IOSR Journal Of Pharmacywww.iosrphr.org
(e)-ISSN: 2250-3013, (p)-ISSN: 2319-4219
Volume 6, Issue 11Version. 2 (Nov 2016), PP. 81-88

The Burden of Non-communicable Diseases and Key Risk Factors in Kandahar city: Results from Provincial STEPS Survey

Khwaja Mir Islam Saeed (MD, MSc) [1], Mohammad Hafez Rasooly (MD, MSc)
[1]*Head of Grant and Service Contract Management Unit (GCMU), Ministry of Public Health, Kabul-Afghanistan, Tel: 0093700290955,* [2]*Influenza Surveillance Officer, Surveillance Department, Ministry of Public Health*

ABSTRACT:-Background: Non Communicable Diseases (NCDs) are chronic medical conditions, non-infectious with long duration and slow progression. Afghanistan is suffering from double burden of diseases including communicable and noncommunicable. The aim of this study was to determine the risk factors for NCDs among adults population in Kandahar city-Afghanistan.
Methods and Materials:A provincial cross-sectional study was conducted from October to November 2015 on the prevalence of NCD risk factors using the WHO STEPS adapted instrument. The study enrolled a random sample of 1165 adults of age group of 25-70 years. Data were collected using a structured questionnaire for assessing non-communicable diseases and their risk factors. Fasting venous blood sample was collected to assess the lipid profile and fasting blood sugar. Anthropometric measurements of the participants were also measured. Data was analyzed using *SPSS* version 20.
Results: Out of all respondents 597 (51.2%) were females and 568 (48.8%) males with overall average age of 38.3±11.2 years. Around two thirds (73.2%) were illiterates and (79.3%) were married. 9.7% were smokers and (16.3%) were mouth snuff users. Sixty percent of respondents ate fruits less than 3 days per week and 60% ate vegetables three days or more per week. Almost 6% of practiced vigorous physical activity and 21.3% of subjects reported doing moderate physical activity. More than half of subjects were overweight or obese. 32.2% had high blood pressure and 22% recorded diabetic. Level of high cholesterol was 30.4%, high triglycerides was 35.7%. Furthermore high level of low density lipoprotein (LDL) was 50.9% and high level of high density lipoprotein (HDL) was 46.6%. The mean level of total cholesterol, HDL, LDL and triglycerides 183 mg/dL, 45.8mg/dL, 107.3 mg/dL and 154.6 mg/dL were respectively.
Conclusions: The findings of study revealed a high burden of risk factors for NCDs in the study population, showing the country is experiencing both communicable and noncommunicable concurrently. It is recommended on focusing of interventions to prevent and control the noncommunicable diseases.

Keywords: *Non-communicable diseases, risk factors, prevalence, WHO step approach, Kandahar*

I. INTRODUCTION

Non Communicable Diseases (NCDs) are chronic medical conditions, non-infectious, with long duration and have slow progression. The main non-communicable diseases commonly prevalent are cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. NCDs cause more deaths than all other causes combined. NCD deaths are projected to increase from 38 million in 2012 to 52 million by 2030 (1). Morbidity and mortality due to non-communicable diseases (NCDs) continue to rise, in developing as well as developed countries (2). The new health goal is to reduce mortality from NCDs by 25% by 2025: the 25 by 25 goal (3). Of the total deaths attributed to NCDs globally, nearly 80% occur in low-and middle-income countries (*4*). Furthermore, NCDs kill at a younger age in developing countries, including those of the Eastern Mediterranean Region (EMR). In some EMR countries up to 50% of those who die from such diseases die before the age of 60 years compared with less than 10% in Western Europe (*5*). The global economic burden of NCDs is huge (6) and disproportionately affects poorer individuals in low-income countries (7). In Afghanistan, as in other countries of the EMR, most of the costs of health care, particularly for NCDs, are paid directly by patients out-of-pocket, and therefore can be a significant burden on household budgets (8). Nearly 54 % of death occurred due to the NCDs in South East Asian Region (9). According to World Health Organization (WHO) estimates the age-standardized death rates due to all NCDs were 1285 per 100 000 population for males and 952 per 100 000 for females (10). Furthermore, the Afghanistan mortality survey 2010 revealed that 33.3% of all deaths in Afghanistan were attributed to NCDs, with cardiovascular diseases, malignant neoplasm, diabetes, respiratory diseases and digestive diseases accounting for 14.0%, 7.3%, 3.7%, 1.9% and 1.8% of total NCDs deaths respectively (11). Based on WHO estimates, in 2000 there were 468 000 people with diabetes in Afghanistan. This number is expected to rise to 1 403 000 in 2030, representing nearly a 3-fold increase compared with 2000 (12). In a study among men aged ≥15 years in Kabul city the prevalence of smoking was

35% (13), while in a study to identify the prevalence and risk factors of NCDs among the older adult population (aged ≥ 40 years) in Kabul city in 2012, the prevalence of diabetes mellitus was reported to be 13.3%, obesity was 31.2% and hypertension was 46.2% (14). Finally, an assessment of the air quality of Kabul city showed that the ambient air quality in the city has deteriorated to such extent that it can be ranked among the most polluted cities in the world, a situation which potentially increases the burden of respiratory diseases and different types of cancer among humans (15). It is believed that a large proportion of NCDs can be prevented by reducing the 4 main risk factors: tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol (6). In Afghanistan, due to competing priorities and many years of conflict, little information is available about the prevalence and risk factors for NCDs. However, facts and figures from neighbouring countries such as Pakistan and the Islamic Republic of Iran give cause for concern (16-20). Given that the risk of mortality due to NCDs has overtaken that due to communicable diseases in Afghanistan (11). The present study aimed to identify the prevalence of risk factors for chronic NCDs in the urban population of Kandahar province.

II. METHODS AND MATERIALS

The study was a cross sectional survey conducted in Kandahar urban city adapting and using the WHO STEP-wise tool (*21).*All permanent household members aged (25-70) years, including men and women who were residents of the cities during the study period and gave consent to participate were included in the study. Temporary residents (resident < 6 months) and those living in institutionalized settings or insecure areas were excluded. Due to the unavailability of previous estimates of risk factor prevalence in this city we assumed the highest prevalence or sample size calculation (50%), 95% confidence interval (CI) and margin of error of 5%. From this we estimated 385 subjects to be included in the survey. Taking into consideration the proportion of other risk factors in similar settings, the number of subjects was increased to 600. Finally, after taking into account the design effect (D_{eff}= 2) of cluster sampling the final sample size was increased to (2 × 600) = 1200 for the city, which was reasonable for achieving the study objectives with limited resources and funding support.

Sampling Techniques and Strategy:

As a framework the Expanded Programme for Immunization (EPI) list of the clusters was used due to its reliability in Ministry of Public Health. For the sample size, initially we obtained the list of all existed EPI clusters which included village/area name, population, and number of households per cluster. For this survey we used multi-stage cluster sampling. In the first stage, from this list we randomly selected 7 clusters of EPI using random number of excel sheet. In the second stage from each selected cluster we randomly selected the five areas (called Area/*Guzar*). Later the overall sample of 1200 households distributed among these selected area according to the proportion to the size of household number in each cluster / areas. Finally, the number of households in each area divided by the sample size assigned for each areas, it was opportunity for team to select household systematically.

***Data collection*:**

According to the plan, two days training was conducted for surveyors followed by a field based session where participants had a chance to fill the questionnaire, measure hypertension and waist circumference and practice taking blood samples from adults under field conditions. A household was defined as a group of people who share the same food pot (not the same roof). In each household the interviewer enumerated all persons who were eligible for our study based on the inclusion criteria. In households with more than one eligible person, we used a lottery system to select the respondent for this survey. In cases of refusal, which was less than 5 %, the interviewer approached the next alternate household. This method provided an equal chance of each member of the household being selected. Various group of targeted data including demographic, behavioural and clinical variables were collected in Kandahar from October 28 to November 4, 2015 by direct interview using the WHO STEP-wise instrument. Anthropometric measurements (height and weight) were used to calculate body mass index (BMI). A BMI of ≥30 kg/m^2 was considered as obese, 25–30 kg/m^2 as overweight and 18.5–25 kg/m^2 as normal weight (22). A waist circumference of 94 cm for men and 80 cm for women was considered as central obesity (23). Systolic blood pressure 140 mmHg and diastolic pressure 90 mmHg were considered as hypertensive (24).Following the interview blood samples were collected the next morning after the respondent had fasted for 10–12 hours. Blood samples were transported in cool boxes (2-8°*C*) from field to Provincial Laboratory on the day of sample collection. After processing and separation of serum, the samples were shipped to Central Public Health Laboratory (CPHL) in Kabul in two consignments by air. Using Cry-vials the samples were coded with ID number of the questionnaire. On arrival in CPHL all serum samples were stored at -80°C until biochemical test conducted. Altogether 1165 questionnaires and samples were filled and tested for biochemical measurement of triglyceride, cholesterol, and glucose.A fasting blood sugar of ≥126 mg/dL was considered as diabetes mellitus (25).

Data Analysis

Data were entered in *Epi-info*, version 7, and cleaned data was analysed using *SPSS*, version 20. Descriptive analysis were done in order describe the proportion of NCD diseases and factors.

Ethical Consideration

The study protocol was approved by the institutional review board (IRB) of the Ministry of Public Health. After an explanation of the survey, informed consent was taken from each individual before the interview.

III. RESULTS

In this study, we were able to approach and interview 1165 individuals. Out of these, 597 (51.2%) were females and 568 (48.8%) males with a mean age of 38.3±11.2 years; more than two third (72.3%) of the study participants were aged less than 45 years. Around two thirds of the respondents (73.2%) were illiterates; and 42% of the participants had income of less than 10000 AFN (USD150). Majority of respondents (79.3%) were married and more than 88.5% of women were housewives (see Table 1).Table 2 shows the prevalence of various risk factors for NCD; 9.7% were smokers and two third of smokers had duration of 10 years of or less. Furthermore (16.3%) were mouth snuff users. Sixty percent of respondents ate fruits less than 3 days per week and 60%% ate vegetables three days or more per week. Thirty three percent of respondents reported to use liquid oil for cooking their kitchen. Almost six percent of the respondents practiced vigorous physical activity and 21.3% of subjects reported doing moderate physical activity. Almost 22% of respondents reported to walk or use bicycle for 10 minutes per day. Fifty six percent of respondents recorded a reclining of three hours or more per day.Table 3 shows that prevalence of pathophysiological risk factors of study participants. More than half of study respondents were recorded to be as overweight or obese. And more than half (55.5%) were suffering from central obesity. On average the BMI was 25.8 Kg/m2. Only about one third (38.6%) and 29.1% of the respondents had low or normal blood pressure respectively while 32.2% had high blood pressure predominantly higher among female . Almost 22% percent recorded as diabetic of them the prevalence of diabetes 25.4% were for females and 19.3% for males. Blood samples of respondents in this study were tested for biochemical parameters. Level of cholesterol with cut off 190mg/dL and level of triglyceride with cut off 150mg/dL were categorized of them 30.4% had higher cholesterol and 35.7% had higher triglycerides. Furthermore high level of low density lipoprotein (LDL) with cut of 100mg/dL were 50.9% and high level of high density lipoprotein (HDL) were both 46.6%. The mean level of total cholesterol, HDL, LDL and triglycerides 183 mg/dL, 45.8mg/dL, 107.3 mg/dL and 154.6 mg/dL were respectively.

IV. DISCUSSION

It is known that due to importance of burden of disease, the greatest priorities in Afghanistan are communicable diseases, malnutrition, vaccination and maternal and child health care. Consequently, minimal efforts have been carried out to reduce NCD risk factors (obesity, hypertension, diabetes and physical inactivity) within the population. This study was carried out to assess the common risk factors (26-27) for NCD in urban population of Kandahar city. It includes almost equal proportion of males and females. Average age of adult population was almost 40 years of which two thirds were younger than 45 years. This could explain and match the life expectancy of 62 years published in Afghanistan (11). Lower status of women could be understood by their involvement within homes close to ninety percent. Using tobacco were explained by smoking and using mouth snuff. Approximately one tenth of adults in Kandahar city were smoking and one seventh of them were using mouth snuff. It is comparable with other study in Jalalabad city in which the prevalence of smoking among adult population was 8% and prevalence of using mouth snuff was 13.7% (28). Eating fruits and vegetables were a good habit of study participants. Two third of adults used three days or more vegetables per week while same proportion used less than three days per week fruits. Probably that is due to high cost of fruit and low cost of vegetables in this city. However this is supported by study in Jalalabad city (28) which is needed to be encouraged. Physical activity was common among adults in Kandahar city by nature of their work. For instance 5% were busy by doing strong and vigorous physical activity while one fifth of there were involved in moderate physical activity. This proportion is a bit lower than Jalalabad city (28) which is needed to be focused.
Like studies in Kabul and Jalalabad (14, 28) more than half of the adult's population in Kandahar city were suffering from overweight and obesity. Our findings on obesity are consistent with global and large-scale studies in other parts of the world (29-31). Moreover, cultural norms in Afghanistan mean that being overweight and obese is perceived as healthy and people are not generally interested in losing weight. However being obese is a big problem and it should be given sufficient attention in the country.According to results of this study almost one third of adult population is suffering from high blood pressure and one fifth adults are suffering from diabetes which both are significant findings. It seems that the country has already entered an epidemic of NCDs, which requires strengthening efforts for control and prevention. In an earlier study in Kabul city the

prevalence of hypertension was 46.0% and of diabetes was 13.7%, rates which are higher than in current study perhaps due to cultural differences and to the older age groups sampled in that study (14) or the reason was the age of the participant of more than 40 years. In addition the study in Jalalabad (28) showed that 28.4% were suffering from high blood pressure and 11.4% were suffering from diabetes. The blood pressure is more or less the same while the proportion of diabetes in Kandahar is double of Jalalabad city. It hypothesizes a question to be answered by further studies. In addition a systematic studies (1996-2004) in the Islamic Republic of Iran, which is a neighbouring county to Afghanistan estimated that the overall prevalence of hypertension and diabetes in the population aged 30–55 and > 55 years were around 23% and 50% respectively (31). In Punjab province in Pakistan, another neighbouring country, the prevalence of diabetes was reported to be 12.1% in males and 9.8% in females which is about the opposite of sex distribution reported by this study (17). The prevalence of high blood pressure was consistent with overall prevalence of hypertension in Karachi, Pakistan which was 26%, with a difference between males (34%) and females (24%). Therefore there is a need for health education campaigns in the country to be focused on overall risk factors. Better community awareness and establishment of sport centres and jogging areas, which are lacking in urban settings particularly for women, should be encouraged and discussed with the relevant sectors. Men are at greater risk of non-communicable disease than women, which is not a modifiable risk factor and could be due to genetic differences. Sex differences in risk factors were also demonstrated in Karachi in Pakistan (29).According to our findings the one tenth of subject were smokers and one sevenths were using mouth snuff which is much higher in men as compare to women. The sex differences in smoking patterns are similar to other studies (33-34). We should understand that there is evidence that NCDs occur as a combined syndrome in the adult population. For example an obese person who is smoking and affected by diabetes has a greater chance of being affected by NCDs. The more risk factors the greater the probability of NCDs among the adult population. The prevalence of diabetes and obesity, either central or general, affects the level of blood pressure and needs to be considered as a co-morbidity while managing other problems. This study hypothesized that the population in the urban setting of this province were entering a critical state of NCDs, while little attention was being given to the issue. Interventions are needed to target a group of risk factors rather than just one or two factors. As a whole the proportion of obesity and overweight, central obesity, hypertension and diabetes were higher among female as compare to males while the level of exercise were low in females as compare to males. This is one of the major and unique findings of this study which requires serious attention and policy makers. The study faced some limitations such as financial constraints which prevented listing of the households before the survey so we approached the community and selected the households directly. Secondly, due to the available free measurement of blood pressure and lab tests, there might be more hypertensive and diabetic patient participated in the study. Therefore it may led to slight overestimation of the findings. The third limitation, which is common to all studies in Afghanistan is the poor security situation which forced us to exclude rural areas from our study. Regardless of these limitations this study has provided some useful baseline information for policy development and the design of interventions. The study demonstrated the impact of NCDs such as diabetes, blood pressure and obesity on a population already burdened by communicable diseases. Whatever findings of this study, it can contribute towards the formulation of more advanced, nationwide studies. There is a need to design and implement a nationwide survey using the WHO STEP-wise approach in order to obtain a more complete picture of the risk of NCDs in the country. NCD services should be an integrated part of primary health care, with systems for screening for asymptomatic hypertension and diabetes and staff training on identification and management of NCD risk factors. Finally, in close collaboration with other sectors steps should be taken to promote healthy lifestyle and practices, and advocate for the legislation considering the main NCD risk factors identified in this study.

V. ACKNOWLEDGEMENTS

We would like to thank Surveillance Department at the Ministry of Public Health and the WHO Kabul office for supporting the study.

REFERENCES

[1] World Health Organization. Global status report on noncommunicable diseases 2014. Available on the WHO website (www.who.int)

[2] Wagner KH, Brath H. A global view on the development of NCDs. Prev Med. 2012; 54:S38-41.

[3] Prevention and control of non-communicable diseases. Outcome of the High-Level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases and the First Global Conference on Health Lifestyles and Non-communicable Disease Control. Sixty-fifth World Health Assembly, 20 April 2012. Provisional agenda item 13.1 (A65/6). Geneva: World Health Organization; 2012. http://apps.who.int/gb/ebwha/pdf_files/WHA65/A65_6-en.pdf

[4] The global burden of disease: 2004 update. Geneva: World Health Organization; 2008 http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf?ua=1
[5] The Political Declaration of the United Nations General Assembly on the Prevention and Control of Non-Communicable Diseases: Commitments of Member States and the way forward .Technical Discussion paper. Fifty-ninth session of the Regional Committee for the Eastern Mediterranean, August2012. Provisional agenda item 4(a) (EM/RC59/3)
[6] http://applications.emro.who.int/docs/RC_technical_papers_2012_3_14578_EN.pdf
[7] Global status report on noncommunicable diseases 2010.Geneva: World Health Organization; 2011(http://www.who.int/nmh/publications/ncd_report_full_en.pdf
[8] Kankeu HT, Saksena P, Xu K, Evans DB. The financial burden from noncommunicable diseases in low- and middle-income countries: a literature review. Health Res Policy Syst. 2013 Aug 16;11:31
[9] Health systems strengthening in countries of the Eastern Mediterranean Region: challenges, priorities and options for future action. Technical discussion paper. Fifty-ninth session of the Regional Committee for the Eastern Mediterranean, October2012 (EM/RC59/Tech.Disc.1)
[10] (http://applications.emro.who.int/docs/RC_technical_papers_2012_Tech_Disc_1_14613_EN.pdf, accessed 20 December 2013).
[11] Salehuddin M, Choudhury KN, Islami N, Zillurahman M, Gosh S, Majib M. Burden of Non-communicable diseases in South Asia – A clinical review. University Heart Journal.2010July; 6(2).
[12] Afghanistan. In: Noncommunicable diseases: country profiles 2011. Geneva: World Health Organization; 2011 http://www.who.int/nmh/publications/ncd_profiles_report.pdf
[13] Afghanistan mortality survey 2010. Calverton (MD): Afghan Public Health Institute, Ministry of Public Health, Central Statistics Organization (Afghanistan), ICF Macro, Indian Institute of Health Management Research and World Health Organization Regional Office for the Eastern Mediterranean; 2011. http://dhsprogram.com/pubs/pdf/FR248/FR248.pdf
[14] World Health Organization, Diabetes programme Country and regional data on diabetes Prevalence of diabetes in the WHO Eastern Mediterranean Region.
[15] http://www.who.int/diabetes/facts/world_figures/en/index2.html
[16] Mohmand. K.A, Sharifi K, Bahram A.A. Smoking prevalence survey in Kabul City. Kabul. Social and Health Development Program.2010 (in press).
[17] Saeed KMI. Prevalence of risk factors for NCDs in the adult population of urban areas in Kabul city, Afghanistan. Cent Asian J Glob Health.2013;2(2): 10.5195/cajgh.2013.69
[18] Sediqi A. A preliminary assessment of air quality in Kabul [Internet]. Afghanistan Online http://www.afghan-web.com/environment/kabul_air_quality.pdf
[19] Esteghamati A, Meysamie A, Khalilzadeh O, Rashidi A, Haghazali M, Asgari F, et al. Third national surveillance of risk factors of NCDs (SuRFNCD-2007) in Iran: methods and results on prevalence of diabetes, hypertension, obesity, central obesity, and dyslipidemia. BMC Public Health.2009; 9:167.
[20] BastiA,Fawwad A, Hakeem R, Ahmedani MYM, Zafar M. Pakistan National Diabetes Survey: prevalence of glucose intolerance and associated factors in the Punjab province of Pakistan. Journal of Primary Care Diabetes Europe. (2010).4 (2); 79–83.
[21] Safdar S, Omair A, Faisal U, Hasan H. Prevalence of hypertension in a low income settlement of Karachi, Pakistan.J Pak Med Assoc. 2004Oct;54(10):506–9.
[22] Musaiger AO. Overweight and obesity in the Eastern Mediterranean Region: can we control it? East Mediterr Health J. 2004Nov; 10(6):789–93.
[23] Veghari G, Sedaghat M, Joshaghani H, Hoseini A, Niknezhad F, Angizeh A, et al. The prevalence of obesity and its related risk factor in the north of Iran in 2006.J Res Health Sci. 2010; 10(2):116–21.
[24] Bonita R, deCourten M, Dwyer T, Jamrozik K, Winkelmann R. Surveillance of risk factors for noncommunicable diseases: the WHO STEP-wise approach. Geneva: World Health Organization; 2002 (WHO/NMH/CCS/01.2002).
[25] Obesity: preventing and managing the global epidemic. Geneva: World Health Organization; 2000 (WHO Technical Report Series No. 894).
[26] The IDF consensus worldwide definitions of the metabolic syndrome. Brussels: International Diabetes Federation; 2006. http://www.idf.org/webdata/docs/IDF_Meta_def_final.pdf
[27] Whitworth JA; World Health Organization, International Society of Hypertension Writing Group. World Health Organization (WHO)/International society of Hypertension (ISH) statement on management of hypertension. J Hypertens.2003Nov; 21(11):1983–92.
[28] Diabetes. Fact sheet no. 312. Updated January 2015.Geneva: World Health Organization; 2015. http://www.who.int/mediacentre/factsheets/fs312/en/
[29] Health management information system (HMIS). In: Annual Report 1391. Kabul, Afghanistan: Ministry of Public Health; 2012

[30] Disease early warning system (DEWS) surveillance. In: Annual Report. Kabul, Afghanistan: Afghan National Public Health Institute, Ministry of Public Health; 2013.
[31] Saeed KMI, Rasooly MH, Alkozai A. Prevalence of risk factors for noncommunicable diseases in Jalalabad city, Afghanistan, evaluated using the WHO STEP-wise approach. EMHJ. 2015; 21(11).
[32] Stevens GA, Singh GM, Lu Y, Danaei G, Lin JK, Finucane MM, et al.; Global Burden of Metabolic Risk Factors of Chronic Diseases Collaborating Group (Body Mass Index). National, regional, and global trends in adult overweight and obesity prevalence. Popul Health Metr. 2012; 10(1):22–2.
[33] Finucane MM, Stevens GA, Cowan MJ, Danaei G, Lin JK, Paciorek CJ, et al.; Global Burden of Metabolic Risk Factors of Chronic Diseases Collaborating Group (Body Mass Index). National, regional, and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9•1 million participants. Lancet. 2011 Feb 12; 377(9765):557–67.
[34] Khuwaja AK, Kadir MM. Gender differences and clustering pattern of behavioural risk factors for chronic NCDs: community-based study from a developing country. Chronic Illn. 2010 Sep; 6(3):163–70.
[35] Haghdoost AA, Sadeghirad B, Rezazadehkermani M. Epidemiology and heterogeneity of hypertension in Iran: a systematic review. Arch Iran Med. 2008 Jul; 11(4):444–52.
[36] WHO STEPS. Chronic disease risk factor surveillance. Data book, I.R. Iran 1388 (2009). http://www.who.int/chp/steps/Iran_DataBook_2009.pdf?ua=1
[37] Pan B, Chen X, Wu X, Li J, Li J, Li Y, et al. Prevalence of noncommunicable diseases and their risk factors in Guangzhou, China. Prev Chronic Dis. 2014; 11:130091

Table 1: Frequency distribution of demographic characteristics of the study participants (N=1165)

Variables	Categories	Female		Male		Total	
		N	%	N	%	N	%
Age							
	25-34	272	45.6	248	43.7	520	44.6
	35-44	161	27	162	28.5	323	27.7
	45-54	94	15.7	94	16.5	188	16.1
	55+	70	11.7	64	11.3	134	11.5
Level of Education							
	Illiterate	533	89.4	307	55.6	840	73.2
	Primary and unofficial	53	8.9	111	20.1	164	14.3
	Secondary school	4	0.7	68	12.3	72	6.3
	High school and over	6	1	66	12	72	6.3
Work Status							
	Official Employees	11	2.4	114	25.7	125	13.8
	Private Business	6	1.3	104	23.4	110	12.1
	Worker/Farmer	0	0	130	29.3	130	14.3
	Jobless	19	4.1	73	16.4	92	10.2
	Housework	409	88.5	5	1.1	414	45.7
	Unable to work	17	3.7	18	4.1	35	3.9
Monthly Income in AFN							
	Less than 10000	25	51	15	32.6	40	42.1
	More than 10000	24	49	31	67.4	55	57.9
Marital Status							
	Single	25	4.2	95	16.8	120	10.3
	Married	487	81.6	435	76.9	922	79.3
	Widow/Widower	66	11.1	9	1.6	75	6.4
	Divorced	6	1	0	0	6	0.5
	Refused	13	2.2	27	4.8	40	3.4

Table 2: Frequency distribution of behavioral risk factors for noncommunicable diseases among the study participants (N=1165)

Variables	Categories	Female		Male		Total	
		N	%	N	%	N	%
Cigarette Smoking Status							

	No	584	97.8	468	82.4	1052	90.3
	Yes	13	2.2	100	17.6	113	9.7
Duration of smoking in years n = 70							
	< 10 years	12	63.2	38	38.4	50	42.4
	10 - 20 years	3	15.8	41	41.4	44	37.3
	≥ 20 years	4	21.1	20	20.2	24	20.3
Mouth Snuff Status							
	No	574	96.3	399	70.5	973	83.7
	Yes	22	3.7	167	29.5	189	16.3
Fruit serving (days per week)							
	< 3	344	58.3	399	61.1	683	59.7
	≥ 3	246	41.7	216	38.9	462	40.3
Vegetables serving (days per week)							
	< 3	199	33.4	270	47.5	469	40.3
	≥ 3	397	66.6	298	52.5	695	59.7
Type of Kitchen Oil							
	Liquid	151	25.7	229	41.3	380	33.3
	Solid	266	45.3	157	28.3	423	37
	Both	170	29	169	30.5	339	29.7
Vigorous Physical Activity							
	No	581	97.6	513	90.5	1094	94.1
	Yes	14	2.4	54	9.5	68	5.9
Moderate Physical Activity							
	No	434	72.9	480	84.8	914	78.7
	Yes	161	27.1	86	15.2	247	21.3
Pedal or bicycle for 10 Minutes per day							
	No	531	89.1	373	65.9	904	77.8
	Yes	65	10.9	193	34.1	258	22.2
Reclining/siting							
	< 3	311	52.5	194	34.4	505	43.7
	≥ 3	281	47.5	370	65.6	651	56.3
1,2 One serving is amount of fruits or vegetables taken once, 3 Physical activity in ten minutes caused high heart beats or respiration, 4 Physical activity in ten minutes caused moderate heart beats or respiration							

Table 3: Frequency of pathophysiological risk factors for NCDs of study participants (N=1165)

Variables	**Categories**	**Female**		**Male**		**Total**	
		N	%	N	%	N	%
Basic Mass index (in kg/m square)							
	Underweight	38	6.4	19	3.3	57	4.9
	Normal weight	222	37.2	300	52.8	522	44.8
	Overweight	205	34.3	195	34.3	400	34.3
	Obesity I	86	14.4	44	7.7	130	11.2
	Obesity II	26	4.4	8	1.4	34	2.9
	Obesity III	20	3.4	2	0.4	22	1.9
Central Obesity (excluding Pregnancy)							
	No	86	16.7	396	70	482	44.5
	Yes	430	83.3	170	30	600	55.5
Blood Pressure (including under treatment)							
	Hypotensive	271	45.4	179	31.5	450	38.6
	Normotensive	84	14.1	255	44.9	339	29.1
	Hypertensive	242	40.5	134	23.6	376	32.2
Blood Sugar elevated (Diabetes Mellitus including under treatment)							
	No	440	74.6	456	80.7	896	77.6
	Yes	150	25.4	109	19.3	259	22.4

Total Cholesterol							
	<190 mg/dL	416	70.6	386	68.4	802	69.6
	≥ 190 mg/dL	173	29.4	178	31.6	351	30.4
LDL							
	<100 mg/dL	318	54.1	247	44	565	49.1
	≥100 mg/dL	270	45.9	315	56	585	50.9
HDL(borderline 40 mg/dL for male and 50mg/dL for female)							
	<40 and 50mg/dL	390	66.2	226	40.1	616	53.4
	≥40 and 50mg/dL	199	33.8	338	59.9	537	46.6
Triglycerides (missing=25)							
	<150 mg/dL	405	68.8	336	59.6	741	64.3
	≥150 mg/dL	184	31.2	228	40.4	412	35.7
1 BMI <18.5, 2 BMI 18.5-24.9, 3 BMI 25-29.9, 4 BMI 30-35, 5 BMI 35-40, 6 BMI >40 7 Systolic Blood Pressure (SBP) 120mmHg and Diastolic Blood Pressure (DBP) 80mmHg, 8 SBP 120-140mmHg and DBP 80-90mmHg, 9 SBP≥140mmHg and DBP≥ 90mmHg, 10 FBS ≥ 126mg%							