

**LEVEL OF PHYSICAL ACTIVITY AMONG TYPE 2 DIABETES  
PATIENTS IN AFGHANISTAN**

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Submitted in Partial Fulfillment of the Requirements for the Degree of  
M.SC. in Rehabilitation Science

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## **DECLARATION**

- This work has not been previously accepted in substance for any degree and is not concurrently submitted in candidature for any degree.
- This dissertation in being submitted in partial fulfillment of the requirement for the degree of MSc in Rehabilitation Science.
- This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A bibliography is appended.
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## **ABBREVIATIONS**

**ACSM** = American College of Sports and Medicine

**ADA**= American Diabetes Association

**BMI**= Body Mass Index

**CI**= Confidence interval

**DM**= Diabetes mellitus

**IPAQ**= International Physical Activity Questionnaire

**MET** =Metabolic Equivalent Tasks

**PA**= Physical Activity

**SD**= Standard Deviation

**WHO**= World Health Organization

## ABSTRACT

**Introduction:** Diabetes mellitus is a metabolic disorder causing increase in blood sugar level in the body affecting 422 million people are living with diabetes worldwide. Diabetes is reaching epidemic level in Afghanistan effecting female population more than male population. Physical activity plays a major role in management of diabetes type 2 but it has been major concern of Afghanistan, since most of the Afghan population is inactive due to various factors. Prevalence rate of physical inactivity is 31.1% world wide and 59.2% in Afghanistan. **Objectives:** To determine the physical activity level among type 2 diabetes patients and to find out about integration of physical activity in diabetic care management in Afghanistan. **Methodology:** A cross-sectional study involving 150 patients was performed. Data were collected using Physical Activity Questionnaire (IPAQ) through face to face interview from Abu Ali Sina Balkhi regional hospital, Mazar I Sharif city, Afghanistan. Descriptive analysis and correlation test was performed appropriately when needed. **Result:** Majority of participants were female. The individuals from age group 45-55 are affected from diabetes type 2. Half of participants (50%) did not receive formal education. 24% of participants had normal weight, 50% were overweight and 26% were obese. Female (14.4%) were more inactive than male (10.75%) participants and were at more risk of developing coexisting disease. Nearly 11% of participants were inactive. The female was much more inactive than male. The average sitting time spent in sitting by participant was 6.37 hours per day. Physical activity level correlates with blood glucose level and body mass index, blood glucose level correlates with sitting time in both male and female. Among male participants age correlated with Body Mass Index and total physical activity correlates with blood glucose level. Among female participant's duration of diabetes and leisure time physical activity correlates with blood glucose level, physical activity intensity and sitting time correlates leisure time physical activity and total physical activity correlates with physical activity advised, blood glucose level and sitting time. **Conclusion:** To sum up, one tenth of participants in our study were inactive, which was much lower in comparison to general inactive prevalence rate of Afghanistan. The physical inactivity prevalence was more among female population which is similar to national prevalence of inactivity.

**Key words:** Physical activity, Diabetes mellitus type 2,

## **CHAPTER I: INTRODUCTION**

### **1.1 Background**

A metabolic disease leading to increase level of blood sugar level in the body as a result of decrease insulin secretion, decrease insulin action or both is known as diabetes mellitus. The duration and types determines the severity of sign and symptoms of diabetes mellitus. Diabetes mellitus if not managed properly may lead to complication such as stupor, coma and if not treated even death may occur due to ketoacidosis or rarely from non-kenotic hyperosmolar syndrome. Management and treatment plan of diabetes mellitus depend on the type of diabetes, but it is difficult to fit the patient single class especially for younger adult. Diabetes mellitus is classified as type one (type1) diabetes mellitus, type two (type 2) diabetes mellitus, gestational diabetes mellitus and other types (Kharroubi, 2015).

Comparing diabetes mellitus type 1 and diabetes mellitus type 2, the most common type is diabetes mellitus type 2. Among all cases, 90 % to 95 % are diabetes mellitus type 2. The body is unable to response to insulin so it is also called as insulin resistance diabetes. It seen mainly in older adults but due to increasing obesity, inactivity and fast food has increases rate in children and young adults. It is mainly caused due to family history, overweight, unhealthy diet, physical inactivity, and impaired glucose. Insulin resistance diabetes can be managed by balanced low carbohydrate diet, increase physical activities and maintaining ideal weight. Healthy diet, regular physical activities, avoiding tobacco helps to delay or prevent the onset of diabetes. Aerobic exercise and resistant exercise in combination is helpful to keep blood sugar level under control ("International Diabetes Federation - What is diabetes?").

There were 108 million people in the world who were suffering from diabetes in 1980. The prevalence of diabetes mellitus is rapidly increasing in low and middle income countries. The life span of nearly half of diabetes population loss their life's before the age of seventy years ("Diabetes," 2018).

Diabetes is reaching epidemic level in Afghanistan. The consumption of rice more frequently is highly associated dietary factor. Females are more suffering from diabetes than male. During the long term (war) conflict people are not receiving proper attention. The cases of undiagnosed diabetes are more. Those one who are diagnosed are unable to attain proper health care. Due to long conflict people are unable to give proper attention to their good habits and are not able to go for regular exercise due to security issue. The lack or moderate physical activities may increase the risk of diabetes mellitus type 2 or its associated complication in afghan population (Saeed, K. M. I., 2017).

Physical activity increases oxygen and energy demand. To fulfill those energy needs the body glucose are utilizing, maintaining blood glucose level (American Diabetes Association., 2004). The study has found that the main reason why diabetes patients are not encouraged towards physical activities are perceived difficulty in participating in exercise, tiredness, lack of time or facilities and lack of awareness about importance of physical activity for diabetes management (Thomas, N., Alder, E., & Leese, G. P., 2004). Physical inactivity accounts six percentage of global death and is fourth leading risk factor for worldwide mortality. 27% of diabetes burden of diabetes is attributed to physical inactivity as a main cause (World Health Organization, 2016). Physical inactivity is a major concern of Afghanistan. A study shows Muslim country people are more physically inactive than people from non-Muslim countries. Especially physical inactivity is seen in female more than the male (Kahan, D., 2015). The reduction of the prevalence of physical inactivity by 10% is the major objective of global action plan for prevention of non –communicable diseases (World Health Organization, 2013).

## **1.2 Justification of the study**

Diabetes is most emerging health issue, the major cause of death and disability. Majority of the countries have given commitment to stop the rise in diabetes, to reduce diabetes related premature death or impairment. But still it is rising as major health problem. In world more than 422 million people are living having diabetes. In addition, its prevalence and incidence are rising day-by-day (World Health Organization, 2018). In the world 1 in 11 adult populations are living with diabetes. It is estimated that 46% of diabetes cases are still undiagnosed and by 2040 the diabetes case will rise to 642 million.

The risk factors of non-communicable diseases like high blood pressure, diabetes, cardiovascular diseases and all cause of mortality is physical inactivity. This is a close association between diabetes and physical activity (Wilmot et al., 2012). The physical activity is considered as exercise pills as it is effective as medicine in any kind of drug therapy. The relation between diabetes and physical activity is well established. So it is included as main treatment plan for diabetes patient (Naci, H., & Ioannidis, J. P., 2013). In addition, lifestyle changes such as physical activity, diet and treatment with metformin, a widely used anti-diabetic drug, both are recommended to reduce the incidence of diabetes in persons at high risk. Their study found lifestyle change are more effective than metformin for diabetes mellitus management. More precise diabetic management plan can be developed by drug dose determination with exercise prescription. Yet, the optimal dose of combining metformin or other anti-diabetic drugs with exercise for better glycemic control is yet to be identified (Malin, S. K., & Braun, B., 2016).

A study by Hallal (2012) reported the 31.1% prevalence rate of physical inactivity worldwide. It showed that females are less active than male. Skip it here it also found 17% of south Asian population are inactive. The physical activity was estimated by using Global Health Observatory Data Repository of World Health Organization (WHO) in adult population of 122 countries (Hallal, P. C., Andersen, L. B., Bull, F. C., Guthold, R., Haskell, W., Ekelund, U., & Lancet, 2012). All this study was conducted using the (IPAQ) International Physical Activity Questionnaire to determine the physical activity level. 1 individual among 5 individuals is physically

inactive in the world. Physical inactivity is more common in female than male, elderly population and in wealthier and urban population.

The actual burden of diabetes is not known for Afghanistan due to its long ongoing war. Total 8.4% of Afghan populations are diagnosed with diabetes (known case). 13.9% are overweight, 2.4% are obese who are at higher risk of getting diabetes. Still Afghanistan does not have proper national policy, strategy, action plan for diabetes management, reduction, prevention and control of overweight, obesity and physical activity. Afghanistan lack evidence based national diabetes guideline, diabetes registry and no referral system for diabetes cases (WHO Diabetes country profiles (2016). This study will be beneficial for the nation. It will provide the data on type two diabetes and its important control measure; physical activity. It will help government to make appropriate guideline for diabetes.

### **1.3 Research Question**

How physically active are type 2 diabetes patients and how is physical activity integrated into diabetic care management in Afghanistan?

#### 1.4 Operational definition

- 1- **Type 2 diabetes:** Diabetes mellitus type 2 or type 2 diabetes is also called as noninsulin-dependent mellitus (NIDDM) Or adult-onset diabetes. It is a metabolic disorder characterized with hyperglycemia (High blood Sugar) due to insulin resistance at voluntary muscle, adipose tissue and liver with lack of B-cell compensation or due to lack of insulin production. (Crimmins, N. A., & Dolan, L. M., 2008). Type 2 diabetes is diagnosed by glycolytic hemoglobin (Hb1AC) which is 7% (126mg/dl) or above. However, a plasma glucose, 7/0 mmol/L or above before meal or 11.1 mmol/L or above after 2 hour of 75 mg glucose in take indicates type 2 diabetes (International Diabetes Federation 2018).
- 2- **Physical Activity:** Physical activity is a movement of body which produced by voluntary muscles that required energy or calories expenditure including activities performed while working, playing, carrying out household chores, travelling and engaging in recreational pursuits (according to World Health Organization) (Physical activity., 2018.).
- 3- **Chronic Disabling Condition:** The conditions that have persistent or recurring health consequences lasting for years and inhibit the patient's usual daily physical activities.
- 4- **Inadvisable to Physical Activity:** The patients, who are advised by physician or surgeons to minimize or cut their usual daily physical activity.
- 5- **Guide Book:** The book that includes patient's education, details and prescription notes and is published by Afghanistan Diabetes Society.
- 6- **Diet:** The diet that is prescribed for the patients according to the guide book.
- 7- **Drugs:** The ant-diabetic Drugs prescribed in the patient's guide book.

## CHAPTER II: LITERATURE REVIEW

Diabetes mellitus can be classified into four major types: diabetes mellitus type 1, diabetes mellitus type 2, gestational diabetes and other specific types depending on its cause. Type 1 diabetes mellitus is caused due insulin deficiency. Insulin resistance and relative insulin deficiency is major causes of diabetes mellitus type 2. Gestational diabetes is seen among female during pregnancy. In order to diagnose diabetes one of the following criteria must be met (1) a fasting plasma glucose greater or equal to 126 (2) sign and symptom of diabetes such as polyuria, polydipsia and unexplained weight loss plus a casual plasma glucose of 200mg/dl or more (3) 2-hour plasma glucose 200 during an oral glucose tolerance test using 75g of glucose. Most often among old adults suffer from diabetes mellitus type 2. Diabetes mellitus can remain undiagnosed for many years without sign and symptoms. The main element that increases the risk for the development of the disease is physical inactivity. The increasing of the number of diabetes patients worldwide is associated with increasing physical activity at a global scale. Financial growth, increasing age, modernization and urbanization, dietary modification and changes in other lifestyle behavior are main contributing factors to diabetes and physical inactivity (International Diabetes Federation - What is diabetes. (2018.). Type 2 diabetes management involves prevention and delaying chronic complication of diabetes through achieving and maintaining optimal blood sugar level. Life style modifications such as physical activity, exercise, weight control, implementing necessary self-care behavior can be included in the management plan of diabetes mellitus. For most of the individual's oral medication and lifestyle change is seen helpful but some are dependent on external insulin (Data & Statistics | Diabetes | Center for Disease Control and Prevention, 2019).

Among 422 million people in the world are suffering from diabetes mellitus, which was only 108 million worldwide in 1980. The prevalence rate of diabetes mellitus among adult above 18 years have increase to 8.5%. The prevalence of diabetes is rapidly increasing in middle income or low income nations. There are many complications related to diabetes like blindness, kidney failure, heart attack, stroke and limb amputation which has increases its mortality and morbidity. In a year 2016 death due to diabetes was 1.6 million and 2.2 million deaths were related to its

complication. Among the deaths half of death people were below 70 years of age. In 2016 WHO declared diabetes as 7<sup>th</sup> leading cause of death (WHO, 2018).

The rapidly increasing prevalence of diabetes has made it the major public health concern to all countries. It has grasped more concern because of its increasing prevalence rate are increasing among all age group: children adolescents and younger adults. Diabetes mellitus type 2 epidemic had covered almost all ethnic group and age group. The causes of diabetes mellitus type 2 are embedded in a very complex group of genetic and epigenetic systems interacting within an equally complex societal framework that determines behavior and environmental influences (Chen, L., Magliano, D. J., & Zimmet, P. Z., 2012).

The condition of diabetes mellitus in South Asian countries (especially in India, Pakistan, Srilanka, Bangladesh Nepal, Bhutan or Maldives) is not better. The overall prevalence is increasing with considerable heterogeneity. This heterogeneity is attributed to many factors that span from socio-economic to status of diagnosis. The burden of diabetes mellitus type 2 is more in India, especially South India. The prevalence rate of different states of India was 10%, 8.4%, 5.3% and 13.6% in Tamilnadu, Maharashtra, Jharkhand and Chandigarh respectively. This data collected from the states if extrapolated, it would project a prevalence of type 2 diabetes mellitus in India in future year. Considering the above data, by 2030, it is projected that there will be 120.9 million people with diabetes in South Asia. This which will be double the number affected in North America or Europe prevalence rate of diabetes in south Asia exceed the prevalence rate in other ethnic in the US (Gujral, Pradeepa, Weber, Narayan, & Mohan, 2013).

A cross sectional study conducted in Afghanistan found out that prevalence rate of diabetes mellitus in Herat city in Afghanistan to be 9.9% were previously diagnosed and were receiving treatment for it. Another 66% were undiagnosed. The prevalence rate in male was 9.8% and in female was 10.1%. Among the study population only 3.3% were previously diagnosed and also recognized many factors like age, frequency of rice consumption, type of cooking oil to be the predisposing ones. It also identified many non-modifiable factors associated with diabetes. The study also stressed on the need to focus on this factor to reduce the burden (Saeed, 2017). Another cross-sectional study was done in Afghanistan in 2011 to find out the prevalence and

associate factors for diabetes mellitus among adults living in Kabul urban area. 1183 participants of aged more than 40 years were involved in the study chosen by simple random sampling technique. A structured questionnaire was prepared by the researcher to collect data in which it contains background of respondents, their blood pressure, body mass index, blood sugar and again physical examination also done of each respondent. In this study researcher select the individual whose fasting blood sugar level was  $>126\%$  were considered as a diabetes patient. In this study, out of 1183 respondents only 157 were considered as a diabetes mellitus. The risk factors identified by this study are advanced age, education level, family history of diabetes, sedentary lifestyle, more consumption of carbohydrate i.e. rice, using a car transportation, sedentary lifestyle hypertension and use of more oily foods. Thus the study concluded that the awareness raising programmed should be conducted to change the lifestyle of all Kabul urban area people to reduce the chances of diabetes in adults (Saeed et al., 2015).

A cross-sectional study conducted in year 2013 was done by (Mir Islam S K) in Afghanistan on the topic “prevalence of diabetes mellitus and its risk factors in adults lived in Jalalabad city, Afghanistan”. A simple random sampling technique was used to collect data from 1200 adults of aged 25-70 years in the study. The physical characteristics of selected adults were identified like; height, weight, blood pressure and blood analysis. The finding of study shows that the prevalence of Diabetes among these adults was 11.8%. The study shows a significant difference between prevalence of male and female. However, this study shows the factors of diabetes are; Obesity, Hypertension, high cholesterol level and others are associated with different diseases and its risk of being diabetes. Hence the study concluded that different awareness raising program should be done to change the life style of every adult to reduce the chances of diabetes mellitus in adults (Mir Islam S K., 2013).

A study was conducted in Japan in 2016 among workers of company having diabetes mellitus type 2 on effectiveness of lifestyle intervention using the internet for the people with early diabetes mellitus type 2. In this study 49 participants completed the 6month exercise therapy programme. The participants used activity meters, scales and sphygmomanometer connected to internet by Bluetooth. All these devices daily recorded all the information of their everyday activities by which the information is

received by health professional's i.e. public health nurse. This nurse visit to all the participants to collect information twice a month. The result of these study shows that the number of daily physical activities increased but statistically it does not show any significant relationship. There was a decrease in HbA1c levels after 6month exercise therapy programme. Whereas this programme did not improve the Body Mass Index and blood pressure of participants. The study concluded that the lifestyle should be modified by the therapy using a monitoring system to control diabetes mellitus (Kato et al., 2020).

A survey was conducted in Pakistan in 2018 on the topic of prevalence of diabetes mellitus type 2 and Screening test of HBA1c. In this study a multistage stratified cluster sampling was used to select a population. 16 districts which was selected randomly were used in this cross-sectional study. Participant meeting the inclusion criteria had blood taken for HbA1c and Oral glucose tolerance test was done among participants. The result of this study shows that the among 18856 participants 2057 were pre-diabetes, 3201 had type 2 diabetes and overall mean HbA1c level was 5.62% and newly diagnosed was 8.56%. The significant association between type 2 diabetes and elder age, body mass index, family history and hypertension was shown in the study. The study concluded that the prevalence of type 2 diabetes and pre-diabetes is much higher than previous study done in Pakistan. It says that all the inclusive things should be developed for screening, prevention and treatment of diabetes at community level (Aamir et al., 2019).

A longitudinal cohort study was conducted in 2008 on the topic of Physical Activity and Prevention of diabetes mellitus type 2. In this study diabetes prevention trial was done among adults with impaired glucose tolerance or who are at high risk of cardiovascular disease. The study shows that performing physical activity approximately 150 minutes per week reduced the chances of progress of diabetes mellitus, it also helps in weight loss. In comparing with this result of this study, those people who are at baseline risk of type 2 diabetes like; client with low body mass index and no history of diabetes in family this people does not shows any symptoms of diabetes mellitus whether they perform physical activity or not. However, it shows that doing physical activity is different according to individual's risk. Thus, the study concluded that providing modified guidelines to the needy population with the

objectives of reducing risk of diabetes mellitus in high risk population to prevent the diabetes (Gill & Cooper, 2008).

In 2006, a systematic review was conducted to identify whether the physical activity of moderate intensity reduces the risk of type 2 diabetes mellitus. The researchers accept 10 prospective cohort studies with 301221 participants for performing physical activity at moderate level to reduce the risk of diabetes mellitus type 2. Among 301221 participants 9367 were incident cases. Among 10 studies five studies investigated that the role of walking to reduce diabetes mellitus type 2. The study shows that the risk of having diabetes was 0.69 % among the participants who perform regular performing physical activity at moderate level as compared to adopting the sedentary lifestyle. The study concluded that to reduce the risk of diabetes mellitus type 2 for individuals they should participate in physical activity in moderate intensity such as brisk walking rather than being a sedentary life style (Jeon et al., 2007).

World widely, the prevalence rate of diabetes mellitus is increasing in fast rate. Before type2 diabetes was disease of middle aged or old ages but from past few decades it is even seen in adolescents and children. Nowadays onset is more from childhood or adolescent. The prevalence rate of diabetes mellitus type 2 in Japan was increased by 4 times in the school going children. And in U.S between 8 and 45% of newly presenting children and have type 2diabetes (Alberti et al., 2004).

Lifestyle modification such as dietary modification, physical activity are the key intervention for management and prevention of diabetes mellitus type 2 because they help in maintaining glucose, lipid, blood pressure, control abnormalities, as well as aid in weight loss and maintenance. Medication should be there to enhance lifestyle improvement, without replacing those (Yates, T., & Scott, A., 2016).

Onset of diabetes mellitus type 2 can be preventing the simple life style modification such as healthy diet plan, regular physical activity, maintaining a normal body weight and avoiding tobacco. The diet, physical activity, medication, regular screening and treatment of complication can be prevented or delayed with the help of physical activity (WHO, 2018).

According to study, obesity is major cause of diabetes mellitus type 2. The study show obesity is more among Pacific Island countries. According to the latest WHO criteria for obesity, among people in American Samoa the prevalence of obesity is 70%, the obesity is common in Nauru, and Tokelau. Other islands such as Kiribati, Marshall island, the federated states of Micronesia, the Solomon island and Fiji the prevalence rate is 50.6%, 45%, 42.6%,32.8%,29.6% (Nanditha et al., 2016). The study also shows that physical activities are key intervention for the prevention and control of diabetes mellitus type 2. Along with medication life style modification is most for improvement of diabetes (Nanditha et al., 2016). Around 4 million people in United Kingdom (UK) are living with diabetes mellitus among which 3.5 million people are diagnosed and 549000 are undiagnosed. Obesity is seen as the major cause of diabetes type 2. According to the International Diabetes Federation (IDF) stated that the top 5 countries with the highest amount of people with diabetes. The top 5 countries are: China 109 million, India 69 million, USA 29 million, Brazil 14 million and Russian Federation 12 million ("Diabetes Prevalence," n.d.). In other countries also, the figure is not so good. The number of adults living in Mena USA is 35 million which will increase to 84 million by the year 2045. The total expenditure of US in health care of diabetes patient are 20.5 billion USD IN YEAR 2017 ("Diabetes in MENA," 2018). Another cross sectional study found out that prevalence rate of diabetes mellitus in Herat city in Afghanistan to be 9.9% were previously diagnosed and were receiving treatment for it. Another 66% were undiagnosed. The prevalence rate in male was 9.8% and in female was 10.1%. Among the study population only 3.3% were previously diagnosed and also recognized many factors like age, frequency of rice consumption, type of cooking oil to be the predisposing ones. It also identified many non-modifiable factors associated with diabetes. The study also stressed on the need to focus on this factor to reduce the burden (Saeed, 2017).

The first line therapy for type 2 diabetes mellitus was exercise, with the physiological effects thoroughly established. It improves the insulin sensitivity, control blood pressure and glycemic control. Exercise improves lipid profile, muscular strength and increase bone density. Moreover, exercise reduces total daily insulin requirements, risk for coronary artery disease, body weight, etc. However, in spite of benefits only 39% of adults with diabetes mellitus are physically active and rest are physically

inactive. It found that there are many barriers that don't allow people to become physically active (Shahar, J. & Hamdy, O., 2015).

A study conducted on middle-aged men shows that intense physical activity for 40 minutes per week reduced the risk of NIDDM (Non-Insulin Dependent Diabetes Mellitus). Low intensity was not able to reduce risk regardless of its duration. It also found that men who are obese or have hypertension or have positive history of NIDDM in a family were higher risk of diabetes. The study recommended physical activity of intensity of 5.5 metabolic units for 40 minute should be done to reduce the risk of NIDDM (Lynch et al., 1996). Another study conducted among older adult with type 2 shows that progressive resistance training (PRT) for 3 days per week for sixteen weeks was able to significant decrease in plasma glycosylate hemoglobin level and increase in muscle glycogen storage. There was 72% decrease in prescribe medicine as compare to control group. The control group does not shoe change in glycosylate hemoglobin and there was reduction in muscle glycogen and there was 42% increase in prescribe medication. The study conclude that the PRT is helpful for reducing blood glucose level and prevent potential risk among old age diabetes mellitus type 2 patients (Castaneda et al., 2002).

An experimental study shows that the intensive lifestyle modification as intervention was able to significantly loss weight in people with diabetes mellitus type 2. It was able to control increased blood glucose level and reduce the risk of CVD (Cardio Vascular Disease) and there was significant decrease in medication compare to group who were given diabetes support and education (American Diabetes Association., 2007). Physical activity is proven very beneficial for type two diabetes patients. The regular physical activities are beneficial then acute physical activity. In order to control blood glucose and prevent its potential risk physical activity should be included in daily life. Unfortunately, the physical activity was not given importance as an intervention for management of diabetes mellitus type 2. Lack of understanding or awareness, lack of motivation, lack of clear advice or explanation of its benefits by health care professionals might be the main reason of it. The regular and appropriate physical activity should be initiated for old age and obese people. The intensity and duration should be gradually increased to reduce risk of injury and other potential harm for them (Albright et al., 2000).

Exercise is important to control or maintain the blood glucose level. The intensity and frequency determine the degree of control or maintain of blood glucose. The benefits of single active exercise are beneficial for 72 hours only. So it is very important to maintain the frequency of exercise. The individual with diabetes should do regular exercise if not at least in consecutive day (Rogers, M. A., Yamamoto, & et al., 1988). A study conducted in China, where exercise-only treatment was included for management of diabetes mellitus. The found that mild or moderate exercise foe 20 minutes, strenuous for 10 minutes or very strenuous activity for 5 minutes per day shows significant results in reducing the risk of diabetes mellitus. It was able to reduce diabetes risk by 46% compare to diet and exercise (42%) and diet alone 31%. Finnish Diabetes Prevention and the U.S Diabetes Prevention Program had recommended healthy diet and increase physical activity for prevention and control of diabetes mellitus (Pan, Jiang, X. G., et al 1997).

A study conducted on middle aged overweight adult where they were subjected to life style modification of at least half an hour of moderate exercise. And in control group no changes were made. The study showed reduced incidence of diabetes by 50% in the experimental group those who subjected to lifestyle modification. It was greater effect of metformin which was only treatment given control. There was reducing of only 31% reduction in incidence of diabetes. The physical activity was found effective in both cases when the weight reduction was achieved or not. The study also found that weight loss as dominant predictor of lower incidence. Physical activity is able to reduce risk among all ethnic groups and all sex. In 2006, a cross sectional study was conducted to assess the physical activity in United Arab Emirates (UAE) among diabetes mellitus type 2 patient to investigate the type 2 diabetic patients who take part in the outpatient centers in Al – Ain District. In this study total 390 patients had participated and they complete the questioner, blood pressure was measured, body mass index (BMI) was calculated, measurement of body fat and abdominal circumference, was taken, glycemic control (HbA1c) and fasting lipid profile was tested. Among those 390 patients enrolled, only 25 % of the patients were reported physical levels for diagnosis of diabetes, and about 3 % were reported physical activity that meets the prescribed guideline. And about 53 % of the patients had under controlled high blood pressure (Hypertension) and unsatisfactory lipid profile. About 71 % patients had a high low density lipoprotein (LDL) also about 73 % patients had

low high density lipoprotein (HDL), about 95 % patients had hypertriglyceridemia, about 44 % patients were obese and about 34 % patients were overweight, about 59 % patients had abdominal obesity. Just 32 % patient had an appropriate glycemic control (AL – Kaabi et al, 2009)

In 2003 a survey was conducted among 23,283 adults in U.S. they were asked, if they physically active (moderate or vigorous activity  $\geq 30$  min, thrice per week). The information on their socio - demographic characteristics and their health conditions was also reported by them self. Type 2 diabetes risk factors examined Was more among participants with age  $\geq 45$  years, non-Caucasian ethnicity, BMI  $\geq 25$  kg / m<sup>2</sup>, high blood pressure (Hypertension) and cardio vascular diseases. About 39 % of adult participants with diabetes were physical active verses 58 % of adult's participants without diabetes. The physically active participant did not have diabetes because the amount of risk factors growth until falling to equivalent rates as adults with diabetes since the regulation for socio – demographic and all clinical factors, the potent correlates of being physically active were income level, restriction in physical activity, depression and sever obesity BMI  $\geq 40$  kg / m<sup>2</sup>. Several traditional predictors of activity (sex, education level, and having received past advice from a caregiver to exercise more) weren't evident among respondents with diabetes (Morrato, Hill, Wyatt, Ghushchyan, & Sullivan, 2007). The increase prevalence rate of diabetes mellitus type 2 was seen in children and adolescence. The sedentary lifestyle and obesity were the main cause of increasing incidence. Diabetes mellitus type 2 prevalence rate in children and adolescent was also increasing. No RCT study is conducted to find weather the physical exercise was beneficial in preventing type 2 diabetes in youth. But some study suggested physical activity for reducing the risk. It suggested 60 minute of regular physical exercise. Many studies were being conducted now days to find the effectiveness of life style modification and physical activity in prevention of diabetes mellitus type 2 in youth. Another study said that two and half hour of moderate to vigorous exercise in a week should be incorporated in life style modification to reduce risk of diabetes in adult. ACSM evidence category A. ADA a level recommendation. Engaging in 30 min of moderate-intensity PA (e.g., brisk walking) during most days of the week (e.g., 2.5 h/week) had been adopted as a recommendation for pregnant women without medical or obstetrical complications (Colberg et al., 2010)

Diabetes management should address physical activity as a vital part in intervention planning for all patients at risk of or with diabetes Mellitus type 2. The appropriate time of high intensity exercise is beneficial for diabetes type 2. There is strong recommendation that appropriately qualified and experienced exercise professionals should prescribe and deliver exercises according to the recommendation of physical activity tailored to individual patient's condition (Hordern, M. D., Dunstan, D. W., Prins, J. B., Baker, M. K., Singh, M. A. F., & Coombes, J. S., 2012). According to American Diabetes Association (2013) physical activity recommendation for diabetes patients with evidence level "at least 150 minutes/week of moderate-intensity aerobic physical activity (50-70% of maximum heart rate). In the absence of contraindications people with type 2 diabetes should be encouraged to perform resistance training three times per week."

## CHAPTER III: RESEARCH METHODOLOGY

### 3.1. Conceptual frame work

<b>MODIFIABLE FACTORS</b>	<b>NON MODIFIABLE FACTORS</b>
<b>Smoking</b> <b>High Blood Pressure</b> <b>Physical Activity</b> <b>Overweight</b> <b>Lifestyle</b> <b>Diet</b>	<b>Hereditary / Genetics</b> <b>Age</b> <b>Ethnic Background</b>

### **3.2. Study Objectives:**

#### **3.2.1 General Objectives:**

To determine the physical activity level of type 2 diabetes mellitus patients and to find out about integration of physical activity in diabetic care management in Afghanistan.

#### **3.2.2. Specific Objectives:**

- To determine the level of physical activity level of type 2 diabetes mellitus patients in Afghanistan.
- To identify any difference between physical activity level between male and female patient of type 2 diabetes mellitus.
- To assess whether diabetes mellitus type 2 patients follow dose based physical activity at the recommended level.

### **3.3. Study Design:**

A cross sectional study design was adopted to conduct this study. It was used to determine the number of physically inactive persons among the type 2 diabetes patients at a given point of time. All the measurements on each person were made at one point in time. The prevalence of level of physical activity in this study is very important because it will likely to influence diabetes management.

### **3.4. Study Population**

The study population was diabetic patients who were registered in Abu Ali Sina Balkhi regional hospital in Mazar I Sharif city, Balkh province, Afghanistan.

### **3.5. Study Area**

The study was conducted in Abu Ali Sina Balkhi regional hospital in Mazar I Sharif city, Balkh province, Afghanistan among type 2 diabetes patients from selected hospital.

### **3.6. Study period**

The study was conducted from June 2019 to May 2020. Data collecting was conducted from August 2019 to September 2019. In these 2 months' data was

collected from the Abu Ali Sina Balkhi regional hospital in Mazar I Sharif city, Balkh province, Afghanistan.

### **3.7. Sample size**

Total number of 150 type 2 diabetes mellitus was sample population of study. All clients were by convenience sample method that they were registered in the hospital. The sample includes all the patients registered in selected hospital at given time period, so the sample size was determined by the following formula:

$$n = \frac{Z^2 p(1 - p)}{d^2}$$

$$n = \frac{(1.96)^2 * 0.9(1 - 0.9)}{(0.05)^2}$$

$$n = 138$$

### **3.8. Inclusion and Exclusion Criteria**

#### **3.8.1. Inclusion criteria:**

- Type 2 diabetes patients.
- 18 to 69 years old type 2 diabetes patients.
- Types 2 diabetes patients who were registered in Abu Ali Sina Balkhi regional hospital in Mazar I Sharif city, Balkh province, Afghanistan.
- The Patients who visited outpatient department of Abu Ali Sina Balkhi regional hospital in Mazar I Sharif city, Balkh province, Afghanistan.

#### **3.8.2. Exclusion criteria:**

- The patients who were not interested in study.
- The patients who did not had blood glucose record in their latest visit.
- The respondents who could not complete the interview.

### **3.9. Sampling technique**

#### **3.9.1 Sampling frame:**

The registered patients from Abu Sina Regional Hospital in Mazar I Sharif city, Balkh province, Afghanistan were the sample population of the study. In the defined period of time: August 2019 to September 2019.

#### **3.9.2. Sampling process:**

The data was collected from Abu Ali Sina Balkhi regional hospital in Mazar I Sharif city, Balkh province, Afghanistan. After submitting the thesis proposal, both English and Dari translated questionnaire, both English and Dari translated consent form to Institutional Review Board of Afghanistan permission was taken from National public health institute, institutional review board, Ministry of Public Health of Afghanistan. After getting approval from Review board the permission was taken from Abu Ali Sina Balkhi regional hospital in Mazar I Sharif city, Balkh province, Afghanistan. Before collecting data, study purpose, its need, everything was explained to participant and written consent was taken from participant. It was clearly explained that all their information will be confidential.

#### **3.9.3 Data collection:**

International Physical Activity Questionnaire was used as a data collection tool for collecting data from 150 type 2 diabetes patients. The interview method was used for data collection.

An information sheet was presented before each patient and was also read out for each patient individually. The information sheet described detailed about the study and the investigation. The informed consent forms were taken from the patients who agreed to participate in this study.

The questionnaire was presented before the patient written format and described to the verbally at face to face interview. The researcher has collected data himself without the help of volunteers. After getting consent from patients who visited the hospital, data collector described the questionnaire to the patients. The data collector ensures full completion of the questionnaire, have the complete questionnaire back to them.

### **3.10. Data collection tools and materials:**

#### **3.10.1. Measurement of physical activity:**

Long version International Physical Activity Questionnaire (IPAQ) was used to collect the data of total 150 participants. International Physical Activity Questionnaire (IPAQ) is a verified instrument developed and tested for use in adult of 18 to 69 years to measure physical activity. It takes about 15 to 20 minutes' time to complete the International Physical Activity Questionnaire (IPAQ). International Physical Activity Questionnaire (IPAQ) consist of 27 questions, covering frequency (days/week) and duration (minutes/day) of moderate and vigorous intensity of physical activity in four categories: leisure time physical activity, domestic and gardening (yard) work activities, work related physical activity and transport related physical activity. Sedentary behavior is also included in the questionnaire. The terms of behavior in typical or usual week was covered by the questionnaire. The separate domain specific score for walking, moderate intensity physical activity and vigorous intensity physical activity in each work, transportation, domestic chores and gardening (yard) and leisure-time domains was structured in IPAQ long form. Sum of the duration in minute and frequency in days for all types of activities in domain such as work, transport related activity, leisure, home and gardening activities and leisure time activity is used to calculated total physical activity score. It also calculates the domain specific scores or activity specific sub scores. The summation of the scores for walking, moderate intensity physical activity, vigorous intensity physical activity within a specific domain is used to calculate domain specific scores, here specific scores require summation of the scores for the specific type of activity across domains (IPAQ– Short and Long Forms Contents, 2010).

#### **3.10.2. Conversion of Physical Activity data to estimated energy expenditure**

Intensity of physical activity are commonly expressed by the use of METs, which stands for Metabolic Equivalent Tasks. The ratio of specific physical activity metabolic rate to resting metabolic rate is called as a MET. The energy cost of sitting quietly is one MET, which is equivalence to a caloric consumption of 1kcal/kg/hr. the MET or energy expenditure of typical week was estimated for this study. for measuring the energy expenditure of physical activity, the METs was applied to the physical activity variables derived from International Physical Activity Questionnaire

(IPAQ). On the basis of intensity of specific physical activity, MET values and formulas for computation of MET minutes was derived. It is estimated that energy consumption in moderate physical activity is four times higher and energy consumption in vigorous physical activity is eight time higher than energy consumption while sitting quietly,

While calculating the person's overall energy expenditure using IPAQ, the physical activity such as moderate intensity physical activity during work, leisure or recreational activity are assigned a value of 4 METs and vigorous intensity are assigned a value of 8 METs. For calculating the total physical activity scores the sum of all MET/minutes/week from moderate physical activity, vigorous physical activity during work, commuting and recreation. The above mentioned MET values were used for calculating a person's overall energy expenditure using GPAQ-2 (IPAQ – Short and Long Forms Contents, 2010)

### **3.10.3 Criteria for classifying PA levels**

While classifying the PA levels, PA during a typical week, the number of days per week, intensity of performed activity was taken in account and classified with the help of certain criteria. According to IPAQ framework, a person's level of physical activity was classified as low, moderate, and high categories (IPAQ – Short and Long Forms Contents," 2010). The criteria for different level of physical activities are given below.

**High:** individual fulfilling following criteria are included here

- a) Vigorous intensity physical activity at least 3 days or achieving minimum total physical activity of at least 1500 MET minutes/week.  
OR
- b) Combination of walking, moderate intensity physical activity, vigorous physical activity for 7 days or achieving total physical activity of at least 3000 MET minutes/week.

**Moderate:** individual who are not included in high level and fulfill the following criteria are included here

- c) Vigorous intensity physical activity, at least for 20 minutes for 3 days.  
OR
- d) Moderate intensity physical activity or walking, at least for 30 minutes

for 5 days or more. OR

- e) Combination of walking, moderate intensity physical activity, vigorous intensity physical activity for 5 days or achieving a minimum total physical activity of at least 600 MET minutes per day

**Low:** An individual whose activity did not meet the criteria of high and moderate activity falls under this category. In this category, no activity was reported or had reported some activity which did not match the criteria of high and moderate categories. This is the lowest level or category of physical activity.

### **3.11. Data analysis and management**

Data was managed and analyzed by using the SPSS software version 22.0. And different kinds of charts and graphs were used for presenting and interpreting the data. Various statistical tools were used for analyzing the data. And also for decorate the graphs and charts Microsoft Office Excel 2013 were used. Individual who had less than 10 minutes and more than 960 minutes per day of physical activity were excluded while analysis physical activity level. While analyzing the socio-demographic variable such physician advice on type, duration, frequency and participant's adherence to advise, the participants who received the advised were only included.

### **3.12. Quality control and quality assurance**

A cross sectional study was conducted where International Physical Activity questionnaire was used as a tool for data collection and no intervention were used. Each question and answer of respondent was explained in order to minimize the possible over-reporting of physical activity when using International Physical Activity. Regions and characteristics of respondent for example their age and sex were considered during interview which can influence physical activity behaviors (AINSWORTH et al., 2006).

For translation, two individuals who were fluent in both languages were assigned for forward translation. They both prepare two versions of questionnaires then they both sat together and discussed and come up with one first version of translated questionnaire. Then this translated version was provided to another person who was

fluent in both languages and who have not seen the original copy of questionnaire for backward translation. Then all three translators sat together and consensus was drawn with final version of translated questionnaires in Persian language.

Then the pilot study had been conducted for the questionnaire to ensure the validity of the questionnaire. With the help of this survey, the unmet and required changes can be made and rearrange the questionnaire to make it easiest, understandable, and clear to the participants. Then both language questionnaire, consent form and thesis proposal was submitted to National public health institute, institutional review board, Ministry of Public Health of Afghanistan for getting approval for data collection.

The questionnaires filled by all those participants were kept safely in order to maintain confidentiality of participants. The data collected had been reviewed several times before entering into the SPSS program to reduce the errors that are likely to occur while entering and analysis of the collected data. The data were being re-coded in the required variables. Analysis of the data was done from the computer to minimize the errors.

### **3.13. Ethical consideration:**

The Ethics approval was obtained before initiation of the study from the Research Ethics Committee at our institution. Then both language questionnaire, consent form and thesis proposal was submitted to National public health institute, institutional review board, Ministry of Public Health of Afghanistan for getting approval for data collection. After getting approval from Review Board the permission was taken from Abu Ali Sina Balkhi regional hospital in Balkh province Afghanistan. The respondents from the study was told clearly about their right to leave or not forced to participate if he/she was not interested to participate in the study. The researcher had taken appropriate informed consent from the participants who were interested to participate in the study after verbally informing about the study and its purpose. The information provided by the participants will not be revealed directly and confidentiality will be maintained. They were being informed that there will not be any harm and direct benefit to participate in the study.

## CHAPTER IV: RESULT

These chapters show the result of our study. The data were analyzed with the help of SPSS software. The descriptive analysis was performed for almost all variables. T-tests were performed to assess the influence of sex of participants on anthropometric and metabolic profile of participants. Whereas, Pearson's correlation was performed to find the correlation of physical activity and other measurement with sex of participants.

### 4.1. Socio-demographic characteristics:

**Table 4.1: Sex and Age groups of the Participants (n=150)**

		Frequency	Percentage
Sex	Men	46	30.7 %
	Women	104	69.3 %
	Total	150	100 %
Age group (in years)	15 – 24	2	1.3 %
	25 – 34	2	1.3 %
	35 – 44	29	19.2 %
	45 – 54	60	40 %
	55 – 65	57	38 %
	Total	150	100 %

Among 150 respondent's patients 30.7 % (n = 46) were men and 69.3 % (n = 104) were women. Mean age of respondents were 52.6 years ( $\pm$  8.5). None were below 20 years, the majority 40 % (n = 60) of them were within 45-55 years age group, followed by 38 %, (n = 57) were within 55-65 years age group, 19.3 %, (n = 29) were within 35-45 years age group, 1.3 %, (n = 2) were within 25-35 years age group and 1.3 %, (n = 2) were within 15-25 years age group (Table 4.1).

**Table 4.2: Level of Education among the Type 2 Diabetes Patients (n=150)**

Level of education	Male (48) % (n)	Female (102) % (n)	Total (150) % (n)
No education (never attend School/not Passed class I)	26.1% (12)	60 % (63)	50 % (75)
Primary (class I to Class V)	26.1 % (12)	6.7 % (7)	12.7% (19)
Lower secondary and Secondary Class To Class XI)	26.1 % (12)	16.3% (17)	19.3% (29)
Higher Secondary (Class XII)	8.7 % (4)	5.8 % (6)	6.7% (10)
Graduate and Above (Degree-pass / Hon's / Post Graduate/ M.S / Ph.D. / Equivalent	13 % (6)	10 % (11)	11.3% (17)

Table 4.2 shows the level of education among type 2 who respondents. Among all participants most of them (50 %, n = 75) had no education or never attend school, (19.3 %, n = 19) of participants lower secondary and secondary education, (12.7 %, n = 19) of participants were with primary education, (11.3 %, n = 17) of participants were graduate and above and (6.7 %, n = 10) of participants were with higher secondary education. (Table 4.2)

**Table 4.3: Type of Occupation and Gender of the patients (n=150)**

Occupation	Gender of the patients		Total
	Male	Female	
Housewife	no	0	88
	%	0.00%	84.60%
Unemployed and Retired	no	5	2
	%	10.90%	1.90%
Agriculture	no	18	0
	%	39.10%	0.00%
Education	no	5	12
	%	10.90%	11.50%
worker (Repair of motor, carpenter, labor, rickshaw, transportation, home maker	no	13	1
	%	28.30%	1.00%
Job (Armed force, manager, hotel, financial and insurance	no	5	1
	%	10.90%	1.00%
Total	no	46	104
	%	100.00%	100.00%

Table 4.3 shows the type of occupation and gender specification. Most of participants 58.70 % (n = 88) were housewife followed by 12 % (n = 18) of them were agriculture, 11.30 % (n = 17) of them were education, 9.3 % (n = 14) of them were worker, 4.70 % (n = 7) of them were unemployed and retired and 4 % (n = 6) of them were job.

**Table 4.4: Chronic Disease reported by diabetic type 2 patients**

Disease	Responses		
	N	Percent of Diseases	Percent of participants
Heart Disease	23	14.0%	15.3%
Arthritis	10	6.1%	6.7%
Chest Disease	4	2.4%	2.7%
Visual Impairment	18	11.0%	12.0%
Mobility Impairment	6	3.7%	4.0%
Other Problems	13	7.9%	8.7%
No other Disease	90	54.9%	60.0%
Total	164	100.0%	

Table 4.4 shows the diseases that were reported by diabetes type 2 patients. The percentage of disease cases and percentage of diabetes type 2 patients having diseases are presented in the table IV, some of the diabetes type 2 patients had more than one chronic disease. (n – 90) diabetes type 2 patients had no other disease which is 54.9 % and 60 % of the disease cases and participations. Heart disease was the most frequent disease (n = 23) which is 14 % and 15.3 % of the disease cases and participations, followed by visual impairment (n = 18) which is 11 % and 12 % of the disease cases and participations, other problems combined was represented (n =13) patients which is 7.9 % and 8.7 % of the disease and participations, the third most frequent disease was arthritis (n = 10) which is 6.1 % and 6.7 % of the disease cases and participations, mobility impairment was reported by (n = 6) patients which is 3.7 % and 4 % of the disease cases and participations and few of the participants had chest diseases consisted the least reported (n = 4) which is 2.4 % of the disease cases and 2.7 % of the participants. (Table 4.4)

**Table 4.5 Anthropometric and metabolic profile of the study sample**

Variable	Total (N=150) Mean±SD	Men (N=48) Mean±SD	Women (N=102) Mean±SD	P
Age in year	52.23±8.51	55.81±6.71	50.54±8.78	0.00
Duration of DM	5.72±3.68	5.65±3.62	5.75±3.72	0.87
Height of patient (in cm)	161.60±7.27	168.08±6.40	158.55±5.43	0.00
Weight of patient (in kg)	73.34±10.93	77.69±11.87	71.29±9.87	0.001
Body mass index	28.06±3.64	27.42±3.28	28.37±3.77	0.138
Pulse rate (beats per minute)	73.73±4.64	74.58±4.46	73.33±4.69	0.124
Blood pressure (mmHg)	2.41±1.47	2.47±1.54	2.47±1.44	0.49
Blood glucose level(mg/dl)	199.01±47.60	198.56±50.27	199.22±46.54	0.94

Table 4.5 represented the anthropometric and metabolic profile of study participants. There was statistical significant in age in years for men (55.81±6.71) and women (50.54±8.78); p = 0.00, height of men (168.08±6.40) and women (158.55±5.43); p = 0.00 and in weight of men (77.69±11.87) and women (71.29±9.87); p= 0.001. Although there was significant difference in mean duration of diabetes mellitus, body mass index pulse rate and blood glucose level in men and female but it was not statically significant (p>0.05).

**Table 4.6: Blood Pressure categories reported by participants**

Blood Pressure	Gender of the patients			
		Male	Female	Total
Normal	no	23	44	67
	%	50.0%	42.3%	44.7%
Elevated	no	7	11	18
	%	15.2%	10.6%	12.0%
Hypertension stage 1	no	2	11	13
	%	4.3%	10.6%	8.7%
Hypertension stage 2	no	8	32	40
	%	17.4%	30.8%	26.7%
Hypertensive crisis	no	6	6	12
	%	13.0%	5.8%	8.0%
Total	no	46	104	150
	%	100.0%	100.0%	100.0%

Table 4.6 represents the blood pressure categories of participants. Half of the male participants (50%, 23) and nearly 42 percent of female participants (42.3%,44) had normal blood pressure. More female participants had elevated blood pressure (11, 10.6%), hypertension stage 1 (11, 10.6%) and hypertension stage 2 (30.8%, 32) than male. Equal number of male and female had hypertensive crisis, it accounts 13% among male and 5.8% among female participants.

## 4.2 Personal factors affecting physical activity among diabetes mellitus patients

The descriptive analysis was performed to analyse the different factors which were affecting the physical activity level of participants. The analysis was performed under various categories.

### 4.2.1 Patient's thought about physical activity for type 2 diabetes mellitus

**Table 4.7 Patient's thought about physical activity for T2DM %( n)**

	Not known	good	Very good	Bad	Very bad	Not answered
Total	32.7%(49)	55.3%(83)	11.3%(17)	1%(1)		
Male	37.5%(18)	50%(24)	12.5%(6)	-	-	-
Female	30.4%(31)	57.8%(59)	10.8%(11)	1%(1)	-	-

The table 4.7 shows thought of male and female type 2 diabetes patients about physical activity for diabetes management. The study revealed that among total participants 49 (32.7%) of participant did not have any idea about physical activity for diabetes management, 83(55.3%) thought it was good, 17(11.3%) of participant thought it was very good and only 1(1%) thought it was bad. Analysis thought about physical activity among different gender we observe that 24(50%) and 6 (12.5%) of male participant thought physical activity was good and very good respectively. Whereas among female participants, 59(57.8%), 11(10.8%) and 1(1%) thought physical activity was good, very good and bad respectively. 18 (37.5%) of male participants and 31(30.4%) of female participants had not really thought about physical activity for diabetes management.

### 4.2.2 Is physical activity enjoyable.

**Table 4.8 is physical activity enjoyable?**

	Yes	No
Total	64.7%(97)	35.3%(53)
Male	60.4%(29)	39.6%(19)
Female	66.7%(68)	33.3%(34)

The table 4.8 shows the descriptive analysis if the physical activity is enjoyable to participant or not. In general, 64.7% (97) participants enjoyed physical activity and 35.5% (53) participant did not enjoyed physical activity. 60.4% (29) and 39.6%(19) male participant said yes and no respectively when asked if physical activity is enjoyable. 66.7 (68) of female participants enjoyed physical activity and other 33.3% (34) did not enjoyed it.

### 4.2.3 Physician advice about physical activity for type 2 diabetes patient

**Table 4.9 Type, intensity, frequency and duration of physical activity advised by physician**

<b>Physical activity type</b>					
Total respondents	Walking	Running	Cycling	Stair climbing	Other PA
97(100%)	96(99%)	1(1%)	-	-	-

<b>Physical activity intensity</b>				
Total respondents	Light	Moderate	Vigorous	No advice given
97(100%)	78(80.4%)	15(15.5%)	4(4.1%)	-

<b>Frequency (days/week)</b>	
Mean $\pm$ SD	Mode
5.90 $\pm$ 0.77	6

<b>Duration (minutes/day)</b>	
Mean $\pm$ SD	Mode
39.69 $\pm$ 14.68	30

Here the type of physical activity, intensity, frequency and duration of physical activity advised by physician in table 4.9. The study showed 96 (99%) of participants were advised walking and 1(1%) was advised cycling by physician. None of the participants were advised for cycling, stair climbing and other form of Physical Activity. It also showed that 78 (80.4%), 15 (15.5%) and 4 (4.15) of participants were advised for light, moderate and vigorous physical activity. The mean frequency of physical activity was 5.90 with standard deviation of 0.77. 6 was the mode frequency of physical activity. Similarly, the mean duration of physical activity was 39.69 with standard deviation of 14.48 and mode 30.

#### 4.2.4 Adherence to physician's advice about physical activity

**Table 4.10 Adherence to physician's advice about physical activity**

Total	Always	Often	Sometime	Seldom	Never
97(100%)	54(55.7%)	33(34%)	7(7.2%)	2(2.1%)	1(1%)

The table 4.10 showed to which degree the participants were adhered to physician's advice about physical activity. It showed 54 (55.7%) participants were always, 33 (34%) participants were often and 7 (7.2%) were sometime adherence to physician's advice about physical activity. 2 (2.1%) participants and 1 (1%) participant was seldom and never adherence to physician's advice respectively.

#### 4.3 Environmental factor affecting physical activity

**Table 4.11 Environmental factors affecting physical activity (N=150)**

Environmental Factors	Yes	No	
Any playground for physical	55.3% (83)	44.7% (67)	
Walkable playground	54% (81)	46% (69)	
Fitness hall or institute for physical activity	22.7% (34)	77.3% (116)	
Urban planning and transport for physical activity	0.7%(1)	99.3%(149)	
Physically active friends and relatives	67.3%(101)	32.7%(49)	
Friends and relatives thoughts of physical activity			
Very good	Good	Bad	Not known
1.3% (2)	59.3% (89)	0.7% (1)	38.7% (58)

Table 4.11 shows the different factors affecting the physical activity of participants. 83 (55.3%) participant said there was playground for physical activity and other 67 (44.7%) they did not have playground for physical activity. Whereas, 81 (54%) participant had walk able ground and nearly half of participants (69, 46%) did not have it. Only 34 (22.7%) and 1 (0.7%) did not had barrier to physical activity due fitness hall or institute and urban planning and transport for physical activity respectively. 101 (67.3%) participants had active friends and relatives. Majority of participants (89, 59.35) said that their friends and relative had good thoughts about physical activity. Very less percentage of participant family and relatives thought it was good. 58 (38.7%) participants had no idea about their friends and relatives thought about physical activity. Only one participant (1%) said that his/her relative thought physical activity was bad.

#### 4.4 Obesity class

**Table 4.12 Sex specific obesity class (total n=150)**

Obesity class	Total (N=150) %(n)	female (N=102) %(n)	Male (N=48) %(n)
Normal	24%(36)	18.6%(19)	35.4%(17)
Overweight	50%(75)	54.9%(56)	39.6%(19)
Obesity	26%(39)	26.5%(27)	25%(12)
Percentage of participant overweight and above	76%(144)	81.4%(83)	64.6%(31)

Sex specific obesity class of participants is shown in table 4.12. The total number of participant was 150. The descriptive analysis shows that 36 (24%) of participants had normal weight, 75(50%) were overweight and 39 (26%) were obese. The study revealed that overall 144 (76%) of participant did not have normal body weight (overweight and above). While comparing the percentage of male and female in each category of obesity classes the study revealed that among total female population 18.9%(19), 54.9%(56) and 26.5%(27) were normal weight, overweight and obese respectively. Whereas 35.4% (17), 39.6% (19) and 25% (12) male participants were normal, overweight and obese respectively. The study also revealed that in total 144(76%), among female 83(81.4%) and among male 31(64.6%) participants did not have normal body weight (overweight and above).

#### 4.4 Prevalence of three categorical levels for physical activity in male and female:

**Table 4.13: Sex specific physical activity categories of participants**

PA Category		Gender of the patients		
		Male	Female	Total
LOW	number	1	15	16
	%	2.2%	14.4%	10.7%
MODERATE	number	8	10	18
	%	17.4%	9.6%	12.0%
HIGH	number	37	79	116
	%	80.4%	76.0%	77.3%
Total	Number	46	104	150
	%	100.0%	100.0%	100.0%

The prevalence of physical activity among the type 2 diabetes patient was low level of physical activity 10.7 % (n = 16), moderate level of physical activity 12% (n = 18) and high level of physical activity 77.3 % (n 116). The prevalence of low level of physical activity was found more among female diabetes type 2 patients (14.4 %, n = 15) compared to the prevalence found among male diabetes type 2 patients (2.2 %, n = 1). However, the prevalence of moderate level and high level of physical activity was higher among male diabetes type 2 patients (17.4 %, n = 8) compared to the prevalence found among female diabetes type 2 patients (9.6 %, n = 10). Followed by prevalence of high level of physical activity among male diabetes type 2 patients (80.4 %, n = 37) compared to the prevalence found among female diabetes type 2 patients (76 %, n = 79) (table 4.13)

#### 4.5 Disease risk among male and female relative to Body Mass Index

**Table 4.14 Disease risk among male and female relative to Body Mass Index (N =150, Male = 48, female =102)**

Body Mass Index	Disease risk	Male %(n)	Female%(n)
Underweight	No risk	-	-
Normal weight	No risk	35.4% (17)	18.6% (19)
Overweight	Increase risk	39.6% (19)	54.9 (56)
Obesity	High risk	25% (12)	26.5% (27)
Extreme Obesity	Extremely high risk	-	-
Total participant at risk of disease		64.58% of men 20.67% of total	81.37% of female 55.33 % of total

The table 4.14 presents the risk of disease among male and female relative to their body mass index. In our study there were no participants who were underweight or were extremely obese. 35.4% (17) male out of and 18.6 % (19) female participant were having weight, hence they did not have risk for disease. Overweight individual are at increasing risk of disease, 19 (39.6%) male and 56 (54.9%) female participants were under this category. 12 (25%) male and 27(26.5%) female participants are at high risk of disease since they were extremely obese. 64.58% of males among male participants and 20.67 % male among total population are at risk of disease. And 81.37% of females among female participants and 55.33% of females among total population are at risk of disease.

**4.4 Composition of physical activity less than 150 minutes per week among men and women in different domain and intensity specific**  
**Table 4.15 Composition of physical activity less than 150 minutes per week among men and women in different domain and intensity specific**

Sex of respondent	In work %(n)	In transport %(n)	In domestic and garden %(n)	In leisure %(n)	For walking %(n)	For moderate intensity %(n)	For vigorous intensity %(n)	For total PA
TOTAL (134)	73.1% (98)	100% (134)	41.8% (56)	100% (134)	97.8% (131)	27.6% (37)	82.1% (110)	12.7% (17)
MALE (43)	23.3% (10)	100% (43)	86% (37)	100% (43)	93% (40)	55.8% (24)	46.5% (20)	11.6% (5)
FEMALE (91)	96.7% (88)	100% (91)	20.9% (19)	100% (91)	100% (91)	14.3% (13)	98.9% (90)	13.2% (12)

The table 4.15 represents the physical activity less than 150 minutes per week among men and women in different area. In general, it was seen that 100% of responded spend less than 150 minute/week in transport and leisure activity. The second height percentage was seen for work 98 (73.1%) participants. The least number of participants spend less than 150 minutes for moderate intensity activity. In contrast 110 (82.1%) participants spend less than 150 minutes/ week for vigorous intensity activity and 37 (27.6%). In overall, the percentage spends on total PA less than 150 minute/ week is 12.7% (17 participants). While it also showed that 100% (43) male spend less than 150 per week in transport and leisure activity. Only 10 (23.3%) male participants spend less than 150 minute per week in work. 40 (93%), 24 (55.8%) and 20 (46.5%) spend less than 150 minutes for walking, moderate intensity activity and vigorous activity respectively. Whereas 100% (91) female participants spend less than 150 minutes/week in leisure and in transport. In contrast, only 19 female participants spend less than 150 minutes in domestic and garden work. Whereas in response to intensity, 100% of female participants spend less than 150 minutes for walk. 98.9 % (90) and 14.3% (13) female participants spend less than 150 minutes for vigorous intensity and moderate intensity activity respectively. 11.6% (5) male (among total male participants) and 13.2% of female (among total female participants) spend less than 150 minutes in total physical activity.

#### 4.5 Domain and intensity specific composition of physical activity among men and women of different BMI groups

**Table 4.16 Domain and intensity specific composition of physical activity among men and women**

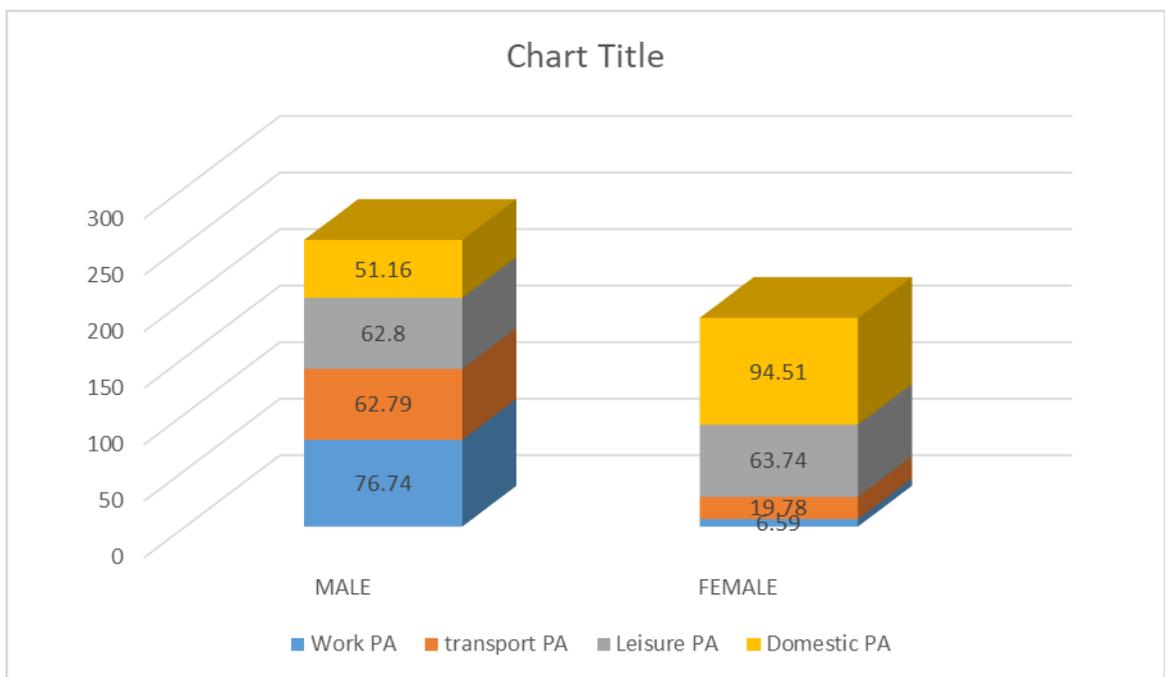
Parameters	Sex	Domain of PA				Intensity of PA		
		Work related PA %	Transport related PA%	Domestic and garden related PA%	Leisure time PA%	Walking %	Moderate intensity PA%	Vigorous Intensity PA%
Normal weight	Male (15)	66.67	66.67	40	73.33	73.33	93.33	40
	Female (16)	12.5	18.75	81.25	12	81.25	75	6.25
Overweight	Male (18)	77.78	61.11	66.67	55.56	72.22	88.89	55.56
	Female (51)	7.84	19.60	98.03	86.62	74.51	98.03	0
Obesity	Male (10)	90	60	40	60	90	80	80
	Female (24)	0	20.83	95.83	45.83	13	54.17	0

The table 4.16 shows the percentage of male and female of various BMI categories under different domain and intensity specific composition of physical activity. Among male having normal weight, 66.67 % spend time on work related and transport related physical activity. Only 40% of males spend time domestic and garden related physical activity. Maximum number of males (73.33%) spend time in leisure time physical activity. Most of the males were involved in moderate intensity physical activity. In contrast, only 40% male were involved in vigorous intensity physical activity. It also revealed that 81.25% of normal weight female spend time in domestic and garden related physical activity and only 12% of them spend time on leisure time physical activity. Majority of females (81.25%) were involved in low intensity physical activity i.e. walking and least (6.25%) were involved in vigorous intensity physical activity. 77.78% of overweight male were involved in work related physical activity and least (61.11%) were involved in transport related physical activity. Majority of overweight females (88.89%) were involved in moderated intensity physical activity and less number (55.56%) of female were involved in vigorous intensity physical activity. In case of obese male, 90% of males spend time on work related physical

exercise and minimum males spend time on domestic and garden related physical activity. Most of the obese males were involved in all intensity of physical activity: 90% walking, 80% moderate and high intensity. In case of obese female, none of them were involved in work related physical activity. Maximum obese females (95.83%) were involved in domestic and garden related physical activity. 54.17% of females did moderate intensity exercise and none of did vigorous exercise.

#### 4.6 Composition of total physical activity among men and women

The figure 4.1 illustrates the composition of total physical activity among male and female. 76.74 %, 62.79%, 62.8% and 51.16% of male spent time on work related, transport related, leisure time and domestic and garden related physical activity. 6.59%, 19.78%, 63.74%, 94.51% of female spent time on work related, transport related, leisure time and domestic and garden related physical activity.



**Figure 4.1 Composition of total physical activity among men and women.**

#### 4.7 Sex specific time (in minutes) spent by participants in doing physical activity in typical week

**Table 4.17 Sex specific time (in minutes) spent by participant in doing physical activity in a typical week**

Sex	Age groups (year)	15-25 (n=2) (M=0) (W=2)	25-35 (n=2) (M=0) (W=2)	35-45 (n=28) (M=6) (W=22)	45-55 (n=54) (M=13) (W=41)	55-65 (n=48) (M=24) (W=24)
Women	Mean	2781	3195	4855.36	12706.56	4315.13
	Median	2781	3195	5517	5013	4663.50
Men	Mean	-	-	24156.50	14060.08	15249
	Median	-	-	26455.50	12708	14615
Both	Mean	2781	3195	8991.32	13032.41	9782.17
	Median	2781	3195	6264	5697	5683.50

The table 4.17 represent the time spent by male and female of different age group in doing physical activity per week. There was no male participant in 15-25 and 25-35 age group and time spent by female of respective age group was 2781 and 3195 minutes respectively. It was seen that male in age group spent more time (mean time = 24156.50) whereas, female of age group 45-55 spent more time on physical activity per week (mean time =12706.56). It also showed that men in all age group spent more time in physical activity per week than their female counter parts. It also revealed that participant at the age of 45-55 spent more time (mean time= 13032) than participants in other age groups.

#### 4.8 Physical activity levels, physical fitness and sedentary behaviour in the study sample

**Table 4.18 Physical activity levels, physical fitness, and sedentary behaviours in the study sample**

Variable	Total (N=134) Mean ± SD	Male (N=43) Mean ± SD	Female (N=91) Mean ± SD	P
Total physical activity (MET-minutes/week)	10723.90±28454.65	16132.58 ± 9904.55	8168.15±33617.65	0.131
Total time spent for PA (Min/week)	354.93±182.20	470.63 ± 233.52	300.25 ±119.13	0.000
Total transport time spent for PA (min/week)	15.67±27.62	35.35±37.36	6.37±14.26	0.000
Total leisure time spent for PA (Min/week)	25.60±22.11	28.37±24.97	24.29±21.10	0.338
Total domestic and garden time spent for PA(Min/week)	192.31±144.85	58.53±84.40	255.38±123.067	0.000
Total work time spent for PA(Min/week)	121.68±207.68	348.45±217.00	14.01±74.61	0.000
Sitting time (Min/day)	2676.53±561.84	2780.47±552.41	2574.51±553.62	0.046
Transport sitting time (Min/day)	29.33±61.02	30.23±72.78	28.91±55.04	0.907

The table 4.18 shows the physical activity levels, physical fitness and sedentary behaviour of participants. The study showed the mean total physical activity (MET- minute/week) and mean total time spent for physical activity (minute/week) was higher in male (16132.58 minutes) (470.63 minutes) than female (8168.15 minutes) (300.32 minutes). The male participant spent more mean time in transport related (35.35 minutes), leisure related (28.37 minutes) and work related (348.45 minutes) than female (6.37 minutes), (24.29 minutes) and (14.01 minutes) respectively. Whereas, female spent more mean time on domestic and garden related physical activity (255.38 minutes) than male counterparts (58.53). The study also revealed that male spent more time in sitting than female. The male spent mean 2780.47 minutes in sitting time and mean 30.23 minutes sitting while travelling whereas, female spent mean 2574.51 minutes and mean 28.91 minutes respectively.

**4.9 Time (in minutes) spent by the respondent in work, transport, domestic and garden and leisure time physical and sitting time in atypical week.**

**Table 4.19 Time (in minute) spent by the respondents in work, transportation, domestic and garden and leisure-time physical and sitting time in a typical week**

Domains	Age group	Female						Male			
		15-25	25-35	35-45	45-55	55-65	All age	35-45	45-55	55-65	All age
Working	Mean	0.00	0.00	30	14.63	2.50	14.51	455	324.23	335	348.49
	Median	0.00	0.00	0.00	0.00	0.00	0.00	420	360	430	380
Transport	Mean	0.00	0.00	9.55	4.15	8.33	6.37	70	34.62	27.08	35.35
	Median	0.00	0.00	0.00	0.00	0.00	0.00	60	30	20	30
Domestic and gardening	Mean	270	270	254.55	254.15	255.83	255.38	50	64.62	57.91	58.84
	Median	270	270	280	300	255	270	0.00	0.00	25	20
Leisure time	Mean	45	30	25.91	25.85	17.92	24.29	25	35.38	25.42	28.37
	Median	45	30	30	30	15	30	30	30	30	30
Sitting time	Mean	244.29	394.29	353.38	379.51	369.05	367.79	371.43	390.99	407.02	397.21
	Median	244.29	394.29	351.43	360	360	360	385.72	377.14	377.14	377.14

The table 4.19 represent the time spent by participant of different age group in work, transport, domestic and garden and leisure- time physical activity and sitting time in a typical week. The study showed that female of age group 15-25 and 25-35 spent no time on work and transport related physical activity in a typical week. The female of age group 35-45(mean= 30) 45-55 (mean =14.63) and 55-56 (mean=2.50) spent less time in working. The male participants of age group 35-45 (mean= 455) in physical activity related to work. In over male participants (mean= 348.49) spent more time than female participants (mean = 14.51) in physical activity related to work. The females of age group 35-45 (mean= 9.55) spent more time in transport related physical activity similarly the male of same age group (mean = 70) spent more time. Comparing overall time spent by participants in transport related physical activity, the male spent (mean= 35.35) than female (mean =6.37). The female of age group 15-25 and 25-35 spent mean 70 minutes, which were higher than the time spent by other age group. Whereas, the male participants of age group 45-55(mean = 64.62) spent more time in garden and domestic physical activity than males of other age groups. Overall time spent by male and female showed, female spent (mean =255.38) than male (mean = 58.84). It was also seen that young females spent more time in leisure related physical activity whereas mid age male spent more time in leisure in leisure related physical activity. But the much difference in time spent by male and female participants in leisure related physical activity was not seen in the study. While going through the time spent by female participant just sitting, it was found that 25-35 (mean = 394.29) age group females spent more time in sitting. Whereas, the female participant of age group 15-25 (mean = 244.29) spent less time in sitting. In contrast, the older male participants (age group 55-65) spent more time sitting (mean = 407.02) and mid aged male participants (age group 35-45) spent less time in sitting (371.43). It was also observed that male participant (mean= 397.21) of our study spent more time in sitting than the female participants (mean =367.79).

#### 4.20 Physical activity levels and other measurements in male and female.

**Table 4.20 Correlation coefficient for physical activity level and other measurements in male and female**

Parameters	Age in year	Duration of DM(in year)	Body Mass Index	physical activity intensity(advised by physician)	Blood glucose level	Sitting time	Leisure PA	Total PA
<b>Age group of patient</b>								
male	1	.413	<b>0.012</b>	-0.321	-0.143	0.187	-0.12	-0.265
Female	1	.317	0.143	-0.077	0.166	0.192	-.249	<b>0.002</b>
<b>Duration of DM(in year)</b>								
Male	.413	1	-0.277	-0.064	-0.067	0.231	-0.112	-0.247
Female	.317	1	-0.103	-0.076	<b>0.02</b>	0.061	-0.089	0.146
<b>Body mass index</b>								
Male	<b>0.012</b>	-0.277	1	<b>0.006</b>	-0.099	-0.096	-0.235	0.268
Female	0.143	-0.103	1	<b>-0.038</b>	0.109	0.111	-0.149	<b>-0.024</b>
<b>Physical activity intensity(advised by physician)</b>								
Male	-0.206	-0.146	<b>0.006</b>	1	<b>0.032</b>	-0.055	.743**	<b>-0.002</b>
Female	0.077	-0.076	<b>-0.038</b>	1	<b>-0.052</b>	<b>-0.042</b>	<b>-0.054</b>	-0.051
<b>Blood glucose level</b>								
Male	-0.143	-0.067	-0.099	<b>0.032</b>	1	<b>-0.034</b>	-0.29	<b>-0.007</b>
Female	0.166	<b>0.02</b>	0.109	<b>-0.052</b>	1	<b>-0.022</b>	<b>-0.018</b>	-0.09
<b>Sitting time</b>								
Male	0.187	0.231	-0.096	-0.230	<b>-0.034</b>	1	0.057	-.332*
Female	0.192	0.061	0.111	<b>-0.042</b>	<b>-0.022</b>	1	<b>-0.038</b>	<b>-0.044</b>
<b>Leisure PA</b>								
Male	-0.12	-0.112	-0.235	-0.060	-0.29	0.057	1	-0.181
Female	-.249	-0.089	-0.149	<b>-0.054</b>	<b>-0.018</b>	<b>-0.038</b>	1	-0.119
<b>Total PA</b>								
Male	-0.265	-0.247	0.268	-0.380	<b>-0.007</b>	-.332*	-0.181	1
Female	<b>0.002</b>	0.146	<b>-0.024</b>	<b>-0.051</b>	-0.09	<b>-0.044</b>	-0.119	1

The correlation coefficient test was performed to find the correlation among age, duration of DM, BMI, intensity of physical activity, blood glucose level, sitting time, leisure PA and total PA in male and female. The study revealed that there was a positive correlation of age of female participants with body mass index ( $r=0.012$ ) and total physical activity ( $r =0.002$ ). Among male participant there was no correlation of age with other measures. Among female population, the positive correlation was seen between duration of diabetes mellitus and blood glucose level ( $r= 0.02$ ). Other than this correlation is not seen between duration of diabetes mellitus and other measures. Whereas, in male participant correlation were not seen between duration of diabetes mellitus and other measurements. Although there was correlation between body mass and physical activity intensity in both male and female but male had positive correlation ( $r= 0.006$ ) and female had negative correlation ( $r= -0.038$ ). The negative correlation was found between body mass index and total physical activity. The positive correlation was found between physical activity intensity and blood glucose level ( $r=0.032$ ) and negative correlation was found between physical activity intensity and total physical activity ( $r=-0.002$ ) in male participants. Whereas, the negative correlation was found between physical activity intensity and sitting time among female participants ( $r=-0.042$ ). The negative correlation was found between blood glucose level and sitting time in both male ( $r= -0.034$ ) and female ( $r = -0.022$ ). In female, the negative correlation was found between blood glucose level and leisure time physical activity ( $r= - 0.018$ ). And in male, the negative correlation was seen between blood glucose level and total physical activity ( $r= -0.007$ ). The negative correlation between sitting time and leisure physical activity ( $r= -0.038$ ) and total physical activity ( $r =-0.044$ ) among female participants.

The analysis showed that majority of participants were female and all of them were household. Half of participants had not attained formal education. More than half of type 2 diabetes patients of our study does not have coexisting disease and have normal blood pressure. Most of them had advised for walking as a physical activity but only half of them always follow it. Half of the female were obese whereas only quarter half males were obese. Positive correlation was seen among body mass index and total physical activity, duration of DM and blood glucose level among female. Correlation was seen between body mass index and physical activity intensity in both male and female participants. Statically significant was seen in age and weight.

## CHAPTER V: DISCUSSION

The study focus on the physical activity level among the diabetes type 2 in diabetes type 2 patient in Afghanistan. The physical activity level was seen under various categories like type of physical activity performed, intensity, frequency, physical activity during work, physical activity during transport, physical activity during gardening and domestic work and physical work during leisure time. The intensity was seen as physical activity in walking, moderate physical activity and vigorous physical activity. The total physical activity, MET-minutes, total time spend was also calculated. The sedentary behavior of participant was observed by time spent sitting during week days, time spend sitting on weekends and average time spend sitting. The prevalence of obesity among type 2 diabetes is also studied in this study. The study also studied the possible result.

### **5.1 Socio-demographic, anthropometric and metabolic profile.**

The study showed that majority of patients were female, 40% of patient were in age group 45-54 years and minimum participants were from age group 15-24 and 25-35. Half of the participants did not receive any formal education, females were major contributor to it (63, 60%). Nearly 85% of females were housewife whereas nearly 40% males were involved in agriculture. More than half of participants did not had coexisting illness but 14% participant had heart disease and 11% had visual impairment along with diabetes type 2. This finding was supported international diabetes federation, which state diabetes type 2 can affect people at any age ("International Diabetes Federation - What is diabetes,2018).A study conducted in Bangladesh said that risk of diabetes was higher in age group 45-49 years , which is similar to our study. The same study suggested that diabetes was associated with high level of education contrasting with our study finding which showed diabetes were more common in uneducated (Akter,2014). The study showed that the average duration of diabetes was 6 years, average Body Mass Index was 28 and average blood glucose level was 199 mg/dl. And about 70% of participant had normal blood pressure. These finding were supported by the statements that diabetes is often associated with overweight and obese. (Center for Disease Control and Prevention, 2019).

And the similar finding was found in the study conducted in Bangladesh which showed that the risk of diabetes was higher in overweight and obese individuals.

### **5.2 Personal factor and environmental factor affecting physical activity.**

The study showed that about of participant thought that physical activity was good for diabetes management 30% did not had much idea about it. And about 65% of participant enjoyed doing physical activity. This implies that personal thoughts about physical activity were an important motivating factor for performing physical activity. The study showed that nearly 55% of participant had walk able playground but they lack fitness hall or institute for physical activity (22.7%). Most of them did have urban planning and transport barrier for physical activity. Nearly 70% of participant had friends and relatives who are physically active and a little more than half positive thought about physical activity for management of diabetes. These showed that the participant had less physical and attitudinal environmental factor barrier to physical activity. This result can be explained by several studies indicating the attitudinal and physical factors including recreation facilities and locations, transport and seeing others as determinates of physical activity (Kato et al., 2020).

### **5.3 Objective measurement – selected physical fitness measures**

#### **5.3.1 Disease risk**

The study showed that three fourth of participants were at the risk of developing disease. Half of the female participants are and about 21% of female populations are at the risk of developing disease. It was almost similar to the statement that three in five diabetes patient had risk of developing disease given by Northern American Association for Study of Obesity (American Diabetes Association., 2007). These result is also similar to the finding of study in Balkhau (Castaneda et al., 2002).

#### **5.3.2 Obesity class**

Half of the participants were overweight and nearly 30% were obese. Almost equal percentage of male and females were seen in each category. In total, three fourth of participants were overweight and obese where nearly 60% of the participants are females.81.4% (83) among female and 64.6% among male participants falls under this category. In contrast, the prevalence of overweight and obesity was 34.4% and 12% globally. In a study conducted in northern Tanzania showed 44.9% were overweight

and 40.1% were obese (Damian, Kimaro, Mselle, Kaaya, & Lyaruu, 2017.). A study conducted in Sudan showed overweight 39.9% and 25.5% obesity among diabetes which is similar to our study findings. This study showed higher rate of obesity among female (29.2%) than in male (18.1%) (Ali, Almobarak, Awadalla, Elmadhoun, & Ahmed, 2017, p. 252). Our study showed the prevalence rate of nearly 55% of overweight and nearly 27% of obesity. Whereas, in general population the prevalence of overweight was nearly 14% and obesity was nearly 3% in Afghanistan (WHO, 2016).

#### **5.4 Prevalence of three categorical levels for physical activity**

The study showed that 10.7 % of participants were physically inactive, 18% performed moderate physical activity and 77.3% performed high level physical activity. The physical inactive was seen more in female (93.75%) than male (6.25%). In contrast a study conducted in Istanbul Turkey showed 39.5% had low, 51.9% had moderate and 8.5% had high level of physical activity among type two diabetes patient (Çolak et al., 2015, p. 142-147). Similarly, a study conducted in China showed that 28.6% low, 47.3% moderate and 24.1% high. The same study showed physical inactivity was less in women (27.8%) than in male (29.4%) (Wang et al., 2018, p. 1-8) which completely contrast with our study result. Contrastingly, the study in USA showed 61% of individuals with diabetes were physically inactive. (Morrato et al., 2007, p. 203-209). The study conducted among 38 Muslim countries showed the prevalence rate of 32.3%, among female the prevalence rate was 28.8% and among male it was 35.5% (Kahan, 2015). The prevalence rate of physical inactivity globally was 31.1% (Hallal, P.C., Andersen, L.B & all, 2012) and in Afghanistan was 59.2% physically inactive. The prevalence rate of physical inactivity was 57.9 for male and 59.9% for female in Afghanistan. All these results contrast with our findings. This contrasting result can be due to time laps of studies, population involved and health facilities of countries.

#### **5.5 Sedentary behavior –sitting time**

In an average the sitting time spend by participants was 2676.53 minutes per week (6.37 hours per day. Almost equal hours were spent by both male and female participants. Similarly, the average transport sitting time was 4.19 minute per day. Although, the mean in time spent by male and female is not much but the significant difference is seen among male and female ( $P= 0.046$ ). The least time sitting time was

spent by female in age group 15-25, the much difference is not seen in the other age group in both male and female participants. The study conducted in Istanbul, Turkey showed the average sitting time of 5 hours which was hour less than of our study (Çolak et al., 2015, p. 142-147). The study conducted in Australia showed the difference of hour per day in sitting between male and female, which was not found in our study (Miller & Brown, 2004, p. 219-224). In our study negative correlation was found between sitting time and blood glucose level. Among female participants the negative correlation was seen between physical activity intensity, total physical activity and leisure time physical activity. This finding is different from study conducted by Proper and his team where sitting time leisure time activity and body mass index (Miller & Brown, 2004, p. 219-224)

### **5.6 Physical activity integration in diabetes management.**

More than half (61.33%) of participant received the advised on type, intensity, duration and frequency of physical activity by their physician. This finding is almost similar to the finding of study conducted in USA where about three quarter diabetes patients were advised for physical activity (Morrato et al., 2007, p.203-209). Almost all participants were advised for walking and only 1 participant was advised for running finding similar to study in Scotland where 96% Scotland (Thomas, 2004, p. 287-291) Maximum number (80.4%)of individuals were advised to do light exercise. The mean frequency advised was 6 days per week and mean duration was 40 minutes per day. More than half of participants were adherence to physician's advice about physical activity. These findings were a bit different to the meta- analysis performed by Boule and his team, where the frequency was 4 days per week and duration was 49 minutes/week. Whereas, American Diabetes Association recommended at least 150 minutes/week of moderate intensity aerobic physical exercise for level A diabetes and also people with diabetes should perform resistance exercise. But in our study none of the patients were advised resistance exercise.

## **CHAPTER VI: CONCLUSION AND RECOMMENDATION**

### **6.1 Conclusion**

Three fourth of participant were obese or overweight increasing their risk of developing disease. Among them females were at higher risk which can be due to lack of education, their occupation and time spend by them on sitting. Lack of information about positive affect of physical activity and lack of proper institution for training are the major barrier for performing physical activity. Although the physical activity was advised by physician but they don't follow the recommendation follow by American Diabetes Association. Majority of female spend time on domestic and garden physical activity and majority of male on their work related physical activity. Majority of participants spend time on walking than on moderate intensity and vigorous intensity physical activity. Body Mass Index, physical activity level, duration of disease, time spend on sitting correlates with blood glucose level. It showed that physical activity should be included in diabetes management. this study will also help the policy maker to address physical activity as intervention of diabetes management and also help them to address the barrier of physical activity. Moreover, promoting overall physical activity level in general population at leisure time, increasing awareness and increasing facilities for physical activity can be a reasonable option. The study also showed the current need of providing education and job opportunity to females. The special attention is needed for female with diabetes since their increased body mass index put them higher in risk of developing coexisting illness. In additional, the low level of physical activity among them increases risk of diseases putting economic burden on nation. To explore type 2 diabetes patient's physical activity in a nationally representative sample including rural area in particular and the reason behind insufficient physical activity are possible area for further study.

## **6.2 Recommendation**

I would like to recommend the study finding to health care professionals, health care organization and policy makers. The health care professionals, specially the doctors and nurse could utilize the knowledge for the better management of diabetes type 2 patients and could understand the current scenario of physical inactivity among type 2 diabetes patient and the barrier for physical activity. So that the can overcome this problem. The organist ion can utilize this finding for the better management of diabetes patients. The policy maker could utilize the finding for planning appropriate awareness program, policy making related to diabetes management, they could also utilize the data to get a clear picture of diabetic patients in the country and make necessary needed change. For the future research longitudinal study would be better to get a better understanding of physical activity among diabetes patients. The study could be conducted in the community level so that all the diabetes patients would be included. In additional to level of physical activity, the study would also focus on the factors causing physical inactivity. Randomize sampling method could represent the population in the better way, so that the result would be generalize to all Afghan with diabetes type 2.

### **6.3 Limitation**

The study was a cross-sectional study, so the physical activity of the diabetes patient could not be monitor for a longer period of time and it was difficult to determine the actual reason behind physical inactivity (American Diabetes Association., 2007). The study somehow fails to determine the actual reason why women with diabetes were less active than male. In additional, it was difficult to know why the prevalence of inactivity among diabetes patient was much lower to the national prevalence rate of inactivity in general population of Afghanistan. This study had been able to report disease frequency but could not measure functional limitation and psychological problem like depression that might affect physical activity. The investigator acknowledges that recall bias in relation to respondents performed physical activity as well as categorization of moderate and vigorous activities might had influenced the findings of the study. Therefore, the researcher could not rule out the chances of under-or over-reporting of physical activity with certainty. Since the convenience sampling method was chosen for easy accessibility of diabetes patients who visited the hospital, the study could not involve those who did not receive health service. So study did not know anything about the diabetes patients who did not visit the hospital. Thus the factors like the patient's proximity to diabetes center or motivation might have an impact of the responses. The study sample does not represent the general population of type 2 diabetes patients in Afghanistan.

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## **APPENDIX I**

### **Inform Consent**

#### **BANGALSESH HEALTH PROFESSION INSTITUTE, MRS) 2018-2019)**

Dear Participant,

I invite you to participate in a research study entitled: “Level of physical activity among type 2 diabetes patients in Afghanistan”. I am currently enrolled in the (MRS 5<sup>TH</sup> Batch) at Bangladesh Health Profession Institute (BHPI), and am in the process of writing my Master’s Thesis.

Your participation in this research project is completely voluntary. You may decline altogether, or leave blank any questions you don’t wish to answer. There are no known risks to participation beyond those encountered in everyday life. Your responses will remain confidential and anonymous. Data from this research will be kept under lock and key and reported only as a collective combined total. No one other than the researchers will know your individual answers to this questionnaire.

If you agree to participate in this project, please answer the questions on the questionnaire as best you can. It should take approximately (20- 25 minutes) to complete.

Thank you for your assistance in this important endeavor.

Name of Participation:

Contact No.:

Signature:

## رضایت نامه

### انستیتوت تخصصی صحت بنگله دیش (BHPI) (2018-2019)

شرکت کننده عزیز

من از شما دعوت میکنم در این مقاله تحقیقاتی به عنوان “سطح فعالیت بدنی در بیماران شکر نوع 2 در افغانستان” شرکت کنید. من در حال حاضر محصل دوره پنجم انستیتوت تخصصی صحت بنگله دیش (BHPI) هستم و در حال نوشتن پایان نامه کارشناسی ارشدم (ماستری) هستم.

اشتراک شما در این تحقیق کاملاً داطلبانه است. شما اخطیار دارید که کاملاً اشتراک نکنید و یا سوالاتی را که اگر نمی خواهید جواب بدهید خالی بگذارید. هیچ خطری برای اشتراک فراتر از مواردی که در زندگی روزمره دیده شود وجود ندارد. اسناد های این تحقیق کاملاً به صورت محرّم و کلیدی نگهداری میشود و فقط به عنوان یک جمع ترکیبی گزارش داده میشود. هیچ کس غیر از محققان پاسخ های فردی شما را در مورد پرسشنامه نمیدانند.

اگر قبول دارید در این تحقیق شرکت کنید لطفاً به بهترین شکل ممکن به سوالات پرسشنامه جواب بدهید. ممکن تکمیل این پرسشنامه (20-25 دقیقه) طول بکشد. از کمک شما در این تلاش مهم سپاسگذارم.

نام شرکت کننده:

شماره تماس:

امضا:

## Questionnaire – English

### Part A: Patient's information

Patient ID:	Patient's Name:
Patient Address:	Contact No:
Age: ..... year ..... months Or Date of Birth <table border="1" style="width: 100%; height: 20px; margin-top: 5px;"></table>	Sex: <input type="checkbox"/> Male(1) <input type="checkbox"/> Female(2) <input type="checkbox"/> Others(3)
Reference no	
Diabetes for how long .....year.....months.....days Or Date of case entry: <table border="1" style="width: 100%; height: 20px; margin-top: 5px;"></table>	

Height ..... cm	Weight ..... kg
<b>Body Mass Index</b> _____ Underweight=<18.5 Normal weight=18.5-24.9 Over weight=25-29.9 Obesity= class I=30-34.9 Class II=35-39.9 Extreme Obesity=>40	Underweight =1 Normal weight=2 Over weight=3 Obesity=4 Extreme obesity=5
Pulse Rate _____, Beats per minutes	Blood Pressure _____,mmHg
<b>Any Other Disease</b> Heart disease (1) Arthritis(2), chest disease(3), Injuries(4), visual Impairments(5) and mobility limitations(6) Or any other Disease, please mention .....(7) no diseases (8)	
<b>Blood Glucose Level</b> Date of blood test for diabetes <table border="1" style="width: 100%; height: 20px; margin-top: 5px;"></table>	(1) Fasting: (2) Two hours after breakfast: (3) Two hours after lunch: (4) Random: (5) <b>Glycated hemoglobin (HbA1c):</b>
<b>Which latest measures are available,</b>	

<b>older HbA1c if latest is not available</b>	<b>Date:</b>
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**Occupation:**

No	Type of occupation	No	Type of occupation
1	Agriculture, forestry, fishing	10	Accommodation and food service activities(Hotel and restaurant)
2	Day wages, labor, rickshaw puller	11	Financial and insurance Activities
3	Business	12	Education
4	Repair of motor vehicles, motor cycles	13	Unemployed
5	Service	14	Retired
6	Transportation work	15	Homemaker
7	Managers	16	Armed forces occupation
8	Professionals and scientific activities	17	Other: Please mention .....
9	Technicians and associated professionals		
18	Please briefly describe what kind of duties do you usually do during a workday?_____.		

**Education:**

Serial No	Level of education
1	<b>No Education:</b> Never attend School/ not pass class-I
2	<b>Primary:</b> Class-I to Class-V
3	<b>Lower secondary:</b> Class-VI to Class-IX
4	<b>Secondary:</b> Class-X
5	<b>Higher Secondary:</b> Class-XII
6	<b>Graduate &amp; above:</b> Degree (pass)/Hon's/Post graduate/M.S/Ph.D./Equivalent

## Part B: International Physical Activity Questionnaire (October 2002)

### INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

#### PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?

Yes

No 

**Skip to PART 2: TRANSPORTATION**

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

\_\_\_\_\_ **Days per week**  
(WorkVperW)

No vigorous job-related physical activity → *Skip to question 4*

3. How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

\_\_\_\_\_ **Hours per day** (WorkVMperD)  
\_\_\_\_\_ **Minutes per day**

4. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

\_\_\_\_\_ **Days per week** (WorkMDperW)

No moderate job-related physical activity → *Skip to question 6*

5. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

\_\_\_\_\_ **Hours per day** (WorkMDperD)  
\_\_\_\_\_ **Minutes per day**

6. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

\_\_\_\_\_ **Days per week** (WorkWDperW)

No job-related walking → *Skip to PART 2: TRANSPORTATION*

7. How much time did you usually spend on one of those days **walking** as part of your work?

\_\_\_\_\_ **Hours per day** (WorkWMperD)

\_\_\_\_\_ **Minutes per day**

**PART 2: TRANSPORTATION PHYSICAL ACTIVITY**

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

\_\_\_\_\_ **Days per week** (TransVeDperW)

No traveling in a motor vehicle



*Skip to question 10*

9. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

\_\_\_\_\_ **Hours per day** (TransCDperD)

\_\_\_\_\_ **Minutes per day**

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

\_\_\_\_\_ **Days per week** (TransCDperW)

No bicycling from place to place



*Skip to question 12*

11. How much time did you usually spend on one of those days to **bicycle** from place to place?

\_\_\_\_\_ **Hours per day** (TransCMperD)

\_\_\_\_\_ **Minutes per day**

12. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

\_\_\_\_\_ **Days per week** (TransWDperW)

No walking from place to place → *Skip to PART 3:HOUSEWORK,*

13. How much time did you usually spend on one of those days **walking** from place to place?

\_\_\_\_\_ **Hours per day** (TransWMperD)

\_\_\_\_\_ **Minutes per day**

### **PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY**

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

\_\_\_\_\_ **Days per week** (DmGrVDperW)

No vigorous activity in garden or yard → *Skip to question 16*

15. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

\_\_\_\_\_ **Hours per day** (DmGrVMperD)

\_\_\_\_\_ **Minutes per day**

16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

\_\_\_\_\_ **Days per week** (DmGrMDperW)

No moderate activity in garden or yard → *Skip to question 18*

17. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

\_\_\_\_\_ **Hours per day** (DmGrMMperD)

\_\_\_\_\_ **Minutes per day**

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

\_\_\_\_\_ **Days per week**  
(DmGrHMDperW)

No moderate activity inside home → *Skip to PART 4:*  
*RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY*

19. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

\_\_\_\_\_ **Hours per day**  
(DmGrVHMMperD)

\_\_\_\_\_ **Minutes per day**

#### **PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY**

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

\_\_\_\_\_ **Days per week**  
(LeisureWDperW)

No walking in leisure time



*Skip to question 22*

21. How much time did you usually spend on one of those days **walking** in your leisure time?

\_\_\_\_\_ **Hours per day**  
(LeisureWMperD)

\_\_\_\_\_ **Minutes per day**

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

\_\_\_\_\_ **Days per week**  
(LeisureVDperW)

No vigorous activity in leisure time



*Skip to question 24*

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

\_\_\_\_\_ **Hours per day**  
(LeisureVMperD)

\_\_\_\_\_ **Minutes per day**

24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

\_\_\_\_\_ **Days per week**  
(LeisureMDperW)

No moderate activity in leisure time → *Skip to PART 5: TIME SPENT SITTING*

25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

\_\_\_\_\_ **Hours per day**  
(LeisureMMperD)  
\_\_\_\_\_ **Minutes per day**

#### **PART 5: TIME SPENT SITTING**

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

\_\_\_\_\_ **Hours per day**  
(WeekDStMperD)  
\_\_\_\_\_ **Minutes per day**

27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

\_\_\_\_\_ **Hours per day** (WeekendDStMperD)  
\_\_\_\_\_ **Minutes per day**

**Part C: Personal Factor**

<b>28.</b> what do you think, doing physical activity for your diabetes is: Very bad(1)      Bad(2)      Not Known(3)      Good(4)      Very Good(5) (PAHow)		
<b>29.</b> Do you thing doing leisure time physical activity is enjoyable? (PAEnjoy)	Yes (1)	No (2)

**Part D: Environmental Factor**

<b>30.</b> Is there any playground or open field in your neighborhood? (playG)	Yes (1)	No (2)
<b>31.</b> If yes, is the playground walk able? (Walkable)	Yes (1)	No (2)
<b>32.</b> Are there any fitness halls or institutes in your city suitable for walking? (FitnessH)	Yes (1)	No (2)
<b>33.</b> Are Urban planning, transportation system in your city suitable for walking? (UrbanP)	Yes (1)	No (2)
<b>34.</b> What your adult friends and relatives think, doing physical activity is: Very bad(1)      Bad(2)      Not Known(3)      Good(4)      Very Good(5) (PAFrThink)		
<b>35.</b> Are your adult friends and relatives physically active or do they usually perform sporting activities? (PAFrDo)	Yes (1)	No (2)

**Part E: Physical Activity Inclusion**

<b>36.</b> Do you have physical activity prescription for your diabetes management? (DoPA)	Yes (1)	No (2)
<b>If no, then answer question no 37</b>		
<b>37.</b> Do you know to which health professionals you need to contact for physical activity prescription for your diabetes management?	Yes (1)	No (2)

(PAHprocont)		
<b>If yes then answer question no 38 and 39</b>		
<b>38. Physical activity Type:</b>		
Walk (1) Run (2) Swim (3) Cycling (4) Stair climbing (5) other (6).....		
(PAFr) <b>Frequency (days/week):</b> 1 / 2 / 3 / 4 / 5 / 6 / 7		
(IntPA) <b>Intensity:</b>		
<b>Light (1)</b>	<b>Moderate (2)</b>	<b>Vigorous (3)</b>
( A casual walk)	(A Brisk Walk)	(Jogging or Running)
(TmPA) <b>Time (minutes/day):</b>		
<b>39. Do you follow your doctor's advice about physical activity? (FDocAdv)</b>		
Never (1) Seldom (2) Sometimes (3) Often (4) Always (5)		
<b>This is the end of the questionnaire, thank you for participating.</b>		
Name and signature of Data Collector:		
Date of Data Collection: / /	Time of Data Collection:	

پرسشنامه - درى

بخش A: اطلاعات بیمار

اسم بیمار:	آی دی بیمار:			
شماره تماس:	آدرس بیمار:			
جنسیت:	سن: ----- سال ----- ماه			
1-مرد <input type="checkbox"/> 2-زن <input type="checkbox"/> 3-دیگر <input type="checkbox"/>	یا تاریخ تولد			
<table border="1"> <tr> <td></td> <td></td> <td></td> </tr> </table>				
شماره مرجع:				
چه مدت میشود که شما دیابت دارید .. .. سال .. .. ماه .. .. روز				
یا				
تاریخ ورود دوسیه				
<table border="1"> <tr> <td></td> <td></td> <td></td> </tr> </table>				

وزن -----کیلوگرام		قد ----- سانتی متر
کم وزن=1 وزن نورمال=2 اضافه وزن=3 چاق=4 چاقی شدید=5 چاقی شدید=>40		<b>شاخص حجم بدن</b> کم وزن<18.5 وزن نورمال=18.5-24.9 اضافه وزن=25-29.9 چاقی کلاس اول=30-34.9 چاقی کلاس دوم=35-39.9
فشار خون _____ mmHg		نبض _____ ضربان در دقیقه
<b>کدام بیماری دیگر</b> 1-امراض قلب 2-آرتروز(ورم مفاصل) 3-بیماری قفس سینه 4-صدمات 5-اختلالات بینایی 6-محدودیت های حرکتی 7-یا بیماری دیگر (لطفا ذکر کنید) ----- 8-هیچکدام		
روزه (معه خالی):		سطح قند خون:
دو ساعت بعد صبحانه		تاریخ معاینه خون
دو ساعت بعد از غذا چاشت		
تصادفی:		
(هموگلوبین گلیکیت شده: (HbA1c)		آخرین اقدامات دسترس برای اندازه گیری, اگر آخرین موجود نباشد قدیمی آن (HbA1c) است
تاریخ:		

**شغل :**

شماره	نوع شغل	شماره	نوع شغل
10	فعالیت های خدمات غذایی (هوتل و رستوران)	1	زراعت، جنگلداری، ماهیگیری
11	فعالیت های مالی و بیمه	2	کارگر روزمزد، کارگر، ریکشا بان
12	تعلیم و تربیه	3	تجارت پیشه
13	بیکار	4	مستری موتر و موترسایکل
14	متقاعد	5	خدمات
15	خانه دار	6	کار حمل و نقل
16	نیروی مسلح	7	مدیر
17	دیگر (لطفا ذکر کنید) -----	8	فعالیت های علمی و مسلکی
		9	کاردان فنی و مجرب

لطفاً بطور خلاصه شرح دهید که معمولاً در طول روز کاری چه نوع وظایفی را انجام می دهید؟\_

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### تحصیلات:

شماره	درجه تحصیلی
1	بیسواد: هیچ وقت مکتب نرفته است
2	تحصیلات ابتدایی: صنف اول الی پنجم
3	تحصیلات متوسطه پایین: صنف ششم الی نهم
4	تحصیلات متوسطه: صنف دهم
5	تحصیلات بالاتر از متوسطه: دوازدهم
6	فارغ التحصیل و یا بالاتر: فارغ صنف دوازدهم، دانشگاه، ماستر، دوکتورا

## بخش B: پرسشنامه بین المللی فعالیت بدنی (اکتبر 2002)

### پرسشنامه بین المللی فعالیت بدنی

ما علاقه مندیم تا در مورد انواع فعالیت های بدنی که مردم به عنوان بخشی از زندگی روزمره خود انجام می دهند ، اطلاعاتی کسب کنیم. این سؤاها در مورد فعالیت بدنی که در مدت 7 روز انجام داده اید ، از شما سؤال خواهد شد. لطفاً به هر سؤالی پاسخ دهید حتی اگر خود را فردی فعال نمی دانید. لطفاً به فعالیت ها فکر کنید که شما آنها در خانه و حیاط و در محل کار انجام می دهید و یا از مکانی به مکان دیگر میروید و یا در اوقات فراغت خود برای تفریح و یا ورزش استفاده میکنید.

به تمام فعالیت های شدید و متوسطی که در 7 روز گذشته انجام داده اید ، فکر کنید. فعالیت های بدنی شدید به فعالیت هایی اشاره میشود که تلاش بدنی زیادی دارند و باعث می شوند تنفس کردن شما بسیار سخت تر از حد نرمال باشد.

فعالیت های بدنی متوسط به فعالیت هایی اشاره میشود که تلاش بدنی متوسطی دارند و باعث می شوند نفس کمی سخت تر از حد نرمال باشد.

### بخش 1: فعالیت های بدنی مرتبط به شغل

بخش اول مربوط به شغل شما میشود. این شامل مشاغل با حقوق ، مزرعه ، کار داوطلبانه ، کار دوره یی و هر کار غیرقابل پرداخت دیگر که شما در خارج از خانه انجام داده اید. کارهای غیرقابل پرداخت (بدون معاش) مانند کارهای خانه ، کارهای حیاط ، نگهداری عمومی و مراقبت از خانواده شامل نمیشود که اینها در قسمت 3 سؤال شده است.

1. آیا در حال حاضر شغلی دارید یا کارهای خارج از منزل را انجام می دهید؟

بلی

نخیر

### اگر جواب نخیر است پس به بخش 2 بروید

سؤالات بعدی مربوط به تمام فعالیتهای بدنی است که در 7 روز گذشته به عنوان بخشی از کارهای پرداختی (با معاش) یا پرداخت نشده (بدون معاش) شما انجام داده اید. این شامل مسافرت به کار و محل کار نمی شود.

2. در طول 7 روز گذشته ، چند روز فعالیتهای بدنی شدید مانند بلند کردن وزن های سنگین ،

حفر کاری ، کارهای ساختمانی سنگین و یا بالا رفتن از پله ها به عنوان بخشی از کار خود

انجام داده اید؟

فقط به آن فعالیت های بدنی که حداقل 10 دقیقه آنها انجام داده اید فکر کنید.

----- روز ها در هفته

کارهای شدید انجام داده نشده است پس به سوال 4 بروید.

3. معمولاً چقدر زمان را در یکی از آن روزها صرف انجام فعالیت های بدنی شدید به عنوان بخشی از کار خود کرده اید؟

----- ساعت در روز

----- دقیقه در روز

4. باز هم ، فقط به آن فعالیت های بدنی که حداقل 10 دقیقه در هر زمان انجام داده اید ، فکر کنید. طی 7 روز گذشته ، در چند روز فعالیتهای بدنی متوسط مانند حمل بارهای سبک را به عنوان بخشی از کار خود انجام داده اید؟ لطفاً راه رفتن را شامل نسازید.

----- روز در هفته

هیچ فعالیت بدنی مرتبط با شغل وجود ندارد پس به سوال 6 بروید

5. معمولاً چقدر زمان را در یکی از آن روزها صرف انجام فعالیت های بدنی متوسط به عنوان بخشی از کار خود کرده اید؟

----- ساعت در روز

----- دقیقه در روز

6. در طول 7 روز گذشته ، در طی چند روز حداقل 10 دقیقه در هر زمان به عنوان بخشی از کار خود پیاده روی کردید؟ لطفاً پیاده رویی را که برای رفتن به کار انجام داده اید ، حساب نکنید.

----- روز در هفته

هیچ پیاده روی در کار صورت نگرفته است پس به بخش 2 بروید.

7. معمولاً چقدر وقت را در یکی از آن روزها به عنوان بخشی از کار خود برای پیاده روی اختصاص داده اید؟

----- ساعت در روز

----- دقیقه در روز

### بخش 2: فعالیت های بدنی حمل و نقل

این سوالات در مورد نحوه سفر شما از مکانی به مکان دیگر ، از جمله مکانهایی مانند کار ، فروشگاه ، فیلم و غیره است.

8. طی 7 روز گذشته ، در چند روز در یک وسیله نقلیه موتوری مانند قطار ، بس شهری ، موتر یا واگن برقی سفر کردید؟

----- روز در هفته

در هیچ وسیله نقلیه موتوری سفر نکرده است پس از سوال 10 بگذرید.

9. معمولاً چقدر وقت خود را در یکی از آن روزها برای مسافرت در قطار ، بس شهری ، موتر ، تراموا یا نوع دیگری از وسایل نقلیه موتوری گذراندید؟

----- ساعت در روز

----- دقیقه در روز

اکنون فقط به دوچرخه سواری و پیاده روی فکر کنید که ممکن است برای رفتن به کار و محل کار ، انجام کارها و یا رفتن از جای دیگر انجام داده اید.  
10. در طول 7 روز گذشته ، چند روز حداقل 10 دقیقه از بایسکل (دوچرخه) برای رفتن از مکانی به مکان دیگر استفاده نمودید؟

----- روز در هفته

از بایسکل (دوچرخه) برای رفتن از جایی به جایی دیگر استفاده صورت نگرفته است

پس از سوال 12 بگذرید

11. معمولاً چقدر وقت خود را در یکی از آن روزها برای (بایسکل رانی) از مکانی به مکان دیگر گذراندید؟

----- ساعت در روز

----- دقیقه در روز

12. در طول 7 روز گذشته ، در طی چند روز حداقل 10 دقیقه پیاده روی کردید تا از جایی به جای دیگر بروید؟

----- روز در هفته

هیچ پیاده روی صورت نگرفته است پس به بخش 3 بروید

13. چقدر وقت خود را در یکی از آن روزها برای پیاده روی از مکانی به مکان دیگر گذراندید؟

----- ساعت در روز

----- دقیقه در روز

### بخش 3: کار های خانه، نگهداری لوازم خانه و مواضبت از فامیل

این بخش در مورد برخی فعالیت های بدنی است که شما ممکن است در 7 روز گذشته در داخل و اطراف خانه خود انجام داده باشید ، مانند کارهای خانه ، باغبانی ، کارهای حیاط ، کارهای نگهداری عمومی و مراقبت از خانواده.

14. فقط به آن فعالیت های بدنی که حداقل 10 دقیقه در هر زمان انجام داده اید فکر کنید.

در طول 7 روز گذشته ، چند روز فعالیت های بدنی شدید مانند بلند کردن وزن های سنگین ، خرد کردن چوب ، برف پاکی یا فعالیت در باغ یا حیاط انجام داده اید؟

----- روز در هفته

هیچ فعالیت شدید صورت نگرفته است پس به سوال 16 بروید.

15. معمولاً چقدر زمان را در یکی از آن روزها صرف انجام فعالیت های بدنی شدید در باغ یا حیاط کرده اید؟

----- ساعت در روز

----- دقیقه در روز

16. باز هم ، فقط به آن فعالیت های بدنی که حداقل 10 دقیقه در هر زمان انجام داده اید ، فکر کنید. در طول 7 روز گذشته ، در چند روز فعالیتهای متوسطی مانند حمل بارهای سبک ، جارو کردن ، شستن پنجره ها ، و کار های که در باغ یا حیاط انجام داده اید؟

----- روز در هفته

هیچ فعالیت متوسطی در باغ و حیاط انجام داده نشده است پس به سوال 18 بروید.

17. معمولاً چقدر زمان را در یکی از آن روزها صرف انجام فعالیت های بدنی متوسط در باغ یا حیاط کرده اید؟

----- ساعت در روز

----- دقیقه در روز

18. یک بار دیگر ، فقط به آن فعالیت های بدنی که حداقل 10 دقیقه در هر زمان انجام داده اید ، فکر کنید. در طول 7 روز گذشته ، در چند روز فعالیتهای متوسطی مانند حمل بارهای سبک ، شستشوی پنجره ها ، تمیز کردن کف و جارو کردن داخل خانه خود انجام داده اید؟

----- روز در هفته

هیچ فعالیت متوسط در خانه صورت نگرفته است پس به بخش 4 رفته شود

19. چقدر زمان معمولاً در یکی از آن روزها برای انجام فعالیتهای بدنی متوسط در خانه خود صرف کرده اید؟

----- ساعت در روز

----- دقیقه در روز

#### بخش 4: تفریح، ورزش و فعالیت های فیزیکی در اوقات فراغت

این بخش در مورد تمام فعالیت های بدنی است که شما در 7 روز گذشته صرفاً برای تفریح، ورزش یا اوقات فراغت انجام داده اید. لطفاً هیچ فعالیتی را که قبلاً به آنها اشاره کرده اید ، شامل نکنید.

20. در طول 7 روز گذشته چند روز حداقل 10 دقیقه پیاده روی در هر اوقات فراغت خود انجام داده اید؟ قدم زدن را که قبلاً ذکر کرده اید حساب نکنید.

----- روز در هفته

هیچ پیاده روی در اوقات فراغت انجام نشده است پس به سوال 22 بروید.

21. معمولاً در یکی از آن روزها در اوقات فراغت خود چند بار پیاده روی می کنید؟

----- ساعت در روز

----- دقیقه در روز

22. فقط به آن فعالیت های بدنی که حداقل 10 دقیقه در هر زمان انجام داده اید فکر کنید. در طول 7 روز گذشته ، چند روز فعالیت های بدنی شدید مانند ایروبیک ، دویدن ، بایسکل رانی سریع یا شنا سریع در اوقات فراغت خود انجام داده اید؟

----- روز در هفته

هیچ فعالیت شدید در اوقات فراغت انجام نشده است پس به سوال 24 بروید

23. در اوقات فراغت معمولاً چقدر زمان را صرف انجام فعالیت های بدنی شدید نموده اید؟

----- ساعت در روز

----- دقیقه در روز

24. باز هم ، فقط به آن فعالیت های بدنی که حداقل 10 دقیقه در هر زمان انجام داده اید ، فکر کنید. طی 7 روز گذشته ، چند روز فعالیتهای بدنی متوسط مانند دوچرخه سواری با سرعت منظم ، شنا با سرعت مرتب و تنیس را در اوقات فراغت انجام داده اید؟

----- روز در هفته

هیچ فعالیت بدنی متوسط در اوقات فراغت صورت نگرفته است پس به بخش 5 بروید.

25. معمولاً چقدر زمان را صرف انجام فعالیت های بدنی متوسط در اوقات فراغت نموده اید؟

----- ساعت در روز

----- دقیقه در روز

#### بخش 5: اوقات که در حالت نشستن سپری میکنید

آخرین سوالات مربوط به زمانی است که شما هنگام کار ، در خانه ، هنگام کار در دوره یی و در اوقات فراغت می نشینید. این ممکن است شامل مدت زمان نشستن در یک میز ، بازدید از دوستان ، خواندن و یا دراز کشیدن (نشستن) برای تماشای تلویزیون باشد. زمانی را که شما در وسایل نقلیه بودید را ذکر نکنید که قبلاً در بالا بیان نموده اید.

26. در طول 7 روز گذشته ، چقدر وقت را صرف نشستن نمودید؟

----- ساعت در روز

----- دقیقه در روز

27. در طول 7 روز گذشته ، معمولاً در روزهای تعطیل آخر هفته چقدر وقت را صرف نشستن کردید؟

----- ساعت در روز

----- دقیقه در روز

بخش C: فکتور یا عمل شخصی		
28. چی فکر میکنید، فعالیت های بدنی برای دیابت شما چیست؟ بسیار بد (1) بد (2) مشخص نیست (3) خوب (4) بسیار خوب (5) (PAHow)		
نخیر	بلی	29. فکر میکنید انجام دادن فعالیت های بدنی در وقت بیکاری لذت بخش است؟ (PAEnjoy)
(2)	(1)	
بخش D: فکتور های محیطی		
نخیر	بلی	30. آیا در محله شما (همسایگی) زمین بازی یا فضای باز وجود دارد؟ (playG)
(2)	(1)	
نخیر	بلی	31. اگر بله، آیا زمین بازی قابل پیاده روی میباشد؟ (Walkable)
(2)	(1)	
نخیر	بلی	32. آیا در شهر شما صالون بدنسازی مناسب یا کدام نهاد برای پیاده روی وجود دارد؟ (FitnessH)
(2)	(1)	
نخیر	بلی	33. آیا پلان شهری و سیستم حمل و نقل در شهر و محل زندگی تان برای پیاده روی مناسب است؟ (UrbanP)
(2)	(1)	
34. دوستان و آشنایان بزرگسال شما چی فکر می کنند که انجام فعالیت فیزیکی (بدنی) چیست؟ (1) بسیار بد (2) بد (3) نا شناخته (4) خوب (5) بسیار خوب (PAFrThink)		
نخیر	بلی	35. آیا دوستان و بستگان بزرگسال شما از نظر فیزیکی فعال هستند یا معمولاً فعالیت های ورزشی را انجام می دهند؟ (PAFrDo)
(2)	(1)	

بخش E: گنجانیدن فعالیت های فیزیکی (بدنی)		
نخیر	بلی	36. آیا برای مدیریت و کنترل دیابت شما کدام فعالیت فیزیکی (بدنی) تجویز شده است؟ (DoPA)
(2)	(1)	
اگر جواب نخیر باشد پس سوال 37 را جواب دهید.		
نخیر	بلی	37. آیا کدام داکتر متخصص را میشناسید که با آن در تماس شده و برای مدیریت و کنترل دیابت شما فعالیت های فیزیکی (بدنی) را تجویز نماید؟ (PAHprocont)
(2)	(1)	
اگر جواب بلی باشد پس سوال 38 و 39 را جواب دهید		
38. نوع فعالیت فیزیکی (بدنی) پیاده روی یا قدم زدن (1) دوش (2) آبیازی (3) بایسکل رانی (4) بالا رفتن از زینه (5)		

دیگر... (6).....	
1 / 2 / 3 / 4 / 5 / 6 / 7 تکرار (روز / هفته)	
<b>شدت:</b>	
(1) متوسط	(2) (زیاد) قدرتمند (3)
(پیاده روی یا قدم زدن سریع)	(دوش آهسته و یا سریع)
<b>زمان: (دقیقه / روز)</b>	
39. آیا شما توصیه های داکتر خود را در مورد فعالیت های بدنی تعقیب میکنید؟	
(1) هرگز	(2) به ندرت
(3) بعضا	(4) اغلبا
(5) همیشه	

این پرسشنامه تمام شد، تشکر از اشتراک شما

اسم و امضا گردآورنده معلومات:	
زمان گردآوری معلومات:	تاریخ گردآوری معلومات:

## Approval of the thesis proposal



### বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই) Bangladesh Health Professions Institute (BHPI)

(The Academic Institute of CRP)

Ref. CRP-BHPI/IRB/07/19/1309

Date: 06/07/2019

To,  
Ahmad Jawed Safi  
M.Sc. in Rehabilitation Science (MRS)  
Session 2018-2019, Student ID: 181180133  
BHPI, CRP-Savar, Dhaka-1343, Bangladesh

**Subject: Level of physical activity among type 2 diabetes patients in Afghanistan**

Dear Ahmad Jawed Safi  
Congratulations,

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above mentioned thesis, with yourself, as the principal Investigator. The following documents have been reviewed and approved:

S.N.	Name of Documents
1.	Thesis Proposal
2.	Questionnaire
3.	Information sheet and consent form.

The study involves answering a questionnaire to address level of physical activity among type 2 diabetes patients in Afghanistan. Since the study involves use of a questionnaire that may take 20 to 25 minutes to answer. Since, there is no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 9.00 AM on 16<sup>th</sup> February 2019 at BHPI.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

*Mohammad Millat Hossain*

Mohammad Millat Hossain  
Assistant Professor, Dept. of Rehabilitation Science  
Member Secretary, Institutional Review Board (IRB)  
BHPI, CRP-Savar, Dhaka-1343, Bangladesh

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ, ফোন : ৭৭৪৫৪৬৪-৫, ৭৭৪১৪০৪ ফ্যাক্স : ৭৭৪৫০৬৯

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404, Fax : 7745069, E-mail : contact@crp-bangladesh.org, www.crp-bangladesh.org

## Permission letter for data collection



Islamic Republic of Afghanistan  
Ministry of Public Health  
Afghanistan National Public  
Health Institute  
Institutional Review Board



د افغانستان اسلامي جمهوریت  
د عامې روغتیا وزارت  
د افغانستان د عامې روغتیا ملي انسټیټوټ  
د اخلاقیات بررسی بورډ



Date: September 07, 2019

IRB Code No: E.0919.0069

To: Ahmad Jawed Safi      Ahmad Jawed Safi  
M.Sc. in Rehabilitation science (MRS)  
Bangladesh Health Professions Institute (BHPI)

Subject: Exempt of proposal entitled “ **Level of physical activity among type 2 diabetes patients in Afghanistan** ”.

Dear **Ahmad Jawed Safi**

The research proposal entitled “**Level of physical activity among type 2 diabetes patients in Afghanistan**” is exempted from Institutional Review Board Examination Because this study is Approved by IRB of BHPI with the reference number of (CRP-BHPI/IRB/07/19/1309), we are pleased to accept your request for exemption and approve the study.

We reserve to the rights to monitor and audit your study and any violation of ethical norms during the course of study shall lead to withdrawal of given approval.

The duration of approval for a study to begin the research project is valid for one year and the exact date of research project implementation (start and end) should be informed to IRB secretary.

You are bound to share the result of your study with MoPH prior any dissemination plan.

Sincerely,

**Bashir Noormal** *MD, MPH*  
Director General  
Afghanistan National Public Health Institute (ANPHI) &  
Chairman, Institutional Review Board (IRB)  
Ministry of Public Health

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