%)				
1. I think I can eat low fat diet in everyday even though I don't like it much.	3 (2.5)	16 (13.4)	18 (15.1)	47 (39.5)	35 (29.4)
2. I feel I can eat vegetables even though it is difficult to access.	7 (5.9)	24 (20.2)	15 (12.6)	39 (32.8)	34 (28.6)
3. I think I cannot avoid eating extra salt because it is delicious for me.	29 (24.4)	30 (25.2)	19 (16.0)	33 (27.7)	8 (6.7)
9. I think I can avoid alcohol drinking even though my close friends drink.	4 (3.4)	13 (10.9)	14 (11.8)	42 (35.3)	46 (38.7)
12. I think it is very easy for me to eat low fat diet everyday.	6 (5.0)	9 (7.6)	20 (16.8)	48 (40.3)	36 (30.3)
13. I think it is quite difficult for me to eat vegetables everyday.	35 (29.4)	43 (36.1)	15 (12.6)	19 (16.0)	7 (5.9)
14 I think it is difficult for me to avoid taking extra salt.	35 (29.4)	39 (32.8)	18 (15.1)	19 (16.0)	8 (6.7)
19. I think it is easy for me to avoid alcohol drinking.	9 (7.6)	29 (24.4)	17 (14.3)	30 (25.2)	34 (28.6)

Table 6.4

Frequency and Percentage of Subject's by Intention to Perform CVD Preventive Behaviors Items (N=119)

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
	n(%)				
1. I decide to eat low fat (bean/fish) diet in the next month in each meal.	1 (.8)	6 (5.0)	25 (21.0)	62 (52.1)	25 (21.0)
3. I have no plan to avoid extra salt with food in each meal in the next month.	20 (16.8)	51 (42.9)	17 (14.3)	25 (21.0)	6 (5.0)
6. I am not willing to eat less rice/noodle in each meal in the next month.	10 (8.4)	39 (32.8)	26 (21.8)	30 (25.2)	14 (11.8)
11. I decide to form an alcohol free student club that will help me to avoid drinking alcohol forever.	1 (.8)	10 (8.4)	32 (26.9)	43 (36.1)	33 (27.7)
14. I haven't strong commitment to avoid alcohol drinking everywhere evermore.	29 (24.4)	37 (31.1)	26 (21.8)	13 (10.9)	14 (11.8)
18. I am willing to avoid stress every time by using assertive attitude form right now and forever.	5 (4.2)	6 (5.0)	15 (12.6)	52 (43.7)	41 (34.5)
21. I haven't desire to celebrate smoking free week from our college if it comes from the next month.	33 (27.7)	32 (26.9)	23 (19.3)	18 (15.1)	13 (10.9)
22. In the next month, I have desire to join in a smoking free club and wall postering to avoid smoking.	3 (2.5)	8 (6.7)	23 (19.3)	35 (29.4)	50 (42.0)

Table 7

Cronbach's Alpha Coefficients of Attitudes (AT), Subjective Norms (SN), Perceived Behavioral Control (PBC), and Intention (IN) Measurements Scales to Test the Reliability (N=30)

Measurement variables		Items	Cronbach's alpha (α)
Principal scale	Subscale		
Attitudes		20	.77
	Behavioral Belief	10	.65
	Outcome Evaluation	10	.77
Subjective Norms		30	.84
	Normative Belief	15	.82
	Motivation to Comply	15	.71
PBC		22	.80
	Control Belief	11	.72
	Power of Control	11	.77
Intention		22	.82

APPENDIX B

Assumption Testing

Table 8.1

Assumption o f Normality by Skewness and Kurtosis of Variables

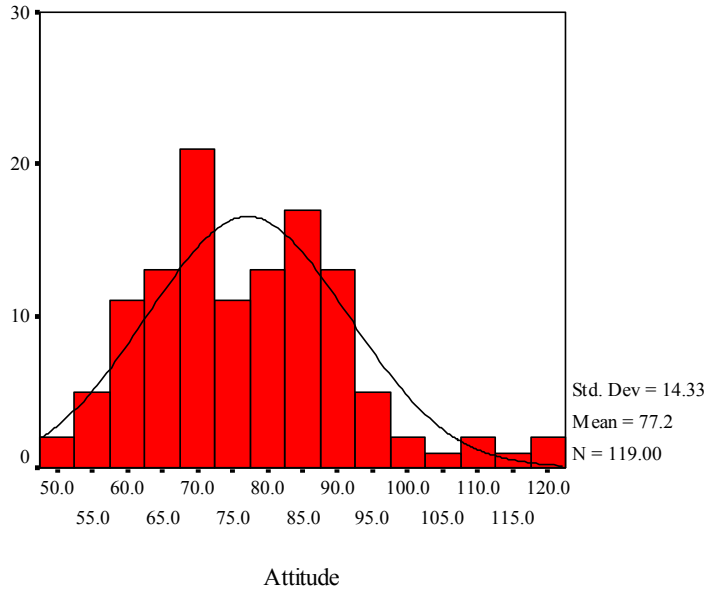
Variables	Skewness	Std. error of skewness	Kurtosis	Std. error of kurtosis	Z $_{kurtosis}$	Kolmogorov-Smirnov
AT	.58	.22	.30	.44	0.68	.18.
SN	.07		-.19		-0.43	.20*
PBC	.23		-.28		-0.64	.20*
IN	.59		.70		0.63	.17

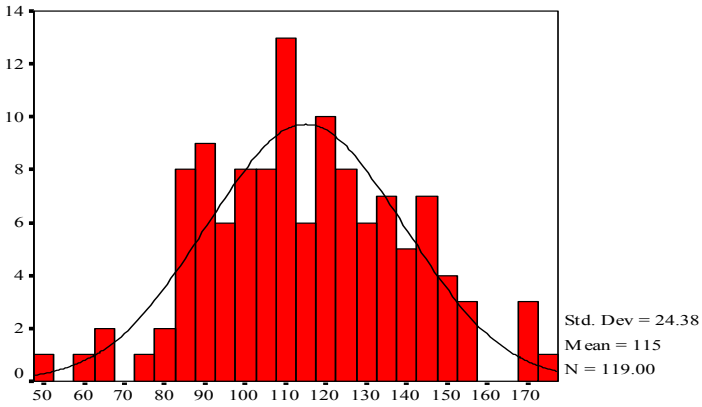
* This is a lower bound of the significance

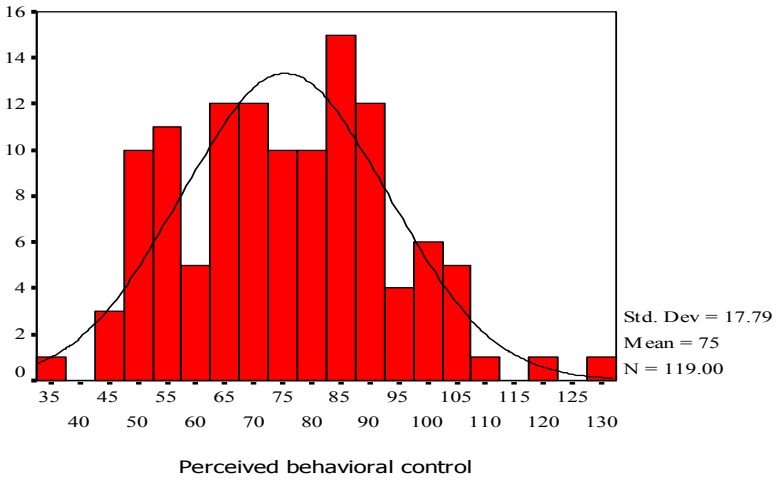
a. Lilliefors significance correction

Figure 3

Assumption of Normality by Histogram




Std. Dev = 24.38
Mean = 115
N = 119.00
Subjective norms


Std. Dev = 17.79
Mean = 75
N = 119.00
Perceived behavioral control

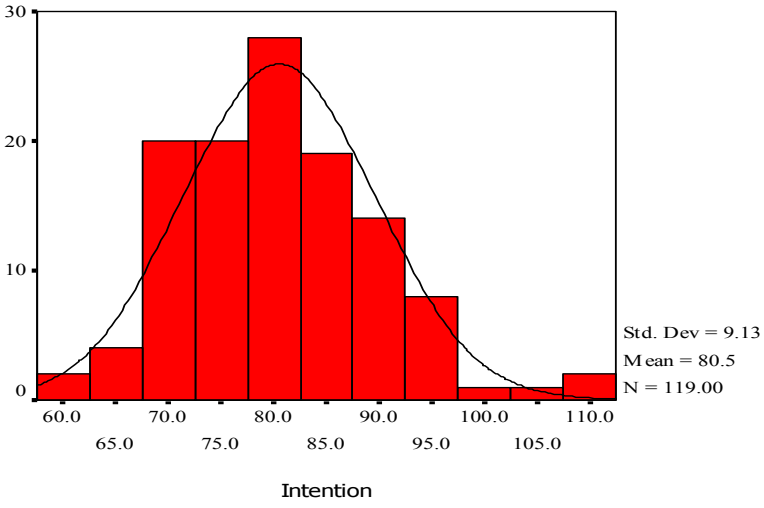

Std. Dev = 9.13
Mean = 80.5
N = 119.00
Intention

Figure: 4

Assumption of Normality by P-P Plots

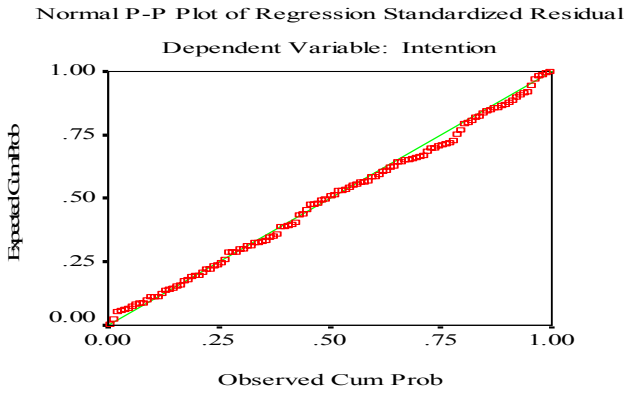
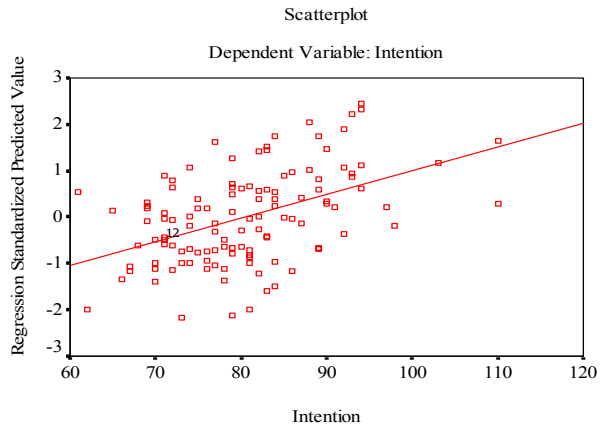
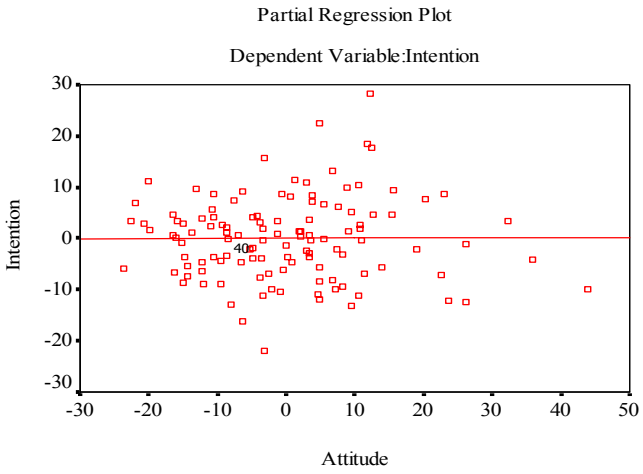


Figure 5

Assumption of Linearity





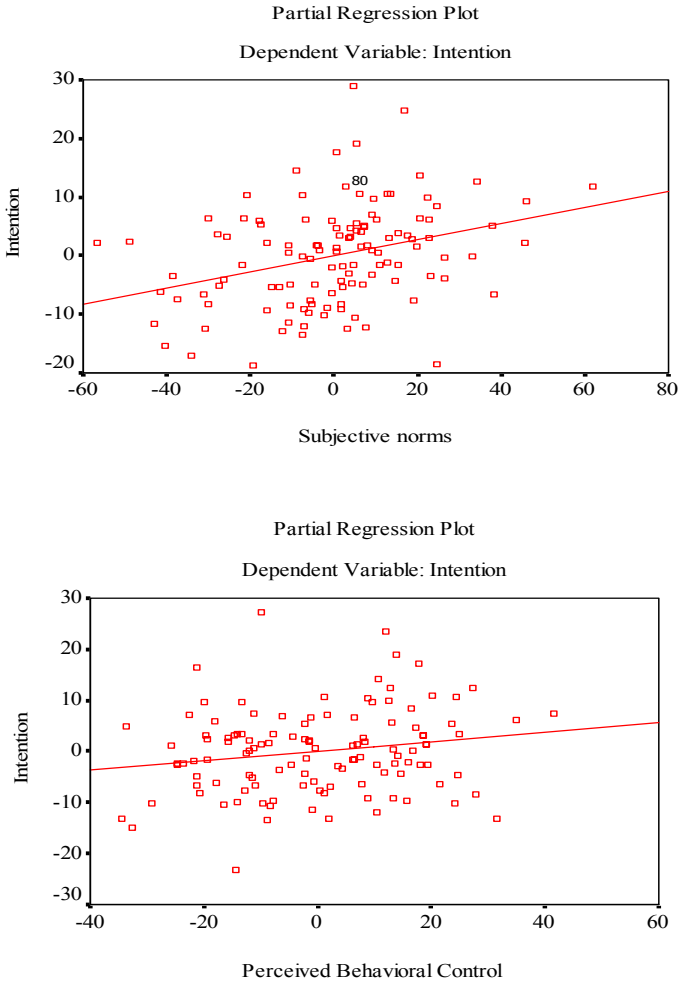


Figure 6

Assumption of Homoscedasticity

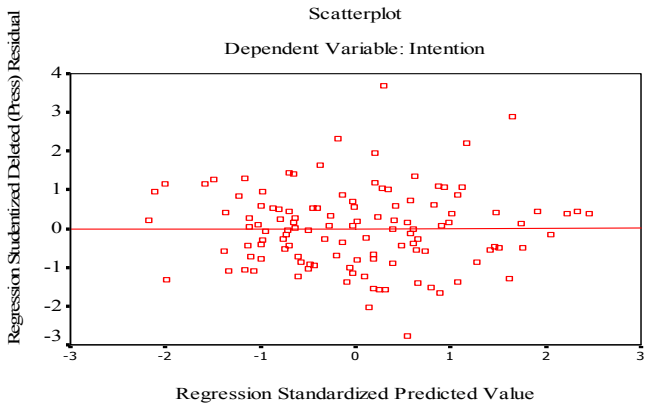


Table 8.2

Assumption of Multicollinearity by Bivariate Correlations (Pearson's) among the Study Variables (N=119)

Variable	1	2	3	4
1. Attitude	1.00			
2.Subjective norms	0.46**	1.00		
3.Perceive Behavioral Control	0.22*	0.39**	1.00	
4.Intention	0.21*	0.44**	.32**	1.00

* p=<.05, **p=<.01 (2-tailed)

Table 8.3

Multicollinearity among Predictors Variables by Tolerance and VIT test

Predictor variables	Tolerance	VIF
Attitude	.79	1.27
Subjective Norms	.70	1.42
Perceived Behavioral Control	.85	1.18

APPENDIX C
Informed Consent Form

Study Title: Influence on Attitudes, Subjective Norms, Perceived Behavioral Control on Intention to Perform CVD Preventive Behaviors.

Dear student,

I am Jahura Khatun a master's student, Faculty of Nursing, Prince of Songkla University, Thailand. I am also a senior staff nurse of National Institute of Cardio-vascular Diseases and Hospital (NICVD), Dhaka, Bangladesh. I am going to conduct a master's degree research for fulfilling my course requirements. The purpose of this study was to determine the predictive ability of attitude, subjective norms, perceived behavioral control, on intention to perform cardiovascular disease preventive behaviors among young adult in Bangladesh.

In this regards, I would like to invite you to participate in this research process and provide your necessary information about the study. Your participation is voluntary and no any harm or risk for your self and for your organization. The data you provide will only be used for this research purposes and it will be destroyed after the research report completed. Your information will provide a good understanding about the CVD preventive behavioral approach for the young-adult, particularly for college students.

I would like to inform you that your confidentiality and anonymity will be strictly maintained. The information I will gather from your given data, it will only be accessible for the researcher and the advisors of my research process. Your name and any identifying information will not be used in the report of the study.

Lastly, if you agree to participate in this study, I will provide you a set of questionnaire to answer. Moreover, you will be needed to sign your name under the heading given billow.

Thank you in advance for your wiliness to participate in this study.

…… …… ……..

(Name of participant) (Signature of Participant) Date

Major advisor address

Asst. Prof. Dr. Umaporn Boonyasopun

Faculty of Nursing

Prince of Songkla University

Hatyai, Thailand

Email: umaporn.b@psu.ac.th

Researcher address

Jahura Khatun

5/10 “D” type quarter Paik Para

Mirpor, Dhaka Bangladesh

Email: khatunjahura@yahoo.com

Mobile- 0172395345

APPENDIX D

Instruments for Data Collection

Subjects Code…..... College …….....

Date……

Research title: Influence of attitude, subjective norms, and perceived behavioral control on intention to perform Cardiovascular Disease (CVD) preventive behavior among young adult in Bangladesh.

Introduction:

This instrument was divided into 3 sections. Section I was related demographic and part history of CVD preventive behaviors information. Section II was related to factors influencing on intention to perform CVD preventive behaviors. Section III was related to intention to perform CVD preventive behaviors.

General instruction:

Please, follow the instructions before answering the questionnaire.

1) Answer all the items of the questionnaire honestly and don't leave out any items to answer, otherwise your data may not be useful for this study.
2) Answer the items as you prefer and there is no right or wrong answer.
3) Please don't write your name anywhere.
4) Please answer the questionnaire about yourself by selecting only one answer for each question with the mark √ in the ( ) or fill in the space.
5) If you don't understand or are not clear about any item, you can ask the researcher for answering the questions.
6) The statement is focus only of your opinion not in your knowledge or what you actually do. Please answer according to your personal perception.

Section I: Demographic and Past History of CVD Preventive Behaviors Information

1. Age……Years

2. Sex i. ( ) Male ii. ( ) Female

3. Type of food consumption i. ( ) Fast food ii. ( )Vegetable iii. ( ) Other

4. Height ……Cm

5. Weight……Kg

6. BMI……Kg/m^2 (Calculated by the researcher)

7. Past history of stress i. ( ) Yes ii. ( ) No

8. Past history of smoking i. ( ) Yes ii. ( ) No

9. Past history of alcohol drinking i. ( ) Yes ii. ( ) No

10. Past history of daily exercise i. ( ) Yes ii. ( ) No

11. Family history of cardiovascular disease i. ( ) Yes ii. ( ) No

Section II: Factors Influencing on Intention to Perform CVD Preventive Behaviors

Attitude towards CVD Preventive Behaviors Scale

Instruction: The attitude towards CVD preventive behavior scale seeks information about your opinion or feeling or judgment towards your action to prevent CVD and the consequence of that behavior. Please read each statement and then mark √ (tick) in the section that agrees best with how you feel or perceived. Please select only answer for each statement. There is no right or wrong answers.

- Strongly agree means that the statement is most relevant to your opinion.
- Agree means the statement is relevant to your opinion.
- Uncertain/ unsure means that you are not sure whether the statement is relevant to your opinion

- Disagree means the statement is not relevant to your opinion
- Strongly disagree means the statement is absolutely not relevant to your opinion

For example

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
I think eating high fiber food can reduce high blood pressure					√

The answer indicates that your opinion is highly relevant to eating high fiber food what is good for reducing your high blood pressure. The statement is a focus only of your opinion not in your knowledge or what you actually do. Please answer according to your personal perception.

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
1. I think eating low fat diet (bean/fish) can reduce the plague in the blood vessel.					
4. I think that practicing 30 minutes walk everyday or at least 3 times in a week can reduce overweight.					
6. I feel that avoidance of smoking can reduce the constriction of blood vessel.					
8. I think that drinking alcohol can increase hyperlipidaemia.					
11. Reducing the plague in the blood vessel is good for less chance of getting heart disease.					

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
14. Keeping normal body weight is important to reduce the risk of heart disease.					
16. Constricted blood vessel is dangerous for developing high blood pressure.					
18. Increasing hyperlipidaemia is risky to develop high blood pressure.					

Subjective Norms towards CVD Preventive Behaviors Scale

Instruction: The subjective norms towards CVD preventive behavior scale seeks information about your opinion or feeling or judgments towards your significant person's opinion (parent, teacher, and friend) and your opinion to perform the action to prevent CVD. Please follow the above answering system that way you did.

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
1. My parents say that I should eat low fat diet in everyday that can reduce my heart disease risk**.**					
3. My teachers think that I should not avoid extra salt that can't reduce the high blood pressure.					
8. My friends think I should not deny smoker accompany for keeping normal heart rate.					
13. My parents say I should avoid stress that can reduce high blood pressure.					
16. I try to eat low fat diet					

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
(bean/fish) that I feel my parents want I should do.					
18. I don't try to avoid extra salt that I consider my teachers think I should not do.					
23. I try to accept sometimes smoking that my friends think I should accomplish.					
28. I consider avoiding stress that I feel my parents' opinion I should follow.					

Perceived Behavioral Control towards CVD Preventive Behaviors Scale

Instruction: The perceived behavioral control towards CVD preventive behavior scale seeks information about your feeling or opinion towards your capabilities of performing CVD preventive behavior and degree of your confidence. Please follow above answering system that way you already did.

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
1. I think I can eat low fat diet in everyday even though I don't like it much.					
5. I think I can't perform jogging everyday at least 20 minutes or 3 times per week even though it is very helpful for me.					
9. I think I can avoid alcohol drinking even though my close friends drink.					
11. I think I can avoid stress					

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
because I have positive thinking.					
12. I think it is very easy for me to eat low fat diet everyday.					
16. I think it is very difficult for me to jog at 20 minutes every day or 3 times per week.					
19. I think it is easy for me to avoid alcohol drinking.					
22. I think it is not difficult for me to avoid stress.					

Section II: Intention to Perform CVD Preventive Behaviors Scale

Instruction: The intention to perform CVD preventive behaviors scale seeks information about your perception of your willingness or plan or decision to practice CVD preventive behavior. The system of answering the statement same as before.

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
1. I decide to eat low fat (bean/fish) diet in the next month in each meal.					
3. I have no plan to avoid extra salt with food in each meal in the next month.					
5. I decide to eat low sugar diet each meal in the next month.					
6. I am not willing to eat less rice/noodle in each meal in the next month.					
9. I decide to join a sport club, which will help me for regular					

Statement	Level of agreement				
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
exercise in different aspects in the next month.					
12. I strongly want to celebrate an alcohol free week at my school through the alcohol free student club in the next month.					
20. I haven't strong commitment to deny smoking from invitation of my friend right now and forever.					
22. In the next month, I have desire to join in a smoking free club and wall pestering to avoid smoking.					

APPENDIX E

Experts of the Content Validity Test

The following four experts examined the content validity of instruments. The name of the experts as follows:

1. Dr. Wandee Suttharangsee, PhD., RN.

Associate Professor, Department of Psychiatric Nursing

Prince of Songkla University, Thailand.

2. Dr. Wandee Kahawong, PhD., RN.

Assit. Professor, Departments of Adults Surgical Nursing

Prince of Songkla University Hospital, Thailand.

3. Mrs. Ira Dibra, MSN in Public Health, RN.

Principal, College of Nursing College

Mymensingh Medical College Hospital, Mymensingh, Bangladesh.

4. Mrs. Rahima Jamal Akter, MSN in Public Health, RN.

Nursing Officer, Directorate of Nursing Services, Bangladesh.

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APPENDIX F

Experts of the Instrument Translation

The following three bilingual English experts served in the translation process of the instruments. These three experts are:

1. Mr. Russel Ahmed (Masters in English)

Assist. Professor, Jahangir Nagor University

Dhaka, Bangladesh.

2. Mr. Shohag Ahmmed (Honors in English and Professional Translator)

Shohag Translation Centre

Motijeel C/A, Dhaka, Bangladesh.

3. Mr. Ariful Islam Arif (MSc Honors in Bangla & English)

Bangladesh Translation Centre, Dhaka, Bangladesh.

VITAE

Name Mrs. Jahura Khatun

Student ID 5110420069

Educational Attainment

Degree	Name of Institution	Year of Graduation
Diploma in Nursing	Nursing Institute, Bogra.	1994
Diploma in Midwifery Nursing	Nursing Institute, Bogra.	1995
Bachelor in Public Health Nursing	College of Nursing, Dhaka.	2004
Master of Nursing Science	Prince of Songkla University.	2010

Scholarship Awards during Enrolment

Master of Nursing Degree Scholarship, Funded by the Directorate of Nursing Services, Ministry of Health and Family Welfare (MOHFW), Government of the People's Republic of Bangladesh.

Work-Position and Address

Senior Staff Nurse C/O Nursing Superintendent, National Institute of Cardiovascular Disease and Hospital, Bangladesh.
Email: khatunjahura@yahoo.com