



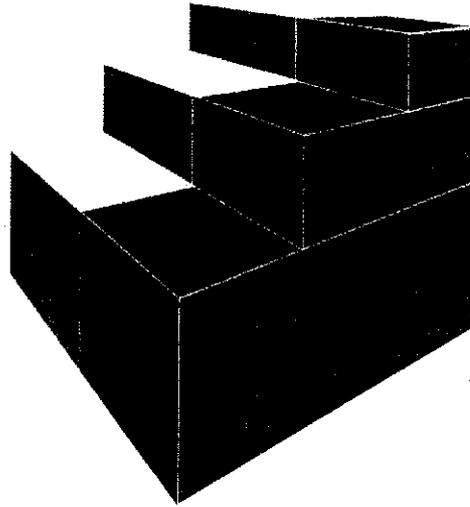
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

« وَقُلْ أَعْمَلُوا فِيسِرَ اللَّهِ عَمَلَكُمْ وَرِسُولِهِ وَالْمُؤْمِنُونَ »

« طِدْقُ اللَّهِ الْعَظِيمِ »

INTRODUCING

It gives me great pleasure to introduce this report about Risk Factors of Non Communicable Diseases in the State of Kuwait. This survey has been implemented by Ministry of Health, Kuwait in collaboration with WHO/EMRO. Initiative for presentation and control of Non-Communicable Diseases known as “EMAN” Network.

This work is an important positive indicator for Kuwait Ministry of Health commitment to prevent and control NCD through approaches and interventions to deal with its root causes; modifiable risk factors such as smoking, unhealthy diet and physical activity.

This survey has been done by using WHO STEPWISE approach for standardized data collection about NCD and their combined risk factors, so that its findings provide data base for planning and monitoring health promotion interventions and programs.

Implementing this project within the PHC system set-up in the State of Kuwait will provide opportunities for building capacity at PHC settings to deal with the problem of non-communicable diseases.

I really appreciate this effort of providing an updated data base about the magnitude of the problem of NCD in the State of Kuwait and their combined risk factors. I hope that this alarming report will give planners, decision makers and health care professionals an insight into the current lifestyles of the studies population.

I am deeply thankful to all contributors of this work, especially WHO staff, GCC executive offices of Health Ministers and the MOH-Kuwait higher committee for EMAN initiative. I would also like to extend my sincere thanks to all members of the project teams.

I am looking forward to continue cooperation with WHO, GCC executive office for Health Ministers and other International Organizations to implement more studies that will help us to exchange more information, experiences and to achieve our common goals for better health for all.

Thank you,

Minister of Health

PREFACE

This report is made upon the main results of the study of Risk factors of Non Communicable Diseases in the state of Kuwait. The survey was conducted in collaboration with WHO as component of the Eastern Mediterranean Approach for Prevention and Control of Non Communicable Diseases; EMAN initiative of WHO-EMRO. Kuwait Ministry of Health had joined EMAN network in 2003, and since then started planning, field survey, data collection, analysis and having this report giving insight in the magnitude of the problem of the prevalence of risk factors of non communicable diseases and the pattern of lifestyle in State of Kuwait.

The findings of this survey is alarming and calling for comprehensive continuous interventions to modify the modifiable risk factors such as smoking, unhealthy diet, lack of physical activity and overweight and obesity. The root causes of NCD such as diabetes, cardiovascular diseases and cancer. Risk factors of NCD can be modified by several interventions, programs and strategies based on the findings this survey has revealed. However, if risk factors have not been controlled today, the health care system will suffer from the burden of dealing with the problems of managing NCD in the near future with subsequent impacts on health and development plans.

The successful completion of this work will not be possible without the sincere support and dedicated efforts of number of organizations and individuals and their active participation. I do appreciate very much their deep concern for this work.

Also I appreciate the continuous consultation given by WHO staff, especially Dr.Osama Al-Khatib, Regional consultant of NCD prevention program WHO-EMRO and the cooperation and support given by the Executive Board of the GCC Ministers of Health.

My special thanks are extended to the Public Authority for Civil Information, Kuwait Radio, TV, national news papers and other national governmental and non-governmental agencies for their sincere support and positive cooperation through the implementation of this study.

The successful conduction of this study was not possible without the dedicated efforts given by the members of the EMAN – Kuwait National Steering Committees, field work, laboratory research teams, data collection, analysis, report writing staff as well as secretarial and administrative team, whose efforts I would like to acknowledge.

Special thanks and appreciations are due to Kuwait individuals whose acceptance to participate in this study made it possible to collect the required data about the pattern of their lifestyle.

I hope that this report will make a significant contribution to planning, implementation and monitoring of health promotion programs. The Kuwait Ministry of Health has already committed itself to implement.

**Dr. Yousef A. Al-Nesef,
Asst. Undersecretary for
Medical Support Services.**

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EXECUTIVE SUMMARY

1. EXECUTIVE SUMMARY

1.1. Introduction

For centuries, communicable diseases were the main causes of death around the world. Nowadays, non communicable diseases (NCDs) like, heart diseases, cancer, diabetes, chronic pulmonary and mental diseases became a real burden on health systems in developed countries as well as with an increasing trend in developing countries where, the transition imposes more constraints to deal with the double burden of infectious and non-infectious diseases in a poor environment characterized by ill-health systems.

Risk factors of these diseases can be demographic, behavioural, biomedical, genetic, environmental, social or other factors, which can act independently or in combination. Increasing life expectancy, reduction in communicable diseases, and high prevalence of risk factors mean that chronic diseases are prominent in the country.

The chronic diseases highlighted formally are considered to be preventable, since many of the factors which influence them can be avoided or modified. Since most of the modifiable risk factors are associated with several different diseases, prevention and management of these factors can have substantial benefits. So the basis of prevention is identification of the magnitude of the common risk factors for their prevention and control.

Currently, data on NCDs and their risk factors are either very scanty or not collated. A timely and ongoing information is needed on the magnitude and trends of these diseases and their risk factors. Therefore, there is a need to establish a national baseline data in order to be utilized for developing a national NCD prevention and control program. This was done through, the use of WHO (STEPS) approach which is a sequential process. It starts with gathering key information on risk factors by questionnaire, then moves to simple physical measurements and then to more complex collection of blood samples for biological analysis.

1.2. Overall goal:

Provide Kuwait with consistent data about the major risk factors, develop standard tools for comparisons over time, prevent chronic disease epidemics before they occur, help health services plan and priorities, predict future caseload of chronic diseases, and monitor and evaluate wide population interventions. This will improve the quality of life of people of Kuwait and help cut the extra burden of these diseases on medical and economic aspects.

Specific Objectives:

1. Identify the prevailing risk factors of NCDs in Kuwait.
2. Reveal the magnitude of the problem of risk factors' prevalence among Kuwaitis.
3. Estimate the prevalence rates of risk factors of NCDs among nationals.
4. Determine the susceptible groups to the common risk factors.
5. Establish a database of risk factors for predicting future trends of these factors.

1.3. Subjects and Methods:

The survey was carried out in Kuwait using World Health Organization Stepwise approach for surveillance of non-communicable disease risk factors. The study design was a national cross sectional descriptive survey carried on a representative sample. All Kuwaiti population within the age of 20 and 65 years who were present in Kuwait during the study period were eligible for inclusion in the study. All the five health regions of Kuwait were included in the study. The stratified random sampling technique was used for selection of the required subjects using a computerized system by the Public Authority of Civil Information. To cope for non availability and non response, a total sample of 4500 subjects (900 from each health region) was planned. The reachable were 2940, of whom 2280 individuals agreed to participate in the study.

The original English Stepwise data collection form, developed by the WHO was used. It was first translated into Arabic. This version was revised and translated again into English and compared with the original form to ascertain the precision of translation. The questionnaire included identification information, Step 1 (demographic information, behavioral information, and clinical history), Step 2 (physical measurement) and Step 3 (biochemical investigations). Some extended and optional questions were added to the questionnaire.

The coordinating committee of the project consisted of experts and specialists in the fields of research design and chronic diseases. The working teams of the survey included financial and administrative team, sampling staff, announcement team, communication teams, field teams (physician, nurse, social worker, nutrition specialist, and laboratory technician), questionnaire revision and collection team, laboratory team, data management team and reporting team. A detailed training plan had been prepared for all working teams. In addition, specific training for different teams had been performed. A pilot study was conducted on the third day of the main training workshop after preparation of the plan of action and all research tools.

The study had been agreed upon by the Ethical Committee for Medical research in Kuwait and a consent form was prepared to be signed by participants before the interview.

Announcement for the survey was conducted through an advertising campaign started in March 2006 and continued throughout data collection period aiming at raising public awareness and preparation.

A primary health care clinic was selected in each region characterized by being in the center of the region, easily accessible, with enough places to receive the participating subjects, facilities for blood sample aspiration and required personnel. A pre-determined schedule of appointments had been prepared to decrease the waiting time before the interviews.

In each health area, selected subjects received telephone calls from social worker personnel asking them to visit the selected primary health care center to share in the study. During the call, subjects were informed about the aim of the study in brief. The procedures of the interview, physical measurements and sample aspiration were explained. Structured interview of the selected subjects was applied for collection of data.

To assure good quality of data, the interview was personal. Also, each questionnaire was given a unique identifier, including self coded questions and information about the interviewers, data entry person, and the code and type of instruments used. Efficient training programs for all working teams in the project had been conducted. Revision of the questionnaire for completion of data was performed. The electronic data entry file was pre-tested and proved to be valid. Data were re-collected from 5% of the participants and compared with those previously collected by another team. Electronic validation of data was finally conducted.

An electronic file has been designed and tested for data entry using Microsoft Access data base. Data checking and editing was conducted through manual revision for the completeness of data in the questionnaire, manual revision of the data in a hard copy of the data file after its entry, electronic revision of the data on the screen case by case, validation of data to detect out-of-range responses and to check for illogic association between variables

Mapping of dataset was performed on the basis of action done during the workshop that was held in Cairo from 29/10/2006 to 2/11/2006 under the supervision of experts from WHO, Geneva. Data set mapping was processed using Mapped Instruments that guide matching site specific instrument and materials to the generic STEPS tool.

Data analysis process ranged from creating the data base to producing the final results for the site report. Data analysis had been conducted in a standard way, using the guidelines suggested by STEPS. Before conducting the statistical analyses, the data had been cleaned properly regarding combinations of variables, handling of missing data and handling of

outliers. No missing in the age and sex variables. EPI-info and Statistical Package for Social Sciences (SPSS) programs have been used for the analyses of data. Weighting started before data analysis. It included individual, non response, and population weights. Simple descriptive statistics were used as frequency, percentage and rates. Also, 95% confidence intervals around rates and arithmetic mean were presented and were used for detection of significant difference between groups. Also, the inter-quartile values were used for the median. Simple and compound frequency distribution tables in addition to contingency ones have been used. Also, graphs were presented when appropriate like bar chart, line graph, pie and radar charts.

Out of the available sample (2940 individuals), a total of 2280 participated in the study with a response rate of 77.6%. Women were more likely to participate than men (81.6% compared with 72.2%). The distribution of the sample by districts was found to be demographically representative of the actual structure of Kuwait.

1.4. Results:

The findings of this study can be summarized as follows:

1.4.1. Step (1): Social, behavioral and clinical characteristics

a) Socio-demographic characteristics

The studied age ranged from 20 to less than 65 years with a mean of 39.2 + 10.9 years and a sex ratio of 1.48 woman to 1 man (59.7% and 40.3%). The highest proportions of the respondents were married (78.4%), followed by single (14.9%) and divorced (4.8%). The overall mean number of household members was 7.7 persons. The overall mean number of years of education was 12.5 years. Men had a higher mean number of years of education than that of women (13.4 vs. 12.0 years). More than half (52.8%) had an educational certificate higher than the intermediate level. Only 5.6% had no formal schooling and 2.0% spent some years in the primary school. More than half of the total study sample (54.2%) were government employees, followed by those engaged in unpaid work (39.6%). Women were substantially more engaged in unpaid work than were men (49.6% compared with 24.7%). Just less than a third of the study sample (31.3%) had monthly reported household earnings of 500 to less than 1000 KD. The least proportion (6.4%) of the participants reported <500 KD monthly household income. Nearly equal proportions (18.1% and 17.9%) reported earning of 1500-1999 KD and 2000 or more KD monthly. The overall parent consanguinity of the respondents was 27.9%.

b) Behavioural measures

The prevalence of smoking was 23.6%. The proportion of smoking among men was nine folds that of women (42.3 vs. 4.4%). The overall prevalence rate of daily smoking was 20.6%, being substantially higher among men (37.8%) when compared with women

(3.0%). There was a decreasing trend of the prevalence rate of daily smoking as the age advances among the whole sample, especially among men. Overall, 89.0% of the current daily smokers consumed manufactured cigarettes, 16.6% smoked shisha, while only 0.9% smoked other types of tobacco. The quantity of daily smoking differed by type with an average of 22.1 cigarettes/day for manufactured cigarettes, 5.2 cigarettes/day for hand-rolled cigarettes and 3.1 stones/day for shisha. The overall mean age at first smoking among current daily smokers was 18.5 years. Men started smoking at earlier ages than women (18.1 vs. 23.1 years). The overall mean duration of smoking was 13.8 years. However, the mean duration of women was higher than that of men (15.1 vs. 13.7 years). Ex-daily smoking was reported by 11.6% of the participants.

The overall prevalence of consuming alcohol in the last 12 months was 2.7%. The prevalence among men was higher than that among women by around 26 folds (5.1% vs. 0.2%). The mean number of drinks consumed one week prior to the interview was 7 cups (7.5 for men and 1.2 cups for women). About 70.6% of alcoholics consumed alcohol at a rate of less than once a month. None of the participants was drinking more than five drinks in a single occasion.

The overall mean number of days of fruit consumption was 4.75 days, with similar means for both men and women (4.76 vs. 4.73 days). On the other hand, the overall mean number of days of vegetable consumption was more than that of fruit (4.93 days), being slightly more among women than among men (5.04 vs. 4.82 days). Men tended to consume more fruit servings than women (2.32 vs. 2.12 servings/days) with a total mean of 2.22 servings/day, while women were consuming more vegetable servings (1.60 vs. 1.55 servings/days) with a total mean of 1.57 servings/day which is far less than that of fruit. The overall average number of combined fruit and/or vegetable was 23.05 servings/week, being higher among men than among women (23.74 vs. 22.36 servings/week). The overall percentage of those who consumed less than 5 servings of fruit or vegetable/day was 81.0%. Women were more likely to consume less than 5 servings of fruit or vegetable/day than men (82.8% vs. 79.2%). More than half of the studied sample (56.0%) were eating fruit or vegetable on fewer than 4 days/weeks, with a slightly higher percentage of men than women (56.1% vs. 55.9%). About three-fifths of the study subjects (61.9%) stated that they consumed <2 servings of fruit or vegetable per day, with higher prevalence among women than men (62.8% vs. 61%, respectively). The majority of the study subjects (81.5%) stated that they consumed <14 servings of fruit or vegetable/ week, with no difference between both genders. The vast majority (95.4%) of participants used vegetable oil for food preparation. Dates were consumed on 3.6 days/week. Men ate dates more frequently than women (4.1 vs. 3.2 days/week). The mean number of days of eating cereals was 2.36 days/week. Women ate cereals more frequently than men (2.67 vs. 2.05 days/week). Pastries were consumed on 3.2 days/week. Women consumed pastries more frequently than men (3.6 vs. 2.9 days/week). Carbonated drinks were consumed on 3.1 days/week. Men consumed carbonated drinks more

frequently than women (3.5 vs. 2.8 days/week). The highest consumption rates were observed at the youngest age group (4.49 days/week). Fresh juice was consumed on 3.5 days/week. Also, men consumed fresh juice more frequently than women (3.7 vs. 3.4 days/week). The overall mean number of days of consuming other soft drinks was one day per week. Women consumed these soft drinks slightly higher than men (1.02 vs. 0.96 days/week). Lamb meat was consumed on 1.77 days/week. Men had a higher mean number of days of eating lamb meat than women (2.03 vs. 1.50 days/week). Veal meat, fish and poultry were consumed on 0.5, 1.6 and 3.1 days/week, respectively. Men had a higher mean number of days of eating these types of food than women (0.55 vs. 0.44, 1.7 vs 1.5 and 3.10 vs 3.07 days/week respectively). The average number of days of consuming both veal meat and poultry decreases as the age advances, while the reverse is true for fish, as the mean number of days of consumption increases with age.

The overall rate of low physical total daily activity (<600 MET) was 55.4%, being higher among women when compared with men (63.2% vs. 47.8%). This rate increases as the age advances with a substantial increase after the age of 55 years, particularly among men. The high spurt among men was in the age group 50-55 years. Low level of physical activity was reported by 64.7% of the participants. Women had a higher prevalence rate than men (71.7 vs. 57.9%). However acceptable level of physical activity was only practiced by 12.8%, being higher among men than among women (17.4 and 8.1%, respectively). This means that the total physical activity of 87.2% of the participants was below the recommended level. The overall mean time spent in total physical activity was 45.1 minutes/day while the median time was 15.0 minutes/day. Men spent longer time practicing total physical activity per day than women (52.2 vs. 37.7 minutes/day) and a median of 21.4 compared with 6.4 minutes/day. The overall mean time spent in work related activity was 22.4 minutes/day, followed by mean time spent in recreation (13.3 minutes/day) and lastly in transportation (9.3 minutes/day). Generally, men spent longer time than women in work-related' (25.2 vs. 19.5 minutes/day), transportation-related (10.6 vs. 8.1 minutes/day) and recreation-related physical activities (16.4 vs. 10.1 minutes/day). There was a decreasing trend of the mean time spent per day in recreation with the advancement of age. About three quarters (72.4%) stated that they do not practice any form of recreational activity while 67.0% reported that they did not practice transportation related activities. These rates were higher among women than men (71.9% compared with 62.2% and 78.1% compared with 66.9% respectively).

c) Clinical history:

The highest proportion of the study participants reported family history of diabetes (72.3%) followed by hypertension (64.8%), then heart diseases (38.9%). The least encountered positive family history was that of tumors (19.6%) and kidney (19.5%) disease.

The overall prevalence of increased blood pressure diagnosed by a doctor or a health worker in the last 12 months preceding the survey was 10.8 %. This rate was higher among women (13.6 %) than men (8%). There was an increasing trend in the prevalence rate of raised

blood pressure as the age advances in both genders. Among those with raised blood pressure, 80.8% were receiving anti-hypertensives prescribed by a physician or a health care worker. The overall mean duration of raised blood pressure was 6.4 years. Women had a higher mean duration when compared with men (6.8 vs. 5.8 years). Those advised to lose weight formed 44.8% of the total sample, while only 36.9% of hypertensive smokers received antismoking advice. About half (52.6%) the participants were advised to start or do more exercise. About two thirds (69.7%) of the participants measured their blood pressure within one year prior to the survey, while 13.6% stated that they did not measure their blood pressure during the previous three years preceding this survey.

The overall proportion of diabetes diagnosed by a doctor or a health worker in the last 12 months preceding the survey was 11.2% with a mean duration of 8.6 years. This rate was higher among women than men (11.6% vs. 10.8%). Among diabetics, 38.1% received insulin and 64.9% received oral anti-diabetic medicines. Losing weight advice was received by 56.2% while 68.3% were advised to start or do more exercise. Less than one third of the diabetic smokers received antismoking instructions. Those using herbal or traditional medicines constituted 11.9% of participants with higher proportions among women (13.3% vs. 10.4%). About three quarters (77.2%) were adherent to medical check up, while only 37.3% stuck to dietary instructions. Adherence to medications was reported by 88.1%, while self blood sugar analysis and self medicine dosing was mentioned by 42.3% and 25.3% respectively. A minority (5.6%) were attending health education sessions during the previous 2 months preceding the survey. Common sources of knowledge for diabetics were: physicians (74.0%), mass media (8.3%) and friends/relatives (7.4%).

The overall prevalence of cardiac diseases diagnosed by doctor or health worker in the last 12 months preceding the survey was 2.9% with a mean duration of 8.2 years. Among cardiac patients, 67.6% were receiving cardiovascular drugs. Just more than a third (35.6%) of the cardiac cases were suffering from acute cardiac thrombosis necessitating hospitalization for more than 5 days and another third (34.0%) was hospitalized during the previous year, with a higher proportion among women than men (39.8% vs. 27.8%). One tenth of the cardiac interviewees (10.1%) stated that they underwent open cardiac surgery, while less than half (43.6%) were subjected to cardiac catheterization. Men were more likely to perform either cardiac surgery (11.5% vs. 8.7%) or catheterization (50.2% vs. 37.3%) than women. Out of cardiac patients, 39.7% were advised to follow special diet, 49.2% lose weight, 48.9% stop smoking and 55.8% start or do more exercise.

1.4.2. Step (2): Physical measurements

a) Anthropometric measurements:

The overall mean height was 164.5 cm. Men were taller than women (171.4 vs. 157.4cm). The mean weight of the participants was 80.4 kg. Men were heavier than women (85.2 vs.

75.6kg). The mean BMI was 29.6 kg/m². Women had a higher mean BMI than that of men (30.5 vs. 28.9 kg/m²). Almost three quarters (75.4% of the participants were overweight / obese. Women were more likely to suffer from overweight / obesity than men (77.4% compared with 73.6%). A minority (2.3%) were suffering from underweight. A general trend of increasing rates of obesity with progress of age was observed for both men and women. Men had a larger waist circumference than women (96.3 vs. 88.8cm); at the entire age spectrum studied. It was found that abdominal obesity was more prevalent among women than among men (48.5 vs. 30.3%), with an overall rate of 39.1%.

b) Blood pressure:

The overall mean systolic blood pressure was 117.6 mmHg and that of diastolic blood pressure was 77.7 mmHg. Both systolic (120 vs. 115 mmHg, respectively) and diastolic blood pressure (79.4 vs. 75.9 mmHg, respectively) were higher among men than among women at different age groups. There was an increasing trend of the mean systolic and diastolic blood pressure with age. The prevalence of the survey-diagnosed hypertension (by questionnaire) was 16.8%. Men had a higher prevalence rate than that of women (18.7% vs. 14.8%). The prevalence of the current use of antihypertensive medications was 8.9%. Women had a higher prevalence rate of receiving antihypertensives than that of men (11.0% vs. 6.8%). An overall prevalence of hypertension (by measurement and questionnaire diagnosed) of 20.5% was demonstrated with higher rate among men than women (21.3% compared with 19.7%).

c) Heart rate:

The overall mean pulse rate was 75.6 beat/minute. Women had a slightly higher mean pulse rate than had men (76.1 vs. 75.1 beat/minute).

1.4.3. Step (3): Biochemical measurements

a) Fasting blood sugar:

The overall mean fasting blood sugar (excluding diabetics and non fasting participants) of the study sample was 5.14 mmol/L, being higher among men than among women (5.23 vs. 5.04 mmol/L). There was an increasing trend of the mean fasting blood sugar level as the age advances for all participants, especially among women. The prevalence of raised fasting blood sugar level diagnosed by the survey (by blood analysis) as well as by history of receiving antidiabetic medications was 12.4%. This rate was higher among men when compared with women (13.3% vs. 11.5%). The rate of raised fasting blood sugar diagnosed by this survey was 2.9%. This rate was higher among men when compared with women (3.2 vs. 2.5%). The prevalence of raised fasting blood sugar level diagnosed by history of receiving antidiabetic medications was 9.8%. This level was higher among men when compared with women (10.4% vs. 9.2% respectively).

b) Total cholesterol:

The overall mean total cholesterol of the study sample was 4.9 mmol/L, being higher among men than among women (5.0 vs. 4.9 mmol/L). Generally, it was observed that there was an increasing trend of the mean total cholesterol level as the age advances for women. Considering the cut off value of 5.2 mmol/L, it was found that the prevalence of raised total cholesterol level was 38.6%. This prevalence was higher among men when compared with women (40.1% vs. 37.2%) as well as among the elder age groups.

c) High density lipoprotein (HDL):

The overall mean HDL level of the study sample was 1.07 mmol/L. Women had higher level than men (1.20 vs. 0.94 mmol/L). Generally, it was observed that there was a decreasing trend of the mean HDL level as the age advances for both genders. At a cut off value of 0.9 mmol/L, it was found that the prevalence of low HDL was 24.4%. This prevalence was higher among men when compared with women (38.0% vs. 10.6%). An increasing trend with age was only demonstrated for women as revealed in figure (36).

d) Low density lipoprotein (LDL):

The overall mean LDL level of the study sample was 3.3 mmol/L. Men tended to have higher levels than women (3.4 vs. 3.2 mmol/L). An increasing trend was demonstrated with age among women. Considering the cut off value of 3.4 mmol/L, it was found that raised LDL affected 39.4% of the participants. This prevalence was higher among men than women (43.8% vs. 34.8%) as well as among elder age groups, especially women.

e) Triglycerides:

A mean of 1.35 mmol/L was found for the study participants. Men showed a higher mean triglyceride than women (1.51 vs. 1.18 mmol/L). An increasing trend of the mean triglycerides level as the age advances was observed for both genders. At a cut off value of 2.26 mmol/L, the prevalence of high triglycerides level was 11.9%. This prevalence was higher among men when compared with women (14.7% vs. 9.0%). An increasing trend of the was demonstrated with age for the whole participants.

f) Glycosylated hemoglobin:

Participants had a mean glycosylated hemoglobin of 5.99%, with higher levels among men than women (6.03% compared with 5.95%). An increasing trend with age progress can be observed especially above the age of 45 for both genders. Those with raised glycosylated hemoglobin (> 5.8%) constituted 11.4% of the total participants. In contrast with gender differences of the mean, women were more likely to suffer from raised glycosylated hemoglobin (11.6% compared with 11.3%).

g) Apo-lipoprotein B:

Measurement of Apo-lipoprotein B revealed a mean of 1.02 g/L, with a slightly higher level among men than women (1.05 vs. 0.98 g/L). Also, men were more likely to suffer raised level of Apo-lipoprotein B (13.95% compared with 13.65%). An increasing trend with age was mainly detected for women.

1.4.4. Combined risk factors:

The overall prevalence of low risk (i.e. none of the risk factors) was 0.6%, without gender difference. On the other hand, the overall prevalence of high risk (i.e. three or more risk factors) was 58.6%. The prevalence rate was higher among men than among women (61.7% vs. 55.4%). This rate increased with progress of age. Categorizing the age of participants into two groups, it was found that those aged 45-64 years had a substantial higher proportion of high risk than that of those aged 20-44 years (70.0% vs. 55.4%). However, clear gender differences can be observed with age where almost similar proportions of men can be observed at these 2 age categories (61.4% and 62.7%) on the other hand, 48.5% of women were at high risk under the age of 45 years compared with 75.6% above this age. Women had higher rates of less than 5 servings of fruit and/or vegetables (82.8%), low total daily physical activity (63.2%), and obesity (76.9%), when compared with men (79.2%, 47.8% and 73.6% respectively). On the other hand, men had higher rates of smoking (37.8%), alcohol (5.1%), hypertension (21.3%), diabetes mellitus (13.3%), high total cholesterol (40.1%), high HDL (38%) and high triglycerides (14.7%), when compared with women (3%, 0.2%, 19.7%, 11.5%, 37.2%, 10.6% and 9% respectively).

1.5. Conclusion and recommendations:

Out of the findings of the current survey, it can be concluded that:

- Risk factors for NCDs, especially the behavioural ones are quite common among the Kuwaiti adult population.
- Lack of physical activity, obesity and insufficient consumption of fruit and vegetable are the main prevalent NCDs risk factors in Kuwait.
- There is a pressing need for Kuwait to initiate national programmes aimed at preventing NCDs and reducing their enormous social and economic costs. As a preliminary phase of such programmes, national health authorities should promote the collection of data on the determinants, magnitude and impact of NCDs.
- Existing information systems should be strengthened with special emphasis on improving all aspects of morbidity and mortality statistics.
- The development of pilot community-based projects for the prevention of NCDs should be seriously considered.
- Equally important is the need to assess the availability of minimum standards of health care for people with established CVD, diabetes and cancer.

- Appropriate measures should be taken to ensure the availability of the essential elements of health care at various levels of care at affordable costs.
- The role of primary health care in the prevention and management of NCDs should be strengthened.
- Inter-country coordination and collaboration are vital. There is a need to establish a network of experts and institutions in the region capable of responding to regional needs in terms of research, training and health care services.

Kuwait STEPS Survey 2006



The STEPS survey of chronic disease risk factors in Kuwait was carried out from March 2006 to June 2007. Kuwait carried out Step 1, Step 2 and Step 3. Socio demographic and behavioural information was collected in Step 1. Physical measurements such as height, weight and blood pressure were collected in Step 2. Biochemical measurements were collected to assess blood glucose and cholesterol levels in Step 3. The STEPS survey in Kuwait was a population-based survey of adults aged 20-64 years. A stratified random sample, with equal proportions, design was used to produce representative data for that age range in Kuwait. A total of 2,280 adults participated in the Kuwait STEPS survey. The overall response rate was 77.6%. A repeat survey is planned for 2010 if funds permit.

Results for adults aged 20-64 years	Both Sexes	Males	Females
Step 1 Tobacco Use			
Percentage who currently smoke tobacco daily	20.8% (18.5 – 22.7)	37.8% (34.1 – 41.4)	3.0% (2.0 – 4.0)
<i>For those who smoke tobacco daily</i>			
Average age started smoking (years)	18.5 (17.9 – 19.1)	16.1 (17.6 – 18.7)	23.1 (21.0 – 25.3)
Average years of smoking	13.8 (12.9 – 14.7)	13.7 (12.7 – 14.7)	15.1 (10.8 – 19.4)
Percentage smoking manufactured cigarettes	85.0% (81.1 – 88.9)	86.0% (82.0 – 90.0)	72.3% (56.6 – 88.0)
Mean number of manufactured cigarettes smoked per day (by smokers of manufactured cigarettes)	22.1 (20.8 – 23.6)	22.0 (20.4 – 23.8)	23.4 (15.7 – 31.1)
Step 1 Alcohol Consumption			
Percentage of abstainers (who did not drink alcohol in the last year)	97.3% (96.5 – 98.1)	94.9% (93.3 – 96.4)	99.8% (99.6 – 100.0)
Percentage of current drinkers (who drank alcohol in the past 30 days)	2.7% (1.9 – 3.5)	5.1% (3.6 – 6.7)	0.2% (0.0 – 0.4)
<i>For those who drank alcohol in the last 30 days</i>			
Percentage who drank alcohol on 4 or more days in the last week	100.0% (100.0 – 100.0)	100.0% (100 – 100)	100.0% (100.0 – 100.0)
Percentage of women who had 4 or more drinks on any day in the last week			100.0% (100.0 – 100.0)
Percentage of men who had 5 or more drinks on any day in the last week		28.4% (5.0 – 51.8)	
Step 1 Fruit and Vegetable Consumption (in a typical week)			
Mean number of days fruit consumed	4.75 (4.74 – 4.75)	4.76 (4.75 – 4.78)	4.73 (4.71 – 4.74)
Mean number of servings of fruit consumed per day	2.22 (2.22 – 2.23)	2.32 (2.32 – 2.33)	2.12 (2.12 – 2.13)
Mean number of days vegetables consumed	4.93 (4.92 – 4.94)	4.82 (4.81 – 4.83)	5.04 (5.03 – 5.06)
Mean number of servings of vegetables consumed per day	1.57 (1.57 – 1.58)	1.60 (1.59 – 1.64)	1.55 (1.54 – 1.55)
Percentage who ate less than 5 of combined servings of fruit & vegetables per day	81.0% (80.8 – 81.1)	79.2% (79.0 – 79.4)	82.8% (82.6 – 83.0)

Kuwait STEPS Survey 2006



Results for adults aged 20-64 years	Both Sexes	Males	Females
Step 1 Physical Activity			
Percentage with low levels of activity (defined as <600 MET-minutes/week)	55.4% (55.2 – 55.6)	47.8% (47.5 – 48.0)	63.2% (63.0 – 63.5)
Percentage with high levels of activity (defined as ≥3000 MET-minutes/week)	14.6% (14.5 – 14.7)	17.8% (17.8 – 18.0)	11.4% (11.2 – 11.6)
Median time spent in physical activity per day (minutes)	15.0 (0.0 – 55.7)	21.4 (0.0 – 64.3)	6.4 (0.0 – 42.9)
Mean time spent in physical activity per day (minutes)	45.1 (41.2 – 48.9)	52.2 (46.0 – 58.5)	37.7 (33.4 – 42.1)
Step 2 Physical Measurements			
Mean body mass index - BMI (kg/m ²)	29.6 (29.3 – 30.0)	28.9 (28.4 – 29.3)	30.5% (30.1 – 30.9)
Percentage who are overweight or obese (BMI ≥ 25 kg/m ²)	75.4 (74.9 – 75.9)	73.6 (73.1 – 74.2)	77.4 (76.8 – 78.0)
Percentage who are obese (BMI ≥ 30 kg/m ²)	41.9 (39.6 – 44.3)	36.4 (32.9 – 39.9)	47.9 (44.9 – 50.8)
Average waist circumference (cm)		96.3 (95.1 – 97.5)	88.8 (87.9 – 89.7)
Mean systolic blood pressure - SBP (mmHg), excluding those currently on medication for raised BP	117.6 (117.0 – 118.2)	120.0 (119.1 – 120.8)	115.0 (114.2 – 115.8)
Mean diastolic blood pressure - DBP (mmHg), excluding those currently on medication for raised BP	77.7 (77.3 – 78.1)	79.4 (79.8 – 80.0)	75.9 (75.3 – 76.8)
Percentage with raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP)	20.5% (20.4 – 20.7)	21.3% (21.1 – 21.5)	19.7% (19.5 – 19.9)
Percentage with raised BP (SBP ≥ 160 and/or DBP ≥ 100 mmHg or currently on medication for raised BP)	10.9% (10.8 – 11.0)	9.0% (8.9 – 9.2)	12.9% (12.7 – 13.1)
Step 3 Biochemical Measurements			
Mean fasting blood glucose (mmol/L), excluding those currently on medication for raised blood glucose	5.14 (5.01 – 5.25)	5.23 (5.15 – 5.30)	5.04 (5.00 – 5.10)
Percentage with raised fasting blood glucose as defined below or currently on medication for raised blood glucose • plasma venous value ≥ 7.0 mmol/L	12.4% (11.0 – 13.8)	13.3% (11.1 – 15.5)	11.5% (9.7 – 13.2)
Mean total blood cholesterol (mmol/L)	4.9 (4.9 – 5.0)	5.0 (4.9 – 5.0)	4.9 (4.9 – 5.0)
Percentage with raised total cholesterol (≥ 5.2 mmol/L)	38.6% (36.4 – 40.9)	40.1% (36.6 – 43.7)	37.2% (34.4 – 39.9)
Percentage with raised total cholesterol (≥ 6.5 mmol/L)	7.2% (8.1 – 8.3)	8.1% (6.3 – 9.9)	6.3% (4.9 – 7.6)
Summary of combined risk factors			
<ul style="list-style-type: none"> • current daily smokers • less than 5 servings of fruit & vegetables per day • low level of activity (<600 MET - minutes) 		<ul style="list-style-type: none"> • overweight or obese (BMI ≥ 25 kg/m²) • raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP) 	
Percentage with low risk (i.e. none of the risk factors included above)	0.8% (0.2 – 0.9)	0.6% (0.0 – 1.2)	0.6% (0.2 – 1.0)
Percentage with raised risk (at least three of the risk factors included above), aged 20 to 44 years old	55.4% (52.6 – 58.3)	61.4% (57.1 – 65.7)	48.5% (44.9 – 52.1)
Percentage with raised risk (at least three of the risk factors included above), aged 45 to 64 years old	70.0% (66.5 – 73.4)	62.7% (57.2 – 68.2)	75.8% (71.3 – 79.9)

INTRODUCTION

2. INTRODUCTION

There has been a recent concern about chronic non communicable diseases (NCDs) in Kuwait. The country is undergoing an epidemiological transition with an increasing burden of chronic NCDs with their contributory risk factors. These diseases constitute threats to health in terms of mortality and Disability Adjusted Life Years (DALYs). Although there is inadequate information about accurate estimates, MOH statistics from hospital based data and routinely collected information show that such diseases represent most of the leading causes of mortality and morbidity. Being the leading causes of morbidity and mortality, the MOH is developing new projects to improve health and to reduce morbidity attributed to those diseases.

To effectively reduce the burden of disease, public health efforts must address the circumstances which cause the disease. People engage in many behaviors which increase their risk of disease. These behaviors, or risk factors, are related to a variety of biological, social, and environmental circumstances and are often modifiable. Risk factors have been described as the “actual” causes of death since they contribute substantially to or are the primary reasons for one or more specific morbid conditions. Currently, insufficient information exists in the public sector’s database to create even the most rudimentary country and regional health workforce inventory, or to determine the existence or extent of any workforce mal-distribution. This basic information about the major risk factors is essential to support Kuwait health and regional planning efforts. (population and working force)

In this introductory chapter, a description of chronic diseases, NCDs and risk factors as well as a brief description of country, will be presented.

2.1. WHO STEPS Overview

The STEPS approach focuses on obtaining core data on established risk factors that determine the major disease burden. It is sufficiently flexibly to allow each country to expand on the core variables and risk factors, and to incorporate optional modules related to local or regional interests.

The WHO STEPwise approach to chronic disease risk factor surveillance provides an entry point for low and middle income countries to get started on chronic disease surveillance activities. It is also designed to help countries build and strengthen their capacity to conduct surveillance. The main chronic diseases attributable to the most common risk factors are:

- Heart disease,
- Stroke,
- Cancer,

- Chronic respiratory diseases, and
- Diabetes.

The WHO STEPwise approach to surveillance (STEPS) is the WHO's recommended surveillance tool for:

- Chronic disease risk factors, and
- Chronic disease-specific morbidity and mortality.

2.1.1. Basis of STEPS

- o STEPS is a sequential process. It starts with gathering key information on risk factors with a questionnaire, then moves to simple physical measurements and then to more complex collection of blood samples for biochemical analysis.
- o STEPS emphasizes that small amounts of good quality data are more valuable than large amounts of poor data. It is based on the following two key premises:
 - Collection of standardized data, and
 - Flexibility for use in a variety of country situations and settings.
- o STEPS uses a representative sample of the study population. This allows for results to be generalized to the population. **Figure (1)** illustrates the general concept of the STEPwise approach.

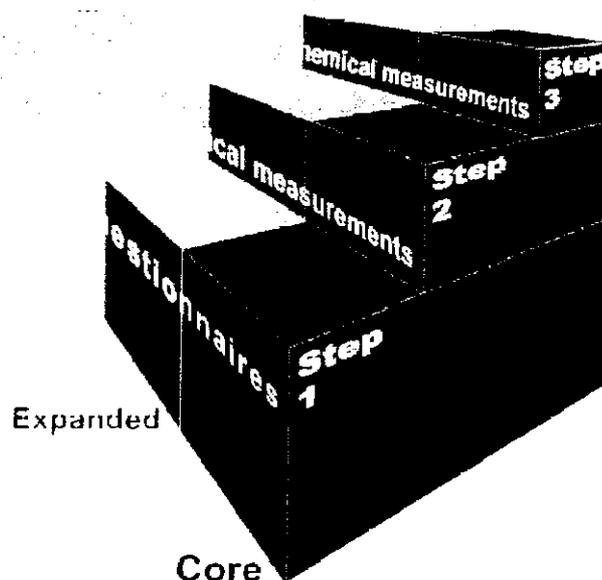


Figure (1): Diagrammatic presentation of the general concept of the STEPwise approach

Source: WHO STEPS Manual

2.1.2 STEPS Instrument

The STEPS tool used to collect data and measure chronic disease risk factors is called the STEPS Instrument (Table 1).

Table (1): the STEPS instrument covers three different levels, or ‘Steps’ of risk factor assessment

Step	Description	Purpose	Recommendation
1	Gathering demographic and behavioural information by questionnaire in a household setting.	to the core data on: <ul style="list-style-type: none"> • Socio-demographic information • Tobacco and alcohol use • Nutritional status • Physical activity. 	All countries/sites should undertake the core items of Step 1.
2	Collecting physical measurements with simple tests in household setting.	To build on the core data in Step1 and determine the proportion of adults that: <ul style="list-style-type: none"> • are overweight and obese, and • have raised blood pressure. 	Most countries/sites should undertake Step2.
3	Taking blood samples for biochemical measurement in a clinic.	To measure prevalence of diabetes or raised blood glucose and abnormal blood lipids.	Only recommended for well-resourced settings.

Source: WHO STEPS Manual

Core, expanded and optional items

Within each Step, there are three levels of data collection. These depend on what can realistically be accomplished (financially, logistically and in terms of human and clinical resources) in each country setting. The core, expanded and optional levels of detail gathered for each Step are briefly described in table (2).

Table (2): The core, expanded and optional levels of details gathered for each Step

Step	Core	Expanded	Optional
1	<ul style="list-style-type: none"> Basic demographic information including: <ul style="list-style-type: none"> o age o sex o years at school • Tobacco use • Alcohol consumption • Types of physical activity • Sedentary • Fruit & vegetable consumption 	<ul style="list-style-type: none"> • Expanded demographic information including: <ul style="list-style-type: none"> o ethnicity o highest level of education o employment o household income • History of tobacco use • Smokeless tobacco use • Binge drinking • Oil and fat consumption • History of raised blood pressure • History of diabetes 	<ul style="list-style-type: none"> • Injury and violence • Mental health • Oral health
2	<ul style="list-style-type: none"> • Height and weight • Waist circumference • Blood pressure 	<ul style="list-style-type: none"> • Hip circumference • Heart rate 	<ul style="list-style-type: none"> • Skin fold thickness • Physical activity measure • Fitness assessment
3	<ul style="list-style-type: none"> • Fasting blood glucose • Total cholesterol 	<ul style="list-style-type: none"> • HDL- cholesterol • Triglycerides 	<ul style="list-style-type: none"> • Oral glucose tolerance test • Urine tests • Salivary cotinine, etc

Source: WHO STEPS Manual

For countries that are just getting started with chronic disease surveillance, the core and expanded questions and measurements for Steps 1 and 2 are recommended by the WHO. While surveys can be a one off exercise, surveillance involves commitment to data collection on an ongoing, repeated basis. Repeat surveys are essential to identify trends in the prevalence of risk factors. (Bonita et al., 2003)

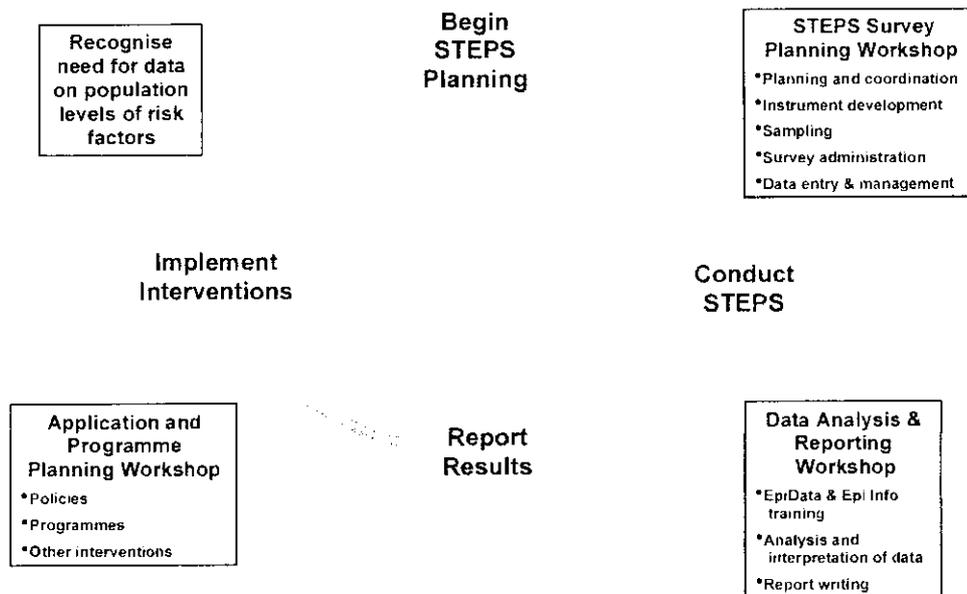


Figure (2): Surveillance process

Source: WHO STEPS Manual

2.2. Chronic Diseases:

Because of their complex and varied nature, chronic diseases are very difficult to define. They vary considerably in terms of their nature, how they are caused and the extent of their impact on communities. Whereas some chronic diseases may be large contributors to premature death, others contribute more to disability. Some may last indefinitely, whereas others may resolve over time, although, generally, chronic diseases are never cured completely. (Bonita et al., 2003)

2.2.1. Features common to most chronic diseases include:

- Complex causality, with multiple factors leading to their onset.
- A long development period, some of which may have no symptoms.
- A prolonged course of illness, perhaps leading to other health complications.
- Associated functional impairment or disability.

Although more common in older age groups (suggesting an underlying role of the ageing process), chronic diseases can occur across all age groups. Type 1 diabetes and childhood asthma are classic examples of chronic diseases that begin early in life. The development and impact of chronic diseases and their risk factors is largely a life-long process.

2.2.2. Non communicable diseases in developing countries:

For centuries, communicable diseases were the main causes of death around the world. Life expectancy was often limited by uncontrolled epidemics. After the Second World War, with medical research achievements in terms of vaccination,

antibiotics and improvement of life conditions, NCDs started causing major problems in industrialized countries. Heart diseases, cancer, diabetes, chronic pulmonary and mental diseases became a real burden for health systems in developed countries. For a while, these diseases were associated with economic development and so called diseases of the rich. Then, by the dawn of the third millennium, NCDs appeared sweeping the entire globe, with an increasing trend in developing countries where, the transition imposes more constraints to deal with the double burden of infective and non-infective diseases in a poor environment characterized by ill-health systems. (Alberti, 2001)

In 1990 the leading causes of disease burden were pneumonia, diarrheal diseases and perinatal conditions. Efficient (preventive) strategies are needed and urgent measures should be taken to control risk factors like tobacco, alcohol, obesity, blood pressure diet and inactivity. Otherwise, developing countries will be unable to provide their people with standard health care. (Donnelly, 2005)

According to the World Health Organization's statistics, chronic NCDs such as cardiovascular diseases (CVDs), diabetes, cancers, obesity and respiratory diseases, account for about 60% of the 56.5 million deaths each year and almost half of the global burden of disease. In 1990, 47% of all mortality related to NCDs was in developing countries, as was 85% of the global burden of disease and 86% of the DALYs attributable to CVDs. An increasing burden will be born mostly by these countries in the next two decades. The socio-economic transition and the ageing trend of population in developing countries will induce further demands and exacerbate the burden of NCDs in these countries. If the present trend is maintained, it is predicted that, by 2020, NCDs will account for about 70 percent of the global burden of disease, causing seven out of every 10 deaths in developing countries, compared with less than half today. (Bonita et al., 2003)

In 1990, approximately 1.3 billion DALYs were lost as a result of new cases of disease and injury, with the major part in the developing countries. In 2002, these countries supported 80% of the global Years Lived with Disability (YLD) due to the double burden of communicable and non communicable diseases. Consequently, their people are not only facing higher risk of premature death (lower life expectancy) but also living a higher part of their life in poor health. These remarks indicate that NCDs are exacerbating health inequities existing between developed and developing countries and also making the gap more profound between rich and poor within low and middle-income countries. (Alberti, 2001)

2.2.2.1. Cardiovascular diseases:

CVD is the name for the group of disorders of the heart and blood vessels and include hypertension, coronary heart disease, cerebrovascular disease and stroke, peripheral vascular

disease, heart failure, rheumatic heart disease, congenital heart disease and cardiomyopathies. Worldwide, an estimated 17 million people die of these diseases, particularly heart attacks and strokes, every year. Once associated with industrialized countries, CVDs are now emerging or rapidly increasing in developing countries. (Editorial; 1995)

Indeed, in 1998, 86% of the DALYs caused by CVDs were attributed to developing countries and in 1999 CVDs contributed to a third of global deaths with 78% in low and middle-income countries. The trend is increasing, indicating that by the year 2010 CVDs will be the leading cause of death in developing countries as a consequence of lifestyle changes brought about by industrialization and urbanization in developing countries engaged in the socio-economic transition. CVDs are promoted by risk factors like tobacco use, alcohol, physical inactivity and unhealthy diet. Unfortunately, the harm caused by these risk factors affects the rise of life expectancy in developing countries. (Gppingetal, 2005)

The costly and prolonged care of CVDs in low-and middle- income countries often divert the scarce family and societal resources to medical care. Consequently, the lower socio-economic groups have greater prevalence of risk factors, higher incidence of disease and higher mortality. (Chutubessy; et al., 2003; Lenfant, 2001; Reddy, 2002)

2.2.2.2. Diabetes:

The recent statistics released by the World Health Organization and the International Diabetes Federation are alarming. The number of diabetics in the world is expected to increase from 194 million in 2003 to 330 million in 2030 with three out of four living in developing countries. (IDF, 2007)

Moreover, in developed countries most people with diabetes are above the age of retirement, whereas in developing countries those most frequently affected are aged between 35 and 64 which makes the burden in terms of DALYs and YLDs heavier in poorer countries. Indeed, in some countries of the Middle East, one in four deaths in adults aged between 35 and 64 years is attributable to diabetes. (Boutayelo et al., 2004; Derouich and Boutayeb, 2002; DP-PRG, 2002)

The burden is exacerbated by the complications such as blindness, amputations and kidney failure for which diabetes is the leading cause, and the interfering action of CVDs which are responsible for between 50 and 80% of deaths in people with diabetes. Studies in different countries have shown that diabetes is a costly disease accounting for between 2.5 and 15% of the total health care expenditure. For the age category 20–79, the world annual direct cost is estimated to be over \$153 billion and expected to double in 2025. (Donnelly, 2005)

According to the National Institute of Diabetes and Digestive Kidney Disease (NIDDK) and the American Diabetes Association, diabetes was the sixth leading cause of death in 1999 with a direct cost of \$44 billion and an indirect cost of \$54 billion annually. In 2002, the direct and indirect cost totaled \$132 billion. In France, an estimation of \$5.7 billion was given for the direct cost of diabetes, whereas, an equivalent cost of \$5.2 billion, representing approximately 9% of the annual NHS budget, was given for UK in 2000. The burden affects more and more developing countries as stressed by different authors who attended the seventh congress of the Pan-African diabetes study group in 2001 and the Metabolic syndrome, Type II Diabetes, and Atherosclerosis Congress in 2004. (CDC, 2004)

2.2.2.3 Cancer:

Cancer is now a major cause of mortality throughout the world. In the developed world, it is generally exceeded only by CVDs but developing countries are responsible for the globally increasing trend. Over 10 million new cases and over 7 million deaths from cancer occurred worldwide in 2000. The contribution of developing countries was 53% for incidence and 56% for deaths. From 1990 to 2000, the incidence and deaths increased by 2.4% per annum. (Parkin et al., 1999)

Between 2000 and 2020, the total number of cases of cancer in the developed world is predicted to increase by 29% whereas, in developing countries an increase by 73% is expected (largely as a result of an increase in the number of old people and as a result of urbanization and change in dietary habits). (Globocan, 2000; Le code Europeen, 2007)

The incidence of cancers of the lung, colon and rectum, breast and prostate generally increases in parallel with economic development, while the incidence of stomach cancer usually declines with development. (Key, 2002)

2.2.2.4. Chronic respiratory diseases:

Chronic respiratory diseases represent a major burden for the health systems worldwide. Most developing countries have no standard protocols for assessing and managing chronic non communicable respiratory diseases such as Chronic Obstructive Pulmonary Disease (COPD) and Asthma. In these countries, the population afflicted by poverty and illiteracy, having very little or even no access to health services, will die before the age of 40 years. They comprise 15% of the population in Latin America, 34% in Arab world, 45% in Sub-Saharan Africa and south-east Asia . Respiratory diseases cause 15% of the global burden of disease. Worldwide, it is estimated that 600 million people suffer from COPD and 2.5 million deaths were attributed to these diseases in 2000. By 2020, COPD is expected to become the third most common cause of mortality in the world. (Ait et al., 2001; BPCO, 2007)

2.3. Risk factors:

Risk factors are characteristics that are associated with an increased risk of developing a particular disease or condition. These can be demographic, behavioural, biomedical, genetic, environmental, social or other factors, which can act independently or in combination. Increasing life expectancy, the reduction in communicable diseases, and the high prevalence of risk factors mean that chronic diseases are prominent in the country. (Strong and Bonita, 2003)

The chronic diseases highlighted formally are considered to be preventable, since many of the factors which influence them can be avoided or modified. For example, tobacco smoking is the single most important factor in the development of chronic obstructive pulmonary disease, and therefore controlling tobacco use is a major preventive strategy for reducing the burden of this disease. Since most of the modifiable risk factors are associated with several different diseases, prevention and management of these factors can have substantial benefits. (Bonita et al., 2003)

The various risk factors and determinants listed in Table (3) have different roles in the prevention of chronic diseases. Behavioural and biomedical risk factors are often able to be modified at the individual level by changes in behaviour or through medical intervention. For the broader influences on health, interventions at the community or population level may be required to produce change, such as strategies to promote immunization of young children, or town planning policies incorporating more open spaces for recreational activity. (Strong and Bonita, 2003)

Table (3): Risk factors and determinants of chronic diseases

Modifiable factors		Broad influences (May or may not)	Non modifiable factor
Behavioural	Biochemical		
Tobacco smoking	Excess weight	Socio-environmental factors	Age
Excess alcohol use	High blood pressure	Psychosocial factors	Gender
Physical inactivity	High blood cholesterol	Early life factors	Indigenous statu
Poor diet	Others	Political factors	Ethnic background
Others			Family history
			Genetic make up

Non-modifiable factors that is, a person's individual characteristics such as their age or ethnicity can help in identifying groups at risk. These characteristics are important factors to consider when developing prevention and management strategies, not only to highlight the differing risk factor profiles in different population groups, but also to ensure that the strategies developed are culturally and linguistically appropriate.

Trends in the prevalence of the main behavioural and biomedical risk factors for chronic diseases are not always consistent with the trends in the diseases most affected by them. Risk factors may be present from any years before a disease manifests, leading to lags between changes in risk factor prevalence and resulting changes in disease incidence or prevalence. Therefore, it is necessary to continue identifying and monitoring the variety of risk factors affecting chronic diseases. (Epping et al., 2005)

In fact, risk factors are used to predict future occurrence of diseases while the current prevalence of diseases is the present situation of these diseases in the community and deaths from such diseases represents the past of history of diseases as presented in table (4).

Table (4): STEPwise approach for diseases

Problem	Step (1)	Step (2)	Step (3)
Deaths (past)	Age and sex specific death rates	Age and sex specific death rates and cause of death (verbal autopsy)	Age and sex specific death rates and cause of death (Death certificate)
Diseases (present)	Hospital or outpatient rates by age and sex	Rates classified into three main groups - Communicable Dis. - Non communicable Dis. - Injuries	Cause specific incidence and prevalence rates
Risk factors (future)	Questionnaires	Questionnaires and physical measurements	Questionnaires, physical measurements and biochemical investigations

Initiatives and networks of the WHO for the prevention and control of chronic non-communicable diseases:

The global strategy of prevention and control of chronic non-communicable diseases have been taken at the third session of the World Health Assembly in May 2000 (resolution WHA53.17), which emphasizes the development of networks of national programs for the prevention and control of non-communicable diseases, for the dissemination of information and exchange of experiences and to support regional and national initiatives.

The World Health Organization has adopted several initiatives to combat non-communicable diseases, through dealing with the common risk factors such as smoking, obesity and lack of exercise and other sports, and after careful practical evaluation of their prevalence rates through epidemiological surveillance using standard tools and application of the initiatives of the WHO to combat non-communicable diseases in the six regional offices of the Organization:

- 1- (CINDI) network, the name stands for: (Countrywide Integrated Noncommunicable Diseases Intervention Program). It started early in 1984 and include the 29 States, that are Member States in European Region addition to Canada.
- 2- (CARMEN) network in the American Region, the name comes from the abbreviated name in Spanish: (Conjunto de Acciones para Reducción Multifactorial de Enfermedades Non Transmissible).It means “the package of measures to reduce the multi-factors for non-communicable diseases”. It was established in 1995.
- 3- (EMAN) network in the Eastern Mediterranean Region. It is abbreviation of (Eastern Mediterranean Approach to Noncommunicable Diseases). It was established in 2001. It is the network in which Kuwait participated.
- 4- (NANDI) network in the African Region. The name stands for: (Network of African Noncommunicable Diseases Interventions) It was established in 2001.
- 5- (MOANA) network in Western Pacific region. The name stands for: (Mobilization of Allies in Noncommunicable Disease Action). It was established in 2002.
- 6- (SEANET-NCD) network in the South-East Asia. The name stands for: (South-East Asia Network for NCD Prevention and Control). It was established in 2004.

All the initiatives agree on the use of standard tools adopted by the WHO, which is the STEPS as a standard and reliable approach to collect data on the prevalence of risk factors common to chronic non-communicable diseases through a system of ongoing epidemiological surveillance for these diseases and their risk factors. This allows the development of accurate and updated database on the magnitude of the problem. This will be considered the logical starting point for the development common programs, plans, policies and programs to combat chronic non-communicable diseases through different levels of prevention and within the integrated system to address the problem.

Programs of prevention and control of non-communicable diseases have been emerged as priorities in many developing countries, and thus there was an urgent need to strengthen and link WHO initiatives. There are encouraging signs in all WHO regions regarding the initiatives of prevention and control of non-communicable diseases and efforts of these networks.

Concerning non-communicable diseases, the Eastern Mediterranean region faces two main health problems; namely; high incidence of high blood pressure (26%) and diabetes (7-25%). The CVD and diabetes are the leading cause of death in the Gulf region. Therefore, it was necessary to establish “EMAN” network in the consultative meeting of the Eastern Mediterranean Region, held in Cairo in June 2001. The network started in nine countries of the Member States with the aim to promote cooperation and capacity-building in the area of

prevention and control of non-communicable diseases through population-based programs to raise the community's awareness of smoking, hypertension, diabetes, obesity and lack of physical exercise, as well as to facilitate capacity building to carry out standardized surveillance of the risk factors for non-communicable diseases, as well as capacity building to improve the care of chronic diseases at the level of primary health care.

There is an agreement between the GCC states on the prevention and control of chronic diseases in the priorities of their health programs because of the burden of chronic diseases on health budgets and development programs.

Owing to availability of primary health care system in the State of Kuwait in the form of robust infrastructure and comprehensive primary health care. It was agreed to use additional factors in each of the three steps, which include the use of questionnaires with some anthropometric measurements and collecting samples of blood for biochemical tests.

(WHO/EMRO The Regional Office for the Eastern Mediterranean (WHO/EMRO) had chosen the Ministry of Health of the State of Kuwait as a regional centre as a "Model for demonstration" of implementation of (EMAN) regarding prevention and control of chronic non-communicable diseases (diabetes). This is because the fact that the State of Kuwait is enjoying a robust infrastructure and comprehensive PHC, in addition to what the experts of WHO have observed of political support to combat non-communicable diseases through dealing with common risk factors and awareness of the magnitude of the problem and its burdens on the health system.

2.3.1. Risk factors at different stages of life:

2.3.1.1. Early life factors:

Risk factors encountered very early in life, including during gestation, may lead to increased risk of chronic diseases in later life. Although the person affected has little or no control over his or her exposure to these risks, action by parents, care givers and the community can limit the exposure of infants and children to factors that could have a negative impact on their future health status, and promote practices that have a positive impact on health. The important factors that can play a role in development of NCDs are low birth weight and breast feeding.

2.3.1.2. Risk factors in children and adolescents:

Children's health needs differ from those of adults, and therefore definitions of some risk factors in children and adolescents are different from those in adults. Although the risks associated with tobacco smoking and excessive alcohol consumption are similar in people of any age and can be measured in a similar fashion, this is not the case for other risk factors. As children grow and develop, their requirements for food and activity and their 'healthy' weight range change. For this reason, recommendations relating to health risk factors may be different for children and adolescents at different ages. However, data on risk factor trends in children are scarce. (Lyll, 2006)

2.3.1.3. Risk factors in adults:

Chronic conditions, including CVD, diabetes, obesity, cancers and respiratory diseases, account for 59% of the 57 million deaths annually and 46% of the global burden of disease. Five out of the 10 leading global disease burden risk factors identified by World Health Report 2002 - high blood pressure, high cholesterol, obesity, physical inactivity and insufficient consumption of fruits and vegetables - are strongly related to diet and physical activity. Together with alcohol and tobacco use, these preventable risks play a key role in the development of chronic diseases, which frequently involve overlapping risk factors and chronic conditions. There is good evidence that a change in dietary habits, physical activity and tobacco control can produce rapid changes in population risk factors and disease burden prevalence for these chronic diseases. (World Health Report, 2002)

In the previous parts, we considered four classes of non communicable diseases, namely, CVDs, diabetes, cancer and chronic respiratory diseases. Despite some differences between these classes and into each class, they do have a common denominator which is the risk factors. Indeed, tobacco, alcohol, high blood pressure, diet and physical inactivity were indicated, at different levels, as risk factors in the four classes of NCDs. Moreover, these risk factors are seen to affect people worldwide with an increasing tendency.

Globally, many of the risk factors for heart disease, diabetes, cancer and pulmonary diseases are due to lifestyle and can be prevented. Physical inactivity, western diet and smoking are prominent causes. Tobacco is the enemy number one. It is the most important established cause of cancer but also responsible in CVDs and chronic respiratory diseases. Tobacco and diet are the principal risk factors, responsible for more than 40% of cancer deaths and incidence. Obesity and dietary habits are the principal risk factors for diabetes of type 2. (Lenfant, 2001; Longde, 2005; Mathers et al., 2002; Reddy, 2002; Stampfer, 2000)

2.3.1.3.1. High blood pressure:

Blood pressure is a measure of the force that the circulating blood exerts on the walls of the main arteries. The pressure wave is easily felt as the pulse; the highest (systolic) pressure is created by the heart contracting, and the lowest (diastolic) as the heart fills. Raised blood pressure is almost always without symptoms. High blood pressure levels damage the arteries that supply blood to the heart, brain, kidneys and elsewhere, producing a variety of structural changes. (Whelton, 1994)

In recent decades it has become increasingly clear that the risks of stroke, heart disease, renal failure and other diseases, are not confined to a subset of the population with particularly high levels of blood pressure, but rather continue amongst those with relatively average but above optimal blood pressure. The main modifiable causes of high blood pressure

are diet, especially salt intake, levels of exercise, obesity and excessive alcohol intake. Most adults have blood pressures that are sub-optimal for health. Across WHO regions, the range between the highest and lowest age-specific mean systolic blood pressure levels is estimated at about 20 mmHg. (Kathleen et al., 2005)

Globally, this indicates that about two thirds of strokes and half of heart disease, are attributable to sub-optimal blood pressure (systolic blood pressure >115 mmHg). World wide, high blood pressure is estimated to cause 7.1 million deaths, about 13% of the total and about 4.4% of the total disease burden. There are, by a conservative estimate, at least 600 million hypertension sufferers worldwide. (Epping et al., 2005; kathleen et al., 2005)

2.3.1.3.2. High cholesterol:

Cholesterol is a fat-like substance found in the blood-stream as well as in bodily organs and nerve fibres. Most body cholesterol is made by the liver from a wide variety of foods, especially from saturated fats. A diet high in saturated fat, low in unsaturated fat, heredity and some metabolic conditions such as diabetes, determine an individual's level of LDL or 'bad' cholesterol.

Cholesterol is a key component in the development of atherosclerosis, the accumulation of fatty deposits on the inner lining of arteries. Mainly as a result of this, cholesterol increases the risks of heart disease, stroke and other vascular diseases. Almost one fifth (18%) of global stroke events (mostly nonfatal) and about 56% of global heart disease are attributable to total cholesterol levels above 3.2 mmol/l. This amounts to about 4.4 million deaths (7.9% of the total) and 2.8% of the global disease burden. (Editionial, 1995)

2.3.1.3.3. Tobacco:

In the 20th century, approximately 100 million people died worldwide from tobacco-associated diseases such as cancers, chronic lung disease, diabetes and CVDs. While tobacco consumption is falling in most developed countries, it is increasing in developing countries by about 3.4% per annum. Today, 80% of the 1.2 billion smokers in the world live in poorer countries where smoking prevalence among men is nearly 50% and half of the 5 million deaths attributed to smoking in 2000 occurred in developing countries, also responsible for the increase in deaths by more than one million during the last decade. (Joossens, 2000; Braphat and Chaloupka, 2000)

Tobacco remains the most important avoidable risk for the four classes of NCDs. It increases the risk of dying from coronary heart disease and cerebrovascular disease 2–3 fold. It increases the risk of many types of cancer, for lung cancer the risk is increased by 20–30 fold. According to studies conducted in Europe, Japan and North America, 83–90% of lung cancers in men and 57–80 in women, are imputable to tobacco. Between 80 and 90 % of the

cancers of esophagus, larynx and oral cavity are caused by tobacco and alcohol. In developing countries, an estimated one-third of all cancer deaths was attributable to smoking in 1995. Finally, tobacco exacerbates the conditions of people living with COPD and asthma. (GLOBOCAN, 2000; Parkin et al., 1999)

2.3.1.3.4. Lifestyle:

Up to 80% of cases of coronary heart disease, and up to 90% of cases of types 2 diabetes, could potentially be avoided through changing lifestyle factors. Also one-third of cancers could be avoided by eating healthily, maintaining normal weight, and exercising throughout life. It was estimated that in high-risk populations, an optimum fish consumption of 40–60 grams per day would lead to approximately a 50% reduction in death from coronary heart disease. A recent study, based on data from 36 countries, reported that fish consumption is associated with a reduced risk of death from all causes as well as CVD mortality. Unfortunately, the fish consumption is very low even in some countries known for their large fish stock like the north African region. Daily intake of fresh fruit and vegetables in adequate quantity (400–500 grams per day), is recommended to reduce the risk of coronary heart disease, stroke and high blood pressure. But, once more, this is thwarted by the western lifestyle invading developing countries. (Derouich and Boutayeb; 2002)

2.3.1.3.5. Overweight/Obesity:

Overweight and Obesity lead to adverse metabolic changes such as insulin resistance, increasing blood pressure and cholesterol. Consequently, they promote CVDs, diabetes and many types of cancer. Worldwide, overweight affects 1.2 billion of whom 300 million are clinically obese. In some developed countries like USA, the prevalence reaches 60% but developing countries like Kuwait have also a very high prevalence. More and more children are suffering from overweight and obesity. However, the most contrasting phenomenon is to find overweight/obesity and malnutrition side by side in low and middle-income countries and hence contributing to the growing burden afflicting these countries. According to the International Obesity Task Force (IOTF) and the WHO World Health report 2002, about 60% of diabetes globally can be attributable to overweight and obesity. In other respects, it is estimated that 60% of world's population do not do enough physical activity. (CDC; 2004; Kenchaiah et al., 2002., Paccaud et al., 2001)

2.3.1.3.6. Alcohol:

Alcohol consumption has also increased in the last decades, with the major part of this increase imputable to developing countries. In 2000, alcohol was responsible for nearly 2 million deaths in the world, representing 4% of the global disease burden. Abuse of alcohol has been linked to a variety of diseases including heart disease, liver, oral and esophageal cancer, hepatitis, gastrointestinal disorders, cirrhosis of the liver, and mental illness. Alcohol is estimated to be a factor in half of all motor vehicle fatalities. In addition, alcohol use by pregnant women can adversely affect birth outcomes, resulting in low birth weight or babies born with fetal alcohol syndrome.

2.3.1.3.7. Low fruit and vegetable intake:

Fruit and vegetables are important components of a healthy diet. Accumulating evidence suggests that they could help to prevent major diseases such as CVD and certain cancers, principally of the digestive system. There are several mechanisms by which these protective effects may be mediated, involving antioxidants and micronutrients, such as flavonoids, carotenoids, vitamin C and folic acid, as well as dietary fibres. These and other substances block or suppress the action of carcinogens and, as antioxidants, prevent oxidative DNA damage. (Key, 2002)

Fruit and vegetable intake varies considerably among countries, in large part reflecting the prevailing economic, cultural and agricultural environments. WHR 2002 analysis assessed the levels of mean dietary intake of fruit and vegetables (excluding potatoes) in each region, measured in grams per person per day. (World Health Report, 2002)

Low intake of fruit and vegetables is estimated to cause about 19% of gastrointestinal cancer, and about 31% of ischemic heart disease and 11% of strokes worldwide. 2.7 million deaths are attributable to low fruit and vegetable intake. Of the disease burden attributable to low fruit and vegetable intake, more than four fifths is from heart diseases and the balance from cancers. (Key, 2002)

2.3.2. Variation of risk factors by age and sex:

Most risk factors are not evenly distributed throughout the population, with substantial variation existing across the ages. Some, such as high blood pressure, high cholesterol and overweight/obesity, are more likely to be reported by older people, whereas others, such as smoking and inadequate fruit and vegetable consumption, are more common in younger people. In most cases prevalence of risk factor is higher among males than females; however, high blood pressure is more common in females in the older age groups.

2.3.3. Multiple risk factors:

Generally, as the number of risk factors a person has for a particular condition, increases, so does his or her risk of developing that condition. Monitoring multiple risk factors can help establish people at greater risk and thereby indicate those who might benefit most from early intervention. The proportion of people with no risk factors was fairly consistent across the age groups, whereas the proportion with five or more risk factors was highest in the 45–64 and 65–84 years age groups. (DPPRG, 2002; Mathers et al., 2002; Smakaranarayanan et al., 2001)

2.3.3.1 Metabolic syndrome:

Sets of risk factors which are often found together are sometimes referred to as a cluster of risk factors. Because of the complex interactions between risk factors, sometimes the increased risk from a cluster of risk factors might be greater than the sum of the risks of the individual factors. Metabolic syndrome is one of such cluster, and is a marker of increased risk of cardiovascular disease, type 2 diabetes and kidney disease. (Kleinfeld, 2006)

Metabolic syndrome is typically characterized by excess abdominal weight, insulin resistance, and high blood pressure and/or lipid abnormalities. People who have metabolic syndrome are two to three times as likely to have a heart attack or stroke and five times as likely to develop Type 2 diabetes compared with those who have not. People with Type 2 diabetes who also have metabolic syndrome are more likely to develop complications such as cardiovascular disease and kidney problems. (MSDAC, 2004)

The definition of metabolic syndrome has been much debated. Several definitions have been proposed, two of which are most commonly used in practice. The definitions are similar in the risk factors included but differ in the central component and the levels at which a person is considered to have each of the factors. (Shach; 2006)

The most recent definition published by the International Diabetes Federation (IDF) in 2005 builds on the previous definitions, and is intended to be easily applicable in clinical practice.

Metabolic syndrome

For people to be defined as having metabolic syndrome they must have:

- Excess abdominal weight (waist circumference ≥ 94 cm for Caucasian men and ≥ 80 cm for Caucasian women)
- Plus any two of the following
 1. Raised triglyceride level (≥ 1.7 mmol/L) or receiving treatment for raised TG
 2. Reduced HDL cholesterol (< 1.03 mmol/L in males or < 1.29 mmol/L in females) or receiving treatment for reduced HDL cholesterol
 3. Raised blood pressure (SBP ≥ 130 mm Hg or DBP ≥ 85 mm Hg) or receiving treatment for previously diagnosed elevated blood pressure
 4. Raised fasting blood glucose (≥ 5.6 mmol/L) or previously diagnosed type II DM

2.4. Kuwait overview:

In recent years, concern with the health conditions of the population has become part of a wider concern with the overall purposes and direction of development of human resources. The development of the potentials of the country's human resources has emerged as one of the main purposes and chief measures of all social and economic development.

The risk factors of today are the diseases of tomorrow. The key to controlling the global epidemics of chronic diseases is primary prevention based on comprehensive population wide programs. Therefore, the aim in each country should be directed to avert these epidemics wherever possible and to control them as quickly as possible where they are already present. However, the basis of chronic diseases prevention is the identification of major common risk factors and their prevention and control.

In the health sector, national resources have been mobilized to attain a healthy milieu that is characterized by high levels of life expectancy and low levels of morbidity. The mobilization took place on two fronts: action and research. On action front, successive health plans gave quantitative targets for achieving certain minimum health goals by fixed dates. On research front, it was recognized that policy makers and program managers who allocate resources across different programs within the broad areas of health need to be provided with a flow of factual data that can be used in evaluation of on-going programs as well as in the formulation of new health policies in a cost-effective manner.

In this part, a brief description of country and its population is given, in order to place the findings of the study in their context.



Figure 3: Map of the State of Kuwait

2.4.1. Land and climate:

The State of Kuwait consists mostly of desert and little difference in elevation, it occupies an area of nearly 17,818 square kilometers and is located at the north-west corner of the Arabian Gulf, between Latitudes 28 and 30 degrees north and between longitudes 46 and 48 east. Kuwait has land boundaries on the south and southwest with Saudi Arabia and on the west and north with Iraq. It is bounded on the east by the Arabian Gulf. The coastal line extends about 195 kilometers, while, the land frontiers extend for 250 kilometers with Saudi Arabia and 240 kilometers with Iraq. The earth surface slopes down gently from west to east. There are also nine scattered Kuwaiti islands in the Arabian Gulf. Administratively, Kuwait is divided into six governorates, Al-Ahmadi, Al-Farwania, Capital, Al-Jahra, Hawali and Mubarak Al-Kabeer.

Kuwait has a very dry, hot climate with frequent sand storms in summer. It enjoys a variable continental climate. Summers (April to October) are extremely hot and dry with temperatures exceeding 51°C (124°F) in Kuwait City several times during the hottest months of June, July and August. Winters (November through February) are cool with some precipitation and average temperatures around 13°C (56°F) with extremes from -2°C to 27°C.

The spring season (March) is warm and pleasant with occasional thunderstorms. Surface coastal water temperatures range from 15°C (59°F) in February to 35°C (95°F) in August. The driest months are June through September, while the wettest are January through March. Thunderstorms and hailstorms are common in November, March and April when warm and moist Arabian Gulf air collides with cold air masses from Europe. One such thunderstorm in November 1997 dumped over ten inches of rain on Kuwait.

2.4.2. Education:

Oil revenues have allowed Kuwait to build an extensive educational system, yielding a literacy rate of 90 percent. Public schooling is free and compulsory from the age of 5 to 18, and several private schools also teach this age group. All private schools offer different and competitive programs, and whilst each school strives to be the best at private education. University education is provided through Kuwait University, which is the only public university, together with a number of private universities such as the American University of Kuwait and Gulf University for Sciences and Technology.

2.4.3. Economy of Kuwait:

Kuwait, for the size of the country, is a rich and a relatively open economy with proven crude oil reserves of 96 billion barrels (15 km³), estimated to be 10% of the world's reserves. Petroleum accounts for nearly half of GDP, 95% of export revenues, and 80% of government income. Kuwait's climate limits agricultural development. Consequently, with the exception of fish, it depends almost wholly on food imports. About 75% of potable water

must be distilled or imported. The expenses of the Iraqi invasion and postwar reconstruction placed a heavy economic burden on the country, but by the mid-1990s Kuwait had resumed its pre-invasion prosperity. The Gross domestic product (GDP) for 2005 was \$53.31 billion, giving Kuwait a per-capita GDP of \$22,800.

2.4.4. Demographic profile:

The demographic situation in Kuwait is unique given the proportionately large number of expatriates relative to the number of Kuwaiti citizens. The difference between the two population groups has varied over the last four decades, particularly after the 1990-91 Gulf War, yet the expatriate population has never been less than 55 percent of the whole population.

As to the age and gender composition of both population groups, each differs from one another significantly. The Kuwaiti population pyramid is typical of “low mortality-high fertility” countries of the Middle East and North Africa region with a wide base and almost perfect symmetry between the two sexes. The non-Kuwaiti population pyramid on the other hand, has a narrow base and a wide middle (i.e. working age groups) and is completely a symmetrical between the sexes (Figure 4).

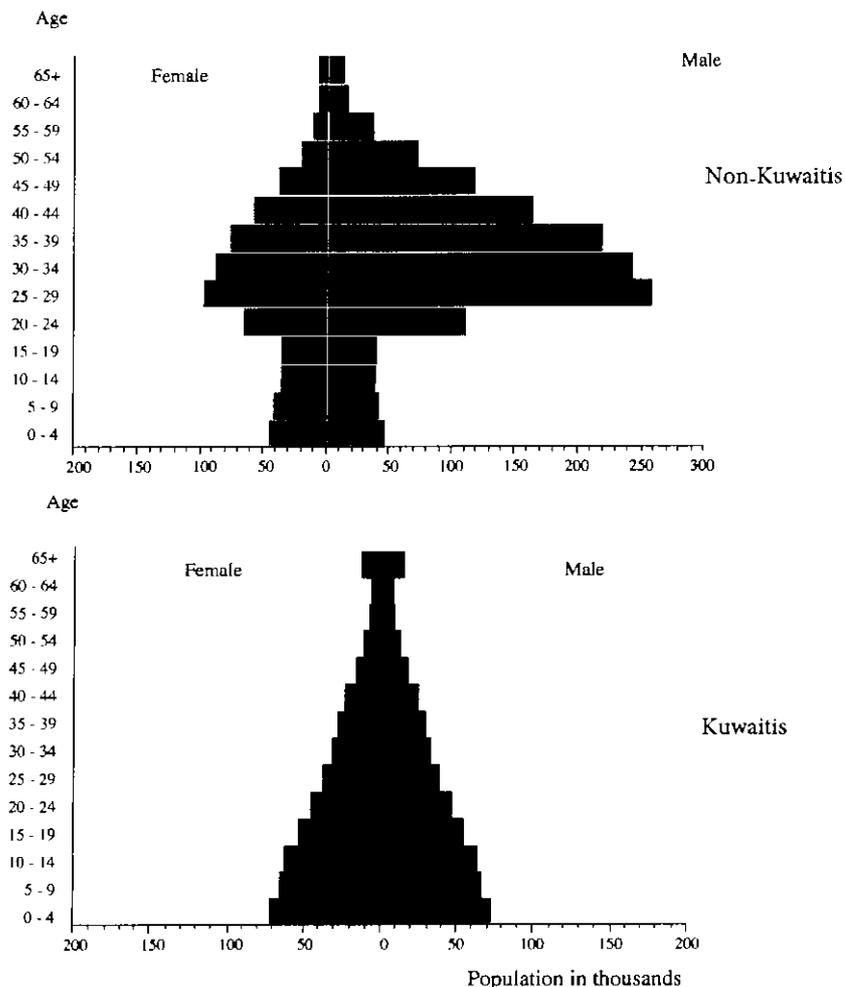


Figure (4) Population pyramids of Kuwaitis and non-Kuwaitis, 2006

The expected greater proportion of elderly Kuwaitis between 2000 and 2020, coupled with a higher life expectancy, will place a larger burden on the Kuwaiti health sectors. Elderly population will require greater health resources (three to four times) as much as non elderly persons and a shift in the orientation of health care delivery toward the management of long-term chronic diseases.

For 2006, Kuwait's population was estimated to be roughly 3,051,845 million people which included approximately 2,043,755 non-nationals. The increase in the size of the native Kuwaiti population is primary due to natural increase, i.e. high fertility and low mortality. Among non Kuwaitis, the high growth is explained by great influx of considerably large number of expatriates who work in Kuwait to fulfill labour requirements necessary to implement development plans.

In 2006, the population of Kuwaiti nationals showed a very young age structure, similar to that commonly observed in high fertility societies, with 11.4% of the population aged under five years, 40% aged under 15 years and only less than three percent aged 65 and over.

In 2006, among Kuwaiti nationals only, the CBR was estimated at 31.4 per thousand population, infant mortality rate at 8.3 per 1000 live births, and the total fertility rate at four births per women.

2.4.5. Epidemiological profile:

Although epidemiological data are comparatively good in Kuwait, mapping out a complete epidemiological profile for the country is constrained by several limitations. The national mortality and cause of death data reported annually by MOH are entirely near complete. However, around two percent of all deaths in 2006 were coded as uncertain. While, morbidity information on notifiable communicable diseases is reported at a national level, similar information on non communicable diseases and injuries is taken almost exclusively from MOH health facility utilization data. Information from other health providers (military, private sector, oil sector) is not collected routinely. Other important epidemiological sources for the estimation of disease incidence and prevalence like disease registries (except for cancer) and large sample disease surveys are in short supply.

The epidemiological profile reflects the ongoing demographic and epidemiological transitions in Kuwait. The epidemiological transition is affected by population aging effects of the demographic transition. In twenty years, elderly people in Kuwait will live longer and represent a larger proportion of the population. The demographic changes will continue the shift in the burden of disease from communicable diseases to non-communicable diseases

and injuries include changing lifestyle habits and risky behaviors (i.e. diet, exercise, smoking, substance abuse, and driving).

The combination of population aging and changing risk factors will continue to alter the burden of disease (both in terms of mortality and morbidity) for the foreseeable future. Cardiovascular diseases, cancer and injuries, namely road traffic accidents are the three non-communicable diseases categories responsible for about 65 percent of all deaths in 2006, while, infectious diseases were responsible for about 2.3 percent of all deaths. These facts highlight the extent of the epidemiological transition in Kuwait, particularly if endocrine – related deaths (diabetes 4.7%) are added to the list of non-communicable diseases and other injuries mentioned.

The incidence of communicable diseases in Kuwait has declined dramatically over the last thirty years. As a result of broad-based immunization efforts by the Kuwaiti health authorities, several communicable diseases have either been eradicated fully or been brought down to a minimum. Between 1997 and 2006, for example, no cases of polio or diphtheria were reported. In spite of the overall success in reducing incidence rates of communicable diseases, several diseases continue to pose a public health challenge for Kuwaiti disease control authorities. These infectious diseases include chickenpox, diarrhea, salmonella, viral hepatitis and tuberculosis.

2.4.6. Non-communicable diseases and injuries:

The epidemiological profile of Kuwait has undergone a significant shift over the last thirty years. While infectious diseases were the leading cause of death in 1973, cardiovascular diseases are now the principal cause of death in Kuwait, responsible for about 39.5% of all Kuwaiti deaths. The combination of cardiovascular diseases, cancers and injuries causes approximately 65 percent of all deaths in the country.

The striking increase in the percent contribution of cardiovascular diseases to overall mortality is attributed to a number of important factors. On a broad level, rising socioeconomic conditions have led to greater adoption of sedentary lifestyles. Physical inactivity, diet (especially over nutrition or obesity), and smoking are resulting in a higher incidence of CHD and stroke in the Kuwaiti population. This dramatic increase in the mortality rates associated with non communicable diseases highlights the importance of health promotion initiatives to engender the greater adoption of healthier lifestyles. Physical activity and diet are two areas in which health promotion activities should be given a much higher degree of attention.

2.4.7. Risk factors:

In light of the ongoing epidemiological transition in Kuwait, risk factors associated with non communicable diseases (hypertension, tobacco use, alcohol consumption, and obesity) are gaining greater prominence in relation to the known communicable diseases risk factors (i.e. unsafe water, poor sanitation standards....etc).

In 2005, Kuwait nutritional surveillance system pointed that among adult aged 20 years and above 41.7% of males and 32.7% of females were over weight at the same time 38.0% of males and 48.5% of females were suffering from obesity.

Concerning diabetes, 19.5% of Kuwaiti males and 16.6% of Kuwaiti females were suffering from impaired blood glucose (≥ 6.2 to < 7.1 mmol/L) and 26.7% Kuwaiti males and 16.6% of Kuwaiti females were having high glucose levels (≥ 7.1 mmol/L).

Elevated cholesterol (≥ 5.2 to < 6.2 mmol/L) were encountered among 33.9% and 31.9% of Kuwaiti male and females respectively, while, 23.9% of Kuwaiti males and 22.9% of Kuwaiti females were with high cholesterol levels (≥ 6.2 mmol/L) and increasing with age.

Smoking was encountered among 38.8% of males and 2.8% of females. Among males who smoked 74.0% smoked cigarettes, 18.2% smoked shisha and 7.8% smoked both. For females, 58.9% smoked cigarettes, 22.4% smoked Shisha and 13.7% smoked both.

Regarding physical activity, 34.0% of males and 23.5% of females took part in some kind of physical activity. Out of them 65.8% of males and 91.6% females on an average did medium exercises (walking and aerobics) 4 times a week and 33.2% of males 3 times per week and 8.4% of females 4 times per week did tough exercises (running, swimming, cycling and football).

Concerning vegetables and fruits daily intake, 53.7% of males and 59.2% of females consumed green salad daily, 31.95 males and 34.4% of females consumed fruits daily.

2.4.8. Health care system:

The government's health policy aims to achieve and maintain a level of health care among its population that conforms to the goals of health for all strategy through the provision of equitable, free and high level health services attainable by all. In 2006, the per capita health expenditure was estimated at US \$ 572 .

The Ministry of Health is the main provider of health care in the country at all levels (primary, secondary and tertiary). The MOH considers the comprehensive primary health care as the basic first portal of entry to all levels of health care. Primary health care is provided through a network of primary health care centers which have been distributed throughout the country, minimizing problems of accessibility.

In 2006, there were 78 Primary health care centers covering the six governorates in Kuwait. They attracted a total of about 11.6 million patient visits (66.1 % by non-Kuwaitis).

Secondary health care is provided through six general hospitals, each with casualty, outpatient and inpatient departments. Each hospital provides internal medicine, general surgery, pediatrics and orthopedics services, some hospitals also provide ENT, ophthalmology, and obstetric and gynecology services. In 2006, the total number of beds in general hospital was 2922.

Tertiary care, or the third level of care, is provided by nine specialty hospitals providing services in the fields of maternal care, psychiatric care, cancer care, chest diseases, neurosurgery, ophthalmology, burn care, orthopedic surgery, infectious diseases treatment, and physical and rehabilitation services. In 2006, the total number of beds in the specialized hospitals was 2227.

In 2006, the total number of discharges from all governmental hospitals was 193,689. The number of outpatient visits was 1,862,870 and the total number of surgical operations done in the governmental hospitals was 58161, while patient visits to casualty departments numbered 2,601,798.

In addition to the MOH, the private sector also shares in provision of health care. In 2006 there were seven private hospitals, one of which belonged to oil companies, with 713 beds. The total number of discharges from private hospitals in 2006 was 55,144 while the total number of patient visits to private outpatient departments was 1,425,030.

Integrated prevention and control strategies are most effective-focusing on the common risk factors and cutting across specific diseases. So the basis of prevention is the identification of the magnitude of the common risk factors for their prevention and control. Currently, data on NCDs and their risk factors is either very scanty or not collated. A timely and ongoing information gathering policy is needed for monitoring of the magnitude and trends of these diseases and their risk factors.

Therefore, there is a need to establish a national baseline data in order to be utilized for developing a national NCD prevention and control program. This survey is considered the first national survey for NCDs risk factors in Kuwait.

The WHO (STEPS) approach used in this surveillance is a sequential process. It starts with gathering key information on risk factors by questionnaire, then moves to simple physical measurements and then to more complex collection of blood samples for biological analysis. The results of this surveillance will provide Kuwait with consistent data about the major risk factors, develop standard tools for comparisons over time, prevent chronic disease epidemics before they occur, help health services plan and priorities, predict future caseload of chronic diseases, and monitor and evaluate population wide interventions.

It was in this context that MOH decided to conduct the Eastern Mediterranean Approach to Non-Communicable Diseases (EMAN) in 2006. The survey was carried out as part of the Gulf survey of the Council of Health Ministers of the GCC States. This principal report on the Kuwait EMAN study describes the design and methodology of the survey and presents the main findings of the study.

Table (5): Hospital morbidity and total mortality causes, Kuwait 2006

Cause		Morbidity			Morbidity		
		K	NK	T	K	NK	T
CVDs	No	9234	10727	19961	1075	1125	2200
	%	9.8	10.8	10.3	39.5	44.6	41.9
Respiratory diseases	No	13909	8602	22511	177	96	273
	%	14.8	8.6	11.6	6.5	3.8	5.2
Genitourinary diseases	No	6141	6765	12906	77	25	102
	%	6.5	6.8	2.8	2.8	1.0	1.9
Neoplasms	No	2378	2985	5363	412	265	677
	%	2.5	3.0	2.8	15.1	10.5	12.9
Fractures and poisoning	No	6732	8457	15189	282	566	848
	%	7.1	8.5	7.8	10.4	22.4	16.2
Diabetes mellitus	No	1640	1073	2713	137	63	200
	%	1.7	1.1	1.4	5.0	2.5	3.8
Other causes	No	54196	60850	115046	562	385	947
	%	57.5	61.2	59.4	20.6	15.2	18.0
Total	No	94230	99459	193689	2722	2525	5247
	%	100.0	100.0	100.0	100.0	100.0	100.0

Source: Department of Statistics & Medical Records. Health & Vital Statistics Division

AIM OF THE STUDY

3. AIM OF THE STUDY

The Eastern Mediterranean Approach for Noncommunicable diseases (EMAN) represents an integrated system of health programs and interventions that **aim** at controlling such conditions as CVD, hypertension and diabetes mellitus by means of managing risk factors as a principal objective.

3.1. Intermediate objectives:

The approach aims to achieve this target through several intermediate objectives as follows:

- a) Determine the magnitude of the problem and provide an updated database of some important health indicators for Kuwaiti nationals of different age groups, prevalence rates of NCDs such as diabetes mellitus, cardiac diseases as well as prevalence of raised blood cholesterol and lipids. These data will be utilized for monitoring health programs and their evaluation through repeated field health surveys every five years.

- b) Compare the results of this survey with respective counterparts from other countries that completed similar surveys to reveal the magnitude of the problem through the use of the standardized plan set by the WHO and through the use of unified methodologies and tools to carry out these surveys in all countries sharing in this approach in collaboration with the WHO.

- c) Link the results of the survey with health promotion programs in the State of Kuwait. The results will be considered as a scientific baseline for setting health promotion programs for preventing CVD, diabetes mellitus, obesity, overweight as well as implementing comprehensive health programs to control these diseases.

- d) Predict the future burden of NCDs and their risk factors as well as implement, monitor and evaluate the future plans of interventions to prevent and control the epidemic forms of these diseases.

- e) Draw the attention of policy makers in the MOH, managers of the health regions and the central directorate of the PHC and Nutrition Department towards the magnitude of the problem of NCDs and urge them to consider NCD as a top priority of the programs of MOH and formulate plans, policies, and joint programs for controlling NCD at different levels of prevention.

- f) Promote the spirit of team work aiming at including concepts of health promotion in the daily work and in the actual health programs implemented in the primary health care through performing this survey in the primary health care centers with the spirit of team work among physicians, nurses, dieticians, laboratory technicians, social workers.

- g) Develop health manpower through training the national cadres to accomplish projects on scientific bases, to acquire skills, and capabilities to carry out tasks and responsibilities related to promoting community health.

3.2. Specific objectives:

- a) Identify the prevailing risk factors of NCDs in Kuwait.
- b) Reveal the magnitude of the problem of risk factors' prevalence among Kuwaitis.
- c) Determine the susceptible groups to the common risk factors.
- d) Identify the high risk groups.
- e) Establish a database of risk factors for predicting future trends of these factors.

METHODS

4. METHODS

4.1. Scope of the study:

The study was carried out amongst all the five health regions in Kuwait using World Health Organization Stepwise approach for surveillance of non-communicable disease (NCD) risk factors. The WHO has developed this standardized approach (the Stepwise approach) to enable comparisons of data across regions over time, preparing the first ever risk status for major NCDs. The risk factor surveillance approach has been cited as the most efficient mean of providing evidence based data to plan for controlling and reducing the impact of these conditions. It is also sufficiently flexible to be appropriately adaptable in a variety of country situations and settings.

A “risk factor” refers to any attribute, characteristic, or exposure of an individual that increases the likelihood of developing a non-communicable disease. Within a community, measurements of these risk factors are used to describe the distribution of future disease in a population. Because many factors associated with disease can not be modified, emphasis in any surveillance system should be given to those factors that are amenable to intervention. It has been shown that surveillance of selected risk factors (smoking, alcoholism, physical inactivity, poor diet, obesity, hyperlipidemia, hypertension) can reflect a large part of future NCD burden, and provide a measure of the success of interventions.

STEPS is a sequential process starting with collecting information on key risk factors by the use questionnaires (Step 1), then moving to simple physical measurements (Step 2), and lastly collection of blood samples for biochemical assessment (Step 3). In this study, the three steps were used. In addition, the three modules included in each step were used, namely core, expanded and optional.

4.2. Planning:

An administrative plan of the survey starting from the developmental stage to the dissemination of results and closing conference has been prepared. All activities were arranged chronologically alongside the duration needed for each activity.

4.2.1. Establishment:

4.2.1.1. Introductory meeting:

In the framework of co-operation between Executive Office of the Co-operation Council States of the Gulf countries and WHO the study began with an introductory meeting in 2003

that was held in Kuwait in presence of a consultant from the EMRO and the manager of the project. The meeting aimed at defining of the STEPS approach and preparation for the study. Discussion focused upon the increasing burden of chronic diseases and their risk factors, especially diabetes, the standard tool settled by the WHO and similar approaches in other areas. It was decided to begin the study in Kuwait as a model for the Gulf region due the high prevalence of diabetes, highly organized health system in the country, and powerful support of the government to control the disease.

4.2.1.2. Formulation of the coordinating committee:

A committee was formulated to be responsible for conducting the study after discussion of the national action plan. It included representative personnel from different departments in the Ministry of Health namely, primary health care, feeding and nutrition, health education, non-communicable diseases, health and vital statistics and quality assurance, in addition to a diabetologist, a cardiologist and an oncologist. Members from social service office, computer programming and central laboratory were consulted frequently throughout the work. Members of the committee were divided into three groups who were jointly responsible for:

- developing the proposal protocol of the study,
- preparation of the plan of action,
- translation and adaptation of the study questionnaire in Arabic language,
- carrying out training of the survey team, and
- supervision of all procedures of the survey.

4.2.2. Administration:

4.2.2.1. Permissions and consents:

Communications and meetings were held with responsible persons in the fields of research design, demography and civil information, social work, primary health care, laboratory investigations, nutrition, and data management for preparation of the administrative aspects of the study and getting the required permissions. Official approvals were obtained to implement the survey and support providing its requirements.

4.2.2.2. Ethical clearance:

- The study had been agreed upon by the Ethical Committee for Medical Researches in Kuwait.
- The written consent form was prepared to be signed by participants before the interview.

- Any selected subject received an explanation of the aim of the study and its importance. Thereafter, he was free to agree or refuse to participate without any obligation.

4.2.2.3. Privacy and confidentiality:

Absolute confidentiality was considered in dealing with the collected data.

- Names of the participants were hidden. The page containing the identification information and formal consent in the questionnaire was torn off from the questionnaire and kept in the coordination center.
- Special places for the interview in the selected health centers were made available for receiving participants and away from other attendants seeking health services.
- One room was prepared for interviewing each gender of the participants in the selected health centers.

4.2.2.4. Budget assignment:

The required budget for the project had been assigned by the end of 2005 after communication with the sponsoring organizations.

4.3. Study population:

All Kuwaitis population in the age of 20 to 65 years who were present in Kuwait during the study period were eligible for the study. All the five health regions of Kuwait were included in the study. Thus, it was probable for any person who fulfilled the criteria of inclusion to be included in the survey.

The study design was a national cross sectional descriptive survey carried on a representative sample of Kuwaiti population. This design suits the type of the present study and facilitates accomplishing the pre-determined goal and objectives. This design was preferred as it is relatively less expensive, and needs shorter period of time for data collection than longitudinal survey. Also, this design enable calculation of prevalence of the selected risk factors that can be used as a base line information for future comparison. Also, it would be useful for comparison with similar rates in other countries.

4.4. Sampling:

4.4.1. Sample type:

The stratified random sampling technique was used for selection of the required subjects using the computerized system by the Public Authority of Civil Information (PACI) that keeps records including civil identification numbers and demographic data for all inhabitants in Kuwait.

Kuwait is divided into six governorates: Capital, Hawali, Farwanyia, Ahmadi, Jahraa and Mubarek Alkabeer. Each of the first five governorates has an administrative health region where inhabitants are registered. Mubarek Alkabeer governorate had been established in 2000. Inhabitants of this government are still registered in Hawali, Farwanyia and Ahmadi health regions. Hence, we relayed upon classification of Kuwait into five districts according to the defined health regions. A simple random sample was selected from each health region with equal allocation.

4.4.2. Sample size:

WHO recommended a minimum of 400 subjects per age group i.e. 200 males and 200 females, thus a total 1600 subjects were needed for the four 10-year age groups from 25 to 64 years. Since we decided to include a sixth age category including persons from 20 to 24 years, a sample size of 1800 would fulfill the WHO requirement. Thus, a total sample of 4500 subjects (900 from each health region) was randomly selected to cope for the drop outs caused by non-availability and non-response.

4.4.3. Sample frame:

For each health region, a population frame was prepared including all Kuwaiti subjects in the age group 20 – 64 years. We depended upon civil identification numbers that were available by the (PACI) in preparing the frames. Other personal data were also available as name, sex, age, address and telephone number.

4.4.4. Sample unit:

The sampling unit was any Kuwaiti person in the age group 20 – 64 years living in the defined health region during the period of the study. Thus primary sampling unit in this survey equals one.

4.4.5. Criteria of Inclusion:

Kuwaiti subject (male or female) in the age group 20 – 64 years and present in Kuwait during the period of the study.

4.4.6. Criteria of exclusion:

Non Kuwaiti persons and Kuwaiti subjects aged less than 20 or over 64 years or not available during the study period.

4.5. Tools and equipment:

All necessary supplies and equipments were procured by the administrative and financial team and were distributed to the directorates of the selected health centers to be used for the survey.

4.5.1. Questionnaire:

An Arabic version of the Stepwise data collection form (questionnaire) was used. The original English form, settled by the WHO, was first translated into Arabic by members of the coordinating committee. This version was revised and translated back to English and compared with the original form to ascertain the precision of translation. The Arabic version of the questionnaire was then revised question by question by the team responsible for this task. Accordingly, it was developed and adapted for use in Kuwait with all the necessary modifications.

To facilitate collection of data, the questionnaire was a self-coded one and divided into several domains. Each domain was given an alphabetical title (e.g. "T" for tobacco use and "A" for alcohol consumption). Each item or question within a domain was given a number. Open ended questions were avoided as possible. For the ease of data entry, an additional column was added on the left side of the questionnaire to write the code of the selected answer for each question.

4.5.1.1. Included information:

The available opportunity to conduct such a national survey and the importance of obtaining the prevalence of diabetes and hypertension brought up the decision to include the expanded and optional modules of Step 1, Step 2 and Step 3. Accordingly the questionnaire included the following information:

a) Identification information:

This section includes the location and the time of the interview, the interview condition, in addition to information about the interviewer, and contact information of the participant.

b) Step 1

- Demographic information:

It consisted of eleven questions including information about age, sex, education, employment, and household income.

- Behavioral information:

It included four sections about tobacco use (11 questions), alcohol consumption (5 questions), dietary habits and food consumption regarding fruit and vegetable and oil or fat consumption (16 questions), and daily work, transportation and recreation physical activity (19 questions)

- Clinical history:

This section included clinical history of hypertension, diabetes, and cardiac diseases. Patient practices in case of having any of these conditions were also inquired about (45 questions).

c) Step 2 Physical measurements:

It included anthropometric measurements (height, weight and waist circumference), in addition to blood pressure and pulse measurement readings. This section was comprised of 13 items and a question about pregnancy.

d) Step 3 Biochemical investigations:

This section included levels of fasting blood glucose, glycosylated hemoglobin (HbA1c), Apo-lipo-protein-B (Apo-B), in addition to the blood lipid profile (triglycerides, total cholesterol, HDL and LDL). It included 8 measurements and 14 questions. Also data about the interviewer and used equipment were recorded for follow up and quality purposes.

4.5.1.2. Guidelines:

Guidelines were prepared for utilization of the STEPS instrument, and included within the instruction form prepared for the data collection teams. It included definition terms as:

- Standard drink:

One standard drink equals to one bottle of beer (285ml) or one measure of spirits (30 ml) or one glass of wine (120 ml) or one measure of aperitif (60 ml) or two measures of Sewa. For those who consume a mixture of different types of drinks, collate all and then calculate the number of standard drinks.

- Serving of fruit:

One serving of fruit equals one medium size of apple, banana, orange or half cup of chopped, cooked or canned fruits or half cup of fruit juice.

- Serving of vegetable:

One serving of vegetable equals one cup of raw vegetables (spinach, salad) or half cup of cooked or chopped vegetables (tomato, carrot, pumpkin, corn, fresh beans) or half cup of vegetable juice.

- Moderate physical activity:

It Involves moderate physical effort that makes a person breathes somewhat harder than normal. Examples are cleaning, farming, painting, gardening, swimming and climbing stairs.

- Vigorous physical activity:

It Involves hard physical effort that makes a person breathes much harder than normal. Examples are carrying heavy load, heavy construction, digging, running and strenuous sports.

4.5.2. Tools of physical measurements:

4.5.2.1. Blood pressure:

The mercury type of sphygmomanometer was utilized. The same types of sphygmomanometers and stethoscopes were purchased and distributed to the centers. Blood pressure should be measured while the participant is sitting quietly with his right arm placed on the table with the palm facing upwards. After selecting the appropriate cuff size, it was wrapped and fastened securely with the lower edge 2 cm above the inner side of the elbow joint and kept at the same level of the heart. The brachial artery position should be aligned. Disappearance Korotkoff sound was used to register diastolic blood pressure. The average of three readings of blood pressure was recorded.

4.5.2.2. Anthropometric measurements:

Weight scales, height measuring tapes and measuring tapes for waist circumference were purchased under supervision of persons in the Department of Nutrition in the MOH and then distributed to the centers.

- Weight:

Weight measurements were taken on a pre-calibrated electronic weighing scale. Calibration was performed daily using a known weight. The scale should be put on a firm flat surface and the participants should be weighed dressing in light clothes, barefooted, facing forward and standing still. Weight was recorded to the nearest 100 gm.

- Height:

Height must be measured with the subject standing upright against a wall on which was affixed a height measuring device. Measurement was made, with the participant standing with the back against the wall and head in the Frankfort position with heels together. The measuring stick was moved down and placed on the top of the head. The measurement was recorded to the nearest cm.

- Waist circumference:

The waist circumference to be measured using a tape measure. Measurement was made in the mid-axillary line midway between the last rib and the superior iliac crest while the tape was horizontal across the back. The measurement was taken to the nearest 0.1 cm.

4.5.3. Tools for biochemical investigations:

Blood specimen collection equipment: (needles, disposable bags, syringes, swabs, tourniquets, test tubes, tube racks, ice bag containers, gloves, pipettes) were procured by the MOH. Instruments in the central laboratory in Amiri Hospital were utilized for the analyses. Participant should be asked to fast overnight (14 hours), not to consume any food except for plain water and come to the center on the following day. Blood samples to be taken in the morning after the interview. Each data collection team included a laboratory technician who was equipped with blood collection tools. He/she was responsible for drawing blood sample, collection and management of the samples. Before aspiration of the blood sample, the following were confirmed:

- The participant was asked about fasting for 14 hours,
- All the tubes had been labeled with the participant's unique code.

The laboratory technician with the nurse should ensure that each participant was in a sitting comfortable position with the hand resting on a couch before and during collection of blood. After collecting the blood, the nurse carefully removed the tube and placed another tube for the next sample. After taking the required sample, the nurse carefully removed the venoject needle from the participant. The use of venoject blood collecting method with presence of vacuum in the tubes allows blood to flow directly into the tube with minimum haemolysis.

The blood sample had to be separated and kept in a suitable temperature till delivered to the central laboratory. Well enclosed ice bags were used to keep the blood sample till reaching the laboratory in the same day.

4.5.3.1. Apparatus:

Table (6) shows techniques and apparatus that were used for laboratory investigation in Step 3 of the survey.

Table (6): Laboratory apparatus

Parameter	Technique	apparatus
Fasting blood glucose	The enzymatic method (Glucose Oxidase)	Visible Light Spectrophotometer
Glycosylated hemoglobin (Hb _{A1c})	High performance Ion exchange liquid	TOSOH-G7 Glycohemoglobin analyzer HLC-723
Cholesterol	Enzymatic method by a timed endpoint method	Synchron LX20
Triglycerides	Enzymatic method by a timed endpoint method	Synchron LX20
High density lipo-protein: (HDL)	Enzymatic method by a timed endpoint method	Synchron LX20
Low density lipo-protein (LDL)	Enzymatic method by a timed endpoint method	Synchron LX20

4.6. Personnel:

In addition to the coordinating committee, experts and specialists in the fields of research design and chronic diseases as well as WHO experts were frequently consulted at different stages of the study.

4.6.1. Work teams:

- Financial and administrative team: They were responsible for facilitating communications, meetings, transportation, supplying of the non human requirements, and facilitating all logistic requirements for the projects
- Sampling staff: They were recruited from PACI and were responsible for selection and updating the sample required for the survey.
- Awareness team: The staff in the Department of Health Education in the Ministry of Health were responsible for advertising campaign prior and during the survey for raising public awareness and increasing the response rate of participation.
- Communication team: They were responsible for contacting the selected subjects, explaining to them the aim of the study, time and place of interview and follow-up of their attendance.
- Field team: In addition to a central supervisor, ten teams were formed (two in each selected health center). Each team consisted of:
 - . A physician as the head of the team and responsible for the interview and completion of data.

They also received one day training on 13 March 2006 aiming at refreshing their knowledge about the previous workshop, answering of inquiries and reviewing the details. A detailed training plan had been prepared for all working teams who had been selected for the project. It could be summarized in the following:

- Training had been performed under supervision of experts from the MOH and WHO in the field of training specialty and surveillance of chronic diseases.
- Training courses were composed of short theoretical lectures and practical application for development and improvement of the required skills of different teams. Previous experience gained from other countries had been presented.
- Training methods included short lectures, small and medium group discussions, role play and brain storming.
- Special training for different teams had been performed:
 - . Data collectors were particularly trained on completing the questionnaire in proper time and all items were discussed in details. They were also trained on using show cards for physical activities and dietary patterns.
 - . Nurses were trained specifically on measuring blood pressure, height, weight, and abdominal circumference.
 - . Data entry personnel were trained on using the pre-designed program and getting familiar with it.
 - . Laboratory technicians were informed about the details of implementation, methods of evaluation of their work and guidance about sample collection, keeping quality, transport and management.
 - . White boards were used for explanation and summarization. Also data and overhead projectors were used for presentation.
 - . Training practices had been prepared. In addition, trainees received a simplified manual of the training program at the end of the training.
 - . Training of the trainers preceded the training program for identification of terms and definition of norms to assure unified training for all trainees.
 - . Pre- and post- training tests and evaluation forms were used during and after the training.

4.6.3. Pilot study:

It was conducted on the third day of the main training workshop after preparation of the plan of action and all research tools.

4.6.3.1. Aims of the pilot study:

- Examination of the administrative system and sequential procedures of recruitment of subjects, data collection, revision and sending of both questionnaires and blood samples.

- Testing of the questionnaire and identification of unclear questions and terms, assessing reaction of the participants to the research procedures and performing any required modification in the questionnaire.
- Assessing the validity of the research manuals.
- Estimation of the required time for completion of the questionnaire.
- Evaluation of the computerized system of data entry and the time needed.
- Evaluate the effectiveness of the training programs of the working teams.
- Examination of the co-operation process between different work teams.
- Identification of unexpected difficulties during the various steps of the study.

The pilot study was conducted in similar circumstances of the main study on 20 subjects in each selected center by 2 teams (a total of 100 subjects). Participants sharing in the pilot study were not included the final sample.

4.6.3.2. Feedback of the pilot study:

- The questionnaire was suitable for application in Kuwait regarding the language, cultural beliefs and social habits.
- Forty five minutes were needed to complete the questionnaire.
- Minor modifications were performed in the questionnaire.
- The response rate was 85%.
- It was postulated that a separate room for each gender of the recruited subjects in each center would be more comfortable for the participants. Also, female nurses were more preferred than males by female participants.

4.7. Implementation of interviews:

4.7.1. Organization process of the team:

The relation between different teams has been well defined to avoid function overlap and ensure full cooperation. The exact times of either supervision or actual work has been accurately defined to avoid loss of time of both participants and members of the teams.

4.7.2. Time of the study:

Data collection required six months to be completed (from March to August 2006)

4.7.3. Place of the study (setting):

The study had been conducted in the five health regions of Kuwait. A primary health care center was selected in each region characterized by being in the center of the region, easily accessible, with enough places to receive the participating subjects, facilities for blood sample aspiration and required personnel.

4.7.3.1. Preparation of the places of interview:

In each selected health center, two separate rooms were prepared (one for men and another for women) for interviewing recruited subjects, performing the physical measurements and aspiration of the required blood sample. For the ease of reaching the specified areas, boards and leading marks had been held on the rooms and throughout the ways from the gates to the examination rooms inside the centers. A pre-determined schedule of appointments had been prepared to decrease the waiting time of the interviewees.

4.7.4. Announcement for the survey:

Advertising campaign started on 4 March 2006 and continued throughout data collection period aiming at raising public awareness. It was composed of:

- TV talk shows with the project manager and members of the committee to explain the importance of chronic diseases and encourage the population to participate. Announcement was made through the local TV channels.
- Advertisement in the newspapers at the beginning of data collection about the importance of the project was undertaken.
- Explanation boards had been held in the primary health care centers and pamphlets, containing knowledge about risk factors of chronic diseases especially smoking, physical inactivity, malnutrition, obesity, raised blood pressure, blood glucose and blood lipids, had been distributed to the visitors.
- Advertising media in co-operative societies had been used for the same purposes due to its importance as large sectors of the population attend these places frequently.



Figure (8): Explanation board held in one of the selected health care centers

4.7.5. Recruitment of subjects:

In each health region, selected subjects received telephone calls from social workers asking them to visit the selected primary health care center to share in the study. During the call, subjects were informed about the aim of the study in brief. The procedures of the interview, physical measurements and sample aspiration were explained. Also, they were informed about the name and place of the health center, the place of interviewing room, name of person responsible for receiving them, date and time of appointment and average duration that they would spend in the center. Subjects were asked to be fasting for 14 hours at the time of interview.

Each of the participants visited the center twice. The first visit was for interview, physical measurement and blood sample aspiration. During the second visit, subject received the results of laboratory investigations, deficient data were completed and medical advice was provided through Arabic pamphlets including certain health instructions regarding the current health status of the participant.

4.7.6. Survey method:

Structured interview of the selected subjects was adopted for data collection as the required information were numerous and different. During the interview, subjects were first asked about socio-demographic and behavioral characteristics and clinical history, physical measurements were taken and a blood sample for laboratory investigations was aspirated.

4.7.7. Quality assurance:

For the surveillance to be sustainable, the STEPwise approach advocates that small amounts of good quality data are more valuable than large amounts of poor quality data. Hence, we relied upon the following procedures to ensure the good quality of data:

- The study technique is personal interview that is characterized by relatively high quality data.

- Each questionnaire was given a unique identifier, that appeared on all pages, the corresponding laboratory form, consent form and blood specimen tube and blood sample forms sent to the laboratory.
- The questionnaire was designed as self coded questions to facilitate data collection and data entry in a precise manner.
- The questionnaire included information about the interviewers and data entry person, who had a unique code, and the code and type of instruments used for the physical measurements to validate the readings and discovering any discrepancy in the data and determining the responsibility about any error.
- Efficient training programs for all working teams in the project had been conducted. Personnel did not begin their tasks except after attending the training successfully.
- Revision of the questionnaire for completion of data was performed by the head of the PHC center. Missing data were completed during the second visit of the participant.
- The electronic data entry file was pre-tested and proved to be valid. It was designed to match the arrangement of the variables in the questionnaire. Automatic skipping was taken into consideration, if applicable.
- Data were re-collected from 5% of the participants and compared with those previously collected. The previously collected and recollected data were matching.
- Revision of the accuracy of entered data was performed by another team. They compared data of the questionnaire with that entered on the screen. They corrected any discovered errors.
- Electronic validation of data was conducted through frequency and association tables to detect unexpected codes and invalid relations between variables.

4.8. Data management:

4.8.1. Data entry:

An electronic file has been designed for data entry using “Microsoft Access data base” version 2007 by programmers in the Department of Health Information System in the MOH. In order to limit errors at entry, the range of values were set for several variables, based on the information obtained from the WHO experts. The response options were created and jumping of the skipped questions was provided. Data entry team was provided with guidelines and instructions.

4.8.2. Data checking and editing:

A staff working at the Department of Health and Vital Statistics were assigned to review, check and edit data. The process passed through four stages:

- Manual revision of the completeness of data in the questionnaire was performed by the heads of the centers before the data entry.
- Manual revision of the data in a hard copy of the data file after its entry.
- Electronic revision of the data on the screen case by case.
- Validation of data to detect out of range responses and to check for unaccepted association between variables Errors were corrected by checking the questionnaires.

4.8.3. Mapping of dataset:

It was performed on the basis of action done during the workshop that was held in Cairo from 29/10/2006 to 2/11/2006 under the supervision of experts from WHO Geneva.

4.8.3.1. Definitions:

Generic tools are unmodified tools from the STEPS Geneva team that are available for data analysis. Site specific tools are tools that have been modified to match site specific requirements. Since we decided to use the generic tool for data analysis and reporting of results, we proceeded to map the data set using “Mapped Instruments” which is a tool that guides matching site specific instrument and materials to the generic STEPS tool.

4.8.3.2. Aims of mapping:

Mapping the site specific instrument aimed at:

- Using data analysis and reporting tools as :
 - . Fact sheet and Fact sheet analysis guide,
 - . Data book,
 - . Automated Epi info analysis programs.
- Having documentation on:
 - . Instrument used
 - . Data entry values.
- Facilitating comparisons of the results with that from other countries.

4.8.3.3. Tools of mapping:

The available tools for mapping the site materials to the Generic tools were:

- STEPS Mapped Instrument and Dataset Structure
- Instructional guide on mapping the site instrument.

4.8.3.4. Processes of mapping:

The process of mapping the site instrument passed through the following steps:

- Completing the instrument components of the Mapped Instrument by:
 - . Identifying the first question on the site specific instrument.
 - . Locating the question on the Mapped Instrument template.
 - . Going to the next question.
- Completing the dataset components of the Mapped Instrument by:
 - . Matching the dataset variable names to the question on the Mapped Instrument.
 - . Matching the data types to the questions on the Mapped Instrument.
- Transforming the site dataset by:
 - . Identifying records that do not match the generic STEPS responses
 - . Identifying records in the site dataset that do not match :
 - The generic STEPS code or variable name and
 - The data type of the generic dataset.
- Changing the structure of the site dataset to match the STEPS dataset.
- For new or altered questions they need to be:
 - . Recoded at the bottom of the associated section of the Mapped Instrument
 - . Given the code of X plus a numeric value (X1, X2,)

After mapping of our dataset, it was transferred into STEPS databases for analysis using Epi Info version 3.2 under windows, Microsoft Access, Microsoft Excel and SPSS as required during the analysis.

4.8.4. Weighting of data:

Weighting of data allows generalization of results to the entire population. It is necessary for all sample based surveys. It requires scientifically selected sample, complete documentation and high overall response rate. This process had begun during the workshop held in Cairo from 29/10/2006 to 2/11/2006 under the supervision of experts from WHO Geneva. It was completed and discussed with an expert from the WHO office in Geneva who was invited to Kuwait during the period 30/5/2007 to 2/6/2007. During this period scientific discussion with the Kuwait team responsible for the analysis resulted in solution of all constraints regarding weighting and analysis of data.

4.8.4.1. Aims of weighting data:

Weighting of data accounted for:

- The probability of selection within the population,
- Non response rates,
- Distribution of the target population by age and sex.

4.8.4.2. Types of weighting:

- Individual weight (W1):

It accounted for the variation in the selection probabilities in the sample. It equals the sampling proportion for each stratum. Hence we had 5 values for W1. It requires information on the sample number for each health region (stratum) and the target population within the criteria of inclusion in each stratum.

- Non response rates (W2):

It was calculated to avoid bias due to the non-response. It equals 1/response rate for each age and sex group. We had 12 values for W2. It requires information about age and sex distribution of the sample. It also needs age and sex distribution of the respondents to calculate the response rate for each age and sex group.

- Population weight (W3):

It was used to adjust the sample to the target population (post-stratified adjustments). For each gender it equals population proportion for certain age group / sample proportion for the same age group. This resulted in 12 values for W3. It requires age and sex distribution of the eligible population and the selected sample.

- Primary sampling unit (PSU):

As there is only one stage sample in this survey, the value of PSU was set as one.

4.9. Data analysis:

Data analysis process ranged from creating the data-base to producing the final results of the report. Data analysis had been conducted in a standard way, using the guidelines suggested by STEPS. Before conducting the statistical analyses of data, the following were confirmed:

- The data had been cleaned properly regarding combinations of variables, handling of missing data and handling of outliers.
- No missing in the age and sex variables as well as the consent form.

4.9.1. Statistical methods:

The Epi-info and Statistical Package for Social Sciences (SPSS) programs have been used for statistical analysis of data. Simple descriptive statistics were used as frequency, percentage, rates and measures of central tendency. Also, 95% confidence intervals around rates and/or parameters were presented and were used for detection of significant difference between groups. Simple and compound frequency distribution tables in addition to contingency ones have been used. Also, graphs were presented when appropriate like bar charts, line graphs, pie charts and radar graphs.

4.9.2. Calculated variables:

4.9.2.1. Level of physical activity:

“MET-minutes/week” method was used to determine physical activity level for each person. This method depends upon the standard of a metabolic equivalent for characterizing physical activities at different levels. It estimates the amount of oxygen used by the body during physical activity. It is calculated according to the following steps:

- Classification of physical activity into 5 categories (vigorous work, moderate work, transportation, vigorous sport and moderate sport).
- Calculation of the time spent in each type of physical activity in minutes per week.
- Considering the non performance of certain activity as “zero”.
- Multiplying the time spent in minutes/week by specific factor for each type of activity as follows:
 - . Vigorous work x 8
 - . Moderate work x 4
 - . Transportation x 4
 - . Vigorous sport x 8
 - . Moderate sport x 4
- Finding the summation of the values in the previous step for each person, and accordingly, categorizing subjects into different physical activity classes.

4.9.2.2. Definition of norms:

- Overweight and obesity: Body mass index was used as an indicator. It was calculated as weight in Kg/height in square meters.

Weight categories	BMI
Underweight	< 18.5
Normal	18.5 – 24.9
Overweight	25.0 – 29.9
Obese	≥ 30.0

- Abdominal obesity was considered if waist circumference > 102 cm for men and > 88 cm for women.
- Hypertension: It was considered if the participant was on regular anti- hypertensive treatment regardless of his/her blood pressure readings. Hence, hypertension was diagnosed if the participant was currently under medication or with a systolic blood pressure ≥ 140 and/or a diastolic blood pressure ≥ 90 mmHg. Severe hypertension was diagnosed if the participant had a systolic blood pressure ≥ 160 and/or a diastolic blood pressure ≥ 100 mmHg.
- Diabetes: It was considered if the participant was on regular insulin or hypoglycemic treatment regardless of his venous blood glucose readings. Diabetes was also considered if the level of fasting venous blood glucose ≥ 7.0 mmol/L
- Lipid profiles were defined as follows:
 - Level A Hypercholesterolaemia : total cholesterol was ≥ 5.2 and < 6.5 mmol/L
 - Level B Hypercholesterolaemia : total cholesterol was ≥ 6.5 mmol/L
 - Low HDL Cholesterol : < 0.9 mmol/L
 - High LDL Cholesterol : > 4.1 mmol/L
 - High Triglycerides : > 4.5 mmol/L
- Glycosylated haemoglobin: > 5.8%
- Elevated Apo-lipo protein B:
 - For men: > 1.33 g/L
 - For women: > 1.26 g/L

4.9.3. Exploratory data analysis:

Looking at raw data to find its important features using simple frequency tables, histograms and cross tabulation for categorical variables and ranges and means for continuous ones.

4.9.4. Final analysis:

The results of the final analysis were presented in a data book, which had been used to create the fact sheet and final report.

The fact sheet is a summary of key results of the STEPS chronic disease risk factors. It provides interested parties with key findings of the survey and highlights the issues that the main report will cover in more depth.

The data book is a full tabulation of all questions in the STEPS instruments. It included both weighted and un-weighted results. It compiles a complete set of data results related to each question and measurement in the instrument. It provides the first step in the reporting process.

4.10. Data dissemination:

A group of 6 experts in this field was selected for this task. WHO guidelines for reporting were followed.

4.10.1. Reports:

The main reporting documents that had been produced are:

4.10.1.1. Fact sheet:

It included short summary of key results. It was prepared in the standard format without adding results of the optional or extended questions or measurements.

4.10.1.2. Primary report:

It was decided to begin writing a primary report in Arabic including summary, introduction, aims and objectives of the study, the most important results in addition to the conclusion and recommendation. Un-weighted data were presented.

4.10.1.3. Final report:

It is the main comprehensive report for the whole STEPS chronic disease risk factor survey in English. All tables needed to present the results were taken from the data book generated during the data analysis stage. Weighted data were presented. It included the following information:

- background including the overall rationale and scope of the survey,
- goal and objectives of the survey,
- the study population and sampling design used,

- detailed methods of data collection, management and analyses,
- detailed results of the survey classified by age and sex,
- Executive summary and conclusions, and
- appendices including the STEPS instrument used in the survey.

4.10.2. Conference:

A conference will be held after publication of the final report to help dissemination of the obtained results and raise awareness of both the professionals and community population about the importance of risk factors of the chronic non communicable diseases.

4.10.3. Scientific articles:

Several articles will be prepared and submitted to indexed international medical journals.

4.11. Non response:

Social workers called the selected subjects in sequence according to a sample list. In case of absence of the selected subject, he/she was dropped and considered as unavailable and the next one in the list was called and so on. If the subject was available and refused to share, his/her age and sex and the cause of refusal was recorded and considered as “non-responding”. If the subject agreed to share but did not come in the determined time, he received a second and third call before considered as non responding.

4.11.1. Overall response rate:

As shown in table (7), the overall response was 77.6%. The highest rate was found in Ahmadi government (78.9%), whereas the lowest rate was encountered in Hawali (76.9).

Table (7): Kuwaiti population (20 – 64 years), selected sample and response rates by health regions

Region	Population*	Sample size	Available	Participants	Response rate %
Capital	205474	900	620	479	77.26
Hawali	166448	900	622	478	76.85
Jahraa	103822	900	399	310	77.69
Farwanyia	182468	900	666	519	77.93
Ahmadi	316074	900	633	494	78.04
Total	973286	4500	2940	2280	77.55

* Source: Public Authority of Civil Information 2005

4.11.2. Response rate by age, gender and government:

The planned sample of the study was 2940 participants. The results showed a high response rate in the first step (77.6%). Out of the planned sample, a total of 2280 participated in the study (Table 8). Women were more likely to participate than men (81.6% compared with 72.2%). The least to share in the survey were those in the age group 20-24 years (59.6%) while those aged 35-44 years had the highest response rate (83.2%).

Table (8): Response proportions (step 1) by gender and age group

Age Group	Men			Women			Total		
	Eligible	Participated		Eligible	Participated		Eligible	Participated	
	N	n	%	N	n	%	N	n	%
45-54	215	111	51.6	225	151	67.1	440	262	59.6
25-34	314	227	72.3	401	323	80.6	715	550	76.9
35-44	333	258	77.5	526	457	86.9	859	715	83.2
45-54	286	226	79.0	367	312	85.0	653	538	82.4
55-64	123	96	78.0	150	119	79.3	273	215	78.8
20-64	1271	918	72.2	1669	1362	81.6	2940	2280	77.6

Out of the participants in the first step, only three individuals did not carry out some physical measurements. Thus, the responses of the first and second steps were nearly the same.

Non fasting participants or those fasting for less than 12 hours were excluded from the analysis and considered as non respondents for step 3 as shown in table (9). Accordingly,

the response rate for step three was 70.1% (64.6% for men and 74.3% for women). The lowest response rate for step three was that of the age group 20-24 years (50.9%) and the highest rate was that of the age group 35-44 years (76.5%).

Table (9): Response proportions (step 3) by gender and age group.

Age Group	Men			Women			Total		
	Eligible	Participated		Eligible	Participated		Eligible	Participated	
	N	n	%	N	n	%	N	n	%
20-24	215	93	43.3	225	131	58.2	440	224	50.9
25-34	314	203	64.6	401	295	73.6	715	498	69.7
35-44	333	231	69.4	526	426	81.0	859	657	76.5
45-54	286	203	71.0	367	281	76.6	653	484	74.1
55-64	123	91	74.0	150	106	70.6	273	198	72.5
20-64	1271	821	64.6	1669	1240	74.3	2940	2061	70.1

Table (10) shows distribution of the studied respondents by district, gender and age group. The distribution of the sample by districts was found to be demographically representative of the actual structure of Kuwait. Similar response rates can be observed for all health districts with a range of 76.9% for Hawali to 78% for Ahmadi. The high response of women was demonstrated in all the studied districts. The highest response rate was that of the age group 55-64 years living in Farwania (95.5%) while those in the age group 20-24 years living in Hawali had the lowest response (37.9%).

Table (10): Response proportions by district, gender and age group.

Age Group	Capital		Hawali		Farwaniya		Ahmadi		Jahra	
	n	%	n	%	n	%	n	%	n	%
Men										
20-24	23	63.9	20	27.0	22	75.9	32	71.1	14	45.2
25-34	33	68.8	44	69.8	57	67.9	47	77.6	46	79.3
35-44	67	76.1	58	93.6	49	68.1	53	72.6	31	81.6
45-54	61	74.4	50	94.3	35	76.1	66	77.7	14	70.0
55-64	13	59.1	20	71.4	43	95.6	11	68.8	9	75.0
20-64	197	71.4	192	68.6	206	74.6	209	74.6	114	71.7
Women										
20-24	29	72.5	27	54.0	29	67.4	40	78.4	26	63.4
25-34	60	77.9	63	88.7	84	73.7	63	79.8	53	88.3
35-44	103	85.1	103	96.3	103	84.4	78	81.3	70	87.5
45-54	71	83.5	68	93.2	56	82.4	83	83.8	34	81.0
55-64	19	90.5	25	61.0	41	95.4	21	75.0	13	76.5
20-64	282	82.0	286	83.6	313	80.3	285	80.7	196	81.7
Total										
20-24	52	68.4	47	37.9	51	70.8	72	75.0	40	55.6
25-34	93	74.4	107	79.9	141	71.2	110	78.6	99	83.9
35-44	170	81.3	161	95.3	152	78.4	131	77.5	101	85.6
45-54	132	79.0	118	93.7	91	79.8	149	81.0	48	77.4
55-64	32	74.4	45	65.2	84	95.5	32	72.7	22	75.9
20-64	479	77.3	478	76.9	519	77.9	494	78.0	310	77.7

The following Gantt chart illustrates the time schedule of all activities of the study. It also shows the starting and ending dates of each activity. (Figure 9)

Year	03			04			05	06						07																		
Month	6	7	8	9	10	11	12	1	2	3	4	5	12	1	2	3	4	5	6	6	7	8	9	10	11	12	1	2	3	4	5	6
Establishment stage																																
Establishing Coordinating Committee																																
Appointment of General Coordinator																																
Preparation and planning stage																																
Scope definition																																
Formation of committees and work teams																																
Gaining support from related administrative departments																																
Development of implementation plan																																
Budgeting and determination of sponsoring resources																																
Administrative and ethical approvals																																
Preparing the principal sites for the survey																																
Providing STEPS instruments																																
Definition of target population and study sample																																
Stage of recruitment and training of personnel																																
Recruitment of field staff																																
Training of teams																																
Stage of preparation for data collection																																
Pilot study																																
Production of the final tools and purchasing equipment																																
Organization of data collection schedule																																
Announcement campaign																																
Data collection stage																																
Call of participants																																
Obtaining consents																																
Conducting the survey																																
Data entry stage																																
Design e-data sheet																																
Data entry																																
Checking and cleaning of data																																
Data analysis stage																																
Exploratory analyses																																
Preliminary data analysesFinal analyses																																
Reporting and Disseminating Results																																
Produce preliminary reports																																
Final report																																
Conference																																

Figure (9): Summary of the plan of action

LIMITATIONS AND CONSTRAINTS

5. LIMITATIONS AND CONSTRAINTS

Unfortunately some limitations and constraints were met during planning, sampling and analysis of this study. Limitations due to the cross sectional strategy of the study included; dealing only with the survivors, inability to prove causation or calculate incidence rates in addition to use of estimates of the relative risk. A long lag period between initial planning and actual starting of the survey due to routine administrative procedures required to provide the required budget. Non responses were mainly attributed to change of telephone number, moving to another residence or traveling abroad. The difference between the number of governorates (currently 6 governorates) and the number of health regions (5 health regions) necessitated some modifications for the calculation of the total population in each region and calculation of the response rates.

Women, especially the elderly, were slightly overrepresented in the sample. This could be due to their availability during the assigned examination times or the higher desire for medical check up.

Some discrepancies were discovered in the original adopted WHO questionnaire with regard to the questions covering the dietary and physical activity domains. Some of the original dietary indicators could not be calculated from the designed questions. Thus, all the necessary modifications were performed either in the calculation of the indicators or in the interpretation of the proposed indicators. New definitions were proposed in contrast to complete cancellation proposed by the WHO head quarter of the global study. Also, major defects were discovered in the original scale proposed for calculating the level of physical activity. The necessary modifications of the EPI Info software designed for analysis were performed in consultation with experts from the WHO head quarter. The whole section and scale measuring physical activity is being revised by the WHO head quarters according to recommendation of the Kuwaiti team (see appendix). Calculation of combined risk factors was definitely affected by the missing values of these risk factors. Thus the smallest participant number was used to calculate combined risk factors.

No analysis programs were available for the optional or extended items included in the used questionnaire thus; the SPSS was utilized for tabular and statistical presentation for these items.

Unfortunately, the hip circumference could not be measured, mainly, for cultural reasons. Also, waist circumference could not be measured for pregnant women. Cultural and religious reasons were behind the low prevalence of alcohol drinking and smoking especially among women. Too many details were enquired about alcohol use while those used to drink alcohol were really a minority. This could affect the reliability of alcohol drinking results as well as smoking among women.

Several grades were utilized to calculate prevalence of hypertension and diabetes mellitus. Also, only those receiving medications were added to calculate the overall prevalence of either diabetes or hypertension. Although, the differences are negligible especially for hypertension yet, it is well known that diet control is only used for mild diabetics adherent to medical instructions. Also, the tabular templates of the WHO included weight and height for the total sample (men and women) with limited, if any, benefit.

RESULTS

6. RESULTS

This section of the report deals with textual, tabular and graphical presentation of the results. Data portrayed include those of social and behavioural characteristics as well as physical and biochemical measures. Results will be demonstrated in the following sequence:

Step 1:

1- Socio-demographic characteristics

2- Behavioural measures:

Smoking status

Alcohol consumption

Dietary pattern

Physical activity

3- Clinical history:

Family history of non communicable diseases

Present history:

Hypertension

Diabetes mellitus

Cardiac diseases

Step 2 (physical measurements):

Anthropometric measurements (weight, height, BMI, Waist circumference)

Blood pressure

Heart rate

Step 3 (Biochemical measurements):

Fasting blood sugar

Total cholesterol

High density lipoprotein

Low density lipoprotein

Triglycerides

Glycosylated hemoglobin

Apo-lipoprotein B

Combined risk factors

The following has to be noted during reading or revision of the tables:

- The results are classified by age group and gender except when not applicable.
- The tables demonstrate mainly the age and gender specific rates and their 95% confidence limits.
- Confidence intervals are calculated also for the arithmetic means while the inter-quartile range is shown for the median.
- The valid numbers are illustrated in the tables for each gender as well as the total.
- Missing cases are not presented in the tables.
- All the values shown in the tables are calculated for the weighted data, except for the sociodemographic characteristics where unweighted values were used.

STEP (1)
Sociodemographic
Characteristics



6.1. Step 1

6.1.1. Socio-demographic characteristics:

6.1.1.1. Age :

Table (11) and Figure (10) show age groups and gender of the participants. No age or gender data was missing. The highest proportion was for the age group 35-44 years (31%) followed by those aged 25-34 years (24.3%), then those of the age group 45-54 years (22.9%). The age group 20-24 years constituted 13% of the participants while the eldest age group (55-64 years) had the lowest proportion (8.8%). Women outnumbered men, with a ratio of 1.5:1. Women were more likely to be presented in the age group 35-44 years than men (33.8% compare with 26.9%) while men were slightly more presented in all other groups.

Table (11): Age group and gender of the participants

Age Group	Men		Women		Total	
	n	%	n	%	n	%
20-24	126	13.7	170	12.5	296	13.0
25-34	235	25.6	320	23.5	555	24.3
35-44	247	26.9	461	33.8	708	31.0
45-54	220	24.0	301	22.1	521	22.9
55-64	90	9.8	110	8.1	200	8.8
20-64	918	100	1362	100	2280	100

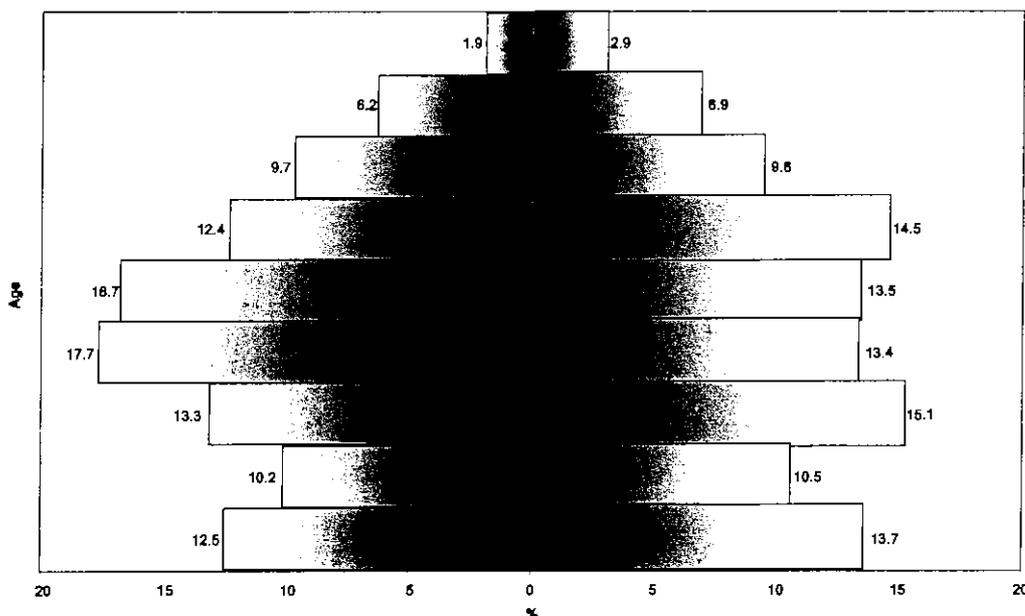


Figure (10): Age and gender composition of the survey sample

6.1.1.2. Marital status

Table (12) and Figures (11 & 12) show distribution of the studied respondents according to married status, gender and age group. The highest proportion of the respondents was married (78.4%), followed by single (14.9%) and divorced (4.8%), while 1.9% were widows. The percentage of married men was higher than that of women (83.1% compared with 75.2%) and the reverse was observed for the divorced respondents (1.9% compared with 6.8%). About two-thirds of the later group (65.1%) were in the age group 25-44 years. As expected, the proportions of single persons decreased with age while those of the widows increased with age.

Table (12): Marital status of survey participants

Age Group	Single		Married		Widow		Divorced	
	n	%	n	%	n	%	n	%
Men								
20-24	98	77.8	28	22.2	0	0.0	0	0.0
25-34	28	11.9	195	83.0	0	0.0	12	5.1
35-44	7	2.8	239	96.8	0	0.0	1	0.4
45-54	2	0.8	213	86.2	1	0.4	4	1.6
55-64	2	2.2	88	97.8	0	0.0	0	0.0
20-64	137	14.9	763	83.1	1	0.1	17	1.9
Women								
20-24	107	62.6	58	33.9	1	0.6	4	2.3
25-34	59	18.4	235	73.4	1	0.3	25	7.8
35-44	24	5.2	395	85.7	9	2.0	33	7.2
45-54	8	2.7	258	85.7	15	5.0	20	6.6
55-64	5	4.5	78	70.9	17	15.5	10	9.1
20-64	203	14.9	1024	75.2	43	3.2	92	6.8
Total								
20-24	205	69.3	86	29.1	1	0.3	4	1.4
25-34	87	15.7	430	77.5	1	0.2	37	6.7
35-44	31	4.4	634	89.5	9	1.3	34	4.8
45-54	10	1.9	471	90.4	16	3.1	24	4.6
55-64	7	3.5	166	83.0	17	8.5	10	5.0
20-64	340	14.9	1787	78.4	44	1.9	109	4.8

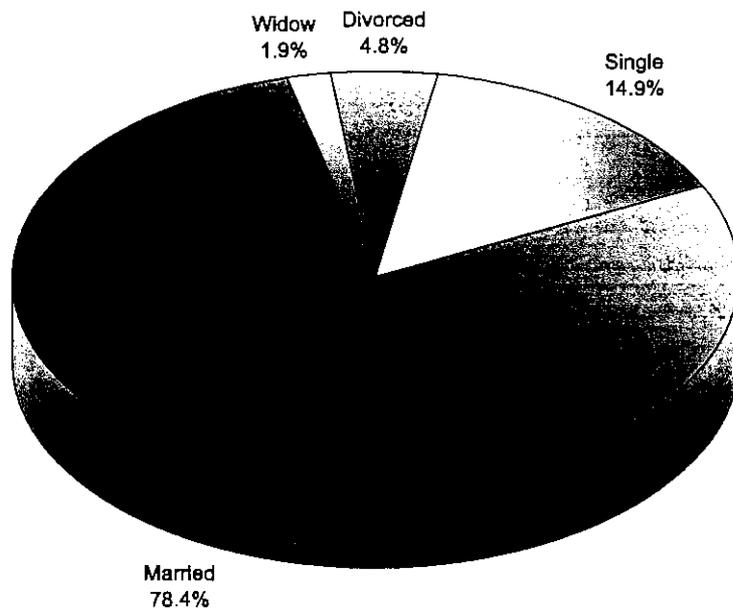


Figure (11): Marital status of the participants

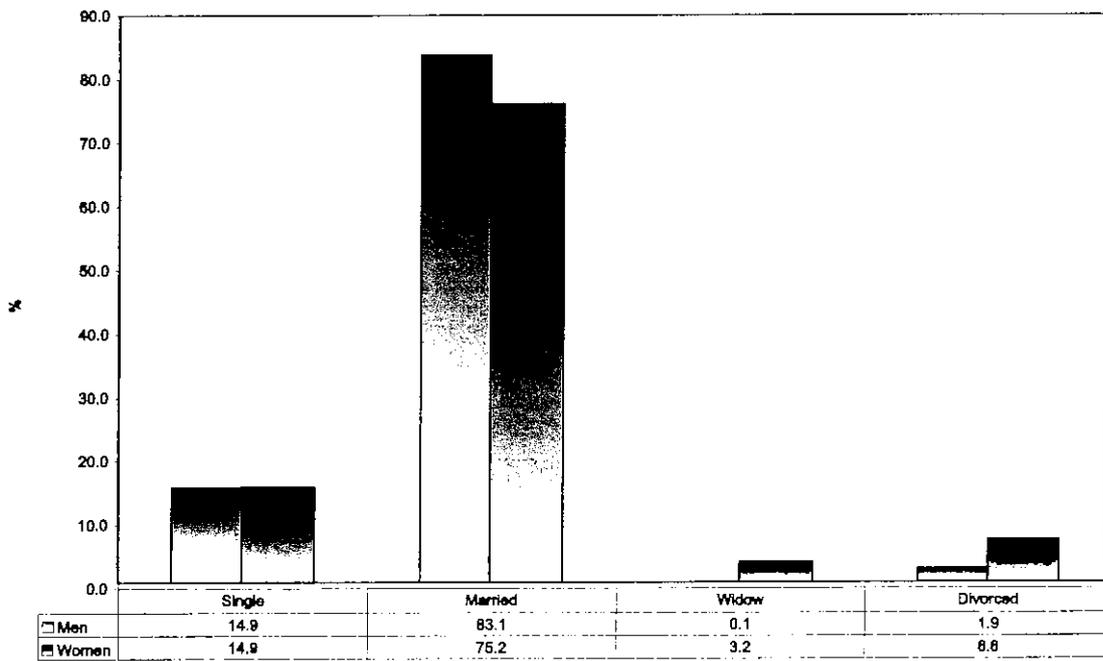


Figure (12): Distribution of the participants by marital status and gender

6.1.1.3. Household number

Table (13) and **Figure (13)** show mean number of household members by age group as well as the categories of household number. The response rate of the family size information was 99.1%. The overall mean number of household members was 7.7 persons. The highest mean household number was observed among those in the age group 20-24 years (8.6 persons) followed by those aged 55-64 years (8.5 persons), while the lowest mean was observed among those in the age group 35-44 years (7.3 persons). Less than a tenth (8.4%) of the participants had a family of less than four persons. About half the sample (49.0%) had a family size of 4-7 persons while large families (8 or more) constituted 29.1% of the sample.

Table (13): Mean number of household members

Age Group	Total	
	Mean	n
20-24	295	8.6
25-34	553	7.5
35-44	698	7.3
45-54	516	7.8
55-64	197	8.5
20-64	*2259	7.7

*= 21 cases were missed.

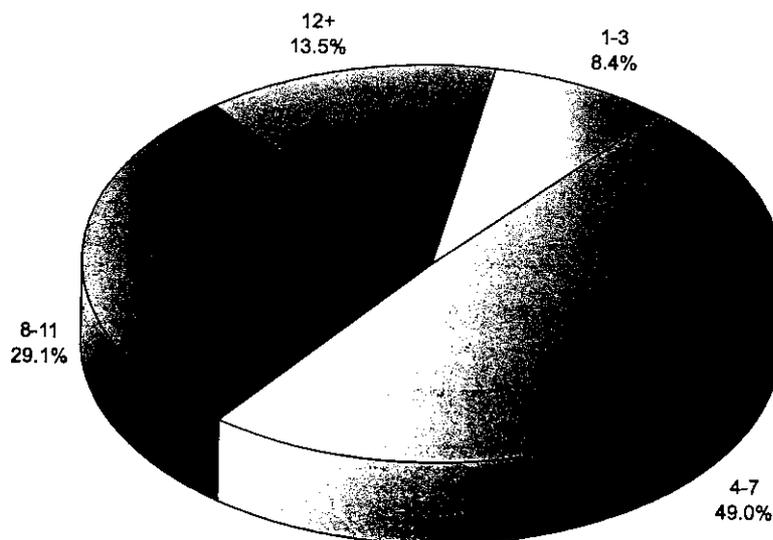


Figure (13): Household number of the participants

6.1.1.4. Level of education:

Table (14) shows the mean number of years of education of the participants. The overall mean number of years of education was 12.5 years. Men had a higher mean number of years of education than that of women (13.4 vs. 12.0 years). The eldest participating group (55-64 years) had the lowest mean of years of education (7.4 years), with a mean of 9.4 years of education for men and 5.9 years for women. Generally, women tended to have a slightly higher mean of education years up to the age of 34 years while men had apparently higher mean years of education above this age.

Table (14): Mean number of years of education of the participants

Age Group	Men		Women		Total	
	n	Mean	n	Mean	n	Mean
20-24	126	13.2	170	13.9	296	13.6
25-34	235	14.1	320	14.2	555	14.1
35-44	247	14.7	461	12.6	708	13.3
45-54	220	12.9	301	9.8	521	11.0
55-64	90	9.4	109	5.9	199	7.4
20-64	918	13.4	1361	12.0	2279	12.5

Table (15) and **Figures (14 &15)** show highest level of education achieved by the survey participants. Just more than a third of the studied sample (34.5%) had completed their intermediate school, while more than half (52.8%) had a higher level of education. Only 5.6% had no formal schooling and 2% spent some years in the primary school. The majority (92.4%) of the respondents held at least an educational certificate while the rest (7.6%) either had no formal school teaching (5.6%) or just only spent some years in the primary school (2.0%). More than a quarter (26.4%) held a university or higher certificate. Another quarter (26.4%) completed their high school education while about one third (34.5%) held an intermediate school certificate. Women tended to be less educated than men, where 10.6% of them did not hold any educational certificate compared with 3.0% of men. Those holding a primary or intermediate school certificate constituted 43.7% of men and 36.6% of women. More or less, similar proportions of men and women held higher school certificate (26.7% compared with 26.3%) or university or higher educational certificate (26.7% compared with 26.2%).

Table (15): Highest level of education achieved by the survey participants

Age Group	No formal schooling		Some primary schooling		Primary		Intermediate school		High school		College / university		Post-graduate degree	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Men														
20-24	0	0.0	0	0.0	1	0.8	66	52.4	43	34.1	16	12.7	0	0.0
25-34	0	0.0	0	0.0	6	2.6	84	35.7	82	34.9	52	22.1	11	4.7
35-44	0	0.0	0	0.0	2	0.8	93	37.7	66	26.7	66	26.7	20	8.1
45-54	5	2.3	2	0.9	13	5.9	89	40.5	47	21.4	50	22.7	14	6.4
55-64	12	13.3	8	8.9	14	15.6	33	36.7	7	7.8	8	8.9	8	8.9
20-64	17	1.9	10	1.1	36	3.9	365	39.8	245	26.7	192	20.9	53	5.8
Women														
20-24	0	0.0	1	0.6	4	2.4	56	32.9	65	38.2	44	25.9	0	0.0
25-34	2	0.6	2	0.6	12	3.8	78	24.4	110	34.4	112	35.0	4	1.3
35-44	18	3.9	10	2.2	23	5.0	164	35.6	104	22.6	132	28.6	10	2.2
45-54	50	16.6	14	4.7	25	8.3	96	31.9	70	23.3	40	13.3	6	2.0
55-64	39	35.8	9	8.3	16	14.7	27	24.8	9	8.3	8	7.3	1	0.9
20-64	109	8.0	36	2.6	80	5.7	421	30.9	358	26.3	336	24.7	21	1.5
Total														
20-24	0	0.0	1	0.3	5	1.7	122	41.2	108	36.5	60	20.3	0	0.0
25-34	2	0.4	2	0.4	18	3.2	162	29.2	192	34.6	164	29.5	15	2.7
35-44	18	2.5	10	1.4	25	3.5	257	36.3	170	24.0	198	28.0	30	4.2
45-54	55	10.6	16	3.1	38	7.3	185	35.5	117	22.5	90	17.3	20	3.8
55-64	51	25.6	17	8.5	30	15.1	60	30.2	16	8.0	16	8.0	9	4.5
20-64	126	5.6	46	2.0	116	5.1	786	34.5	603	26.4	528	23.2	74	3.2

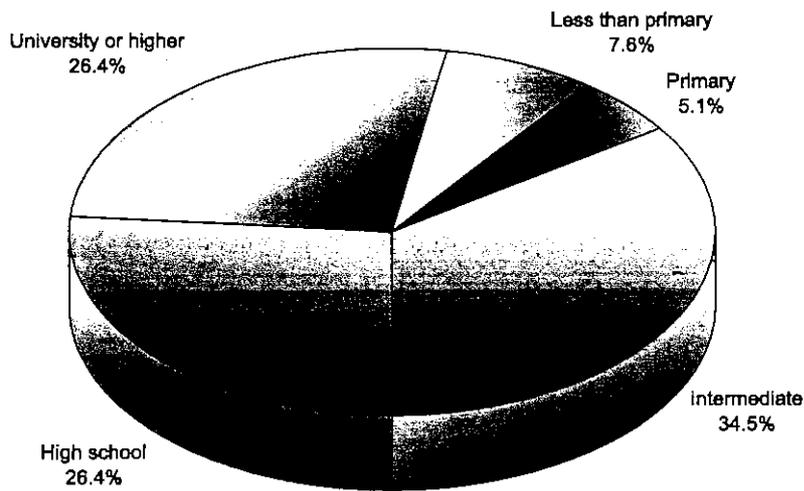


Figure (14): Education of the participants

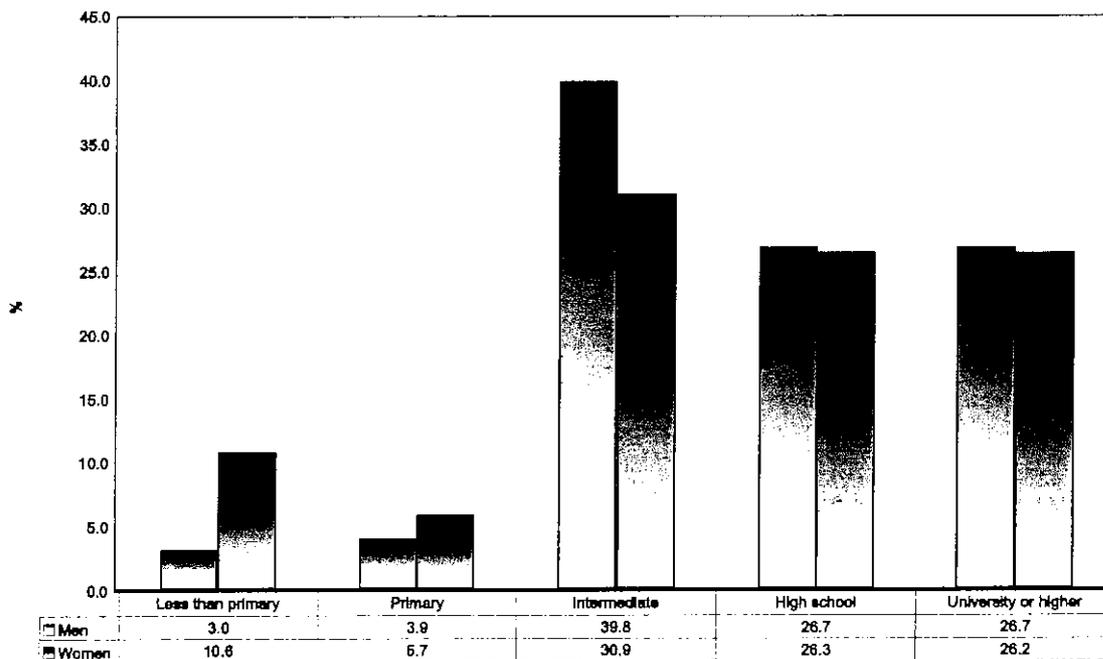


Figure (15): Distribution of participants by education and gender

6.1.1.5. Occupation

Table (16) and Figures (16 & 17) show the proportions of participants in paid employment and those who are unpaid. More than half the study sample (54.2%) were government employees, followed by those engaged in unpaid work (39.6%). Non-governmental employees (4.7%) and self-employed subjects (1.5%) were less represented. There were higher proportions of governmental, and non governmental employees as well as self employed men

(65.7%, 6.5% and 3.1% respectively) than women (46.5%, 3.4% and 0.4% respectively). On the contrary, women were substantially more engaged in unpaid work than men (49.6% compared with 24.7%).

Table (16): Proportion of participants in paid employment and those who are unpaid

Age Group	Governmental employee		Non-governmental employee		Self-employed		Unpaid	
	n	%	n	%	n	%	n	%
Men								
20-24	61	48.4	11	8.7	3	2.4	51	40.5
25-34	206	87.7	19	8.1	4	1.7	6	2.6
35-44	217	87.9	15	6.1	6	2.4	9	3.6
45-54	105	47.7	13	5.9	11	5.0	91	41.4
55-64	14	15.6	2	2.2	4	4.4	70	77.8
20-64	603	65.7	60	6.5	28	3.1	227	24.7
Women								
20-24	48	28.4	10	5.9	0	0.0	111	65.7
25-34	244	76.3	13	4.1	0	0.0	63	19.7
35-44	264	57.3	18	3.9	3	0.7	176	38.2
45-54	68	22.6	5	1.7	1	0.3	227	75.4
55-64	9	8.3	0	0.0	2	1.8	98	89.9
20-64	633	46.5	46	3.4	6	0.4	675	49.6
Total								
20-24	109	36.9	21	7.1	3	1.0	162	54.9
25-34	450	81.1	32	5.8	4	0.7	69	12.4
35-44	481	67.9	33	4.7	9	1.3	185	26.1
45-54	173	33.2	18	3.5	12	2.3	318	61.0
55-64	23	11.6	2	1.0	6	3.0	168	84.4
20-64	1236	54.2	106	4.7	34	1.5	902	39.6

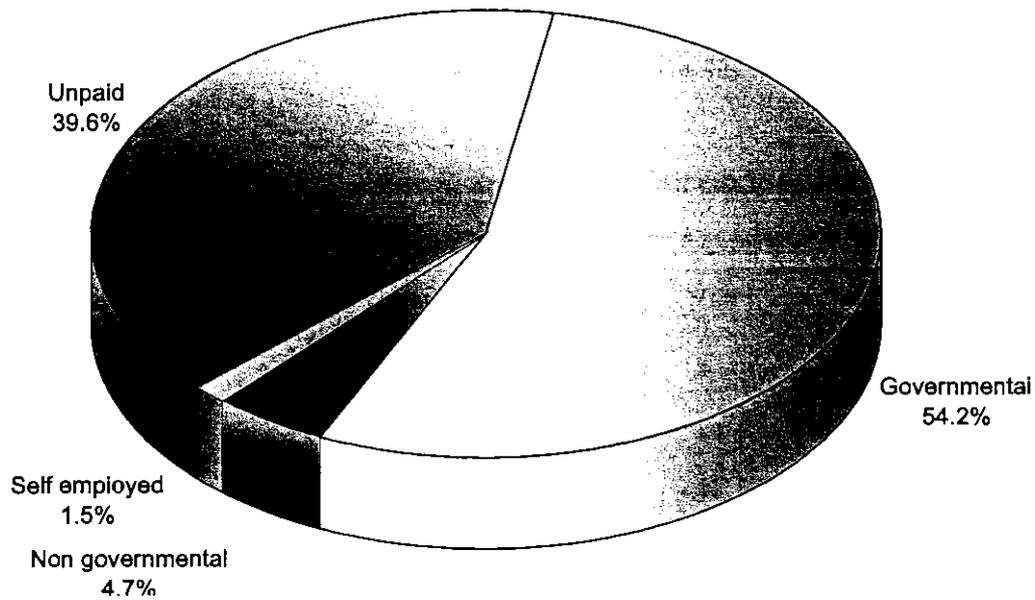


Figure (16): Occupation of participants

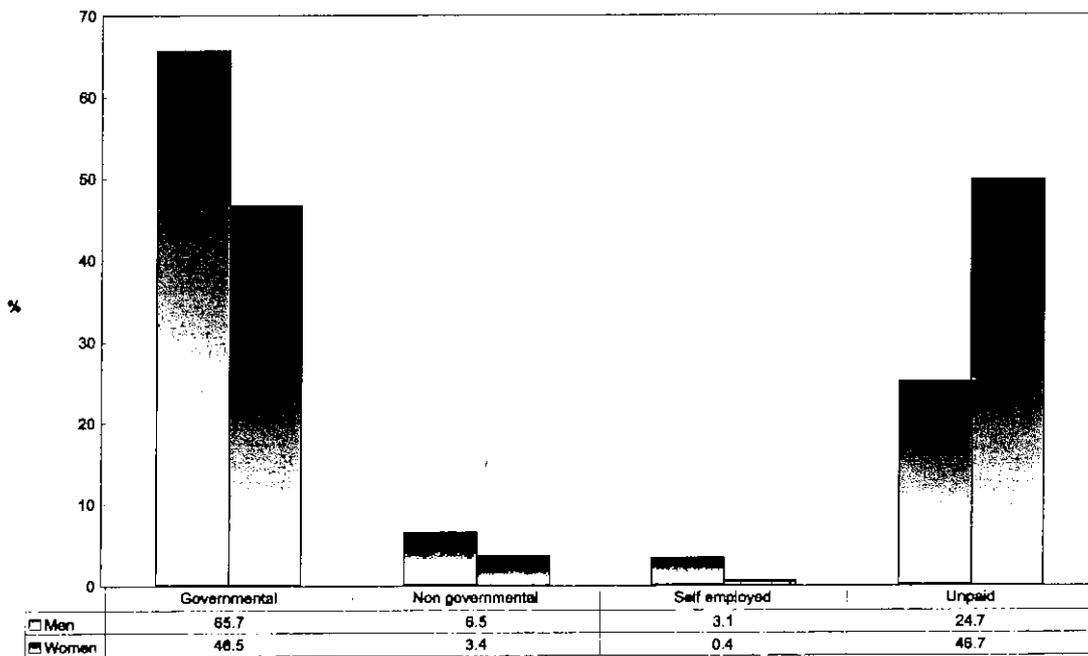


Figure (17): Distribution of the participants by occupation and gender

Table (17) shows distribution of participants engaged in unpaid work by type of work and age groups. About two-fifths (39.6%) had unpaid work. Out of those, 43.2% were homemakers while 36.0% were retired. Students constituted 13.5%, while unemployed formed 6.5%. More than half of the latter were able to work. Retired, students and unemployed whether able or unable to work were more likely encountered among men (70.5%, 17.2%,

6.6% and 4% respectively) than women (24.4%, 12.3%, 3.3% and 1.9% respectively). As expected, home makers were all women.

Table (17): Proportion of participants in unpaid work

Age Group	Non-paid		Student		Home-maker		Retired		Do not work Able to work		Do not work Not able to work	
	n	%	n	%	n	%	n	%	n	%	n	%
Men												
20-24	1	2.0	38	74.5	NA	---	1	2.0	9	17.6	2	3.9
25-34	0	0.0	0	0.0	NA	---	0	0.0	5	83.3	1	16.7
35-44	1	11.1	1	11.1	NA	---	6	66.7	1	11.1	0	0.0
45-54	1	1.1	0	0.0	NA	---	85	93.4	0	0.0	5	5.5
55-64	1	1.4	0	0.0	NA	---	68	97.1	0	0.0	1	1.4
20-64	4	1.8	39	17.2	NA	---	160	70.5	15	6.6	9	4.0
Women												
20-24	0	0.0	76	68.5	18	16.2	0	0.0	13	11.7	4	3.6
25-34	0	0.0	5	7.9	47	74.6	3	4.8	3	4.8	5	7.9
35-44	0	0.0	2	1.1	131	74.4	40	22.7	3	1.7	0	0.0
45-54	2	0.9	0	0.0	123	54.2	98	43.2	1	0.4	3	1.3
55-64	0	0.0	0	0.0	71	72.4	24	24.5	2	2.0	1	1.0
20-64	2	0.3	83	12.3	390	57.7	165	24.4	22	3.3	13	1.9
Total												
20-24	1	0.6	114	70.4	18	11.2	1	0.6	22	13.6	6	3.7
25-34	0	0.0	5	7.9	47	68.1	3	4.3	8	11.6	6	8.7
35-44	1	0.5	3	1.6	131	70.8	46	24.9	4	2.2	0	0.0
45-54	3	0.9	0	0.0	123	38.7	183	57.5	1	0.3	8	2.5
55-64	1	0.6	0	0.0	71	42.3	92	54.8	2	1.2	2	1.2
20-64	6	0.7	122	13.5	390	43.2	325	36.0	37	4.1	22	2.4

NA= Not Applicable.

6.1.1.6. Family income:

Table (18) and Figure (18) show monthly reported household earnings of participants in KD. Just less than a third of the study sample (31.3%) had monthly earnings of 500 to less than 1000 KD. The least proportion (6.4%) of the participants reported a monthly income of less than 500 KD. Nearly equal proportions (18.1% and 17.9%) reported earnings of 1500-1999 KD and 2000 or more KD monthly.

Table (18): Monthly reported household earnings of participants in KD

Age Group	< 500		500-999		1000-1499		1500-1999		2000+	
	n	%	n	%	n	%	n	%	n	%
20-24	23	8.5	89	32.8	61	22.5	36	13.3	62	22.9
25-34	25	4.6	182	33.4	165	30.3	83	15.2	90	16.5
35-44	32	4.6	186	26.6	210	30.0	160	22.9	112	16.0
45-54	38	7.5	156	30.8	105	20.7	109	21.5	99	19.5
55-64	25	12.9	82	42.3	40	20.6	13	6.7	34	17.5
20-64	143	6.4	695	31.3	581	26.2	401	18.1	397	17.9

6.1.1.7. Parent consanguinity:

Table (19) shows parent consanguinity. The overall parent consanguinity of the respondents was 27.9% being highest among the age group 35-44 years (31.5%) and least among 55-64 years group (24.4%). There was no specific trend for the frequency of consanguinity when the age group of the respondents was considered.

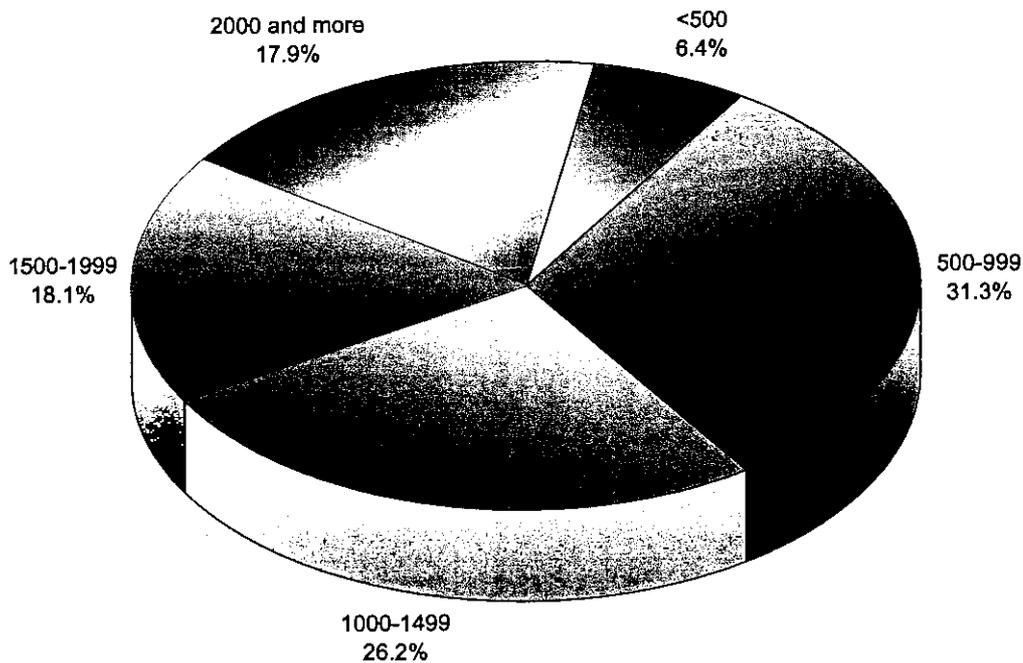
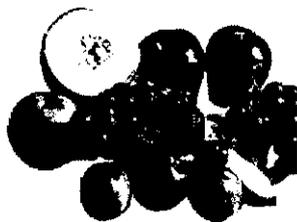


Figure (18): Monthly income of the participants in KD

Table (19): Parent consanguinity of survey participants

Age Group	Consanguine		Non consanguine	
	n	%	n	%
20-24	81	27.6	213	72.4
25-34	151	27.6	396	72.4
35-44	162	31.5	352	68.5
45-54	134	26.3	376	73.7
55-64	47	24.4	146	75.6
20-64	575	27.9	1483	72.1

STEP (1)
Behavioural Risk Factors



6.1.2. Behavioural measures:

6.1.2.1. Smoking status:

6.1.2.1.1. Current daily smoking:

In order to assess the prevalence of smoking habits in Kuwait, respondents were asked about their current and past status of smoking. Results showed that the prevalence of smoking was (23.6%). **Table (20)** shows distribution of the respondents according to smoking status. The proportion of smoking among men was nine folds that of women (42.3% vs. 4.4%). Men had higher proportions of smoking than women in all age groups. Regarding age specific smoking rate, it is noticed that the highest rate was among 20-24 years old (29.8%) followed by 25-34 years old subjects (27.1%). The overall prevalence of daily smoking was 20.6%, being substantially higher among men (37.8%) when compared with women (3.0%). There was a decreasing trend of the prevalence rate of daily smoking as the age advances among the whole sample, especially among men.

Figure (19) illustrates distribution of the study participants according to their smoking habit. **Figure (20)** depicts the percent prevalence of current smoking of the study participants according to gender and age groups.

Table (20): Smoking status of the study participants

Age Group	Current smokers						Does not smoke	
	Daily		Non-daily		Daily and non-daily			
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =315)		(n =32)		(n =347)		(n =558)	
20-24	43.9	(34.8 –52.9)	5.9	(1.6 –10.3)	49.8	(40.7 –58.9)	50.2	(41.1 –59.3)
25-34	43.2	(36.7–49.7)	5.8	(2.6–9.0)	49.0	(42.4 –55.6)	51.0	(44.4 –57.6)
35-44	37.1	(31.0–43.2)	3.0	(0.8 –5.3)	40.1	(33.9 –46.3)	59.9	(53.7 –66.1)
45-54	22.4	(16.9 –28.0)	2.9	(0.6 –5.2)	25.3	(19.5–31.1)	74.7	(68.9–80.5)
55-64	17.0	(9.1 –24.9)	0.0	-----	17.0	(9.1 –24.9)	83.0	(75.1 –90.9)
20-64	37.8	(34.1–41.4)	4.5	(2.8–6.1)	42.3	(38.6 –45.9)	57.7	(54.1–61.4)
Women	(n =39)		(n =16)		(n =55)		(n =1288)	
20-24	1.4	(0.0 –3.3)	2.2	(0.0 –4.7)	3.6	(0.5–6.7)	96.4	(93.3–99.5)
25-34	4.2	(1.8 –6.5)	1.0	(0.0 –2.2)	5.2	(2.6–7.7)	94.8	(92.3–97.4)
35-44	2.4	(1.0 –3.8)	1.4	(0.3 –2.6)	3.8	(2.0–5.6)	96.2	(94.4–98.0)
45-54	3.0	(1.1 –5.0)	0.7	(0.0 –1.6)	3.7	(1.6–5.8)	96.3	(94.2–98.4)
55-64	4.3	(0.5 –8.1)	1.9	(0.0 –4.5)	6.2	(1.7–10.7)	93.8	(89.3–98.3)
20-64	3.0	(2.0 –4.0)	1.4	(0.6 –2.1)	4.4	(3.2–5.6)	95.6	(94.4 –96.8)
Total	(n =354)		(n =48)		(n =402)		(n =1846)	
20-24	25.1	(19.7 –31.3)	4.3	(1.6 –7.0)	29.8	(23.8 –35.8)	70.2	(64.2 –76.2)
25-34	23.7	(19.9 –27.6)	3.4	(1.7 –5.1)	27.1	(23.2 –31.1)	72.9	(68.9 –76.8)
35-44	20.1	(16.7 –23.6)	2.2	(1.0 –3.5)	22.4	(18.8 –25.9)	77.6	(74.1 –81.2)
45-54	11.8	(9.0 –14.7)	1.7	(0.5 –2.8)	13.5	(10.5 –16.6)	86.5	(83.4 –89.5)
55-64	9.5	(5.5 –13.4)	1.1	(0.0–2.7)	10.6	(6.3 –14.8)	89.4	(85.2 –93.7)
20-64	20.6	(18.5 –22.7)	2.9	(2.0 –3.8)	23.6	(21.4 –25.7)	76.4	(74.3 –78.6)

Age
1.8

Age
1.2

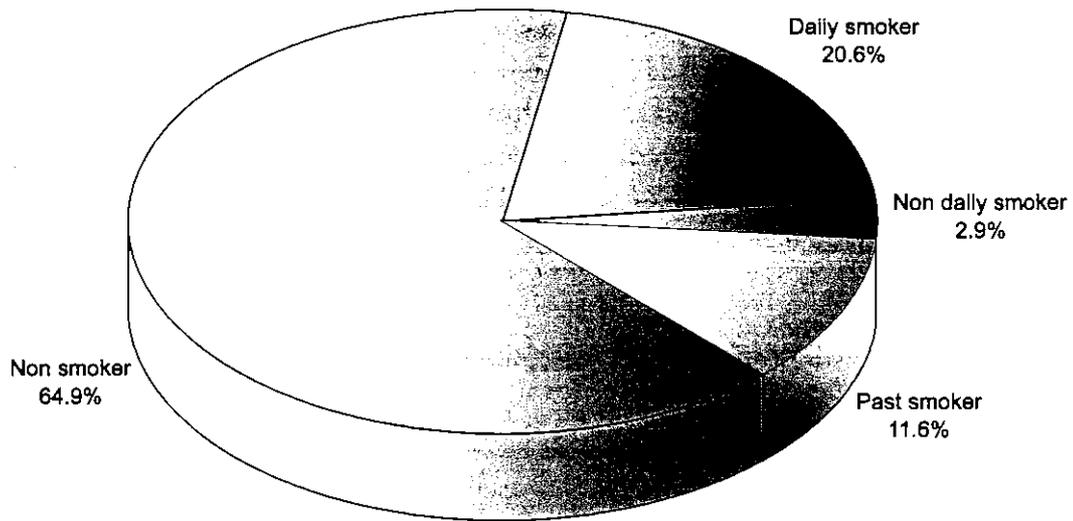


Figure (19): Smoking habits of the participants

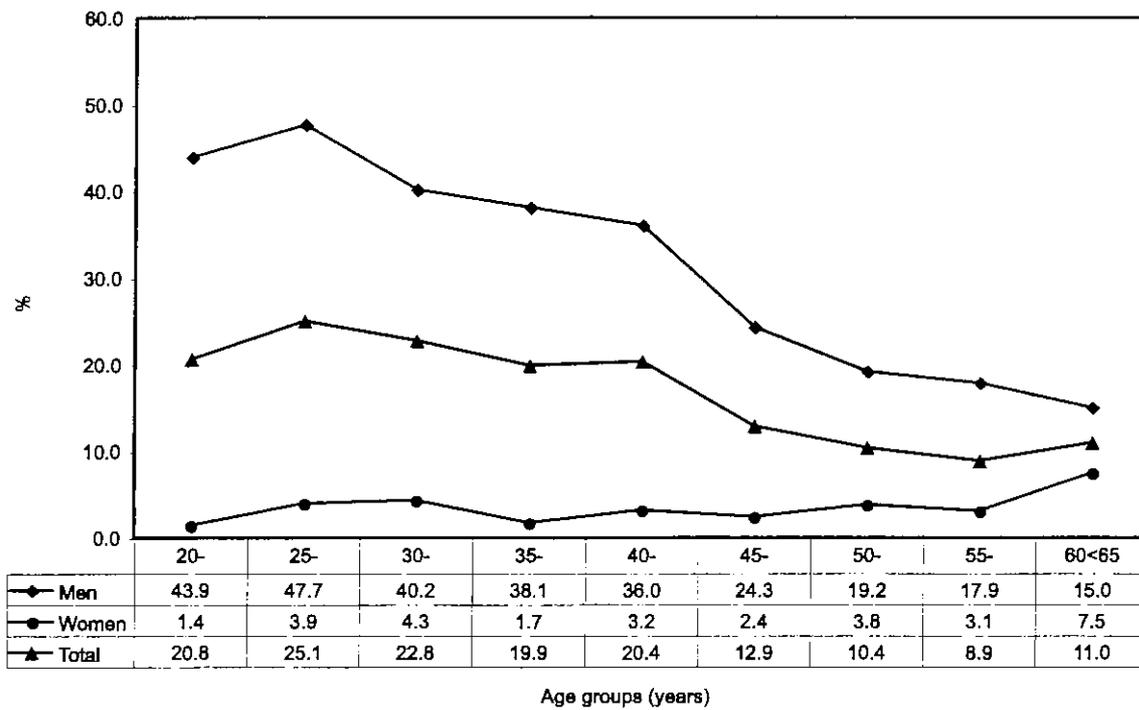


Figure (20): Prevalence of current daily smoking of the participants by gender and age groups

Table (21) shows percentage of smokers using manufactured cigarettes (among daily smokers). The proportion who smoked manufactured cigarettes was 85.0% of the daily smokers. Men tended to use manufactured cigarettes more than women (86.0% compared with 72.3%). These cigarettes were more commonly daily smoked by those in the extremes of age (90.9% at the age group 20-24 years and 85.7% at 55-64 years). The same trend can be observed for both men and women.

Table (21): Percentage of smokers using manufactured cigarettes (among daily smokers)

Age Group	Men (n=264)		Women (n=28)		Total (n=292)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
20-24	90.7	(83.2–98.2)	100	(100–100)	90.9	(83.6–98.3)
25-34	86.0	(79.3–92.7)	59.2	(30.1– 88.3)	83.7	(76.9–90.4)
35-44	80.2	(71.9–88.5)	82.0	(58.3 –100)	80.3	(72.3– 88.2)
45-54	84.6	(74.6 –94.7)	66.3	(33.9–98.7)	82.1	(72.3–91.9)
55-64	85.1	(68.4 –100)	87.6	(62.6–100)	85.7	(72.0–99.5)
20-64	86.0	(82.0 –90.0)	72.3	(56.6 –88.0)	85.0	(81.1 –88.9)

Table (22) shows percentage of current daily smokers among smokers. The majority (87.5%) were daily smokers with higher proportions among men than women (89.4% compared with 68.4%). Although the lowest rates of daily smoking were among the youngest age groups (88.1% for men and 38.7% for women) yet, no clear pattern could be demonstrated by age for either men or women.

Table (22): Percentage of current daily smokers among smokers

Age Group	Current daily smokers		Non-daily smokers	
	%	(95% CI)	%	(95% CI)
Men	(n =315)		(n =32)	
20-24	88.1	(79.6–96.5)	11.9	(3.4 –20.4)
25-34	88.2	(81.8 –94.4)	11.8	(5.5–18.1)
35-44	92.4	(86.9–97.9)	7.6	(2.1 –13.1)
45-54	88.6	(80.0 –97.2)	11.4	(2.8 –20.0)
55-64	100.0	-----	0.0	-----
20-64	89.4	(85.6–93.2)	10.6	(6.8–14.4)
Women	(n =39)		(n =16)	
20-24	38.7	(0.0–82.5)	61.4	(17.5–100)
25-34	80.4	(59.7 –100)	19.6	(0.0 –40.3)
35-44	62.8	(38.8–86.8)	37.2	(13.2 –61.2)
45-54	81.8	(58.3 –100)	18.2	(0.0 –41.7)
55-64	69.7	(33.7 –100)	30.3	(0.0 –66.2)
20-64	68.4	(54.1 –82.6)	31.6	(17.4 –45.9)
Total	(n =354)		(n =48)	
20-24	85.5	(76.9 –94.1)	14.5	(5.9 –23.1)
25-34	87.4	(81.4 –93.4)	12.6	(6.6 –18.6)
35-44	90.0	(84.4 –95.5)	10.0	(4.5 –15.6)
45-54	87.6	(79.5 –95.7)	12.4	(4.3 –20.5)
55-64	89.4	(75.6 –100)	10.6	(0.0 –24.4)
20-64	87.5	(83.8 –91.2)	12.5	(8.8 –16.2)

Table (23) shows mean amount of tobacco used by daily smokers by type. The overall mean number of manufactured cigarettes used by the daily smokers was 22.1 cigarettes/day, being slightly higher among women than among men (23.4% vs. 22.0%). However, there was an ascending trend of the mean number of manufactured cigarettes used as the age advances. This was evident among men in particular. On the overage, 5.2 hand rolled ciarettes were smoked perday. Men tended to smoke this type of cigarettes more than women (20.0 compared with 12.4 cigarettes per day). This type of cigarettes was only smoked by men in the age group 55-64 years and women at the age group 35-44 years. The overall mean number of shisha stones used was 3.1 store day. Men used more shisha stones than women (3.3 vs. 1.9 shisha stone/day). Overall, 84.0% of the current daily smokers consumed manufactured cigarettes, 16.6% smoked shisha, while only 0.9% smoked other types of tobacco as revealed in **Figure (21)**.

Table (23): Mean amount of tobacco used by daily smokers by type

Age Group	Manufactured cigarettes		Hand-rolled cigarettes		Pipes of tobacco		Shisha	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Men	(n =264)		(n =1)		(n = 0)		(n = 55)	
20-24	20.5	(17.3 –23.7)	0.0	-----	0.0	-----	2.9	(1.1 –4.6)
25-34	21.2	(19.0 –23.4)	0.0	-----	0.0	-----	3.7	(2.2 –5.2)
35-44	23.1	(20.0 –26.2)	0.0	-----	0.0	-----	3.3	(1.8 –4.8)
45-54	26.8	(21.7 –32.0)	20.0	-----	0.0	-----	2.7	(1.6 –3.8)
55-64	30.5	(21.3 –39.6)	0.0	-----	0.0	-----	1.5	(0.9 –2.2)
20-64	22.0	(20.4 –23.6)	20.0	-----	0.0	-----	3.3	(2.4 –4.1)
Women	(n =28)		(n =2)		(n =1)		(n =11)	
20-24	12.5	(1.4–23.6)	0.0	-----	0.0	-----	3.0	-----
25-34	29.4	(12.6–46.3)	0.0	-----	20.0	-----	1.7	(0.8–2.7)
35-44	23.9	(13.5–34.3)	15.0	-----	0.0	-----	1.0	-----
45-54	24.5	(7.5–41.6)	0.0	-----	0.0	-----	1.7	(0.8–2.7)
55-64	17.8	(8.8–26.8)	10.0	-----	0.0	-----		(–)
20-64	23.4	(15.7 –31.1)	12.4	(7.9 –17.1)	20.0	-----	1.9	(1.1– 2.6)
Total	(n =292)		(n =3)		(n =1)		(n = 66)	
20-24	20.3	(17.1 –23.4)	0.0	-----	0.0	-----	2.9	(1.3 –4.1)
25-34	21.7	(19.4 –24.1)	0.0	-----	20.0	-----	3.4	(2.1 –4.6)
35-44	23.1	(20.1 –26.1)	15.0	-----	0.0	-----	3.2	(1.8 –4.6)
45-54	26.6	(21.6 –31.5)	20.0	-----	0.0	-----	2.3	(1.5 –3.2)
55-64	26.9	(19.4 –34.4)	10.0	-----	0.0	-----	1.5	(0.9–2.1)
20-64	22.1	(20.6 –23.6)	15.2	(2.5 –28.0)	20.0	-----	3.1	(2.4 –3.8)

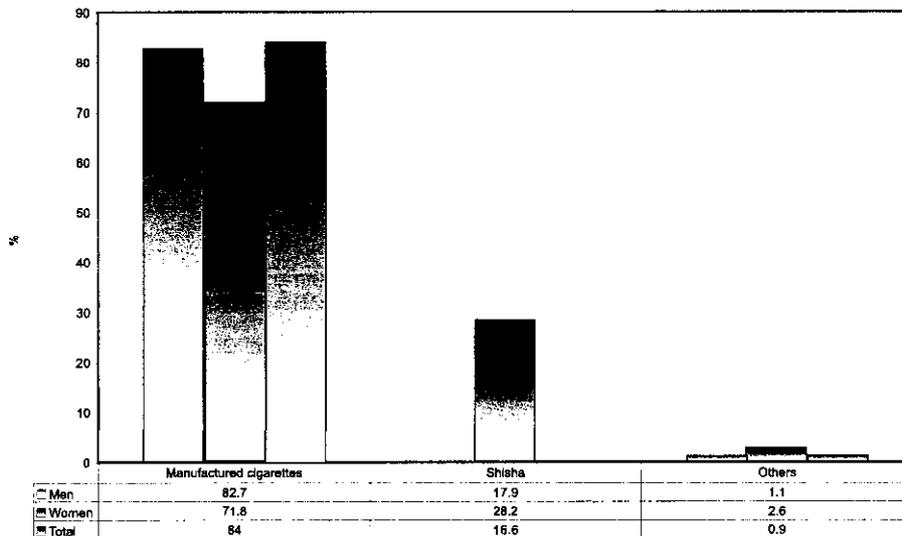


Figure (21): Distribution of Current smokers by type of smoking and gender

Figure (22) illustrates the distribution of daily smokers according to number of cigarettes smoked per day and gender. Among the current daily smokers, just less than half (47.3%) were smoking 11-20 cigarettes/day. One third (33.4%) were used to smoke more than 20 cigarettes/day. The rest (19.3%) were used to smoke 1-10 cigarettes/day. The number of daily smoked cigarettes varied by gender; about half of men (48.5%) were used to smoke 11-20 cigarettes/day, while only 35.7% of women used to smoke the same number of cigarettes/day. However the percentages of women who were used to smoke 1-10 cigarettes/day or more than 20 cigarettes/day were more than those of men (28.6% and 35.7% compared with 18.3% and 33.2%, respectively).

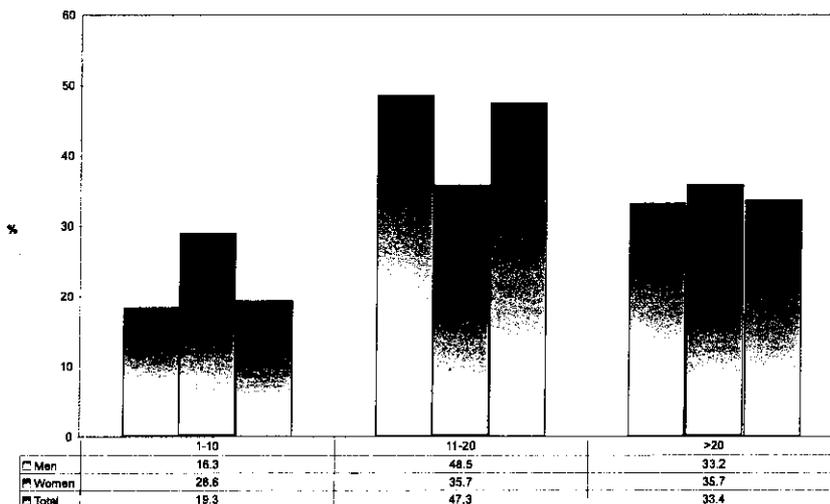


Figure (22): Distribution of daily smokers by number of daily smoked cigarettes and gender

Table (24) and **Figure (23)** show average age of initiation and duration, in years, of smoking among current daily smokers. The overall mean age at first smoking among current daily smokers was 18.5 years. It was noticed that those below 35 years of age started smoking at earlier ages than their older counterparts i.e. 35 years and over. Men started smoking at earlier ages than women (18.1 vs. 23.1 years), even when different age groups were considered.

Concerning the duration of smoking, the overall mean duration was 13.8 years. However, the mean smoking duration of women was higher than that of men (15.1 vs. 13.7 years).

Table (24): Average age of initiation and duration, in years, of smoking among current daily smokers

Age Group	Age started smoking (mean age)		Years of smoking (mean duration)	
	Mean	(95% CI)	Mean	(95% CI)
Men	(n =315)		(n =315)	
20-24	15.9	(15.2 –16.6)	6.5	(5.7 –7.4)
25-34	17.2	(16.5 –18.0)	12.5	(11.6 –13.4)
35-44	20.9	(19.6 –22.2)	18.6	(17.4 –19.9)
45-54	21.9	(19.6 –24.3)	26.5	(24.0 –29.0)
55-64	22.3	(17.0 –27.5)	35.6	(30.2 –41.1)
20-64	18.1	(17.6 –18.7)	13.7	(12.7 –14.7)
Women	(n =39)		(n =39)	
20-24	20.0	(15.6 –24.4)	3.0	(0.0 –7.4)
25-34	23.2	(20.3 –26.1)	7.5	(4.7 –10.2)
35-44	24.5	(20.1 –28.9)	15.6	(10.5 –20.6)
45-54	23.2	(16.6 –29.8)	26.7	(19.6 –33.8)
55-64	23.4	(16.0 –30.7)	35.0	(28.3 –41.6)
20-64	23.1	(21.0 –25.3)	15.1	(10.8 –19.4)
Total	(n =354)		(n =354)	
20-24	16.0	(15.3 –16.7)	6.4	(5.6 –7.3)
25-34	17.8	(17.0 –18.5)	12.1	(11.2 –13.0)
35-44	21.1	(19.8 –22.3)	18.4	(17.2 –19.7)
45-54	22.1	(19.9 –24.3)	26.5	(24.2 –28.9)
55-64	22.6	(18.3 –26.8)	35.5	(31.1 –39.8)
20-64	18.5	(17.9 –19.1)	13.8	(12.9 –14.7)

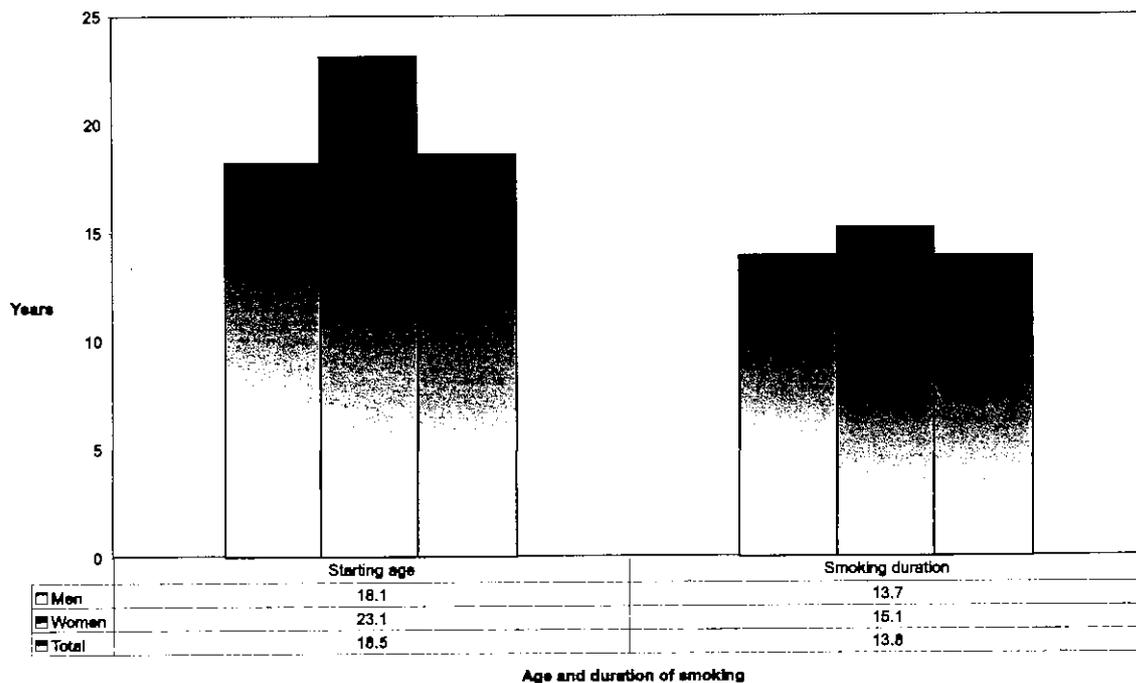


Figure (23): Mean age of initiation and duration, in years, of smoking among current daily smokers

6.1.2.1.2. Ex daily smoking:

Table (25) shows percentage of ex-daily smokers and the mean duration, in years, since they quit daily smoking. The overall proportion of ex-daily smokers was 11.6%. A higher proportion of men was observed in comparison with women (27.4 vs. 1.5%) even for the different age groups. There was almost an increasing trend of proportion of ex-smoking as the age advances after the age of 25 years. The percentage of ex-smokers according to age group and gender is illustrated in Figure (24).

Concerning the duration since quitting daily smoking, it was found that the overall mean duration was 7.4 years, with gender difference (7.6 years for men and 6.0 years for women). An increasing trend in the mean duration of quitting daily smoking was noticed as the age advances for both genders.

Table (25): Percentage of ex daily smokers among participants and the mean duration of quitting daily smoking (in years)

Age Group	Ex daily smokers		Time since cessation (mean duration in years)	
	%	(95% CI)	Mean	(95% CI)
Men	(n =180)		(n =177)	
20-24	21.4	(11.6–31.2)	1.8	(1.0–2.6)
25-34	21.0	(14.0 –28.0)	5.2	(3.7–6.7)
35-44	32.5	(25.0 –40.1)	7.2	(5.5–8.8)
45-54	31.2	(24.1–38.4)	12.2	(9.4–15.0)
55-64	44.8	(33.3 –56.3)	13.4	(10.5–16.2)
20-64	27.4	(23.5 –31.4)	7.6	(6.4 –8.7)
Women	(n =20)		(n =20)	
20-24	1.2	(0.0–2.8)	0.5	(0.0–1.3)
25-34	1.0	(0.0–2.2)	1.0	(–)
35-44	0.7	(0.0 –1.5)	2.2	(0.0–4.5)
45-54	2.9	(1.0–4.9)	9.7	(3.9–15.5)
55-64	2.9	(0.0–6.4)	13.7	(0.0–28.4)
20-64	1.5	(0.8 –2.1)	6.0	(1.6 –10.4)
Total	(n =200)		(n =197)	
20-24	9.5	(5.1 –13.8)	1.7	(0.9–2.5)
25-34	8.4	(5.6–11.3)	4.9	(3.5–6.3)
35-44	13.4	(10.1 –16.8)	7.0	(5.4–8.7)
45-54	14.1	(10.8 –17.4)	11.9	(9.3–14.5)
55-64	18.7	(13.1 –24.4)	13.4	(10.5–16.3)
20-64	11.6	(9.9 –13.3)	7.4	(3.9–8.0)

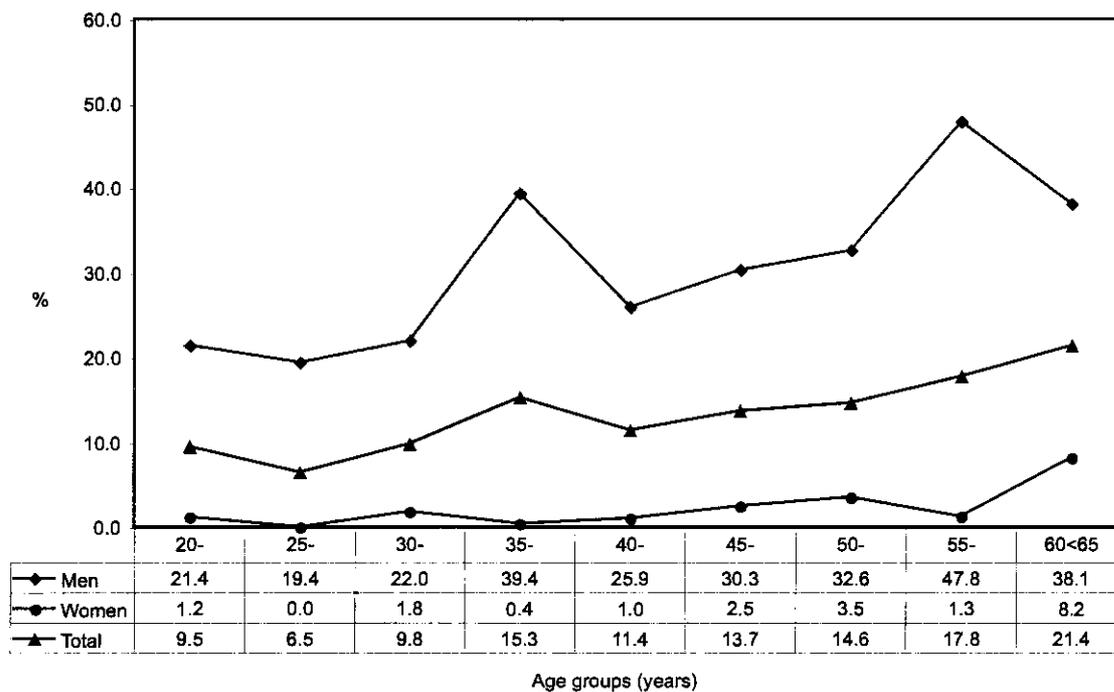


Figure (24): Percentage of ex-daily smokers by age group and gender

Table (26) shows mean amount of tobacco used by ex-smokers by type. The overall mean number of manufactured cigarettes used by the ex-smokers was 24.4 cigarettes/day. Men had a higher mean number than women (25.2 vs. 11.8 cigarettes/day). There was an ascending trend of the mean number of manufactured cigarettes used as the age advances, particularly among men. The overall mean number of shisha stones used was 2.0 store day. Men smoked more shisha stones than their women counterparts (2.1 vs. 1.4 shisha stones/day).

Table (26): Mean amount and type of tobacco used by ex-daily smokers

Age Group	Manufactured cigarettes		Hand-rolled cigarettes		Pipes of tobacco		Shisha	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Men	(n = 164)		(n = 0)		(n = 3)		(n = 27)	
20-24	15.6	(15.3-15.8)	0.0	-----	20.0	(20.0-20.0)	2.2	(2.2-2.3)
25-34	23.6	(23.2-24.1)	0.0	-----	0.0	-----	2.0	(2.0-2.1)
35-44	26.1	(25.7-26.5)	0.0	-----	26.4	(25.8-27.1)	2.0	(1.9-2.1)
45-54	28.4	(27.7-29.0)	0.0	-----	0.0	-----	2.0	(1.9-2.0)
55-64	30.2	(29.5-31.0)	0.0	-----	0.0	-----	2.1	(2.1-2.2)
20-64	25.2	(24.9-25.4)	0.0	-----	23.5	(23.0-23.9)	2.1	
Women	(n = 13)		(n = 0)		(n = 0)		(n = 6)	
20-24	3.0	(3.0-3.0)	0.0	-----	0.0	-----	2.0	(2.0-2.0)
25-34	22.2	(21.1-23.3)	0.0	-----	0.0	-----	0.0	-----
35-44	14.6	(13.6-15.5)	0.0	-----	0.0	-----	1.0	(1.0-1.0)
45-54	7.5	(6.8-8.1)	0.0	-----	0.0	-----	1.3	(1.3-1.4)
55-64	5.0	(5.0-5.0)	0.0	-----	0.0	-----	1.0	(1.0-1.0)
20-64	11.8	(11.3-12.4)	0.0	-----	-----	-----	1.4	
Total	(n = 177)		(n = 0)		(n = 3)		(n = 33)	
20-24	14.8	(14.6-15.1)	0.0	-----	20.0	(20.0-20.0)	2.2	(2.1-2.3)
25-34	23.5	(23.1-24.0)	0.0	-----	0.0	-----	2.0	(2.0-2.1)
35-44	25.9	(25.4-26.3)	0.0	-----	26.4	(25.8-27.1)	1.9	(1.8-2.0)
45-54	26.7	(26.1-27.4)	0.0	-----	0.0	-----	1.8	(1.7-1.8)
55-64	28.5	(27.8-29.2)	0.0	-----	0.0	-----	1.8	(1.8-1.9)
20-64	24.4	(24.2-24.6)	0.0	-----	23.5	(23.0-23.9)	2.0	(2.0-2.1)

Table (27) shows average age of initiation and quitting, in years, of smoking among past smokers. The overall mean age of initiating smoking was 18.3 years, being lower among men than among women (17.9 and 23.3 years). It was observed that there was an increasing trend between mean age of initiation of smoking and age among men. Regarding the age of stopping of smoking, the overall mean age was 31.5 years. Ex-smoker men quit the habit at an earlier age than women (31.2 vs. 35.5 years). An ascending trend was observed with age progress in both genders. The mean age of initiation and quitting, in years, of smoking among past smokers is demonstrated in Figure (25).

Table (27): Average age of initiation and duration, in years, of ex smokers

Age Group	Age started smoking (mean age)		Age stopped smoking (mean age)	
	Mean	(95% CI)	Mean	(95% CI)
Men	(n = 180)		(n = 177)	
20-24	17.3	(17.3–17.4)	20.0	(19.9–20.0)
25-34	17.5	(17.4–17.6)	25.6	(25.5–25.7)
35-44	17.2	(17.1–17.3)	31.8	(31.7–31.9)
45-54	18.3	(18.1–18.5)	37.0	(36.7–37.3)
55-64	19.8	(19.5–20.0)	45.2	(44.9–45.5)
20-64	17.9	(17.8–17.9)	31.2	(31.0–31.3)
Women	(n = 20)		(n = 20)	
20-24	20.5	(20.5–20.6)	22.5	(22.5–22.6)
25-34	28.3	(28.2–28.4)	30.7	(30.5–30.8)
35-44	21.8	(21.5–22.2)	38.4	(38.3–38.6)
45-54	23.1	(22.5–23.8)	39.7	(38.9–40.5)
55-64	21.7	(21.4–21.9)	46.0	(44.9–47.1)
20-64	23.3	(23.1–23.5)	35.5	(35.1–36.0)
Total	(n = 200)		(n = 197)	
20-24	17.6	(17.5–17.6)	20.2	(20.1–20.2)
25-34	18.3	(18.2–18.5)	26.0	(25.9–26.1)
35-44	17.4	(17.3–17.4)	32.0	(31.9–32.2)
45-54	18.9	(18.7–19.1)	37.4	(37.1–37.6)
55-64	19.9	(19.7–20.1)	45.3	(45.0–45.5)
20-64	18.3	(18.2–18.3)	31.5	(31.4–31.7)

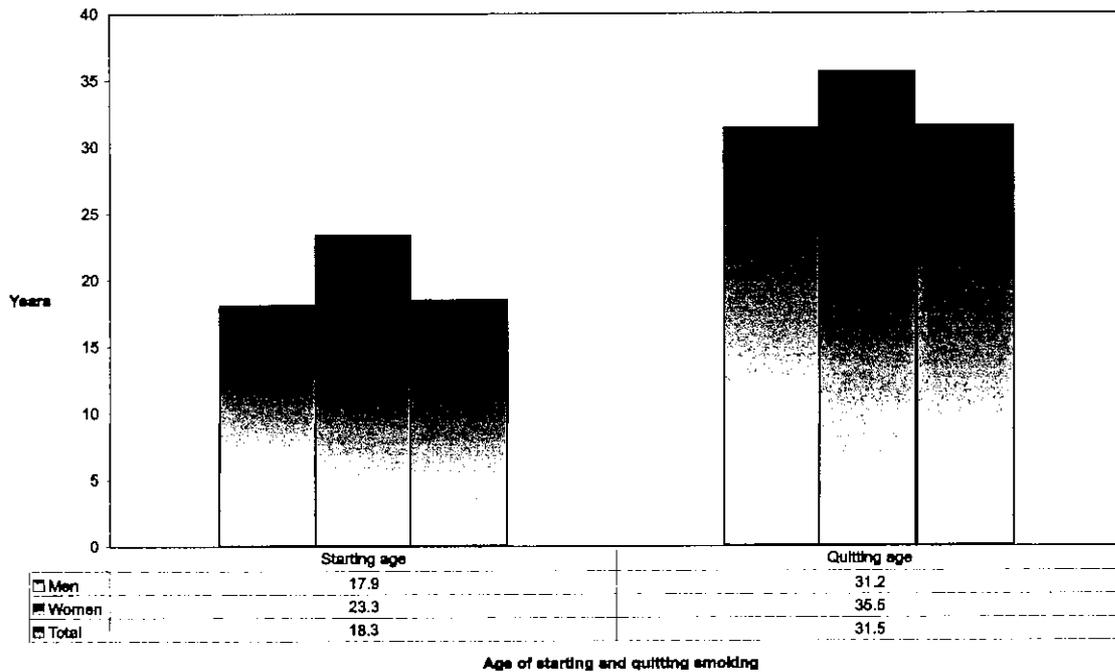


Figure (25): Mean age of initiation and quitting, in years, of smoking among past smokers

6.1.2.2. Alcohol consumption:

6.1.2.2.1. Prevalence of alcohol consumption:

Table (28) shows alcohol consumption status of the participants. It was found that the overall prevalence of drinking alcohol in the last 12 months was 2.7%. The prevalence among men was higher than that among women by around 26 folds (5.1 vs. 0.2%, respectively). It is noted that drinkers of the past year continued to drink during the previous month. The prevalence rates of alcohol consumption status of the participants by age group and gender are illustrated in Figure (26).

Table (28): Alcohol consumption status of the participants

Age Group	Current drinker (last 30 days)		Drank alcohol in last 12 months		Abstainer	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =48)		(n =48)		(n =854)	
20-24	3.2	(0.0-6.3)	3.2	(0.0-6.3)	96.8	(93.7-100)
25-34	8.4	(4.8-11.9)	8.4	(4.8-11.9)	91.6	(88.1-95.2)
35-44	3.6	(1.2-5.9)	3.6	(1.2-5.9)	96.4	(94.0-98.8)
45-54	4.6	(1.8-7.4)	4.6	(1.8-7.4)	95.4	(92.6-98.2)
55-64	4.6	(0.0-9.2)	4.6	(0.1-9.2)	95.4	(90.8-99.9)
20-64	5.1	(3.6-6.7)	5.1	(3.6-6.7)	94.9	(93.3-96.4)
Women	(n =3)		(n =3)		(n =1340)	
20-24	0.0	-----	0.0	-----	100	(100-100)
25-34	0.0	-----	0.0	-----	100	(100-100)
35-44	0.4	(0.0-1.1)	0.4	(0.0-1.1)	99.6	(98.9-100)
45-54	0.0	-----	0.0	-----	100	(100-100)
55-64	0.9	(0.0-2.8)	0.9	(0.0-2.8)	99.0	(97.2-100)
20-64	0.2	(0.0-0.4)	0.2	(0.0-0.4)	99.8	(99.6-100)
Total	(n =51)		(n =51)		(n =2194)	
20-24	1.8	(0.0-3.6)	1.8	(0.0-3.6)	98.2	(96.4-100)
25-34	4.2	(2.4-6.0)	4.2	(2.4-6.0)	95.8	(94.0-97.6)
35-44	2.0	(0.8-3.3)	2.0	(0.8-3.3)	98.0	(96.7-99.2)
45-54	2.1	(0.8-3.4)	2.1	(0.8-3.4)	97.9	(96.6-99.2)
55-64	2.4	(0.3-4.6)	2.4	(0.3-4.6)	97.6	(95.4-99.7)
20-64	2.7	(1.9-3.5)	2.7	(1.9-3.5)	97.3	(96.5-98.1)

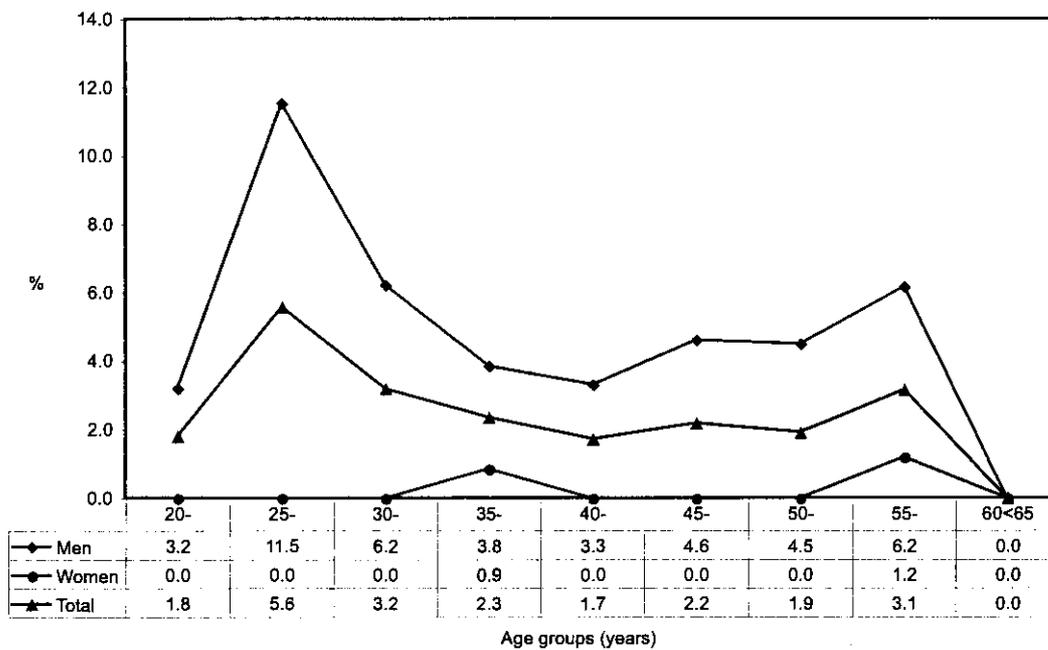


Figure (26): Prevalence rates of alcohol consumption of the participants by age group and gender

6.1.2.2.2. Number of standard drinks consumed per day:

Table (29) shows mean number of standard drinks consumed by current drinkers during the last 7 days. The overall mean number of drinks was 7 cups. Men had a higher mean number of drinks than women by more than 6 folds (7.5 vs. 1.2 cups). No substantial differences of the consumed drinks were observed among different age groups.

Table (29): Mean number of standard drinks consumed by current drinkers during the last 7 days

Age Group	Men (n= 25)		Women (n= 3)		Total (n= 28)	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
20-24	9.5	(2.3-16.6)	0.0	-----	9.5	(2.4-16.6)
25-34	9.4	(2.8-16.0)	0.0	-----	9.4	(2.9-15.9)
35-44	0.8	(0.0-1.8)	0.4	(0.0-2.3)	0.8	(0.0-1.6)
45-54	6.1	(1.8-10.4)	0.0	-----	6.1	(1.8-10.4)
55-64	9.0	-----	2.0	(0.0-3.8)	5.6	(0.4-10.7)
20-64	7.5	(3.5-11.4)	1.2	(0.0-3.8)	7.0	(3.3-10.8)

Table (30) shows number of standard drinks consumed per day and distribution of participants by number of drinks. The overall mean number of drinks consumed was four standard drinks/day. The mean number of drinks consumed was higher among men than among women (4.1 vs. 1.3 drinks/day).

Table (30): Number of standard drinks consumed per day

Age Group	1		2-3		4-5		6+		Mean	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	Mean	(95% CI)
Men	(n =4)		(n =14)		(n =7)		(n =2)		(n =27)	
20-24	0.0	-----	32.1	(32.5 -96.6)	67.9	(3.4 -100)	0.0	-----	4.4	(3.1 -5.6)
25-34	15.1	(0.0 -36.6)	35.9	(6.6 -65.3)	28.7	(0.0 -58.6)	20.2	(0.0 -46.6)	5.2	(1.5 -8.9)
35-44	43.0	(0.0 -90.4)	57.0	(9.5 -100)	0.0	-----	0.0	-----	1.9	(2.0 -2.8)
45-54	0.0	-----	56.3	(17.0 -95.7)	43.7	(4.3 -83.0)	0.0	-----	2.8	(1.7 -4.0)
55-64	0.0	-----	100	-----	0.0	-----	0.0	-----	3.0	(1.7 -4.2)
20-64	14.7	(0.0 -29.4)	43.8	(22.0 -65.4)	31.0	(8.4 -53.7)	10.5	(0.0 -25.2)	4.1	(2.1 -6.1)
Women	(n =0)		(n =1)		(n =0)		(n =0)		(n =1)	
20-24	0.0	-----	0.0	-----	0.0	-----	0.0	-----	0.0	-----
25-34	0.0	-----	0.0	-----	0.0	-----	0.0	-----	0.0	-----
35-44	0.0	-----	0.0	-----	0.0	-----	0.0	-----	0.0	-----
45-54	0.0	-----	0.0	-----	0.0	-----	0.0	-----	2.0	-----
55-64	0.0	-----	100	-----	0.0	-----	0.0	-----	0.0	-----
20-64	0.0	-----	100	-----	0.0	-----	0.0	-----	1.3	(0.0 -3.0)
Total	(n =4)		(n =15)		(n =7)		(n =2)		(n =28)	
20-24	0.0	-----	32.1	(32.3 -96.5)	67.9	(3.5 -100)	0.0	-----	4.4	(3.1 -5.6)
25-34	16.0	(0.0 -36.6)	35.9	(6.7 -65.2)	28.7	(0.0 -58.5)	20.2	(0.0 -46.5)	5.2	(1.5 -8.9)
35-44	43.0	(0.0 -90.3)	57.0	(9.7 -100)	0.0	-----	0.0	-----	1.7	(0.9 -2.6)
45-54	0.0	-----	56.3	(17.1 -95.6)	43.7	(4.4 -82.9)	0.0	-----	2.8	(1.7 -4.0)
55-64	0.0	-----	100	-----	0.0	-----	0.0	-----	2.5	(1.8 -3.2)
20-64	14.2	(0.0 -28.5)	45.5	(24.0 -66.8)	30.1	(8.0 -52.2)	10.2	(0.0 -24.4)	4.0	(2.1 -5.9)

6.1.2.2.3. Frequency of alcohol consumption:

Table (31) shows frequency of alcohol consumption in the last year. There was no daily alcohol consumption in the last year. About 70.6% of the drinkers consumed alcohol less than once a month, followed by 1-3 days per month (15.4%), then 5-6 days/week (11.1%). All women who consumed alcohol in the last year were at low frequency (i.e. less than once/month). Among alcoholic men, two-thirds consumed alcohol less than once/month (69.5%), followed by 1-3 days/month (16%). About one tenth (11.5%) of men consumed alcohol 5-6 days/week.

Table (31): Frequency of alcohol consumption in the last year

Age Group	Daily		5-6 days per/wk		1-4 days per/wk		1-3 days per/month		< once a month	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =0)		(n =4)		(n =2)		(n =10)		(n =32)	
20-24	0.0	-----	40.7	(0.0-90.7)	0.0	-----	0.0	-----	59.3	(9.3-100)
25-34	0.0	-----	5.7	(0.0-17.0)	3.0	(0.0-9.2)	13.9	(0.0-29.6)	77.3	(58.4-96.2)
35-44	0.0	-----	11.0	(0.0-32.2)	0.0	-----	18.2	(0.0-43.3)	70.8	(40.4-100)
45-54	0.0	-----	0.0	-----	0.0	-----	39.1	(7.8-70.3)	60.9	(29.7-92.2)
55-64	0.0	-----	0.0	-----	26.4	(0.0-72.5)	31.1	(0.0-81.9)	42.4	(0.0-93.3)
20-64	0.0	-----	11.5	(0.1-22.9)	3.0	(0.0-7.3)	16.0	(5.5-26.5)	69.5	(54.9-84.1)
Women	(n =0)		(n =0)		(n =0)		(n =0)		(n =3)	
20-24	0.0	-----	0.0	-----	0.0	-----	0.0	-----	0.0	-----
25-34	0.0	-----	0.0	-----	0.0	-----	0.0	-----	0.0	-----
35-44	0.0	-----	0.0	-----	0.0	-----	0.0	-----	100	-----
45-54	0.0	-----	0.0	-----	0.0	-----	0.0	-----	0.0	-----
55-64	0.0	-----	0.0	-----	0.0	-----	0.0	-----	100	-----
20-64	0.0	-----	0.0	-----	0.0	-----	0.0	-----	100	-----
Total	(n =0)		(n =4)		(n =2)		(n =10)		(n =35)	
20-24	0.0	-----	40.7	(0.0-90.6)	0.0	-----	0.0	-----	59.3	(9.4-100)
25-34	0.0	-----	5.7	(0.0-16.9)	3.0	(0.0-9.2)	13.9	(0.0-29.5)	77.3	(58.4-96.2)
35-44	0.0	-----	9.8	(0.0-28.8)	0.0	-----	16.2	(0.0-38.7)	73.9	(46.6-100)
45-54	0.0	-----	0.0	-----	0.0	-----	39.1	(7.9-70.3)	60.9	(29.7-92.1)
55-64	0.0	-----	0.0	-----	20.3	(0.0-57.3)	24.0	(0.0-65.5)	55.7	(9.2-100)
20-64	0.0	-----	11.1	(0.1-22.1)	2.9	(0.0-7.1)	15.4	(5.3-25.6)	70.6	(56.5-84.6)

Table (32) shows frequency and quantity of drinks consumed in the last 7 days grouped into three categories. None of the women drank either five drinks and over on any day or 20+ drinks in seven days. Men who drank 5+ drinks on any day constituted 28.4% of the consumers while those who drank 20+ drinks in seven days were only 5.3%. None of the participants was drinking more than five drinks on a single occasion.

Table (32): Frequency and quantity of drinks consumed in the last 7 days grouped into three categories

Age Group	Drank on 4+ days		5+ drinks on any day		20+ drinks in 7 days	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =25)		(n =5)		(n =1)	
20-24	100	-----	67.9	(3.0–100)	0.0	-----
25-34	100	-----	31.6	(0.3–62.9)	10.4	(0.0–31.0)
35-44	100	-----	0.0	-----	0.0	-----
45-54	100	-----	16.2	(0.0–47.5)	0.0	-----
55-64	100	-----	0.0	-----	0.0	-----
20-64	100	-----	28.4	(5.0–51.8)	5.3	(0.0–16.2)
Women	(n =3)		(n =0)		(n =0)	
20-24	0.0	-----	0.0	-----	0.0	-----
25-34	0.0	-----	0.0	-----	0.0	-----
35-44	100	-----	0.0	-----	0.0	-----
45-54	0.0	-----	0.0	-----	0.0	-----
55-64	100	-----	0.0	-----	0.0	-----
20-64	100	-----	0.0	-----	0.0	-----

6.1.2.3. Dietary pattern:

6.1.2.3.1. Number of days of fruit and vegetable consumed per week:

Table (33) shows mean number of days of fruit and vegetable weekly consumed. The overall mean number of days of fruits consumption was 4.75 days, with similar means for both men and women (4.76 vs. 4.73 days). On the other hand, the overall mean number of days of vegetable consumption was more than that of fruits (4.93 days), being slightly more among women than among men (5.04 vs. 4.82 days). No specific trends were demonstrated with age for either men or women.

Table (33): Mean number of days of fruit and vegetable consumed per week

Age Group	Number of days fruit consumed		Number of days vegetable consumed	
	Mean	(95% CI)	Mean	(95% CI)
Men	(n = 913)		(n = 913)	
20-24	5.03	(5.01–5.06)	4.35	(4.33–4.38)
25-34	4.34	(4.31–4.36)	4.66	(4.64–4.69)
35-44	4.66	(4.64–4.69)	5.20	(5.17–5.22)
45-54	5.35	(5.31–5.38)	5.48	(5.44–5.51)
55-64	4.90	(4.85–4.95)	4.98	(4.93–5.03)
20-64	4.76	(4.75–4.78)	4.82	(4.81–4.83)
Women	(n = 1352)		(n = 1358)	
20-24	4.31	(4.28–4.34)	4.19	(4.16–4.23)
25-34	4.67	(4.65–4.70)	5.17	(5.14–5.19)
35-44	4.80	(4.77–4.82)	5.44	(5.41–5.46)
45-54	5.26	(5.23–5.29)	5.58	(5.55–5.61)
55-64	4.93	(4.89–4.97)	4.95	(4.90–4.99)
20-64	4.73	(4.71–4.74)	5.04	(5.03–5.06)
Total	(n = 2265)		(n = 2271)	
20-24	4.71	(4.69–4.72)	4.28	(4.26–4.30)
25-34	4.50	(4.49–4.52)	4.92	(4.90–4.93)
35-44	4.73	(4.71–4.75)	5.31	(5.30–5.33)
45-54	5.30	(5.28–5.33)	5.53	(5.51–5.56)
55-64	4.92	(4.88–4.95)	4.96	(4.93–4.99)
20-64	4.75	(4.74–4.75)	4.93	(4.92–4.94)

6.1.2.3.2. Mean number of servings of fruit and vegetable consumed per week:

Table (34) shows mean number of fruit, vegetable, and combined fruit and vegetable servings per day on days consumed. It is observed that the overall average number of fruit servings was 2.22 servings/day. Men consumed more fruit than women (2.32 vs. 2.12 servings/days) at all age groups. The overall average number of vegetable servings was lower than that of fruits 1.57/day, being slightly more among men than among women (1.60 vs. 1.55 servings/days).

The overall average number of combined fruit and/or vegetable was 23.05 servings/week, being higher among men than among women (23.74 vs. 22.36 servings/week). The average number of fruit, vegetable, and combined fruit and vegetable servings per week showed an inverted U-shaped distribution with the age groups of both genders.

Table (34): Mean number of fruit, vegetable, and combined fruit and vegetable servings per day on days consumed

Age Group	Number of servings of fruit per day		Number of servings of vegetable per day		Number of servings of fruit and/or vegetable/ week	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Men	(n = 898)		(n = 906)		(n = 891)	
20-24	2.38	(2.37–2.39)	1.50	(1.49–1.51)	23.34	(23.18–23.50)
25-34	2.21	(2.20–2.22)	1.55	(1.54–1.56)	21.50	(21.37–21.63)
35-44	2.37	(2.35–2.38)	1.70	(1.69–1.72)	24.45	(24.28–24.62)
45-54	2.52	(2.50–2.54)	1.71	(1.69–1.73)	28.99	(28.74–29.24)
55-64	2.11	(2.09–2.13)	1.62	(1.59–1.64)	23.29	(22.98–23.59)
20-64	2.32	(2.32–2.33)	1.60	(1.59–1.64)	23.74	(23.66–23.82)
Women	(n = 1340)		(n = 1354)		(n = 1332)	
20-24	2.01	(2.00–2.02)	1.42	(1.41–1.43)	18.92	(18.76–19.07)
25-34	2.06	(2.05–2.06)	1.53	(1.52–1.54)	21.75	(21.63–21.88)
35-44	2.22	(2.20–2.23)	1.65	(1.64–1.67)	23.91	(23.75–24.06)
45-54	2.36	(2.35–2.38)	1.76	(1.75–1.78)	27.27	(27.04–27.49)
55-64	2.04	(2.02–2.06)	1.33	(1.31–1.34)	21.47	(21.19–21.75)
20-64	2.12	(2.12–2.13)	1.55	(1.54–1.55)	22.36	(22.28–22.43)
Total	(n = 2238)		(n = 2260)		(n = 2223)	
20-24	2.21	(2.20–2.22)	1.46	(1.46–1.47)	21.36	(21.24–21.47)
25-34	2.13	(2.13–2.14)	1.54	(1.53–1.55)	21.63	(21.54–21.72)
35-44	2.29	(2.28–2.30)	1.68	(1.67–1.69)	24.18	(24.06–24.30)
45-54	2.43	(2.42–2.45)	1.74	(1.73–1.75)	28.06	(27.90–28.23)
55-64	2.07	(2.05–2.08)	1.45	(1.44–1.46)	22.23	(22.02–22.44)
20-64	2.22	(2.22–2.23)	1.57	(1.57–1.58)	23.05	(23.00–23.11)

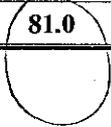
6.1.2.3.3. Consuming five or more fruit and / or vegetable servings per day:

Table (35) shows percentage of participants consuming five or more fruits and/or vegetable servings per day on days consumed. It is observed that the overall prevalence of non-consumption of fruits and/or vegetable per day was 20.1%, with no gender difference (Figure 27). The highest prevalence was among 20-24 years (30.9%), followed by 25-34 years (19.9%) and the least was among 45-54 years group (11.2%).

The overall percentage of those who consumed less than 5 servings of fruit or vegetable/day was 81.0%. Women were more likely to consume less than 5 servings of fruits or vegetable/day than men (82.8% vs. 79.2%). Figure (28) illustrates the prevalence rate of consumption of less than 5 servings of fruits or vegetable/day according to age group and gender.

Table (35): Percentage of participants consuming five or more fruit and/or vegetable per day on days consumed

Age Group	No consumption of fruit or vegetable		Less than five servings of fruit or vegetable per day		Five or more fruit or vegetable per day	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 917)		(n = 781)		(n = 110)	
20-24	30.5	(30.0-30.9)	81.2	(80.8-81.6)	18.8	(18.4-19.2)
25-34	19.1	(18.8-19.5)	82.8	(82.4-83.2)	17.2	(16.8-17.6)
35-44	13.3	(12.9-13.7)	78.9	(78.5-79.4)	21.1	(20.6-21.5)
45-54	13.1	(12.6-13.6)	68.7	(68.0-69.4)	31.3	(30.6-32.0)
55-64	15.3	(14.5-16.0)	75.5	(74.7-76.4)	24.5	(23.6-25.3)
20-64	20.0	(19.7-20.2)	79.2	(79.0-79.4)	20.8	(20.6-21.0)
Women	(n = 1362)		(n = 1197)		(n = 135)	
20-24	31.5	(31.0-32.0)	88.8	(88.4-89.1)	11.2	(10.9-11.6)
25-34	20.6	(20.2-21.0)	84.3	(84.0-84.7)	15.7	(15.3-16.0)
35-44	15.5	(15.1-15.9)	80.9	(80.5-81.4)	19.1	(18.6-19.5)
45-54	9.6	(9.2-10.0)	72.3	(71.6-72.9)	27.7	(27.1-28.4)
55-64	19.4	(18.7-20.0)	83.4	(82.8-84.1)	16.6	(15.9-17.2)
20-64	20.0	(20.0-20.4)	82.8	(82.6-83.0)	17.2	(17.0-17.4)
Total	(n = 2279)		(n = 1978)		(n = 245)	
20-24	30.9	(30.6-31.3)	84.6	(84.3-84.9)	15.4	(15.1-15.7)
25-34	19.9	(19.6-20.1)	83.6	(83.3-83.8)	16.4	(16.2-16.7)
35-44	14.4	(14.1-14.7)	79.9	(79.6-80.2)	20.1	(19.8-20.4)
45-54	11.2	(10.9-11.5)	70.6	(70.2-71.1)	29.4	(28.9-29.8)
55-64	17.7	(17.2-18.2)	80.1	(79.6-80.7)	19.9	(19.3-20.4)
20-64	20.1	(19.9-20.2)	81.0	(80.8-81.1)	19.0	(18.9-19.2)



↑
healthy food

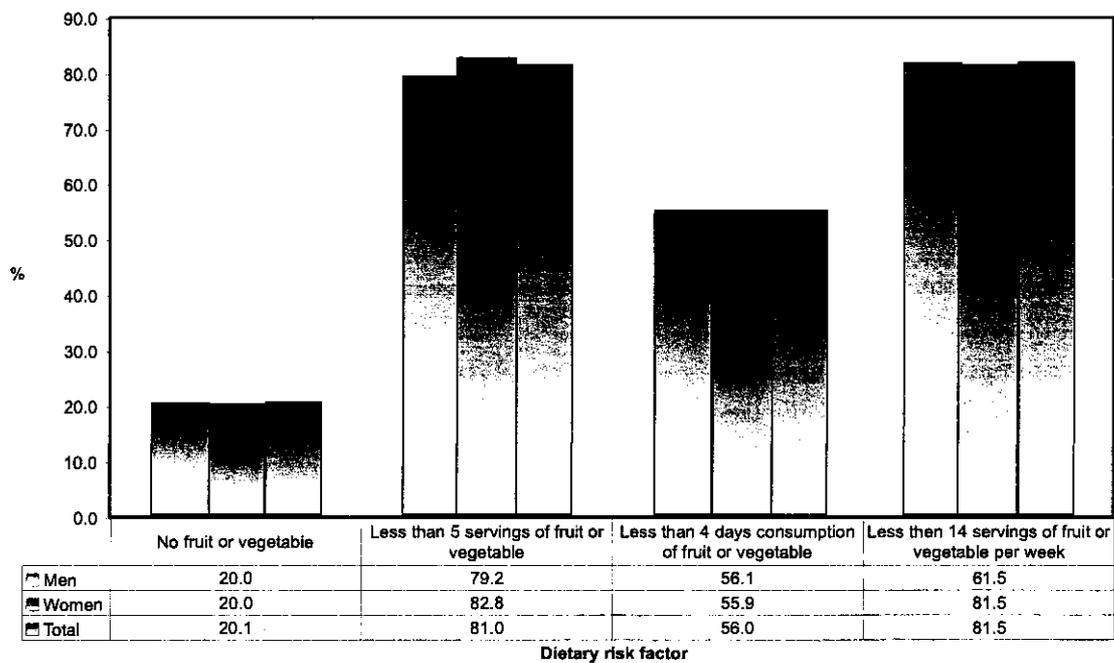


Figure (27): Prevalence of dietary risk of the participants by gender

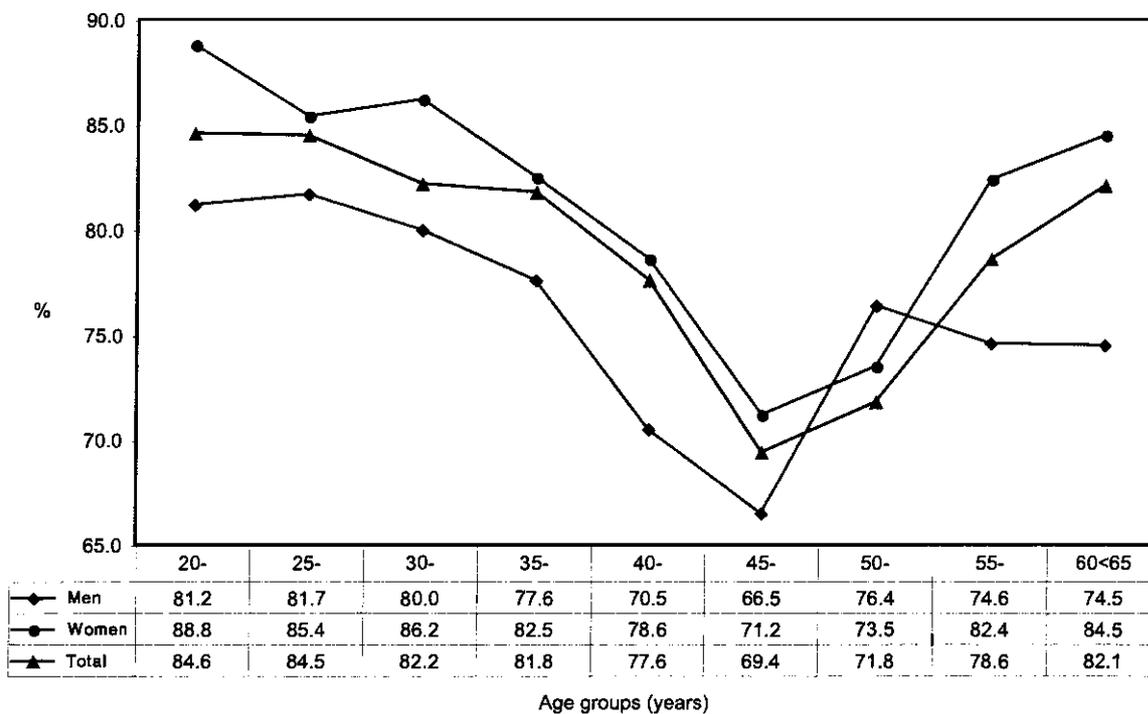


Figure (28): Prevalence rate of consumption of less than 5 servings of fruit or vegetable / day by age group and gender

6.1.2.3.4. Percentage of participants at dietary risk:

Table (36) shows percentage of population at dietary risk. More than half the studied sample (56.0%) were eating fruit or vegetable on fewer than 4 days/week, with a slightly higher percentage among men than women (56.1% vs. 55.9%), (Figure 18). No clear relationship could be found between the prevalence of eating fruit or vegetable on <4 days/week and age.

About three-fifths of the study participants (61.9%) stated that they consumed <2 servings of fruit or vegetable per day, without any specific trend regarding the age groups. However, the percentage of women consuming <2 servings of fruits or vegetable per day is higher than that of men (62.8% vs. 61.0%, respectively).

The majority of the study subjects (81.5%) stated that they consumed <14 servings of fruit or vegetable/ week, with no difference between both genders. Younger age groups were generally consuming less fruit and / or vegetable than the other elder age groups, (**Figures 27 & 29**).

Table (36): Percentage of participants at dietary risk

Age Group	Fruit or vegetable eaten on fewer than 4 days /week		Under 2 servings of fruit or vegetable /day when eaten		Under 14 servings of fruit or vegetable / week	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 285)		(n = 268)		(n = 110)	
20-24	56.7	(56.2–57.2)	64.6	(64.2–65.1)	83.1	(82.8–83.5)
25-34	63.0	(62.6–63.5)	61.9	(61.5–62.4)	85.3	(85.0–85.7)
35-44	54.7	(54.2–55.3)	60.8	(60.3–61.3)	81.5	(81.1–81.9)
45-54	42.6	(41.9–43.4)	55.0	(54.2–55.7)	72.7	(72.0–73.3)
55-64	50.5	(49.5–51.5)	53.9	(52.9–54.9)	73.6	(72.8–74.5)
20-64	56.1	(55.8–56.3)	61.0	(60.8–61.3)	81.5	(81.3–81.7)
Women	(n = 446)		(n = 356)		(n = 61)	
20-24	66.7	(66.2–67.3)	67.8	(67.2–68.3)	85.4	(85.1–85.8)
25-34	55.1	(54.7–55.6)	64.5	(64.1–65.0)	82.6	(82.3–83.0)
35-44	52.0	(51.5–52.6)	59.4	(58.8–59.9)	79.1	(78.7–79.5)
45-54	45.3	(44.6–45.9)	52.0	(51.3–52.6)	75.7	(75.2–76.3)
55-64	57.6	(56.8–58.4)	70.2	(69.4–71.0)	82.4	(81.7–83.0)
20-64	55.9	(56.6–56.2)	62.8	(62.6–63.1)	81.5	(81.3–81.7)
Total	(n = 731)		(n = 624)		(n = 271)	
20-24	61.2	(60.9–61.6)	66.0	(65.7–66.4)	84.2	(83.9–84.4)
25-34	59.1	(58.8–59.4)	63.2	(62.9–63.5)	84.0	(83.8–84.2)
35-44	53.4	(53.0–53.8)	60.1	(59.7–60.5)	80.3	(80.0–80.6)
45-54	44.0	(43.5–44.5)	53.3	(52.8–53.8)	74.3	(73.9–74.8)
55-64	54.7	(54.0–55.3)	63.4	(62.8–64.0)	78.7	(78.2–79.2)
20-64	56.0	(55.8–56.2)	61.9	(61.7–62.1)	81.5	(81.3–81.6)

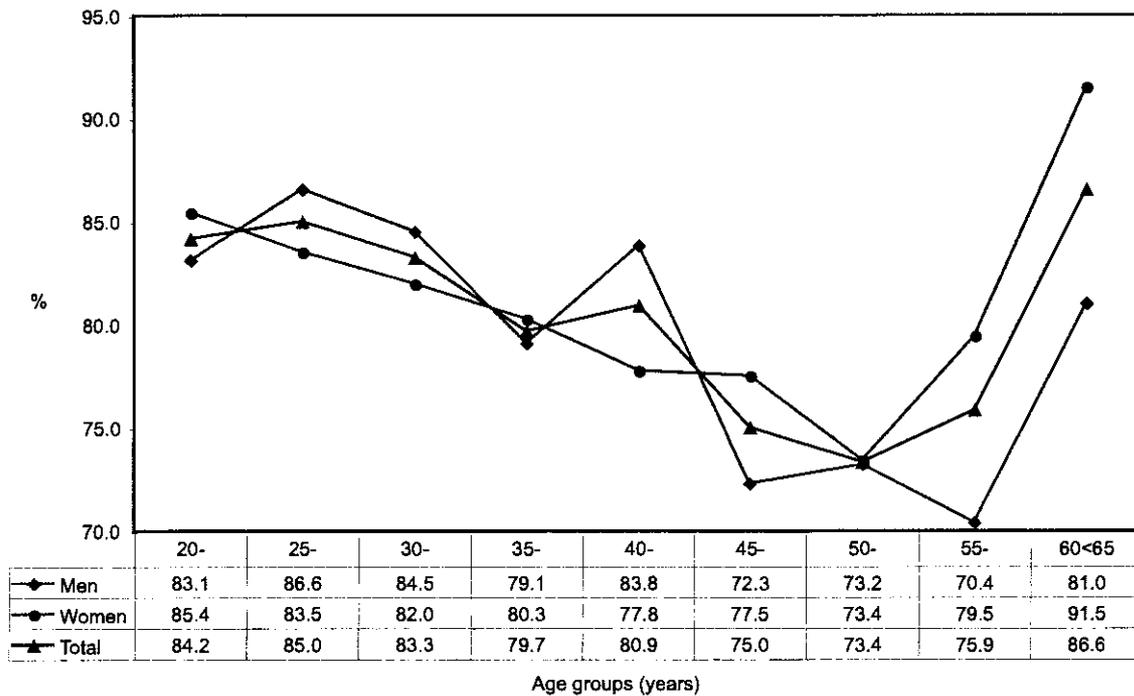


Figure (29): Prevalence of weekly consumption of <14 servings of fruit or vegetable by gender and age groups

6.1.2.3.5. Type of most commonly used fat or oil for food preparation:

Table (37) shows type of oil or fat most often used for meal preparation. The vast majority (95.4%) of participants used vegetable oil for food preparation. Margarine was used by 0.7% of participants followed by the use of butter (0.4%) and the least prevalence was the use of lard for meal preparation (0.2%). As age advances between 20 to 54 years, there is an increasing prevalence of using vegetable oils for meal preparation. Only 3.0% of the study participants stated that they did not use any oil or fat for meal preparation in household.

Table (37): Type of oil or fat most often used for meal preparation in household

Age Group	Vegetable oil		Lard		Butter		Margarine		Palm tree		None used	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
	(n = 2204)		(n = 4)		(n = 9)		(n = 14)		(n = 2)		(n = 47)	
20-24	90.2	(90.0-90.4)	0.5	(0.4-0.5)	0.7	(0.7-0.8)	0.4	(0.4-0.5)	0.0	-----	7.9	(7.7-8.1)
25-34	95.7	(95.5-95.8)	0.2	(0.2-0.3)	0.2	(0.1-0.2)	1.0	(1.0-1.1)	0.1	(0.1-0.1)	2.0	(1.9-2.1)
35-44	96.6	(96.5-96.8)	0.0	-----	0.6	(0.5-0.7)	0.8	(0.7-0.9)	0.0	-----	1.7	(1.6-1.8)
45-54	99.0	(98.9-99.1)	0.0	-----	0.3	(0.3-0.4)	0.4	(0.3-0.5)	0.3	(0.2-0.3)	0.0	-----
55-64	97.4	(97.2-97.6)	0.0	-----	0.0	-----	0.5	(0.4-0.6)	0.5	(0.5-0.6)	0.0	-----
20-64	95.4	(95.3-95.5)	0.2	(0.2-0.2)	0.4	(0.4-0.4)	0.7	(0.7-0.7)	0.1	(0.1-0.1)	3.0	(2.9-3.1)

6.1.2.3.6. Weekly consumption of dates, cereals and pastries:

Table (38) shows mean number of days of consumption of dates, cereals, and pastries. The overall mean number of days of eating dates was 3.60 days. Men ate dates more frequently than women (4.05 vs. 3.15 days/week).

Regarding the frequency of eating cereals, the overall mean number of days of eating cereals was 2.36 days/week. Women ate cereals more frequently than men (2.67 vs. 2.05 days/week). Eating cereals increased with progress of age.

The overall mean number of days of eating pastries was 3.22 days. Women consumed pastries more frequently than men (3.57 vs. 2.88 days/week). In contrast, with cereal consumption, the mean number of eating pastries decreased with ageing.

Table (38): Mean number of days of dates, cereals, and sweets consumed per week

Age Group	Number of days dates consumed		Number of days cereals consumed		Number of days pastries consumed	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Men	(n = 918)		(n = 918)		(n = 918)	
20-24	3.21	(3.18–3.23)	1.89	(1.86–1.91)	3.28	(3.25–3.31)
25-34	4.24	(4.21–4.27)	1.62	(1.60–1.65)	3.11	(3.09–3.14)
35-44	4.43	(4.40–4.46)	2.13	(2.10–2.16)	2.59	(2.56–2.62)
45-54	4.09	(4.05–4.13)	2.60	(2.55–2.64)	2.47	(2.43–2.50)
55-64	5.33	(5.28–5.38)	3.49	(3.43–3.55)	1.89	(1.84–1.94)
20-64	4.05	(4.03–4.06)	2.05	(2.04–2.07)	2.88	(2.87–2.90)
Women	(n = 1362)		(n = 1362)		(n = 1362)	
20-24	2.54	(2.51–2.57)	1.96	(1.93–1.99)	4.61	(4.58–4.64)
25-34	2.82	(2.79–2.85)	2.68	(2.66–2.71)	3.88	(3.85–3.91)
35-44	3.57	(3.54–3.61)	2.86	(2.83–2.90)	3.43	(3.40–3.46)
45-54	3.53	(3.49–3.57)	3.13	(3.09–3.17)	2.75	(2.71–2.78)
55-64	4.05	(4.00–4.10)	3.18	(3.13–3.23)	1.67	(1.63–1.71)
20-64	3.15	(3.13–3.16)	2.67	(2.66–2.69)	3.57	(3.55–3.58)
Total	(n = 2280)		(n = 2280)		(n = 2280)	
20-24	2.91	(2.89–2.93)	1.92	(1.90–1.94)	3.87	(3.85–3.89)
25-34	3.53	(3.51–3.55)	2.15	(2.13–2.17)	3.50	(3.48–3.52)
35-44	4.01	(3.99–4.04)	2.49	(2.47–2.51)	3.00	(2.98–3.02)
45-54	3.79	(3.76–3.82)	2.88	(2.86–2.91)	2.62	(2.59–2.65)
55-64	4.58	(4.54–4.61)	3.31	(3.27–3.35)	1.76	(1.73–1.79)
20-64	3.60	(3.59–3.61)	2.36	(2.35–2.37)	3.22	(3.21–3.23)

6.1.2.3.7. Weekly consumption of carbonated drinks, fresh juice and soft drinks:

Table (39) shows weekly mean number of days carbonated drinks, fresh juice, and other soft drinks consumed. The overall mean number of days of consuming carbonated drinks was 3.12 days/week. Men consumed carbonated drinks more frequently than women (3.47 vs. 2.76 days/week). The mean number of days of consuming carbonated drinks decreases as the age advances, with apparent high consumption rates at the youngest age group (4.49 days/week).

The overall mean number of days of consuming fresh juice was 3.52 days/week. Also, men consumed fresh juice more frequently than women (3.70 vs. 3.35 days/week). The mean number of days of consuming fresh juice decreases as the age advances.

The overall mean number of days of consuming other soft drinks, such as “Vimto” and “Tang” was one (0.99) day per week. Women consumed these soft drinks more frequently than their men counterparts (1.02 vs. 0.96 days/week). Also, the mean number of days of consuming these soft drinks decreases as the age advances.

Table (39): Mean number of days carbonated drinks, fresh juice, and other soft drinks consumed per week

Age Group	Number of days carbonated drinks consumed		Number of days fresh juice consumed		Number of days other soft drinks consumed	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Men	(n = 918)		(n = 918)		(n = 918)	
20-24	4.62	(4.59–4.65)	4.51	(4.49–4.54)	1.07	(1.05–1.09)
25-34	3.60	(3.58–3.63)	3.55	(3.53–3.58)	1.07	(1.05–1.09)
35-44	2.80	(2.77–2.83)	3.31	(3.28–3.34)	0.93	(0.91–0.95)
45-54	2.65	(2.60–2.69)	3.35	(3.31–3.39)	0.81	(0.78–0.84)
55-64	1.79	(1.75–1.84)	2.89	(2.84–2.94)	0.36	(0.33–0.38)
20-64	3.47	(3.45–3.48)	3.70	(3.68–3.71)	0.96	(0.95–0.97)
Women	(n = 1362)		(n = 1362)		(n = 1362)	
20-24	4.33	(4.30–4.36)	3.62	(3.59–3.65)	1.35	(1.33–1.38)
25-34	2.90	(2.87–2.92)	3.61	(3.58–3.63)	1.13	(1.11–1.15)
35-44	2.20	(2.18–2.23)	3.26	(3.23–3.29)	0.97	(0.95–0.99)
45-54	1.59	(1.56–1.63)	3.06	(3.03–3.10)	0.61	(0.59–0.63)
55-64	1.64	(1.60–1.68)	2.51	(2.47–2.55)	0.56	(0.53–0.59)
20-64	2.76	(2.74–2.77)	3.35	(3.33–3.36)	1.02	(1.01–1.03)
Total	(n = 2280)		(n = 2280)		(n = 2280)	
20-24	4.49	(4.47–4.51)	4.11	(4.09–4.13)	1.20	(1.18–1.21)
25-34	3.25	(3.23–3.27)	3.58	(3.56–3.60)	1.10	(1.09–1.12)
35-44	2.51	(2.49–2.53)	3.28	(3.26–3.30)	0.95	(0.94–0.97)
45-54	2.07	(2.05–2.10)	3.19	(3.17–3.22)	0.70	(0.69–0.72)
55-64	1.70	(1.67–1.73)	2.67	(2.63–2.70)	0.48	(0.46–0.50)
20-64	3.12	(3.10–3.13)	3.52	(3.51–3.53)	0.99	(0.98–1.00)

6.1.2.3.8. Weekly consumption of lamb, veal, fish and poultry:

Table (40) shows weekly mean number of days of eating lamb meat, veal meat, fish and poultry consumed. The overall mean number of days of eating lamb meat was 1.77 days/week. Men had a higher mean number of days of eating lamb meat than women (2.03 vs. 1.50 days/week).

The overall mean number of days of eating veal, fish and poultry was 0.50, 1.61 and 3.08 days/week, respectively. Men had a higher mean number of days of eating these types of food than women (0.55 vs. 0.44, 1.74 vs 1.48 and 3.10 vs 3.07 days/week respectively). The average number of days of consuming both veal meat and poultry decreases as the age advances, while the reverse is true for fish, as the mean number of days of consumption increases with age.

Table (40): Mean number of days lamb, veal, fish, and poultry consumed per week

Age Group	Number of days lamb meat consumed		Number of days veal meat consumed		Number of days fish consumed		Number of days poultry consumed	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Men	(n = 918)		(n = 918)		(n = 918)		(n = 918)	
20-24	2.08	(2.07–2.10)	0.92	(0.90–0.93)	1.47	(1.46–1.48)	3.53	(3.51–3.54)
25-34	2.20	(2.19–2.22)	0.51	(0.50–0.52)	1.59	(1.58–1.60)	3.33	(3.31–3.34)
35-44	1.88	(1.86–1.89)	0.40	(0.39–0.41)	1.91	(1.90–1.92)	2.74	(2.72–2.75)
45-54	1.72	(1.70–1.73)	0.31	(0.29–0.32)	2.20	(2.18–2.23)	2.41	(2.39–2.43)
55-64	2.12	(2.09–2.15)	0.17	(0.16–0.17)	2.07	(2.04–2.10)	2.74	(2.70–2.77)
20-64	2.03	(2.02–2.04)	0.55	(0.55–0.56)	1.74	(1.73–1.74)	3.10	(3.09–3.11)
Women	(n = 1362)		(n = 1362)		(n = 1362)		(n = 1362)	
20-24	1.50	(1.49–1.51)	0.67	(0.66–0.69)	1.24	(1.23–1.26)	3.48	(3.46–3.50)
25-34	1.50	(1.49–1.51)	0.53	(0.52–0.54)	1.40	(1.38–1.41)	3.11	(3.10–3.13)
35-44	1.48	(1.47–1.49)	0.33	(0.32–0.34)	1.58	(1.57–1.60)	3.01	(2.99–3.03)
45-54	1.57	(1.55–1.59)	0.26	(0.25–0.27)	1.74	(1.73–1.76)	2.86	(2.84–2.89)
55-64	1.41	(1.39–1.43)	0.11	(0.10–0.11)	1.72	(1.69–1.74)	2.43	(2.40–2.46)
20-64	1.50	(1.49–1.50)	0.44	(0.43–0.44)	1.48	(1.48–1.49)	3.07	(3.06–3.08)
Total	(n = 2280)		(n = 2280)		(n = 2280)		(n = 2280)	
20-24	1.82	(1.81–1.83)	0.81	(0.80–0.82)	1.37	(1.36–1.38)	3.51	(3.49–3.52)
25-34	1.85	(1.84–1.86)	0.52	(0.52–0.53)	1.49	(1.49–1.50)	3.22	(3.21–3.23)
35-44	1.68	(1.67–1.69)	0.36	(0.36–0.37)	1.75	(1.74–1.76)	2.87	(2.86–2.88)
45-54	1.64	(1.62–1.65)	0.28	(0.27–0.29)	1.95	(1.94–1.97)	2.66	(2.64–2.67)
55-64	1.71	(1.69–1.72)	0.13	(0.13–0.14)	1.86	(1.84–1.88)	2.56	(2.53–2.58)
20-64	1.77	(1.76–1.77)	0.50	(0.49–0.50)	1.61	(1.61–1.62)	3.08	(3.08–3.09)

A summary of frequency of consuming dietary items is illustrated in **Figure (30)** which depicts the number of days per week of eating different food items by gender. The spider chart illustrated that women consumed pastries, cereals, fresh juices, other soft drinks and vegetable more frequently than men. On the other hand, men consumed carbonated drinks, lamb and veal meat, fish, poultry, fruit more than women.

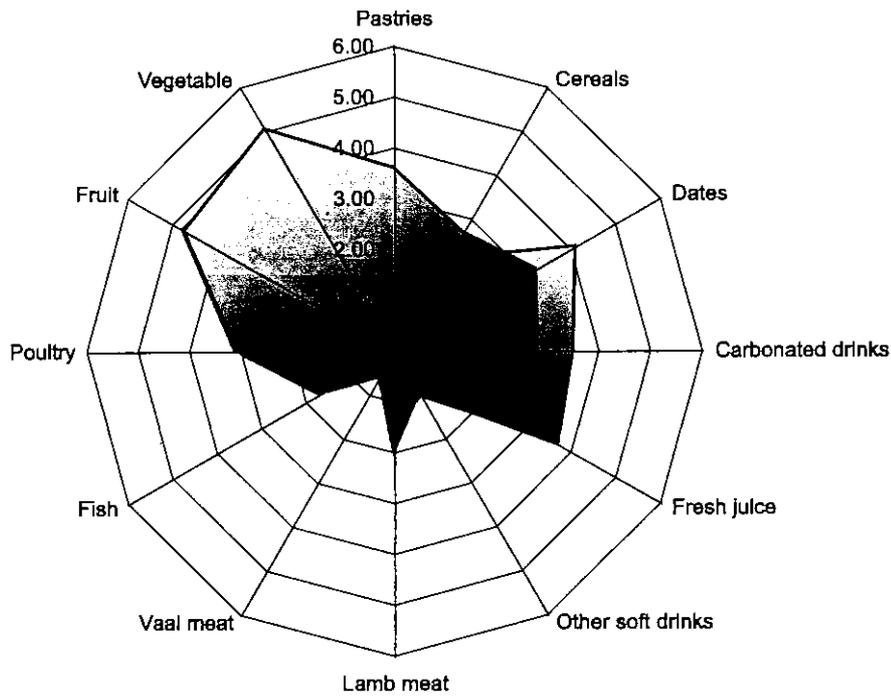


Figure (30): Mean of number of days of consuming different food types per week

6.1.2.4. Physical activity:

6.1.2.4.1. Practicing physical activity:

Table (41) shows percentage of participants classified into three categories of total physical activity. Concerning the risky behaviour, the results were as follows; the overall prevalence rate of low level of physical activity was 64.7%. Women had a higher prevalence rate than men (71.7 vs. 57.9%). Besides, the overall prevalence rate of moderate level of physical activity was 22.5%. In this respect, men had a higher prevalence rate than women (24.7 vs. 20.3%). Regarding the acceptable activity behaviour (high level of physical activity), the overall prevalence rate was 12.8%, being higher among men than among women (17.4 and 8.1%, respectively). This means that the total physical activity of 87.2% of the participants was below the recommended level. **Figure (31)** illustrates prevalence rate of low, moderate and high levels of physical activity by gender. Moreover, **Figure (32)** illustrates prevalence rate of low level of physical activity by gender and age groups.

Table (41): Percentage of participants by total physical activity

Age Group	Low level of activity		Moderate level of activity		High level of activity	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =527)		(n =236)		(n =142)	
20-24	54.3	(45.2–63.4)	21.5	(14.1–29.0)	24.2	(16.3–32.0)
25-34	61.7	(55.3–68.1)	22.9	(17.3–28.4)	15.4	(10.6–20.2)
35-44	59.3	(53.1–65.6)	26.1	(20.5–31.7)	14.6	(10.1–19.1)
45-54	52.2	(45.5–58.9)	32.7	(26.4–39.0)	15.1	(10.3–19.8)
55-64	60.3	(49.7–70.9)	27.1	(17.5–36.7)	12.6	(5.5–19.7)
20-64	57.9	(54.2–61.5)	24.7	(21.6–27.8)	17.4	(14.5–20.3)
Women	(n =975)		(n =264)		(n =104)	
20-24	73.4	(66.2–80.6)	18.5	(12.1–24.8)	8.1	(3.7–12.6)
25-34	70.3	(65.1–75.4)	22.9	(18.2–27.7)	6.8	(4.0–9.6)
35-44	68.4	(64.1–72.8)	22.3	(18.4–26.2)	9.3	(6.5–12.0)
45-54	74.9	(69.9–80.0)	18.2	(13.7–22.6)	6.9	(3.9–9.9)
55-64	75.0	(66.5–83.5)	14.0	(7.2–20.9)	11.0	(4.8–17.1)
20-64	71.7	(69.0–74.3)	20.3	(17.9–22.7)	8.1	(6.4–9.7)
Total	(n =1502)		(n =500)		(n =246)	
20-24	62.5	(56.4–68.7)	20.2	(15.2–25.2)	17.2	(12.3–22.2)
25-34	66.0	(61.9–70.1)	22.9	(19.2–26.5)	11.1	(8.3–13.9)
35-44	63.8	(59.9–67.6)	24.2	(20.8–27.7)	12.0	(9.3–14.7)
45-54	64.6	(60.4–68.8)	24.8	(21.0–28.6)	10.6	(7.9–13.3)
55-64	69.1	(62.4–75.8)	19.3	(13.6–25.0)	11.6	(6.9–16.3)
20-64	64.7	(62.4–67.0)	22.5	(20.6–24.5)	12.8	(11.1–14.5)

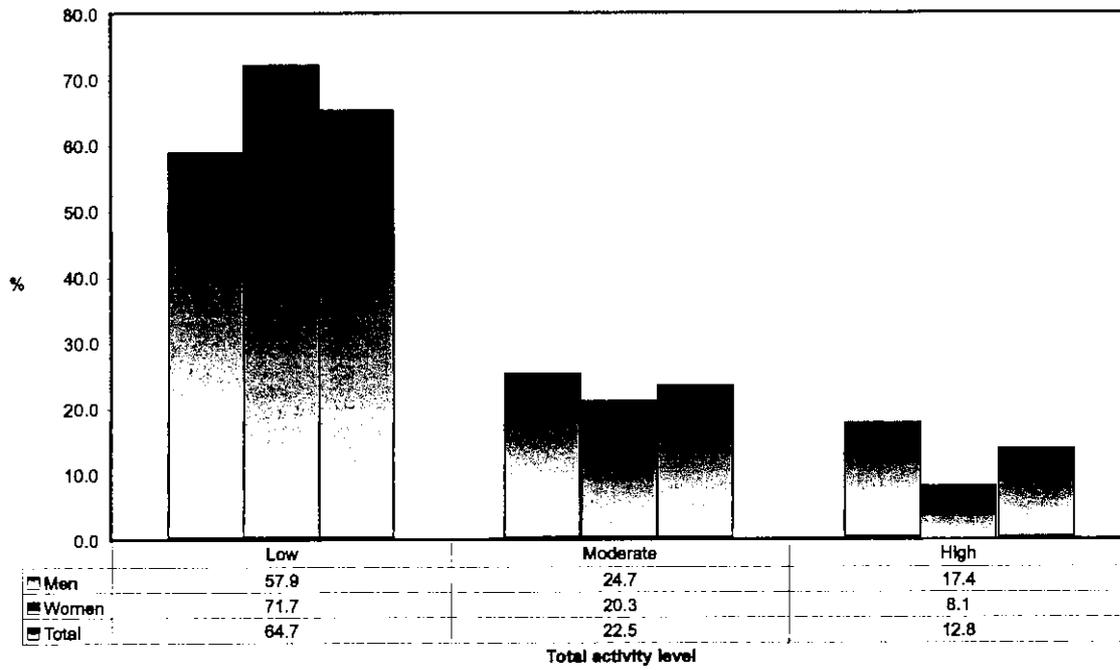


Figure (31): Prevalence rate of low level of physical activity by gender

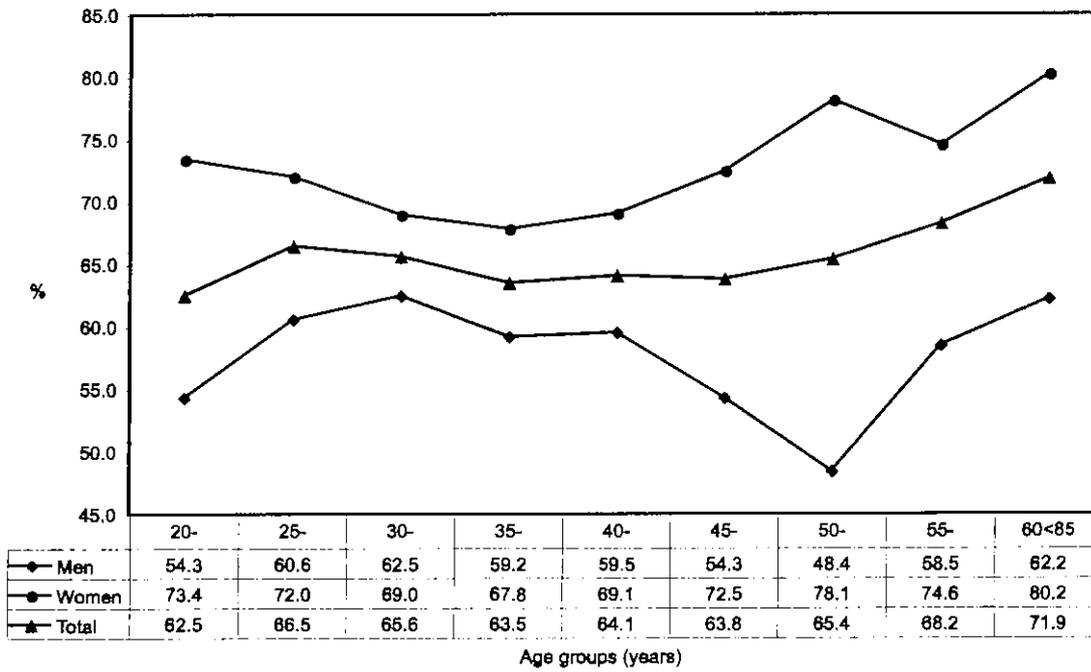


Figure (32): Prevalence rate of low, moderate and high levels of physical activity by gender and age groups

6.1.2.4.2. Time spent in total physical activity per day:

Table (42) shows mean time spent in total daily physical activity. The overall mean time spent in total physical activity was 45.1 minutes/day. Men spent longer time practicing total physical activity per day than women (52.2 vs. 37.7 minutes/day). Young men spent longer time in practicing such activity than older ones.

Table (42): Mean time (minutes) of total physical activity per day

Age Group	Men (n = 905)		Women (n = 1343)		Total (n = 2248)	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
20-24	65.3	(48.2–82.4)	32.9	(23.5–42.4)	51.3	(40.6–62.0)
25-34	48.4	(37.9–58.9)	39.2	(31.3–47.1)	43.8	(37.2–50.4)
35-44	46.6	(37.9–55.4)	41.8	(34.9–48.7)	44.3	(38.7–49.9)
45-54	52.4	(42.2–62.6)	32.4	(24.4–40.4)	41.5	(35.1–47.9)
55-64	34.7	(22.5–46.9)	42.2	(19.3–65.1)	39.2	(24.7–53.7)
20-64	52.2	(46.0–58.5)	37.7	(33.4–42.1)	45.1	(41.2–48.9)

Table (43) shows median time of total physical activity per day. The overall median time spent in total physical activity was 15 minutes/day. Men spent longer time in total physical activity per day than women (21.4 vs. 6.4 minutes/day). Young men (20-24 years) spent longer time than older ones (55-64 years) in total physical activity.

Table (43): Median time (minutes) of total physical activity per day

Age Group	Men (n = 905)		Women (n = 1343)		Total (n = 2248)	
	Median	(IQR)	Median	(IQR)	Median	(IQR)
20-24	27.9	(0.0–90.0)	8.6	(0.0–42.9)	17.1	(0.0–66.4)
25-34	20.0	(0.0–52.9)	6.4	(0.0–42.9)	15.0	(0.0–51.4)
35-44	20.0	(0.0–60.0)	8.6	(0.0–60.0)	14.3	(0.0–60.0)
45-54	30.0	(0.0–60.0)	4.3	(0.0–30.0)	12.9	(0.0–50.0)
55-64	12.9	(0.0–51.4)	0.0	(0.0–30.0)	6.4	(0.0–34.3)
20-64	21.4	(0.0–64.3)	6.4	(0.0–42.9)	15.0	(0.0–55.7)

6.1.2.4.3. Time spent in work-, transport- and recreational physical activity per day:

Table (44) shows mean time spent per day in minutes, in work-, transport- and recreation-related physical activity. The overall mean time spent in work was 22.4 minutes/day, followed by that of recreational (13.3 minutes/day) and lastly in transportation (9.3 minutes/day) activity. Generally, men spent longer time than women in work-related (25.2 vs. 19.5 minutes/day), transportation-related (10.6 vs. 8.1 minutes/day) and recreation-related (16.4 vs. 10.1 minutes/day) physical activities.

There was a decreasing trend of the mean time spent per day in recreational activity with the advancement of age. The corresponding median time for these types of physical activity was zero minutes for both men and women as well as for all age groups.

Table (44): Mean time (minutes) spent per day in work-, transport- and recreation-related physical activity

Age Group	Work		Transport		Recreation	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Men	(n =905)		(n =905)		(n =905)	
20-24	27.6	(16.0–39.2)	8.9	(5.2–12.6)	28.8	(18.7–38.9)
25-34	26.0	(17.1–35.0)	10.2	(7.9–12.5)	12.2	(8.2–16.2)
35-44	24.6	(17.5–31.8)	10.5	(8.1–12.9)	11.5	(8.1–14.9)
45-54	27.0	(18.2–35.7)	12.7	(9.7–15.7)	12.8	(9.4–16.1)
55-64	9.9	(0.0–19.8)	15.7	(9.3–22.2)	9.1	(4.3–13.9)
20-64	25.2	(20.5–29.9)	10.6	(9.1–12.0)	16.4	(13.2–19.7)
Women	(n =1343)		(n =1343)		(n =1343)	
20-24	15.1	(8.1–22.1)	7.9	(4.4–11.5)	9.9	(5.7–14.1)
25-34	17.9	(12.2–23.5)	8.4	(6.0–10.8)	13.0	(8.4–17.5)
35-44	23.7	(18.4–29.1)	7.8	(6.2–9.5)	10.3	(6.9–13.6)
45-54	17.9	(11.1–24.7)	7.9	(6.0–9.8)	6.6	(4.2–9.0)
55-64	27.3	(6.0–48.6)	8.3	(4.3–12.4)	6.6	(2.7–10.5)
20-64	19.5	(16.1–23.0)	8.1	(6.9–9.3)	10.1	(8.2–12.1)
Total	(n =2248)		(n =2248)		(n =2248)	
20-24	22.2	(14.9–29.5)	8.5	(5.9–11.1)	20.6	(14.5–26.8)
25-34	22.0	(16.7–27.3)	9.3	(7.6–11.0)	12.6	(9.5–15.6)
35-44	24.2	(19.7–28.7)	9.2	(7.7–10.7)	10.9	(8.5–13.3)
45-54	22.0	(16.6–27.5)	10.1	(8.3–11.8)	9.4	(7.4–11.4)
55-64	20.3	(6.9–33.6)	11.3	(7.8–14.9)	7.6	(4.6–10.6)
20-64	22.4	(19.5–25.3)	9.3	(8.4–10.3)	13.3	(11.4–15.2)

6.1.2.4.4. Physical inactivity:

Table (45) shows percentage of participants classified as doing no work-, transport- or recreational-related physical activity. The highest prevalence rate was that of doing no recreational activities (72.4%), followed by not doing transport activities (67.0%) while all participants were doing some form of activities during their routine daily work. Women had higher prevalence rates of having no transport- or recreational-related physical activities, when compared with men (71.9% and 78.1% compared with 62.2% and 66.9% respectively). Concerning the age, it was noted that there were decreasing prevalence rates of doing no transport-related activities as the age advances. Figure (33) illustrates prevalence rates of doing neither transport nor recreational physical activities by gender.

Table (45): Percentage of participants classified as doing no work-, transport- or recreational-related physical activity

Age Group	No work activity		No transport activity		No recreational activity	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =7)		(n =539)		(n =630)	
20-24	0	-----	69.1	(60.7–77.4)	54.2	(45.1–63.2)
25-34	0	-----	59.6	(53.2–66.0)	73.8	(67.9–79.6)
35-44	0	-----	61.0	(54.9–67.2)	71.9	(66.2–77.7)
45-54	0	-----	59.5	(52.9–66.0)	62.2	(55.7–68.7)
55-64	0	-----	54.6	(43.8–65.4)	78.8	(69.8–87.8)
20-64	0	-----	62.2	(58.7–65.7)	66.9	(63.3–70.5)
Women	(n =0)		(n =931)		(n =1078)	
20-24	0	-----	74.9	(68.0–81.8)	73.7	(66.5–80.9)
25-34	0	-----	74.1	(69.3–78.9)	76.7	(71.9–81.5)
35-44	0	-----	70.6	(66.5–74.8)	80.1	(76.3–83.9)
45-54	0	-----	66.6	(61.2–72.0)	82.3	(77.8–86.8)
55-64	0	-----	69.2	(60.4–78.1)	80.9	(73.1–88.6)
20-64	0	-----	71.9	(69.3–74.5)	78.1	(75.5–80.6)
Total	(n =7)		(n =1470)		(n =1708)	
20-24	0	-----	71.6	(66.0–77.2)	62.6	(56.5–68.8)
25-34	0	-----	66.8	(62.8–70.9)	75.2	(71.4–79.0)
35-44	0	-----	65.7	(62.0–69.5)	75.9	(72.4–79.4)
45-54	0	-----	63.3	(59.1–67.5)	73.1	(69.2–77.0)
55-64	0	-----	63.3	(56.4–70.2)	80.0	(74.2–85.9)
20-64	0	-----	67.0	(64.8–69.2)	72.4	(70.2–74.6)

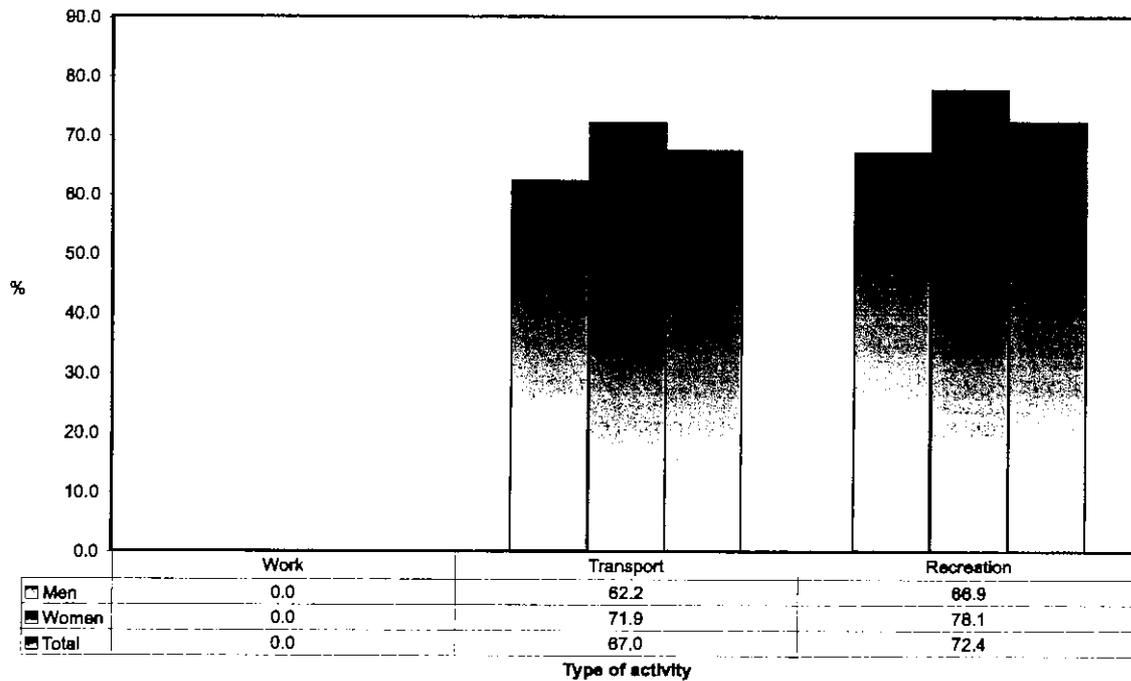


Figure (33): Prevalence rate of doing neither transport nor recreational physical activities by gender

6.1.2.4.5. Total time spent in sedentary activity per day:

Table (46) shows total time spent in sedentary activities per day. The overall median time spent in sedentary activities was 240 minutes/day. This median value was longer for men (240 minutes/day) compared with that of women (180 minutes/day). The middle age groups (35-54 years) had the shortest median time spent in sedentary activities (180 minutes/day). The same trend can be observed for the mean time spent in sedentary activities per day with an overall mean of 237.7 minutes/day and a mean of 251.7 minutes/day for men and 223.4 minutes/day for women.

Table (46): Total time spent in sedentary activities per day in minutes

Age Group	Total time spent in sedentary activities per day			
	Mean	(95% CI)	Median	(IQR)
Men	(n =905)		(n =905)	
20-24	277.5	(245.9–309.2)	240.0	(180.0–360.0)
25-34	252.4	(234.6–270.2)	240.0	(180.0–300.0)
35-44	228.9	(210.9–246.8)	180.0	(120.0–300.0)
45-54	232.4	(213.5–251.4)	180.0	(120.0–300.0)
55-64	258.2	(221.9–294.6)	240.0	(120.0–360.0)
20-64	251.7	(240.1–263.3)	240.0	(120.0–300.0)
Women	(n =1343)		(n =1343)	
20-24	246.5	(225.3–267.7)	240.0	(120.0–360.0)
25-34	208.9	(194.9–222.9)	180.0	(120.0–300.0)
35-44	204.5	(191.2–217.8)	180.0	(120.0–300.0)
45-54	232.1	(214.0–250.2)	180.0	(120.0–300.0)
55-64	252.1	(217.4–286.3)	180.0	(120.0–360.0)
20-64	223.4	(215.2–231.7)	180.0	(120.0–300.0)
Total	(n =2248)		(n =2248)	
20-24	264.1	(243.9–284.3)	240.0	(180.0–360.0)
25-34	230.7	(219.3–242.2)	240.0	(120.0–300.0)
35-44	217.0	(205.7–228.2)	180.0	(120.0–300.0)
45-54	232.2	(219.1–245.4)	180.0	(120.0–300.0)
55-64	254.6	(229.2–279.9)	240.0	(120.0–360.0)
20-64	237.7	(230.5–244.9)	240.0	(120.0–300.0)

6.1.2.4.6. Time spent in work-related physical activity per day:

Table (47) shows mean time of work-related moderate- and vigorous-intensity physical activity per day. The overall mean time spent in moderate work activities was 10.5 minutes/day. Men spent longer time in this level of activity when compared with women (11.3 vs. 9.6 minutes/day).

The overall mean time spent in vigorous work activities was only 2.9 minutes/day. Men spent longer time when compared with women (5.2 vs. 0.5 minutes/day). The median time for all the corresponding categories was zero minutes/day.

Table (47): Mean time of work-related moderate- and vigorous-intensity physical activity per day

Age Group	Moderate		Vigorous	
	Mean	(95% CI)	Mean	(95% CI)
Men	(n =905)		(n =905)	
20-24	17.3	(10.2–24.4)	11.5	(6.0–17.0)
25-34	8.9	(5.5–12.2)	3.3	(1.3–5.3)
35-44	8.7	(5.7–11.6)	2.8	(1.1–4.5)
45-54	11.1	(8.0–14.3)	1.6	(0.6–2.6)
55-64	6.8	(3.2–10.5)	2.3	(0.0–5.0)
20-64	11.3	(8.9–13.6)	5.2	(3.4–6.9)
Women	(n =1343)		(n =1343)	
20-24	9.4	(5.3–13.6)	0.5	(0.0–1.0)
25-34	11.8	(7.7–15.8)	1.2	(0.0–2.7)
35-44	10.1	(6.8–13.5)	0.1	(0.0–0.3)
45-54	6.6	(4.2–9.0)	0.0	-----
55-64	6.6	(2.7–10.5)	0.0	-----
20-64	9.6	(7.8–11.4)	0.5	(0.0–1.0)
Total	(n =2248)		(n =2248)	
20-24	13.9	(9.5–18.3)	6.7	(3.5–9.9)
25-34	10.3	(7.7–12.9)	2.3	(1.0–3.5)
35-44	9.4	(7.2–11.6)	1.5	(0.6–2.4)
45-54	8.7	(6.7–10.6)	0.7	(0.3–1.2)
55-64	6.7	(3.9–9.4)	0.9	(0.0–2.0)
20-64	10.5	(9.0–12.0)	2.9	(1.9–3.8)

6.1.2.4.7. Time spent in recreational physical activity per day:

Table (48) shows mean time of recreational moderate- and vigorous-intensity physical activity per day. The overall mean time spent in recreational related to moderate intensity activities was 20.3 minutes/day. Men spent longer time when compared with women (21.2 vs. 19.3 minutes/day).

The overall mean time spent in recreational related to vigorous intensity activities was only 2.2 minutes/day. In this respect, men spent longer time when compared with women (4 vs. 0.2 minutes/day). It was noted that none of the age group 55-64 years did any vigorous recreational activities on daily basis. The corresponding median time for all these categories was zero minutes/day.

Table (48): Mean time of recreational moderate- and vigorous-intensity physical activity per day

Age Group	Moderate		Vigorous	
	Mean	(95% CI)	Mean	(95% CI)
Men	(n =905)		(n =905)	
20-24	20.4	(11.8–29.0)	7.2	(0.9–13.6)
25-34	21.8	(13.7–29.9)	4.2	(1.0–7.4)
35-44	23.6	(16.6–30.6)	1.0	(0.0–2.1)
45-54	22.4	(15.1–29.8)	4.5	(0.7–8.4)
55-64	9.9	(0.0–19.8)	0.0	-----
20-64	21.2	(17.2–25.1)	4.0	(2.0–6.1)
Women	(n =1343)		(n =1343)	
20-24	14.4	(7.5–21.3)	0.7	(0.0–2.0)
25-34	17.9	(12.2–23.5)	0.0	-----
35-44	23.7	(18.4–29.1)	0.0	-----
45-54	17.5	(10.9–24.1)	0.4	(0.0–1.2)
55-64	27.3	(6.0–48.6)	0.0	-----
20-64	19.3	(15.9–22.8)	0.2	(0.0–0.5)
Total	(n =2248)		(n =2248)	
20-24	17.8	(12.1–23.5)	4.4	(0.7–8.1)
25-34	19.8	(14.9–24.8)	2.1	(0.5–3.7)
35-44	23.7	(19.2–28.1)	0.5	(0.0–1.1)
45-54	19.8	(14.8–24.7)	2.3	(0.5–4.1)
55-64	20.3	(6.9–33.6)	0.0	-----
20-64	20.3	(17.6–22.9)	2.2	(1.1–3.2)

6.1.2.4.8. Classification of total physical activity levels:

Table (49) and **Figure (34)** illustrate specific rates of low and high total daily physical activity according to age groups and gender. The overall rate of low total daily physical activity (<600 MET) was 55.4%, being higher in women when compared with men (63.2% vs. 47.8%). This rate increases as the age advances with a substantial increase after the age of 55 years, particularly among men. Regarding high daily physical activity (≥ 3000 MET), the overall rate was 14.6% (17.8% for men vs 11.4% for women). A clear pattern of decreasing this rate of high total physical activity is noticed among men while no clear pattern can be demonstrated for women for this level of physical activity.

Table (49): Percentage of participants practicing low (< 600 MET) and high (> 3000 MET) total daily physical activity

Age Group	< 600 MET		≥ 3000 MET	
	%	(95% CI)	%	(95% CI)
Men	(n =447)		(n =149)	
20-24	42.8	(42.3–43.3)	23.2	(22.7–23.6)
25-34	50.1	(49.7–50.6)	15.6	(15.2–15.9)
35-44	49.6	(49.1–50.2)	16.5	(16.1–16.9)
45-54	43.9	(43.2–44.6)	16.0	(15.4–16.5)
55-64	58.3	(57.4–59.3)	12.9	(12.2–13.5)
20-64	47.8	(47.5–48.0)	17.8	(17.6–18.0)
Women	(n =867)		(n =149)	
20-24	66.3	(65.8–66.8)	9.7	(9.4–10.0)
25-34	60.3	(59.8–60.7)	12.3	(12.0–12.6)
35-44	60.0	(59.4–60.5)	13.8	(13.4–14.1)
45-54	66.5	(65.9–67.1)	9.1	(8.7–9.5)
55-64	68.0	(67.2–68.8)	10.6	(10.0–11.1)
20-64	63.2	(63.0–63.5)	11.4	(11.2–11.6)
Total	(n =1314)		(n = 298)	
20-24	53.2	(52.9–53.6)	17.2	(16.9–17.4)
25-34	55.2	(54.9–55.5)	13.9	(13.7–14.2)
35-44	54.7	(54.3–55.1)	15.1	(14.9–15.4)
45-54	56.2	(55.7–56.7)	12.3	(11.9–12.6)
55-64	64.0	(63.4–64.6)	11.5	(11.1–11.9)
20-64	55.4	(55.2–55.6)	14.6	(14.5–14.7)

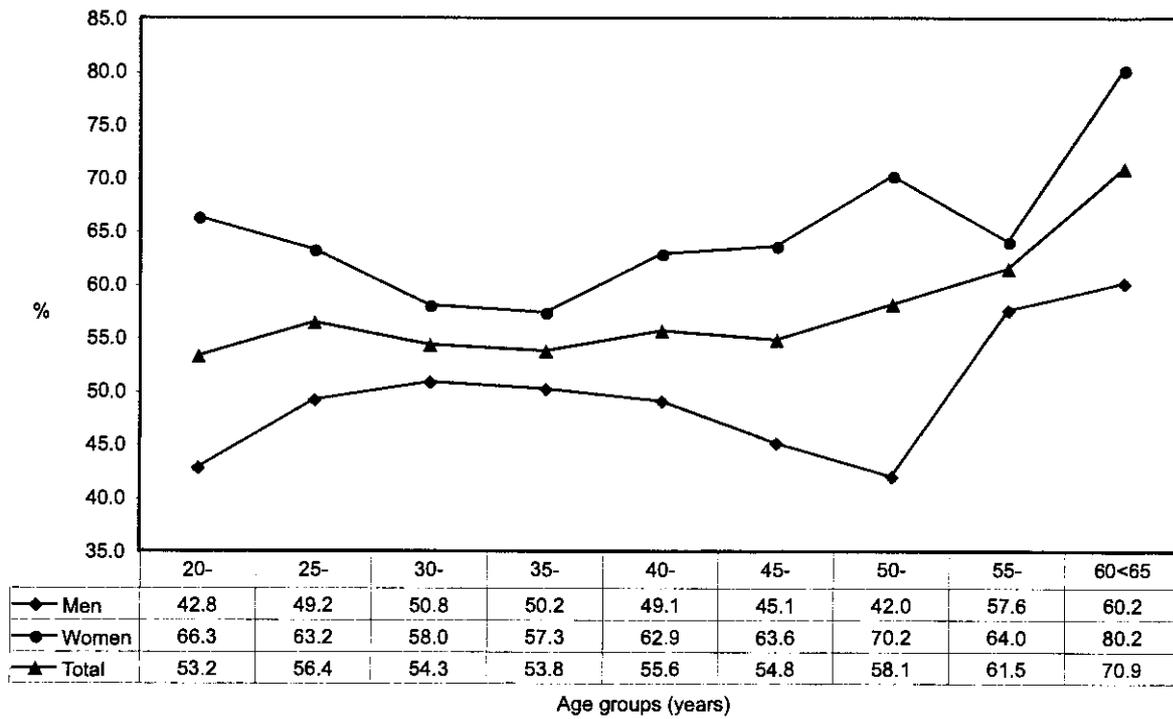


Figure (34): Rate of low total daily physical activity by gender and age groups

STEP (1)
Clinical History



6.1.3. Clinical history:

6.1.3.1. Family history of chronic non communicable diseases:

Table (50) and **Figure (35)** show positive family history of chronic non-communicable diseases. The highest proportion of the study participants reported family history of diabetes (72.3%) followed by hypertension (64.8%), then heart diseases (38.9%). The least encountered positive family history was that of tumors (19.6%) and kidney (19.5%) disease.

Women were more likely than men to have positive family history of hypertension (65.2% compared with 64.2%), heart disease (40.6% compared with 37.3%), tumors (21.1% compared with 18.2%) and kidney diseases (21.7% compared with 17.3%), while positive family history of diabetes was more reported by men (72.6% compared with 71.9%). These differences are quite obvious, for all of these diseases, at the age group 55-64 years except for diabetes mellitus.

Table (50): Positive family history of chronic non communicable diseases

Age Group	Hypertension		Heart		Tumor		Kidney		Diabetes	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 572)		(n = 362)		(n = 161)		(n = 164)		(n = 679)	
20-24	61.2	(60.8-61.7)	23.7	(23.3-24.1)	18.1	(17.7-18.5)	15.8	(15.4-16.1)	64.9	(64.5-65.4)
25-34	68.0	(67.5-68.4)	40.5	(40.1-41.0)	17.2	(16.9-17.6)	16.7	(16.3-17.0)	75.7	(75.3-76.1)
35-44	70.8	(70.3-71.3)	49.3	(48.8-49.9)	22.1	(21.7-22.5)	20.4	(20.0-20.8)	78.0	(77.6-78.4)
45-54	62.3	(61.6-63.0)	42.2	(41.4-42.9)	16.5	(15.9-17.0)	19.3	(18.7-19.9)	75.1	(74.5-75.8)
55-64	38.4	(37.4-39.4)	28.2	(27.3-29.1)	12.8	(12.1-13.5)	12.6	(11.9-13.3)	66.9	(66.0-67.9)
20-64	64.2	(64.0-64.5)	37.3	(37.1-37.6)	18.2	(18.0-18.4)	17.3	(17.1-17.5)	72.6	(72.4-72.8)
Women	(n = 902)		(n = 583)		(n = 309)		(n = 301)		(n = 999)	
20-24	57.0	(56.4-57.5)	30.6	(30.1-31.1)	17.5	(17.1-17.9)	17.2	(16.8-17.6)	61.2	(60.7-61.7)
25-34	66.7	(66.3-67.1)	40.7	(40.3-41.2)	16.6	(16.2-16.9)	24.8	(24.4-25.2)	77.0	(76.6-77.4)
35-44	72.6	(72.1-73.1)	50.2	(49.7-50.8)	26.4	(25.9-26.9)	25.6	(25.2-26.1)	78.3	(77.9-78.8)
45-54	67.4	(66.8-68.1)	43.1	(42.4-43.8)	26.3	(25.7-26.9)	19.0	(18.4-19.5)	71.6	(71.0-72.2)
55-64	59.5	(58.6-60.3)	36.9	(36.1-37.7)	23.3	(22.6-24.0)	17.1	(16.5-17.7)	66.7	(65.9-67.5)
20-64	65.2	(65.0-65.5)	40.6	(40.3-40.8)	21.1	(20.8-21.3)	21.7	(21.5-21.9)	71.9	(71.7-72.2)
Total	(n = 1474)		(n = 945)		(n = 470)		(n = 465)		(n = 1678)	
20-24	59.3	(58.9-59.6)	26.8	(26.5-27.1)	17.9	(17.6-18.1)	16.4	(16.1-16.7)	63.3	(62.9-63.6)
25-34	67.3	(67.0-67.6)	40.6	(40.3-41.0)	16.9	(16.7-17.1)	20.7	(20.5-21.0)	76.4	(76.1-76.6)
35-44	71.7	(71.4-72.1)	49.8	(49.4-50.2)	24.2	(23.9-24.5)	23.0	(22.7-23.3)	78.2	(77.8-78.5)
45-54	65.1	(64.6-65.6)	42.7	(42.2-43.2)	21.8	(21.4-22.3)	19.1	(18.7-19.5)	73.2	(72.8-73.7)
55-64	51.0	(50.3-51.6)	33.4	(32.7-34.0)	19.0	(18.5-19.5)	15.3	(14.8-15.7)	66.8	(66.2-67.4)
20-64	64.8	(64.6-64.9)	38.9	(38.8-39.1)	19.6	(19.5-19.8)	19.5	(19.4-19.6)	72.3	(72.1-72.4)

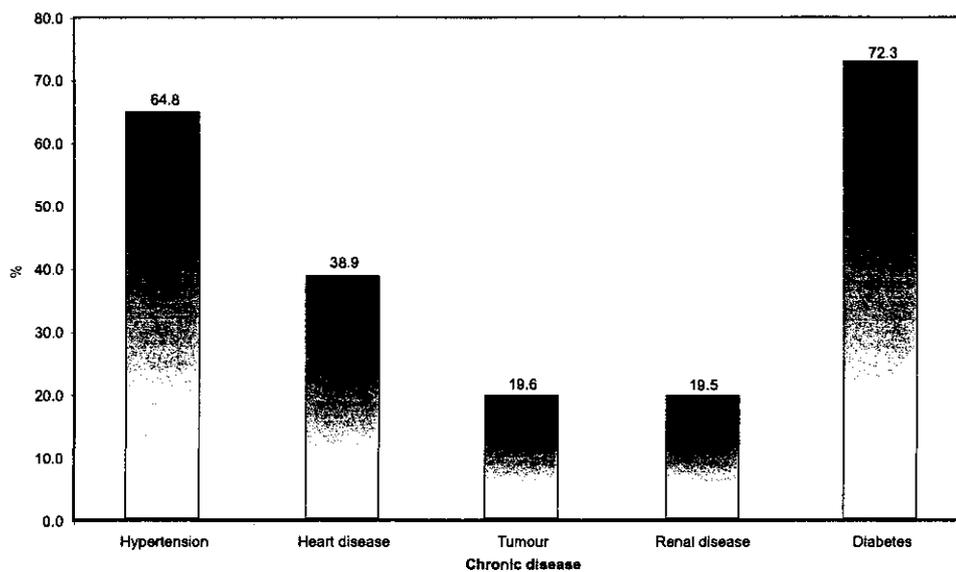


Figure (35): Positive family history of chronic non-communicable diseases

6.1.3.2. Present history:

6.1.3.2.1. Hypertension:

Table (51) shows raised blood pressure diagnosis and treatment results. The overall prevalence of increased blood pressure diagnosed by a doctor in the last 12 months preceding the survey was 10.8 %. This rate was higher among women (13.6 %) than men (8.0%). There was an increasing trend in the prevalence rate of raised blood pressure as the age advances in both genders.

Among those with raised blood pressure, 80.8% were receiving anti-hypertensives prescribed by a physician. Women were more likely to receive these medicines than men (81.4% compared with 80.0%) (**Figure 36**).

Table (51): Raised blood pressure diagnosis and treatment results

Age Group	Raised blood pressure diagnosed by doctor in last 12 months		Currently taking blood pressure drugs prescribed by doctor	
	%	(95% CI)	%	(95% CI)
Men	(n =97)		(n =83)	
20-24	1.3	(0.0–3.3)	65.3	(1.4–100)
25-34	4.7	(1.8–7.5)	53.9	(22.2–85.6)
35-44	10.3	(6.4–14.3)	89.5	(77.6–100)
45-54	18.7	(13.5–23.9)	89.2	(79.0–99.3)
55-64	25.2	(15.6–34.8)	78.8	(61.7–96.0)
20-64	8.0	(6.3–9.7)	80.0	(71.1–88.9)
Women	(n =210)		(n =176)	
20-24	1.4	(0.0–3.3)	0.0	-----
25-34	5.8	(3.2–8.3)	33.0	(10.9–55.0)
35-44	12.0	(8.9–15.1)	65.6	(52.6–78.5)
45-54	28.0	(22.9–33.2)	98.1	(95.4–100)
55-64	48.4	(38.8–58.1)	100	(100–100)
20-64	13.6	(11.8–15.5)	81.4	(75.4–87.3)
Total	(n =307)		(n =259)	
20-24	1.4	(0.0–2.7)	36.4	(0.0–89.1)
25-34	5.2	(3.3–7.1)	42.4	(23.3–61.5)
35-44	11.2	(8.6–13.7)	77.1	(67.9–86.4)
45-54	23.8	(20.1–27.5)	94.9	(90.8–99.0)
55-64	39.2	(32.1–46.4)	94.1	(88.9–99.3)
20-64	10.8	(9.5–12.1)	80.8	(75.8–85.8)

Table (52) shows the mean duration of hypertension. The overall mean duration of raised blood pressure was 6.4 years. Women had a higher mean duration when compared with men (6.8 vs. 5.8 years). There was a tendency of hypertension to occur in earlier age in men than women as indicated by differences in the duration of the disease by age whereas men had a longer mean duration of hypertension at the youngest age group (7.3 years compared with 3.7 years) while women tended to have higher mean duration above the age of 45 years.

Table (52): Mean duration of hypertension

Age Group	Men (n = 97)		Women (n = 210)		Total (n = 307)	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
20-24	7.3	(6.9–7.7)	3.7	(3.4–4.0)	5.7	(5.4–6.0)
25-34	1.7	(1.6–1.8)	1.9	(1.8–2.0)	1.8	(1.8–1.9)
35-44	6.8	(6.5–7.0)	5.4	(5.2–5.6)	6.1	(5.9–6.2)
45-54	6.3	(6.1–6.5)	8.6	(8.5–8.8)	7.8	(7.7–7.9)
55-64	6.7	(6.5–6.9)	8.1	(7.9–8.3)	7.7	(7.5–7.8)
20-64	5.8	(5.7–5.9)	6.8	(6.7–6.9)	6.4	(6.4–6.5)

Table (53) and **Figure (36)** show percentage of population with raised blood pressure who received lifestyle advice. The proportion of participants with raised blood pressure, who were advised or treated by a doctor to lose weight, was 44.8%. Hypertensive women were more advised to lose weight than men (48.6% vs. 38.6%, respectively). This advice was more encountered among women than men.

The proportion of smoking participant with raised blood pressure, who was advised to stop smoking, was 36.9%. This proportion was higher among men than women (40.1% vs. 28%, respectively).

Those receiving an advice to start or to do more exercise constituted 52.6% of hypertensive participants; a figure that was higher in men than women. No specific pattern was encountered if age was considered (56.6% vs. 50.2%, respectively).

Table (53): Percentage of population with raised blood pressure who received lifestyle advice

Age Group	Advised by doctor lose weight		Advised by doctor to stop smoking		Advised by doctor to start or do more exercise	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =38)		(n =13)		(n =54)	
20-24	34.7	(0.0-98.6)	0.0	-----	34.7	(0.0-98.6)
25-34	41.2	(9.7-72.7)	0.0	-----	79.7	(54.0-100)
35-44	46.2	(26.0-66.3)	50.2	(20.2-80.2)	53.8	(33.8-73.8)
45-54	29.4	(15.2-43.6)	31.0	(0.6-61.2)	44.4	(28.7-60.0)
55-64	38.4	(18.0-58.8)	77.9	(37.9-100)	62.1	(41.8-82.3)
20-64	38.6	(28.1-49.1)	40.1	(21.3-59.0)	56.6	(46.0-67.2)
Women	(n =101)		(n =3)		(n =106)	
20-24	50.0	(0.0-100)	0.0	-----	50.0	(0.0-100)
25-34	46.6	(23.5-69.7)	100	(100-100)	52.5	(29.4-75.7)
35-44	50.8	(37.1-64.5)	0.0	-----	47.5	(33.8-61.2)
45-54	39.7	(29.0-50.3)	0.0	-----	51.9	(41.1-62.8)
55-64	56.1	(42.4-69.9)	44.1	(0.0-94.6)	49.2	(35.4-63.1)
20-64	48.6	(41.4-55.8)	28.0	(0.0-57.0)	50.2	(42.9-57.4)
Total	(n =139)		(n =16)		(n =160)	
20-24	41.5	(0.0-90.0)	0.0	-----	41.5	(0.0-90.1)
25-34	44.2	(25.3-63.1)	20.7	(0.0-59.6)	64.7	(46.8-82.6)
35-44	48.6	(36.7-60.5)	40.9	(15.5-66.4)	50.5	(38.6-62.4)
45-54	36.0	(27.5-44.5)	23.1	(0.0-46.5)	49.2	(40.3-58.1)
55-64	51.2	(39.7-62.7)	59.8	(27.6-92.0)	52.8	(41.3-64.3)
20-64	44.8	(38.8-50.8)	36.9	(21.6-52.1)	52.6	(46.6-58.6)

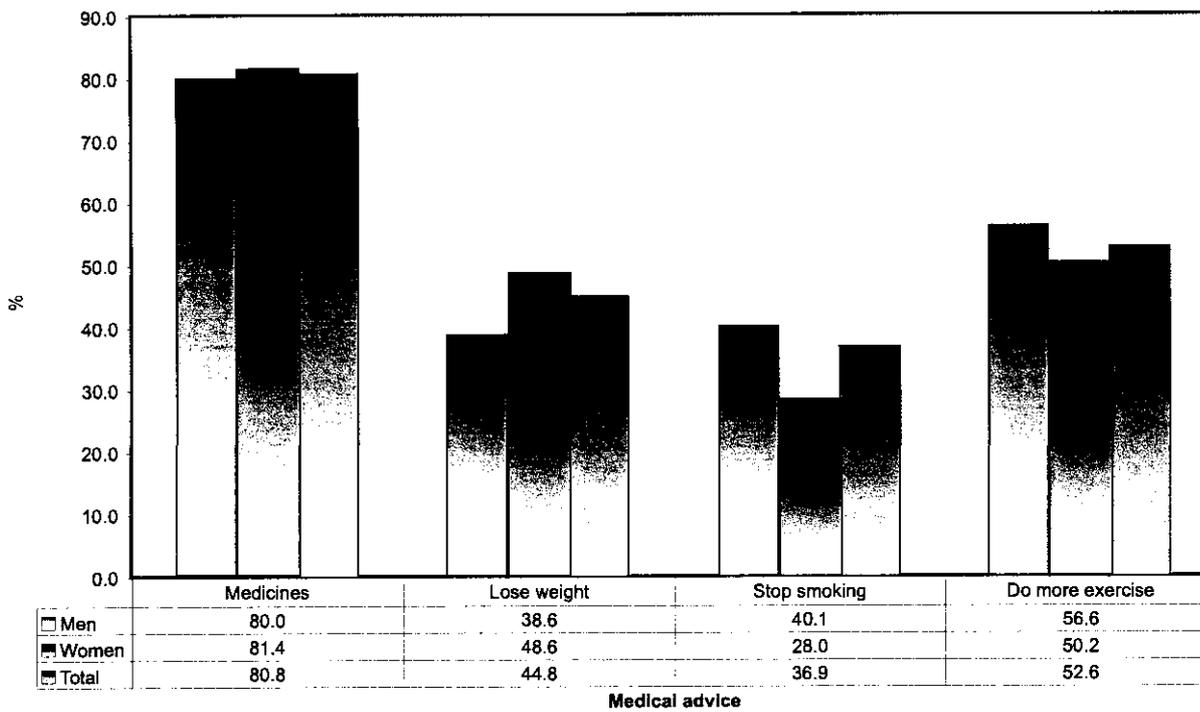


Figure (36): Treatment or lifestyle advice for hypertensive participants by gender

Table (54) shows percentage of population who measured their blood pressure. The proportion of the surveyed subjects who stated that their blood pressure has been measured within the previous 12 months, preceding the survey, was 69.7%. In this respect, a higher proportion of women (72.9%) measured their blood pressure than men (66.6%). Measuring blood pressure in the previous 12 months showed an increasing trend with the advancement of age.

The proportion of the surveyed subjects who stated that their blood pressure has been measured within 1-3 years, before the survey, was 16.7%, with higher proportions among men (17.7% compared with 15.7%).

Also, 13.6% of the participants declared that their blood pressure has been measured during the previous 3 years, before the survey. More men tended not to measure their blood pressure during the previous 3 years than women (15.7% compared with 11.3%).

Table (54): Duration since last measurement of blood pressure

Age Group	During the previous 12 months		Within 1 – 3 years		More than 3 years	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 661)		(n = 137)		(n = 120)	
20-24	52.7	(52.2–53.2)	24.5	(24.0–24.9)	22.8	(22.4–23.2)
25-34	57.9	(57.4–58.3)	21.0	(20.6–21.4)	21.1	(20.7–21.5)
35-44	80.0	(79.6–80.4)	11.0	(10.7–11.3)	9.0	(8.7–9.3)
45-54	83.1	(82.5–83.6)	10.1	(9.7–10.6)	6.8	(6.4–7.2)
55-64	88.3	(87.7–89.0)	10.6	(9.9–11.2)	1.1	(0.9–1.3)
20-64	66.6	(66.3–66.8)	17.7	(17.5–17.9)	15.7	(15.6–15.9)
Women	(n = 1032)		(n = 194)		(n = 136)	
20-24	56.6	(56.1–57.1)	20.8	(20.4–21.3)	22.6	(22.1–23.0)
25-34	70.3	(69.9–70.8)	19.7	(19.4–20.1)	9.9	(9.6–10.2)
35-44	76.1	(75.6–76.6)	14.6	(14.3–15.0)	9.3	(8.9–9.6)
45-54	84.6	(84.1–85.1)	8.6	(8.3–9.0)	6.8	(6.4–7.1)
55-64	94.8	(94.4–95.2)	4.3	(3.9–4.6)	0.9	(0.8–1.1)
20-64	72.9	(72.7–73.2)	15.7	(15.6–15.9)	11.3	(11.2–11.5)
Total	(n = 1693)		(n = 331)		(n = 256)	
20-24	54.5	(54.1–54.8)	22.8	(22.5–23.1)	22.7	(22.4–23.0)
25-34	64.1	(63.8–64.4)	20.4	(20.1–20.6)	15.5	(15.3–15.8)
35-44	78.1	(77.8–78.4)	12.8	(12.5–13.0)	9.1	(8.9–9.4)
45-54	83.9	(83.5–84.3)	9.3	(9.0–9.6)	6.8	(6.5–7.0)
55-64	92.1	(91.8–92.5)	6.9	(6.5–7.2)	1.0	(0.9–1.1)
20-64	69.7	(69.9–69.9)	16.7	(16.6–16.8)	13.6	(13.4–13.7)

6.1.3.2.2. Diabetes mellitus:

Table (55) shows history of diabetes diagnosis and treatment. The overall proportion of diabetes diagnosed by a doctor or a health worker in the last 12 months preceding the survey was 11.2 %. This rate was higher among women (11.6 %), than men (10.8%). There was an increasing trend with increasing age.

Among those diagnosed as diabetics during the last 12 months, 38.1% received insulin and 64.9% received oral anti-diabetic medicines by a physician or a health care worker. Women were more likely to receive insulin than men (39.1% compared with 37.0%), while men were more likely to receive oral medicines than women (65.5% vs. 64.3%).

Table (55): History of diabetes diagnosis and treatment

Age Group	Diabetes diagnosed by doctor or health worker in last 12 months		Currently taking insulin prescribed for diabetes by doctor or health worker		Currently taking oral drugs prescribed for diabetes by doctor or health worker	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men		(n =139)		(n =50)		(n =100)
20-24	2.5	(0.0–5.3)	100	(100–100)	0.0	-----
25-34	3.2	(0.8–5.6)	12.4	(0.0–35.4)	66.2	(32.9–99.5)
35-44	11.6	(7.5–15.7)	29.5	(12.8–46.2)	65.5	(48.0–82.9)
45-54	25.0	(19.1–30.8)	25.3	(13.6–37.0)	74.0	(62.2–85.8)
55-64	55.0	(44.1–65.9)	49.3	(34.8–63.8)	70.4	(57.1–83.6)
20-64	10.8	(8.9–12.7)	37.0	(28.1–45.9)	65.5	(56.6–74.4)
Women		(n =189)		(n =72)		(n =128)
20-24	0.7	(0.0–2.0)	0.0	-----	48.8	(0.0–100)
25-34	3.3	(1.4–5.3)	9.7	(0.0–28.0)	54.0	(23.6–84.3)
35-44	10.5	(7.7–13.3)	22.3	(10.4–34.2)	58.1	(44.4–71.8)
45-54	27.7	(22.6–32.9)	39.9	(29.3–50.5)	78.8	(70.0–87.7)
55-64	41.0	(31.5–50.5)	60.0	(45.1–74.8)	56.6	(41.1–71.6)
20-64	11.6	(9.9–13.2)	39.1	(31.7–46.5)	64.3	(57.0–71.7)
Total		(n =328)		(n =122)		(n =228)
20-24	1.7	(0.0–3.4)	70.7	(33.4–100)	14.3	(0.0–41.4)
25-34	3.3	(1.7–4.8)	11.1	(0.0–25.9)	60.4	(37.6–83.2)
35-44	11.0	(8.5–13.6)	26.2	(15.7–36.6)	62.0	(50.8–73.4)
45-54	26.5	(22.6–30.3)	33.6	(25.7–41.5)	76.8	(69.6–83.9)
55-64	46.6	(39.4–53.9)	54.8	(44.5–65.2)	63.2	(53.0–73.3)
20-64	11.2	(9.9–12.5)	38.1	(32.3–43.8)	64.9	(59.2–70.6)

Table (56) shows mean duration of diabetes. The overall mean duration of diabetes was 8.6 years. Women had a higher mean duration when compared with men (8.9 vs. 8.3 years).

Table (56): Mean duration of diabetes

Age Group	Men (n = 139)		Women (n = 189)		Total (n = 328)	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
20-24	9.7	(9.4–9.9)	1.5	(1.5–1.6)	7.3	(7.0–7.6)
25-34	4.4	(4.2–4.5)	2.1	(2.0–2.2)	3.3	(3.2–3.4)
35-44	6.4	(6.3–6.6)	6.0	(5.8–6.2)	6.3	(6.1–6.4)
45-54	7.9	(7.7–8.1)	9.4	(9.3–9.6)	8.8	(8.6–8.9)
55-64	11.0	(10.8–11.2)	12.4	(12.2–12.6)	11.7	(11.6–11.9)
20-64	8.3	(8.2–8.4)	8.9	(8.8–9.0)	8.6	(8.5–8.7)

Table (57) and **Figure (37)** show history of diabetes lifestyle advice. The proportion of participants with diabetes mellitus, who were advised or treated by a doctor to lose weight, was 56.2%, without a substantial gender difference (55.9% for men vs. 56.6% for women).

Less than two thirds of diabetic smokers were advised to stop smoking (61%). More diabetic men were advised to stop smoking than women (67.5% vs. 41.7%).

Starting or doing more exercise advice was received by 68.3% of diabetic participants. Also, more diabetic men were advised to start or to do more exercise than women (77.7% vs. 59.2%). Those using herbal or traditional remedies for diabetes constituted 11.9% of the diabetics. Women tended to use such remedy more than men (13.3 vs. 10.4%).

Table (57): History of diabetes lifestyle advice

Age Group	Advised or treated by doctor to lose weight		Advised or treated by doctor to stop smoking		Advised or treated by doctor to start or do more exercise		Currently taking herbal or traditional remedy for diabetes	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =77)		(n =29)		(n =108)		(n =12)	
20-24	66.7	(12.7-100)	100	(100-100)	100	(100-100)	33.3	(0.0-87.3)
25-34	61.0	(26.2-95.9)	63.4	(4.3-100)	87.6	(64.6-100)	12.0	(0.0-34.5)
35-44	65.3	(47.9-82.7)	64.0	(37.6-90.4)	80.8	(66.5-95.1)	17.6	(3.4-31.8)
45-54	45.1	(31.8-58.4)	63.6	(36.2-91.1)	68.8	(56.5-81.1)	3.8	(0.0-8.9)
55-64	54.1	(39.6-68.5)	69.6	(43.1-96.1)	75.6	(63.3-88.0)	5.6	(0.0-11.9)
20-64	55.9	(47.1-64.7)	67.5	(52.3-82.7)	77.7	(70.8-84.7)	10.4	(4.3-16.6)
Women	(n =104)		(n =7)		(n =112)		(n =26)	
20-24	100	(100-100)	0.0	-----	100	(100-100)	48.8	(0.0-100)
25-34	64.9	(36.1-93.8)	48.1	(0.0-100)	64.9	(36.1-93.8)	0.0	-----
35-44	53.5	(39.5-67.4)	35.0	(0.0-95.5)	63.7	(50.2-77.2)	19.1	(8.1-30.1)
45-54	48.2	(37.4-59.1)	27.4	(0.0-63.6)	50.2	(39.3-61.0)	12.3	(5.1-19.6)
55-64	62.1	(47.5-76.8)	50.5	(6.1-94.8)	61.3	(46.6-76.1)	11.6	(2.0-21.3)
20-64	56.6	(49.1-64.0)	41.7	(15.0-68.3)	59.2	(51.8-66.5)	13.3	(8.2-18.5)
Total	(n =181)		(n =36)		(n =220)		(n =38)	
20-24	76.4	(36.6-100)	100	(100-100)	100	(100-100)	37.9	(0.0-81.2)
25-34	62.9	(40.1-85.7)	58.2	(12.1-100)	76.9	(57.9-95.8)	6.3	(0.0-18.3)
35-44	59.8	(48.5-71.2)	61.1	(36.8-85.5)	72.9	(62.9-83.0)	18.3	(9.2-27.4)
45-54	46.9	(38.5-55.3)	52.2	(29.4-74.9)	58.2	(50.0-66.5)	8.6	(3.9-13.3)
55-64	58.3	(48.0-68.6)	62.5	(39.5-85.4)	68.2	(58.4-77.9)	8.7	(2.8-14.6)
20-64	56.2	(50.5-62.0)	61.0	(47.7-74.2)	68.3	(63.1-73.5)	11.9	(7.9-15.9)

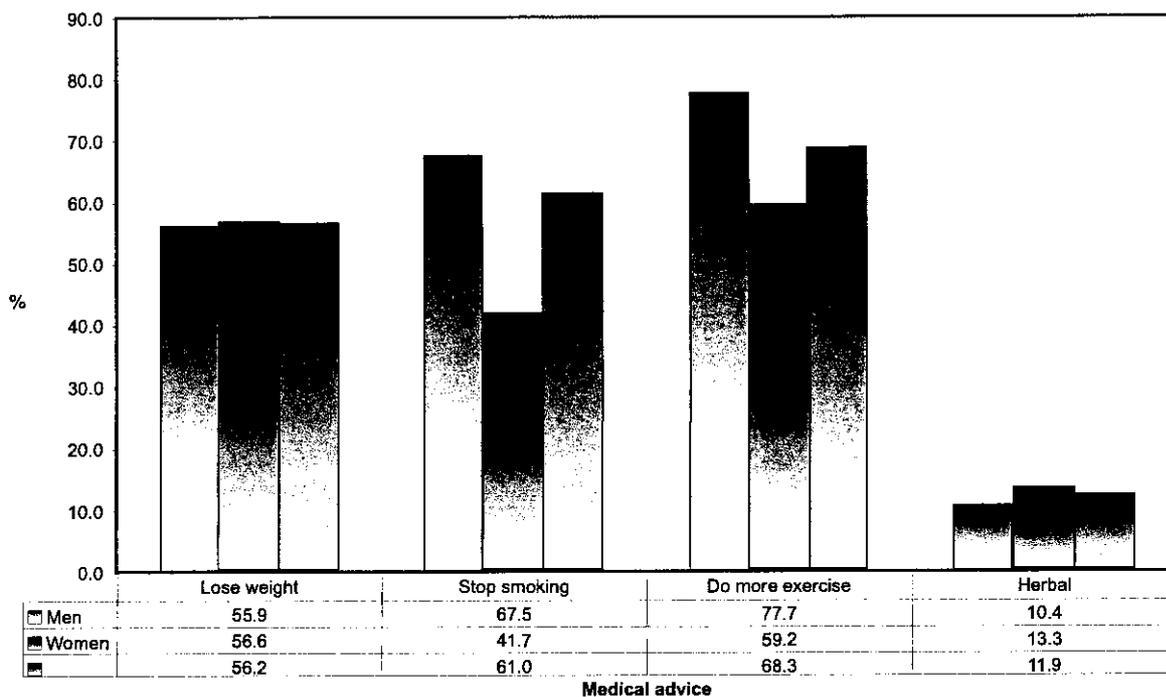


Figure (37): Lifestyle advice for diabetic participants by gender

Table (58) shows adherence of diabetics to health instructions. Among diabetic participants, 77.2% were adhering to periodic medical checkup. Women were more likely to adhere to this practice (79.2%) than men (75.2%).

About one third of diabetic participants (37.3%) were adhering to dietary instructions, with more adherence among men than women (37.8% compared with 36.7%).

The majority were adhering to medications (88.1%). In this respect, women had a higher proportion when compared with men (89.3% vs. 87.0%).

Table (58): Adherence of diabetics to health instructions

Age Group	Adherence to periodic medical check up		Adherence to dietary instructions		Adherence to medication	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 115)		(n = 57)		(n = 124)	
20-24	100	(100-100)	33.3	(30.4-36.3)	66.7	(63.7-69.6)
25-34	48.0	(45.6-50.5)	46.4	(44.0-48.9)	100	(100-100)
35-44	59.2	(57.7-60.7)	36.1	(34.6-37.5)	85.8	(84.7-87.0)
45-54	78.6	(77.4-79.8)	39.5	(38.0-40.9)	77.6	(76.4-78.8)
55-64	88.0	(87.1-88.9)	36.1	(34.8-37.4)	96.0	(95.5-96.5)
20-64	75.2	(74.5-75.8)	37.8	(37.1-38.6)	87.0	(86.4-87.5)
Women	(n = 157)		(n = 72)		(n = 159)	
20-24	48.8	(43.9-53.6)	51.2	(46.4-56.1)	48.8	(43.9-53.6)
25-34	65.7	(63.2-68.3)	21.3	(19.1-23.5)	88.3	(86.5-90.1)
35-44	77.7	(76.3-79.0)	33.7	(32.1-35.2)	86.6	(85.4-87.9)
45-54	82.1	(81.1-83.1)	37.6	(36.4-38.9)	87.4	(86.5-88.3)
55-64	82.5	(81.5-83.5)	40.2	(38.9-41.4)	95.4	(94.9-96.0)
20-64	79.2	(78.6-79.8)	36.7	(36.0-37.5)	89.3	(88.8-89.7)
Total	(n = 272)		(n = 129)		(n = 283)	
20-24	85.0	(83.1-86.9)	38.6	(36.0-41.1)	61.4	(58.9-64.0)
25-34	56.0	(54.2-57.8)	35.1	(33.4-36.8)	94.3	(93.4-95.2)
35-44	67.7	(66.7-68.8)	35.0	(33.9-36.0)	86.2	(85.3-87.0)
45-54	80.6	(79.8-81.3)	38.4	(37.5-39.4)	83.1	(82.3-83.8)
55-64	85.1	(84.5-85.8)	38.2	(37.3-39.1)	95.7	(95.3-96.1)
20-64	77.2	(76.8-77.7)	37.3	(36.8-37.8)	88.1	(87.8-88.5)

Table (59) and Figure (38) show self care measures and attendance of health education sessions by diabetics. About two fifths (42.3%) of the diabetic interviewees stated that they did self blood sugar analysis. In this regards, men had a higher proportion when compared with women (44.9% vs. 39.8%). Self blood sugar analysis showed an inverted U-shaped trend as the age advances with a peak at the age group 25-34 years, and another peak at the age group 55-64 years.

Those practicing self-medicine-dosing-control formed 25.3% of diabetics. Men were more committed to control medicine dose compared with women (28.4 vs. 22.3%).

Attending health education sessions during the previous 2 months preceding the survey was stated by only 5.6%. Women were more likely to attend these sessions than men (6.1% vs. 5.1%).

Table (59): Self care measures and attendance of health education sessions by diabetics

Age Group	Self blood sugar analysis		Self medicine dosing control		Attending health education sessions within the previous 2 months	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 64)		(n = 37)		(n = 8)	
20-24	33.3	(30.4–36.3)	33.3	(30.4–36.3)	0.0	-----
25-34	75.0	(72.9–77.1)	50.8	(48.1–53.6)	0.0	-----
35-44	61.7	(60.2–63.2)	33.4	(31.8–34.9)	7.4	(6.6–8.2)
45-54	45.0	(43.6–46.5)	22.5	(21.3–23.7)	7.0	(6.3–7.8)
55-64	25.1	(23.9–26.3)	24.0	(22.9–25.1)	4.1	(3.6–4.7)
20-64	44.9	(44.1–45.6)	28.4	(27.7–29.2)	5.1	(4.7–5.4)
Women	(n = 78)		(n = 35)		(n = 13)	
20-24	51.2	(46.4–56.1)	48.8	(43.9–53.6)	0.0	-----
25-34	54.5	(51.8–57.1)	35.1	(32.4–37.7)	0.0	-----
35-44	45.9	(44.3–47.6)	25.9	(24.3–27.5)	5.1	(4.4–5.9)
45-54	41.6	(40.4–42.9)	15.1	(14.2–16.0)	7.4	(6.7–8.0)
55-64	30.0	(28.9–31.2)	23.0	(21.9–24.1)	7.2	(6.5–7.8)
20-64	39.8	(39.0–40.5)	22.3	(21.6–22.9)	6.1	(5.7–6.4)
Total	(n = 142)		(n = 72)		(n = 21)	
20-24	38.6	(36.0–41.1)	37.9	(35.3–40.4)	0.0	-----
25-34	65.8	(64.1–67.5)	43.1	(41.2–45.1)	0.0	-----
35-44	54.4	(53.3–55.5)	30.1	(29.0–31.2)	6.3	(5.8–6.9)
45-54	43.1	(42.2–44.1)	18.3	(17.6–19.1)	7.2	(6.7–7.7)
55-64	27.7	(26.8–28.5)	23.5	(22.7–24.3)	5.7	(5.3–6.1)
20-64	42.3	(41.8–42.8)	25.3	(24.9–25.8)	5.6	(5.3–5.8)

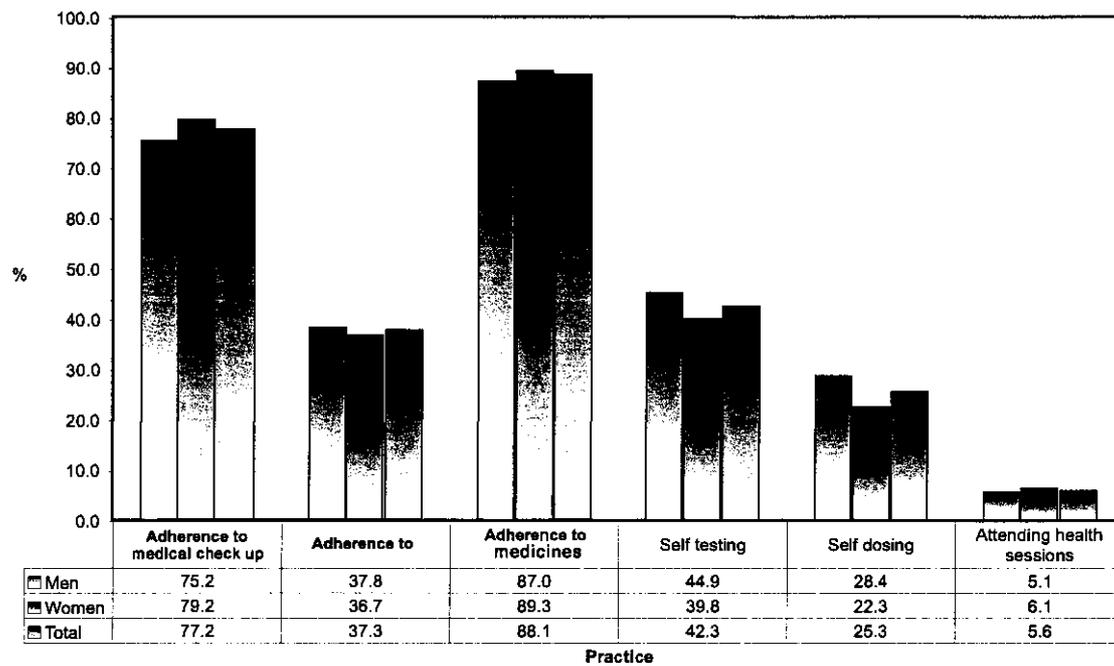


Figure (38): Practices of diabetic participants

Table (60) shows sources of health knowledge for diabetics. Physicians were stated as the main source of health knowledge for diabetics in this study (74.0%), followed by mass media (8.3%) and friends/relatives (7.4%). The least mentioned sources were nurses and health sessions (0.9, 0.6%, respectively). More women received health knowledge about diabetes than men from friends / relatives (8.7% compared with 6.1%), printed materials (7.2% compared with 4.1%) and health sessions (1.3% compared with none), while men were more likely to receive such knowledge from physicians (74.2% compared with 73.8%), mass media (9.1% compared with 7.6%) and nurses (1.1% compared with 0.7%).

Table (60): Sources of health knowledge for diabetics

Age Group	Physician		Nurse		Health sessions		Mass media		Friends / relatives		Printed materials	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 112)		(n = 2)		(n = 0)		(n = 12)		(n = 11)		(n = 6)	
20-24	100	(100-100)	0.0	-----	0.0	-----	0.0	-----	0.0	-----	0.0	-----
25-34	58.8	(56.5-61.2)	0.0	-----	0.0	-----	14.6	(12.8-16.3)	0.0	-----	0.0	-----
35-44	59.5	(58.0-61.0)	0.0	-----	0.0	-----	20.8	(19.6-22.0)	7.2	(6.4-8.0)	9.2	(8.4-10.1)
45-54	70.1	(68.8-71.5)	4.0	(3.4-4.5)	0.0	-----	7.1	(6.4-7.9)	13.3	(12.3-14.3)	1.8	(1.4-2.2)
55-64	88.6	(87.8-89.5)	0.0	-----	0.0	-----	2.0	(1.6-2.3)	2.0	(1.6-2.4)	4.1	(3.6-4.7)
20-64	74.2	(73.5-74.9)	1.1	(0.9-1.2)	0.0	(0.0-0.0)	9.1	(8.7-9.5)	6.1	(5.7-6.4)	4.1	(3.8-4.4)
Women	(n = 145)		(n = 1)		(n = 3)		(n = 16)		(n = 17)		(n = 14)	
20-24	48.8	(43.9-53.6)	0.0	-----	0.0	-----	51.2	(46.4-56.1)	0.0	-----	0.0	-----
25-34	90.3	(88.8-91.8)	0.0	-----	0.0	-----	0.0	-----	0.0	-----	9.7	(8.2-11.2)
35-44	58.8	(57.2-60.4)	0.0	-----	4.1	(3.5-4.8)	10.8	(9.8-11.8)	11.0	(10.0-12.1)	14.1	(13.0-15.3)
45-54	71.0	(69.9-72.2)	0.0	-----	1.2	(1.0-1.5)	8.8	(8.1-9.5)	9.7	(9.0-10.5)	7.9	(7.2-8.5)
55-64	83.2	(82.3-84.2)	2.2	(1.8-2.6)	0.0	-----	3.4	(2.9-3.8)	9.0	(8.3-9.7)	2.2	(1.8-2.6)
20-64	73.8	(73.1-74.4)	0.7	(0.6-0.9)	1.3	(1.1-1.4)	7.6	(7.2-8.0)	8.7	(8.3-9.1)	7.2	(6.8-7.6)
Total	(n = 257)		(n = 3)		(n = 3)		(n = 28)		(n = 28)		(n = 20)	
20-24	85.0	(83.1-86.9)	0.0	-----	0.0	-----	15.0	(13.1-16.9)	0.0	-----	0.0	-----
25-34	73.8	(72.2-75.3)	0.0	-----	0.0	-----	7.6	(6.7-8.6)	0.0	-----	4.6	(3.9-5.3)
35-44	59.2	(58.1-60.3)	0.0	-----	1.9	(1.6-2.2)	16.2	(15.4-17.0)	9.0	(8.3-9.6)	11.5	(10.8-12.2)
45-54	70.6	(69.8-71.5)	1.7	(1.5-2.0)	0.7	(0.5-0.9)	8.1	(7.5-8.6)	11.3	(10.7-11.9)	5.2	(4.8-5.6)
55-64	85.8	(85.2-86.5)	1.1	(0.9-1.3)	0.0	-----	2.7	(2.4-3.0)	5.6	(5.2-6.1)	3.1	(2.8-3.5)
20-64	74.0	(73.5-74.5)	0.9	(0.8-1.0)	0.6	(0.6-0.7)	8.3	(8.1-8.6)	7.4	(7.1-7.1)	5.7	(5.4-5.9)

Other sources were mentioned by 5.4% of men, 0.7% of women and 3.1% of the total.

6.1.3.2.3. Cardiac diseases:

Table (61) shows cardiac disease diagnosis, diagnosis and treatment measures. The overall prevalence of cardiac diseases diagnosed by a doctor in the last 12 months was 2.9%. Women had a higher proportion than men (3.0% vs. 2.8%). There was an increasing trend in the prevalence rate of diagnosed cardiac diseases as the age advances in both genders. **Figure (39)** demonstrates the prevalence of cardiac diseases diagnosed by a doctor in the last year by gender and age groups.

Among cardiac patients, 67.6% were currently taking cardiovascular drugs prescribed by a doctor, with higher proportion among women than men (73.1% vs. 61.9%).

The overall mean duration of cardiac disease was 8.2 years, being higher among women (8.8 years) than among men (7.6 years).

Table (61): Diagnosis, treatment and duration of cardiac disease

Age Group	Cardiac disease diagnosed by doctor in last 12 months		Currently taking cardiovascular drugs prescribed by doctor		Duration of cardiac disease (years)	
	%	(95% CI)	%	(95% CI)	Mean	(95% CI)
Men	(n = 37)		(n = 24)		(n = 37)	
20-24	0.4	(0.4-0.5)	0.0	(0.0-0.0)	2.0	(2.0-2.0)
25-34	1.2	(1.1-1.3)	43.1	(39.0-47.2)	8.1	(7.5-8.7)
35-44	2.5	(2.3-2.6)	48.1	(44.7-51.5)	7.8	(7.6-8.0)
45-54	7.7	(7.3-8.1)	61.6	(59.0-64.2)	9.2	(8.9-9.6)
55-64	12.7	(12.0-13.3)	89.5	(87.7-91.2)	6.2	(6.0-6.4)
20-64	2.8	(2.7-2.9)	61.9	(60.4-63.4)	7.6	(7.4-7.7)
Women	(n = 43)		(n = 31)		(n = 43)	
20-24	0.0	(0.0-0.0)	0.0	(0.0-0.0)	0.0	-----
25-34	2.0	(1.8-2.1)	44.9	(41.5-48.2)	9.3	(8.7-10.0)
35-44	2.1	(2.0-2.3)	64.6	(61.1-68.2)	6.8	(6.4-7.3)
45-54	4.5	(4.2-4.8)	65.4	(62.4-68.5)	7.7	(7.2-8.2)
55-64	13.5	(12.9-14.0)	93.3	(92.1-94.4)	9.9	(9.6-10.2)
20-64	3.0	(2.9-3.1)	73.1	(71.8-74.4)	8.8	(8.6-9.0)
Total	(n = 80)		(n = 55)		(n = 80)	
20-24	0.2	(0.2-0.3)	0.0	(0.0-0.0)	2.0	(2.0-2.0)
25-34	1.6	(1.5-1.7)	44.2	(41.6-46.8)	8.9	(8.4-9.3)
35-44	2.3	(2.2-2.4)	55.6	(53.1-58.1)	7.4	(7.1-7.6)
45-54	6.0	(5.7-6.2)	63.2	(61.2-65.1)	8.6	(8.3-8.9)
55-64	13.1	(12.7-13.6)	91.7	(90.8-92.7)	8.4	(8.2-8.6)
20-64	2.9	(2.9-3.0)	67.6	(66.7-68.6)	8.2	(8.1-8.3)

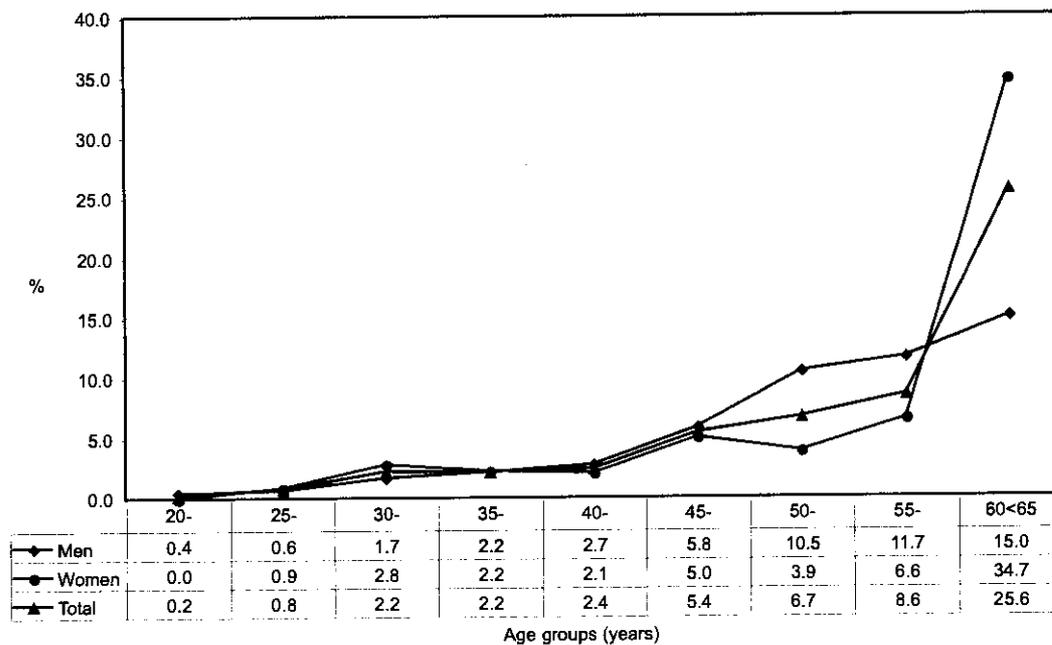


Figure (39): Prevalence of cardiac diseases diagnosed by a doctor or a health worker in the year preceding the survey by gender and age groups

Table (62) shows past history of hospitalization among cardiac patients. Just more than a third (35.6%) of the cardiac cases suffered from acute cardiac thrombosis necessitating hospitalization for more than 5 days. In this respect, women had a higher proportion than had men (36.8% vs. 34.4%, respectively). Moreover, there was an increasing trend of this proportion with advancement of age especially among men.

Also around a third (34.0%) were suffering from cardiac disease necessitating hospitalization during the previous year, with a higher proportion among women than men (39.8% vs. 27.8%).

Table (62): Past history of hospitalization among cardiac patients

Age Group	Acute cardiac thrombosis necessitating hospitalization for more than 5 days		Cardiac disease necessitating hospitalization during the previous year	
	%	(95% CI)	%	(95% CI)
Men		(n = 14)		(n = 10)
20-24	0.0	(0.0-0.0)	0.0	(0.0-0.0)
25-34	0.0	(0.0-0.0)	43.1	(38.9-47.2)
35-44	19.5	(16.8-22.2)	17.3	(14.7-19.9)
45-54	36.3	(33.7-38.8)	25	(22.7-27.4)
55-64	63.0	(60.3-65.7)	35.4	(32.7-38.1)
20-64	34.4	(32.9-35.8)	27.8	(26.5-29.2)
Women		(n = 14)		(n = 17)
20-24	0.0	-----	0.0	-----
25-34	19.5	(16.9-22.2)	28.8	(25.7-31.8)
35-44	32.7	(29.2-36.2)	20.5	(17.5-23.6)
45-54	15.0	(12.7-17.3)	34.0	(31.0-37.1)
55-64	57.5	(55.3-59.8)	55.0	(52.3-57.7)
20-64	36.8	(35.4-38.2)	39.8	(38.3-41.2)
Total		(n = 28)		(n = 27)
20-24	0.0	-----	0.0	-----
25-34	11.9	(10.2-13.6)	34.3	(31.8-36.8)
35-44	25.5	(23.3-27.7)	18.8	(16.8-20.7)
45-54	27.5	(25.7-29.3)	28.8	(26.9-30.6)
55-64	59.7	(58.0-61.4)	47.2	(45.5-49.0)
20-64	35.6	(34.6-36.6)	34.0	(33.0-35.0)

Table (63) shows past history of cardiac intervention measures for cardiac patients. One tenth of the cardiac interviewees (10.1%) were operated upon for open cardiac surgery, while less than half (43.6%) were subjected to cardiac catheterization. Men were more liable to either cardiac surgery (11.5% vs. 8.7%) or catheterization (50.2% vs. 37.3%) than women.

Table (63): Past history of cardiac intervention measures of cardiac patients

Age Group	Performed open cardiac surgery (revascularization)		Performed intervention cardiac catheterization (stint / balloon)	
	%	(95% CI)	%	(95% CI)
Men	(n = 5)		(n = 19)	
20-24	0.0	-----	0.0	-----
25-34	0.0	-----	43.1	(39.0-47.2)
35-44	0.0	-----	38.9	(35.6-42.2)
45-54	17.4	(15.4-19.4)	55.9	(53.3-58.6)
55-64	19.5	(17.3-21.7)	62.1	(59.4-64.8)
20-64	11.5	(10.5-12.4)	50.2	(48.6-51.7)
Women	(n = 3)		(n = 17)	
20-24	0.0	-----	0.0	-----
25-34	0.0	-----	0.0	-----
35-44	0.0	-----	10.1	(7.9-12.4)
45-54	0.0	-----	54.1	(50.9-57.3)
55-64	20.5	(18.7-22.4)	56.3	(54.0-58.5)
20-64	8.7	(7.9-9.6)	37.3	(35.9-38.8)
Total	(n = 8)		(n = 36)	
20-24	0.0	-----	0.0	-----
25-34	0.0	-----	16.7	(14.8-18.7)
35-44	0.0	-----	25.8	(23.6-28.0)
45-54	10.2	(9.0-11.4)	55.2	(53.2-57.2)
55-64	20.1	(18.7-21.6)	58.6	(56.9-60.3)
20-64	10.1	(9.4-10.7)	43.6	(42.5-44.6)

Table (64) shows the percent age of participants with cardiac diseases who received advice related to their life style . Out of cardiac patients participating in this study, 39.7% were advised to follow special diet, 49.2% to lose weight, 48.9% to stop smoking and 55.8% to start or do more exercise. More women received advice regarding special diet (43.3% compared with 35.9%), weight loss (59.3% compared with 38.6%) or stop smoking (60.0% compared with 44.5%) while more men were advised to start or do more exercise (60.0% compared with 51.9%).

Table (64): History of cardiac disease lifestyle advice

Age Group	Advised to follow special diet		Advised to lose weight		Advised to stop smoking		Advised to start or do more exercise	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 13)		(n = 14)		(n = 6)		(n = 23)	
20-24	0.0	-----	0.0	-----	0.0	-----	0.0	-----
25-34	43.1	(39.0-47.2)	43.1	(39.0-47.2)	100	(100-100)	63.5	(59.4-67.5)
35-44	19.5	(16.8-22.2)	48.1	(44.7-51.5)	0.0	-----	48.1	(44.7-51.5)
45-54	38.4	(35.8-41.0)	38.4	(35.8-41.0)	56.3	(52.3-60.3)	62.6	(60.0-65.2)
55-64	46.4	(43.6-49.2)	36.1	(33.4-38.8)	50.0	(43.4-56.6)	72.6	(70.1-75.1)
20-64	35.9	(34.5-37.4)	38.6	(37.1-40.1)	44.5	(41.7-47.2)	60.0	(58.5-61.5)
Women	(n = 20)		(n = 25)		(n = 2)		(n = 20)	
20-24	0.0	-----	0.0	-----	0.0	-----	0.0	-----
25-34	9.2	(7.3-11.2)	61.0	(57.7-64.2)	100	(100-100)	61.0	(57.7-64.2)
35-44	76.8	(73.7-80.0)	66.0	(62.5-69.5)	0.0	-----	22.3	(19.2-25.4)
45-54	35.5	(32.5-38.6)	42.7	(39.6-45.9)	0.0	-----	38.2	(35.1-41.3)
55-64	50.6	(48.3-52.9)	64.4	(62.2-66.6)	50.6	(44.4-56.8)	65.7	(63.5-67.8)
20-64	43.3	(41.8-44.7)	59.3	(57.8-60.7)	60.0	(55.7-64.3)	51.9	(50.4-53.4)
Total	(n = 33)		(n = 39)		(n = 8)		(n = 43)	
20-24	0.0	-----	0.0	-----	0.0	-----	0.0	-----
25-34	22.4	(20.2-24.6)	54.0	(51.4-56.6)	100	(100-100)	61.9	(59.4-64.5)
35-44	45.6	(43.1-48.1)	56.2	(53.7-58.7)	0.0	(0.0-0.0)	36.4	(33.9-38.8)
45-54	37.2	(35.3-39.2)	40.2	(38.2-42.2)	50.1	(46.4-53.9)	52.5	(50.5-54.6)
55-64	48.9	(47.2-50.7)	53.2	(51.4-54.9)	50.3	(45.8-54.8)	68.4	(66.8-70.1)
20-64	39.7	(38.7-40.7)	49.2	(48.1-50.3)	48.9	(46.5-51.2)	55.8	(54.8-56.9)

Figure (40) summarizes the prevalence rates of some non-communicable diseases diagnosed in the last 12 months prior to the interview by gender. It was found that 11% of women were hypertensive compared to only 6.8% of men. Also, women were more likely to suffer from diabetes than men (11.6% compared to 10.8%). Only a minority were suffering from cardiac diseases (3.0% of women and 2.8% of men).

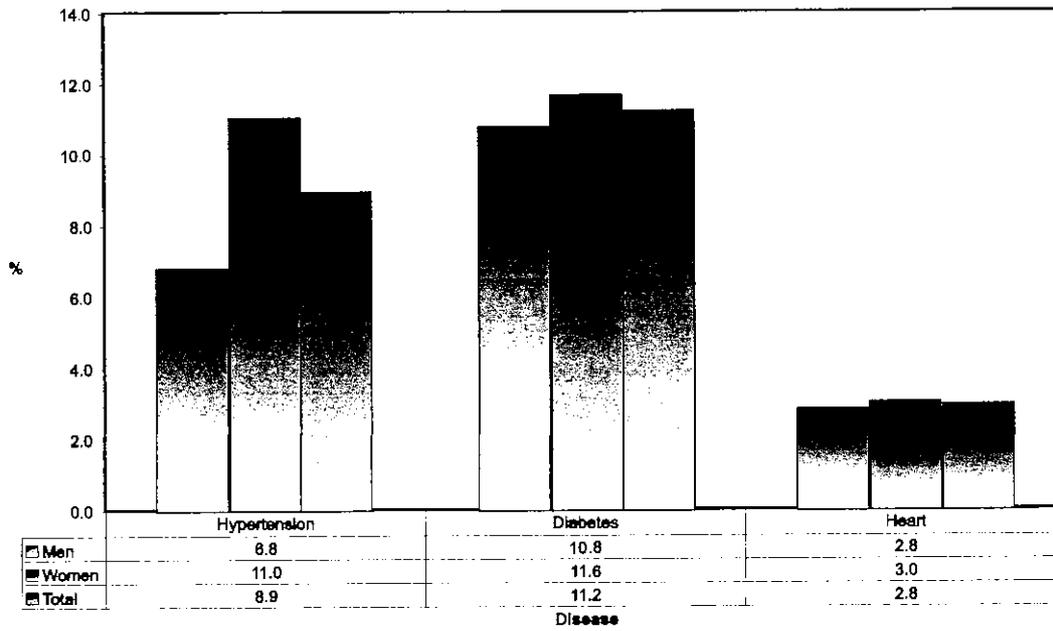


Figure (40): History of non-communicable diseases diagnosed in the last 12 months by gender

STEP (2)

Clinical Measurements



6.2. Step 2: Physical measurements

6.2.1. Anthropometric measurements:

6.2.1.1. Height, weight and BMI:

Table (65) shows results of measuring height, weight and body mass index for the participants (excluding pregnant women). Overall, the mean height was 164.5cm (171.4 cm for men vs 157.4 cm for women) and the mean weight was 80.4 Kg for men vs 75.6 Kg for women). The mean body mass index was 29.6 Kg/m² (30.5 for men vs 26.1 for women).

That is men were taller and heavier than women . Hover the body mass index was lighter among women.

Table (65): Mean height, weight and body mass index (excluding pregnant women)

Age Group	Height (cm)		Weight (kg)		BMI (Kg/m ²)	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Men	(n =905)		(n =905)		(n =905)	
20-24	172.1	(170.9–173.2)	80.3	(76.3–84.3)	27.1	(25.8–28.3)
25-34	171.7	(170.8–172.7)	85.5	(82.8–88.2)	28.8	(28.0–29.6)
35-44	171.8	(170.9–172.8)	89.6	(87.2–92.0)	30.3	(29.5–31.0)
45-54	170.3	(169.5–171.2)	87.4	(85.0–89.7)	30.0	(29.3–30.7)
55-64	167.8	(166.3–169.3)	83.9	(79.9–87.9)	29.3	(28.3–30.3)
20-64	171.4	(170.9–171.9)	85.2	(83.6–86.7)	28.9	(28.4–29.3)
Women	(n =1343)		(n =1277)		(n =1277)	
20-24	157.9	(156.9–158.9)	65.2	(62.9–67.5)	26.1	(25.2–26.9)
25-34	158.0	(157.4–158.7)	76.1	(74.2–78.1)	30.3	(29.5–31.2)
35-44	158.0	(157.4–158.6)	79.0	(77.4–80.7)	31.5	(30.9–32.1)
45-54	156.2	(155.5–156.9)	79.8	(77.9–81.7)	32.6	(31.9–33.3)
55-64	154.3	(153.0–155.5)	82.2	(79.6–84.8)	34.6	(33.5–35.7)
20-64	157.4	(157.0–157.7)	75.6	(74.6–76.6)	30.5	(30.1–30.9)
Total	(n =2248)		(n =2182)		(n =2182)	
20-24	166.0	(164.8–167.1)	73.7	(71.1–76.4)	26.6	(25.8–27.5)
25-34	164.9	(164.1–165.7)	80.8	(79.1–82.6)	29.5	(29.0–30.1)
35-44	165.1	(164.3–165.8)	84.4	(82.9–85.9)	30.9	(30.4–31.4)
45-54	162.6	(161.8–163.4)	83.2	(81.7–84.8)	31.4	(30.9–31.9)
55-64	159.7	(158.4–161.1)	82.9	(80.7–85.2)	32.5	(31.6–33.3)
20-64	164.5	(164.0–164.9)	80.4	(79.5–81.4)	29.6	(29.3–30.0)

6.2.1.1.1. Overweight and obesity:

Table (66) shows BMI classifications (excluding pregnant women). Almost three quarters of the participants were overweight / obese. (75.4%) Women were more likely to suffer from overweight / obesity than men (77.4% compared with 73.6%). A minority (2.3%) were suffering from underweight with higher prevalence among men (3.4%) compared with women (1.2%). A general trend of increasing rates of obesity with progress of age can be observed for both men and women.

Figure (41) shows the prevalence rate of obesity and overweight (BMI ≥ 25 kg/m²) according to gender and age groups. Considering overweight and obesity separately, as shows in **Figure(42)**, indicated that men were more liable to be overweight than women whereas obesity was more encountered among women than men.

Table (66): BMI classifications (excluding pregnant women)

Age Group	Under-weight (<18.5)		Normal weight (18.5 - 24.9)		Over-weight (25 - 29.9)		Obese (30+)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =176)		(n =176)		(n =351)		(n =353)	
20-24	8.5	(3.4-13.7)	38.3	(29.4-47.1)	27.1	(19.1-35.1)	26.1	(18.1-34.2)
25-34	2.4	(0.4-4.3)	21.1	(15.8-26.5)	43.2	(36.6-49.7)	33.3	(27.1-39.6)
35-44	0.8	(0.0-2.0)	13.6	(9.2-17.9)	39.7	(33.5-45.9)	45.9	(39.5-52.2)
45-54	0.9	(0.0-2.2)	15.0	(10.2-19.8)	38.9	(32.3-45.5)	45.2	(38.5-51.9)
55-64	0.0	-----	17.0	(8.8-25.1)	39.3	(28.6-49.9)	43.8	(32.9-54.6)
20-64	3.4	(1.8-4.9)	23.0	(19.7-26.3)	37.2	(33.7-40.7)	36.4	(32.9-39.9)
Women	(n =9)		(n =219)		(n =370)		(n =679)	
20-24	4.0	(0.6-7.4)	45.3	(37.1-53.5)	30.2	(22.6-37.7)	20.6	(14.0-27.2)
25-34	0.8	(0.0-1.8)	22.5	(17.5-27.5)	32.8	(27.3-38.4)	43.9	(38.0-49.8)
35-44	0.2	(0.0-0.7)	14.9	(11.5-18.3)	29.9	(25.5-34.2)	55.0	(50.2-59.7)
45-54	0.3	(0.0-1.0)	9.6	(6.2-13.0)	27.5	(22.3-32.7)	62.6	(57.0-68.1)
55-64	0.0	-----	0.9	(0.0-2.8)	20.3	(12.5-28.1)	78.8	(70.8-86.7)
20-64	1.2	(0.4-2.0)	21.4	(18.7-24.1)	29.5	(26.7-32.2)	47.9	(44.9-50.9)
Total	(n =185)		(n =395)		(n =721)		(n =1032)	
20-24	6.6	(3.3-99.9)	41.2	(35.0-47.4)	28.4	(22.7-34.0)	23.8	(18.3-29.2)
25-34	1.6	(0.5-2.8)	21.8	(18.1-25.5)	38.3	(33.9-42.7)	38.3	(34.0-42.6)
35-44	0.5	(0.0-1.2)	14.2	(11.4-17.0)	35.0	(31.1-38.8)	50.2	(46.2-54.2)
45-54	0.6	(0.0-1.3)	12.1	(9.2-14.9)	32.7	(28.5-36.8)	54.7	(50.3-59.1)
55-64	0.0	-----	7.4	(3.7-11.0)	27.9	(21.4-34.4)	64.7	(57.9-71.6)
20-64	2.3	(1.4-3.2)	22.3	(20.1-24.4)	33.5	(31.2-35.7)	41.9	(39.6-44.3)

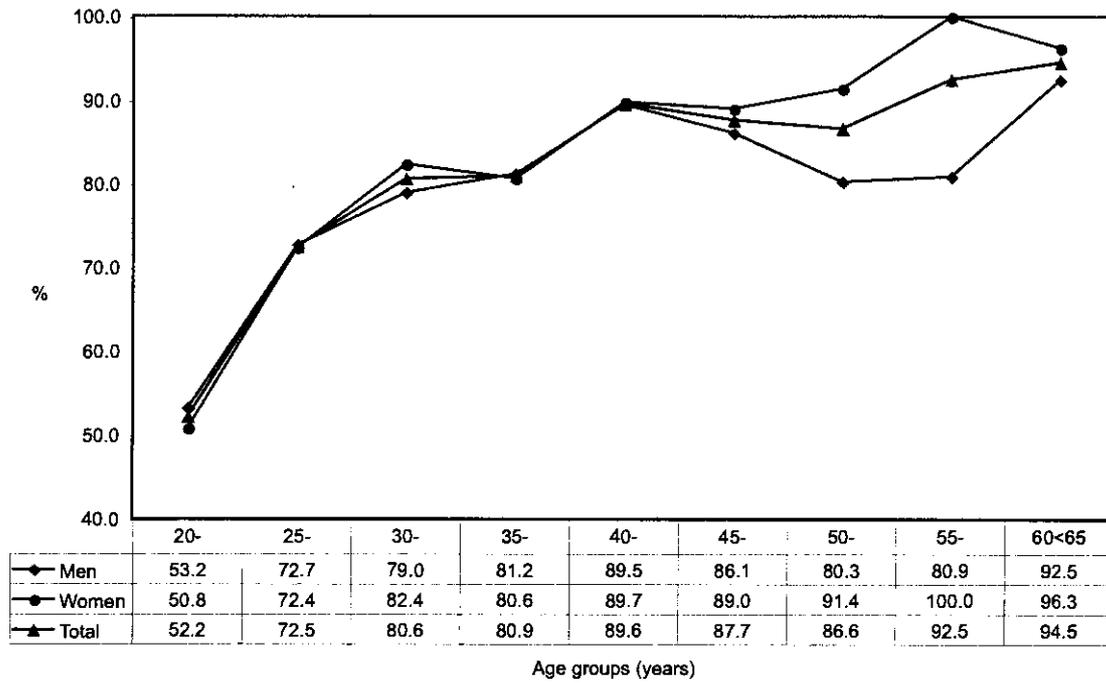


Figure (41): Prevalence rates of obesity and overweight (BMI ≥ 25 kg/m²) by gender and age groups

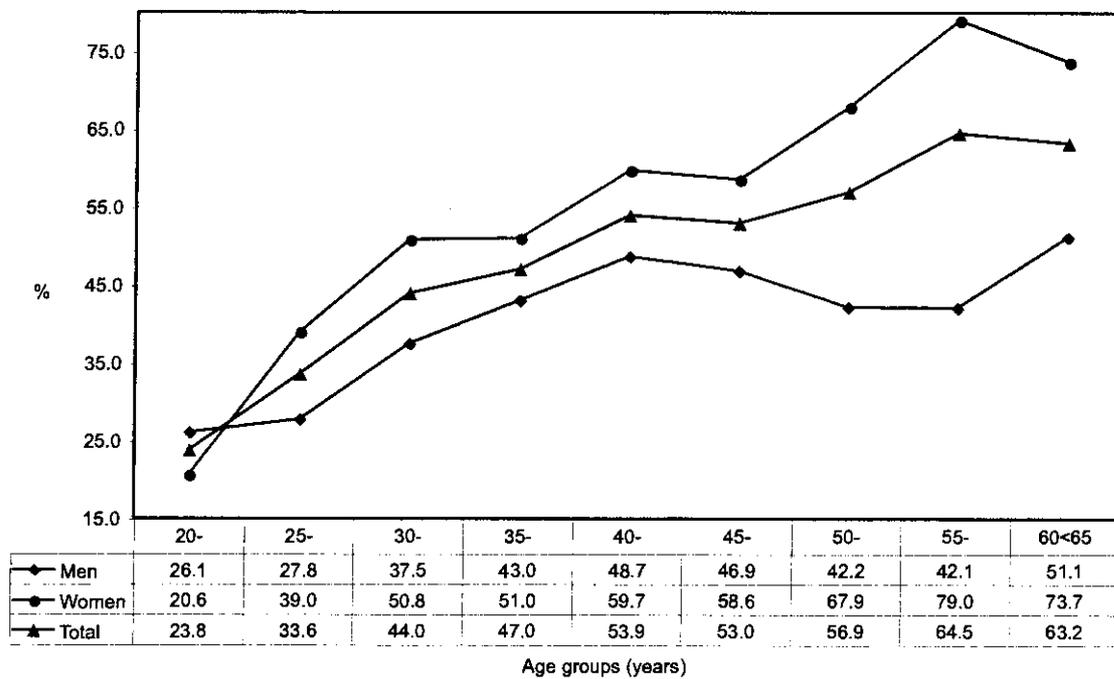


Figure (42): Prevalence rates of obesity (BMI ≥ 30 kg/m²) by gender and age groups

6.2.1.2. Waist circumference:

Table (67) shows mean waist circumference measurements (excluding pregnant women). As expected, men had a larger waist circumference than women (96.3 vs. 88.8cm); at the entire age spectrum studied. Waist circumference seems to increase with advancement of age for both genders.

Table (67): Mean waist circumference (excluding pregnant women)

Age Group	Men (n = 905)		Women (n = 1277)	
	Mean	(95% CI)	Mean	(95% CI)
20-24	89.8	(86.7–92.8)	77.6	(75.7–79.4)
25-34	95.7	(93.7–97.8)	86.6	(85.2–88.1)
35-44	100.3	(98.6–101.9)	91.8	(90.4–93.1)
45-54	101.7	(100.1–103.3)	96.0	(94.5–97.4)
55-64	102.8	(100.2–105.4)	101.0	(98.9–103.1)
20-64	96.3	(95.1–97.5)	88.8	(87.9–89.7)

6.2.1.2.1. Abdominal obesity:

Table (68) and Figure (43) show abdominal obesity (excluding pregnant women). It was found that abdominal obesity was more prevalent among women than among men (48.5 vs. 30.3%). Abdominal obesity increases with age, however high steep increase can be noticed among women with increase of abdominal obesity from 18.2% at age 20-24 years to 89.8% at age 55-64 years. The corresponding rates for men are 18.3% and 49.3% respectively.

Table (68): Abdominal obesity (excluding pregnant women)

Age Group	Men (waist circumference > 102 cm)		Women (waist circumference > 88 cm)		Total	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
	(n = 905)		(n = 1277)		(n = 2182)	
20-24	18.3	(17.9–18.7)	18.2	(17.8–18.6)	18.2	(18–18.5)
25-34	26.7	(26.3–27.1)	36.7	(36.2–37.1)	31.4	(31.1–31.7)
35-44	35.6	(35.1–36.1)	59.2	(58.6–59.7)	46.9	(46.5–47.3)
45-54	47.1	(46.3–47.8)	72.9	(72.3–73.5)	61.1	(60.7–61.6)
55-64	49.3	(48.3–50.3)	89.8	(89.3–90.3)	73.1	(72.5–73.7)
20-64	30.3	(30.1–30.6)	48.5	(48.2–48.8)	39.1	(38.9–39.3)

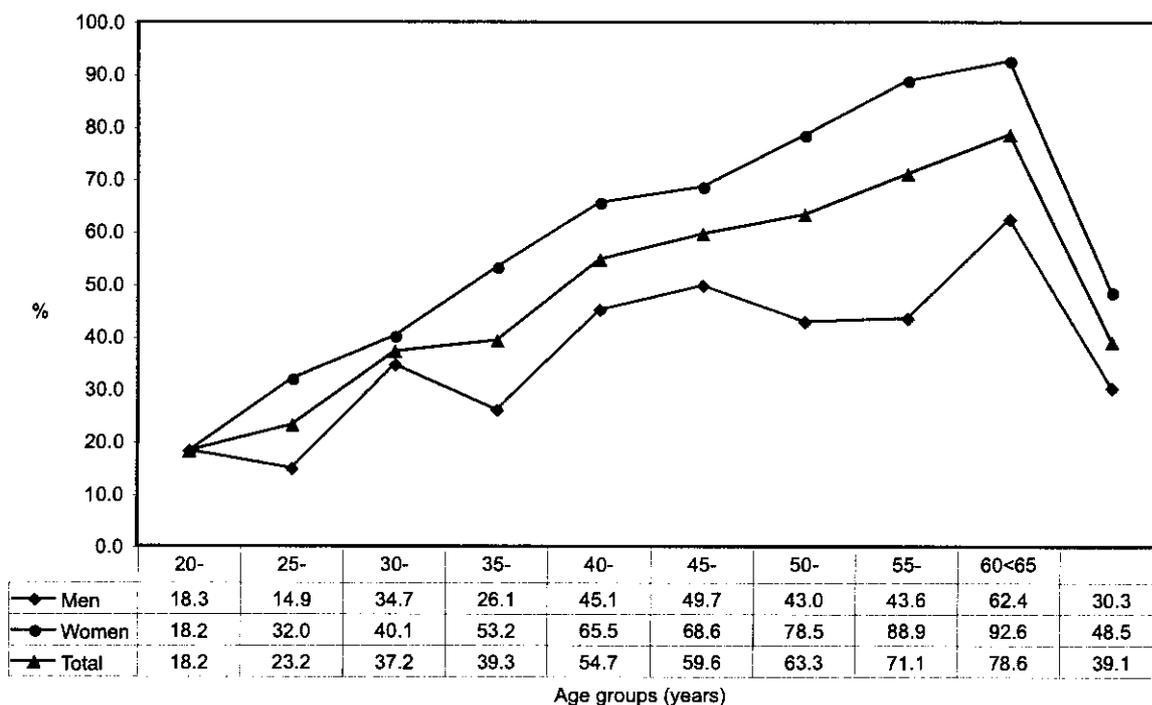


Figure (43): Prevalence rate of abdominal obesity by gender and age group (waist circumference > 88 cm for women and > 102 cm for men) by gender and age groups

6.2.2. Blood pressure:

6.2.2.1. Mean blood pressure:

Table (69) shows mean blood pressure results excluding those currently on medication for raised blood pressure. Both systolic and diastolic blood pressure were higher in men than women (120 vs 115 mm Hg and 79.4 vs 75.9 mm Hg respectively). This could be applied also for different age groups. There was an increasing trend of the mean systolic and diastolic blood pressure from one side and age groups on the other side.

Table (69): Mean blood pressure of participants (excluding those currently on medication for hypertension)

Age Group	Systolic (mmHg)		Diastolic (mmHg)	
	Mean	(95% CI)	Mean	(95% CI)
Men	(n =822)		(n =822)	
20-24	117.2	(115.4–119.0)	76.9	(75.6–78.3)
25-34	119.1	(117.7–120.5)	79.0	(78.0–80.0)
35-44	119.5	(118.0–121.0)	81.0	(79.9–82.1)
45-54	125.7	(123.9–127.6)	82.9	(81.7–84.2)
55-64	131.2	(127.5–134.9)	81.9	(79.9–83.9)
20-64	120.0	(119.1–120.8)	79.4	(78.8–80.0)
Women	(n =1166)		(n =1166)	
20-24	111.0	(109.5–112.5)	73.6	(72.4–74.7)
25-34	112.0	(110.6–113.3)	74.4	(73.5–75.3)
35-44	117.0	(115.8–118.3)	77.4	(76.6–78.3)
45-54	122.0	(120.2–123.8)	79.3	(78.2–80.4)
55-64	127.2	(122.2–132.2)	80.9	(78.5–83.3)
20-64	115.0	(114.2–115.8)	75.9	(75.3–76.4)
Total	(n =1988)		(n =1988)	
20-24	114.5	(113.2–115.8)	75.5	(74.5–76.4)
25-34	115.5	(114.5–116.5)	76.7	(76.0–77.4)
35-44	118.3	(117.3–119.3)	79.2	(78.5–79.9)
45-54	123.8	(122.5–125.1)	81.1	(80.3–81.9)
55-64	129.2	(126.1–132.4)	81.4	(79.8–83.0)
20-64	117.6	(117.0–118.2)	77.7	(77.3–78.1)

6.2.2.2. Prevalence of hypertension:

Table (70) and Figure (44) show the prevalence of raised blood pressure. The prevalence of the current use of antihypertensive medications was 8.9% among all participants. Women had a higher prevalence rate of receiving antihypertensives than that of men (11.0% vs. 6.8%). After excluding those on current antihypertensives, the prevalence of the survey-diagnosed hypertension (not previously diagnosed) was 16.8%. Men had a higher prevalence rate than that of women (18.7% vs. 14.8%). An overall prevalence of hypertension (by measurement and questionnaire diagnosed) of 20.5% was demonstrated with higher rate among men than women (21.3% compared with 19.7%). However, higher rates are observed among women over the age of 45 years than men over this age, Figure (45).

Table (70): Raised blood pressure among participants

Age Group	SBP \geq 140 and/or DBP \geq 90 mmHg (survey- diagnosed)		SBP \geq 140 and/or DBP \geq 90 mmHg or currently on medication for raised blood pressure (overall)		Currently on medication for raised blood pressure (questionnaire - diagnosed)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 210)		(n = 241)		(n = 86)	
20-24	5.1	(4.9-5.3)	6.0	(5.7-6.2)	0.8	(0.8-0.9)
25-34	15.1	(14.8-15.4)	16.2	(15.8-16.5)	2.5	(2.4-2.7)
35-44	25.1	(24.6-25.6)	28.7	(28.2-29.2)	9.6	(9.3-9.9)
45-54	34.3	(33.6-35.0)	40.6	(39.8-41.3)	16.6	(16.1-17.2)
55-64	41.9	(40.9-42.9)	48.8	(47.8-49.8)	23.7	(22.8-24.5)
20-64	18.7	(18.5-18.9)	21.3	(21.1-21.5)	6.8	(6.6-6.9)
Women	(n = 233)		(n = 311)		(n = 178)	
20-24	2.8	(2.6-3.0)	2.8	(2.6-3.0)	0.0	-----
25-34	6.7	(6.4-6.9)	7.9	(7.6-8.1)	1.9	(1.8-2.0)
35-44	15.7	(15.3-16.1)	19.8	(19.3-20.2)	8.0	(7.7-8.3)
45-54	31.1	(30.5-31.7)	42.1	(41.4-42.7)	27.7	(27.1-28.3)
55-64	42.6	(41.8- 43.4)	64.0	(63.2-64.8)	48.5	(47.7-49.3)
20-64	14.8	(14.6-15.0)	19.7	(19.5-19.9)	11.0	(10.9-11.2)
Total	(n = 443)		(n = 552)		(n = 262)	
20-24	4.1	(3.9-4.2)	4.5	(4.4-4.7)	0.5	(0.4-0.5)
25-34	10.9	(10.7-11.0)	12.0	(11.8-12.2)	2.2	(2.1-2.3)
35-44	20.5	(20.2-20.8)	24.3	(24.0-24.7)	8.8	(8.6-9.0)
45-54	32.6	(32.1-33.0)	41.4	(40.9-41.9)	22.7	(22.2-23.1)
55-64	42.3	(41.7-42.9)	57.8	(57.1-58.4)	38.3	(37.7-38.9)
20-64	16.8	(16.6-16.9)	20.5	(20.4-20.7)	8.9	(8.8-9.0)

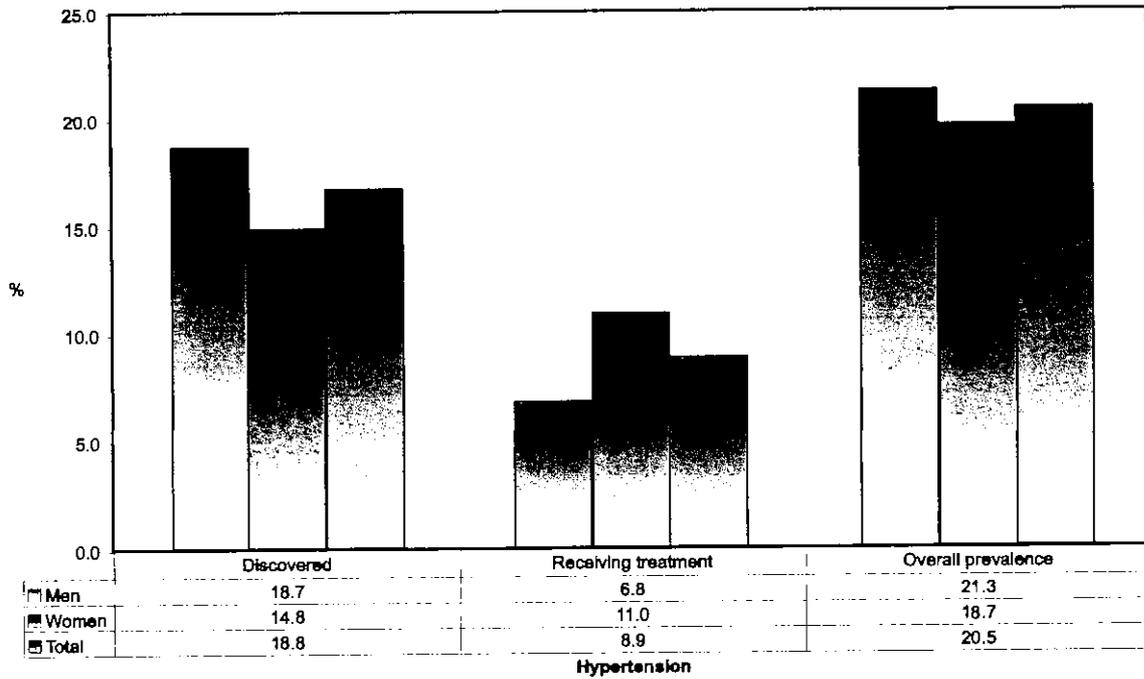


Figure (44): Overall prevalence of hypertension rates by gender

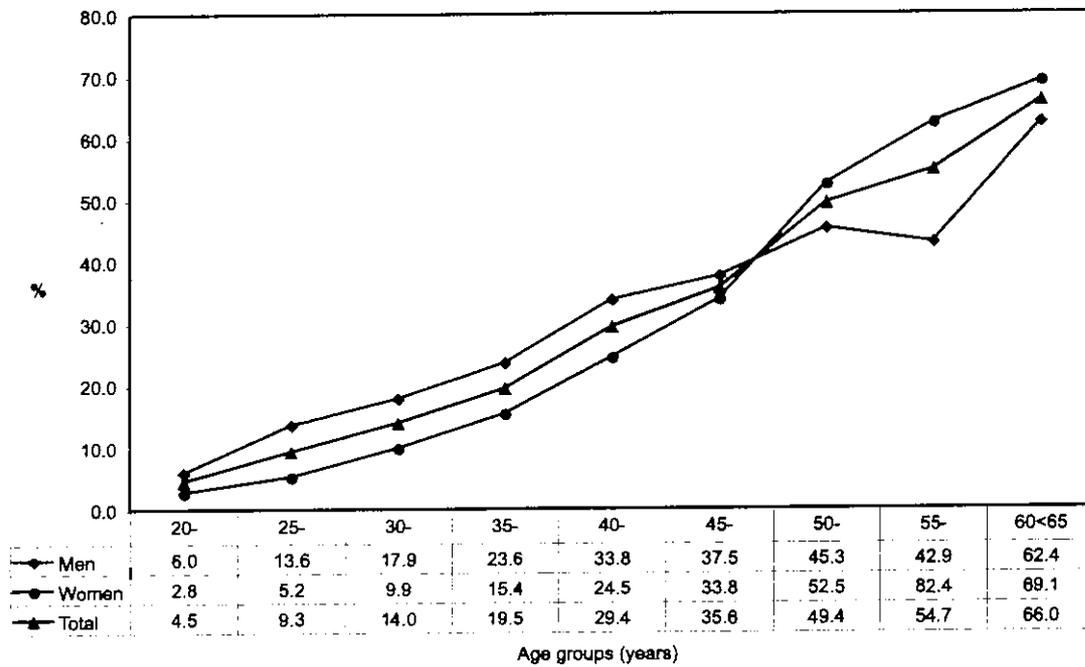


Figure (45): Overall prevalence of hypertension rates (≥ 140/90 mm Hg or on medication) by gender and age groups

6.2.2.3. Severe hypertension:

Table (71) shows raised blood pressure (SBP \geq 160 and/or DBP \geq 100 mmHg). The prevalence of the survey-diagnosed hypertension adopting this definition was 3.5%. Men had a higher prevalence rate than women (3.6% vs. 3.4%, respectively). Combining survey-diagnosed with questionnaire-diagnosed hypertension, an overall prevalence rate of 10.9% was demonstrated. This prevalence was higher among women when compared with men (12.9% vs. 9%). Also, there was an increasing trend of the prevalence of moderate / severe hypertension (either survey-, questionnaire-diagnosed or both) and age with higher rate among women over the age of 45 years than men.

Table (71): Moderate / severe raised blood pressure among participants

Age Group	SBP \geq 160 and/or DBP \geq 100 mmHg (survey- diagnosed)		SBP \geq 160 and/or DBP \geq 100 mmHg or currently on medication for raised blood pressure (overall)		Currently on medication for raised blood pressure (questionnaire - diagnosed)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n = 44)		(n = 113)		(n =83)	
20-24	1.6	(1.5-1.7)	2.4	(2.3-2.6)	0.8	(0.8-0.9)
25-34	0.4	(0.4-0.5)	3.0	(2.8-3.1)	2.5	(2.4-2.7)
35-44	4.4	(4.1-4.6)	11.3	(11.0-11.7)	9.6	(9.3-9.9)
45-54	8.2	(7.8-8.6)	22.5	(21.9-23.2)	16.6	(16.1-17.2)
55-64	15.1	(14.4-15.8)	31.9	(31.0-32.9)	23.7	(22.8-24.5)
20-64	3.6	(3.5-3.7)	9.0	(8.9-9.2)	6.8	(6.6-6.9)
Women	(n = 57)		(n = 208)		(n =176)	
20-24	0	(0.0-0.0)	0	(0.0-0.0)	0.0	(0.0-0.0)
25-34	1.0	(0.9-1.1)	2.9	(2.7-3.04)	1.9	(1.8-2.0)
35-44	4.3	(4.0-4.5)	11.1	(10.7-11.4)	8.0	(7.7-8.3)
45-54	7.6	(7.2-8.0)	30.0	(29.4-30.6)	27.7	(27.1-28.3)
55-64	10.5	(10.0-11.0)	53.8	(53.0-54.7)	48.5	(47.7-49.3)
20-64	3.4	(3.3-3.5)	12.9	(12.7-13.1)	11.0	(10.9-11.2)
Total	(n = 101)		(n = 321)		(n =259)	
20-24	0.9	(0.8-1.0)	1.4	(1.3-1.4)	0.5	(0.4-0.5)
25-34	0.7	(0.7-0.8)	2.9	(2.8-3.0)	2.2	(2.1-2.3)
35-44	4.3	(4.2-4.5)	11.2	(11.0-11.4)	8.8	(8.6-9.0)
45-54	7.9	(7.6-8.1)	26.6	(26.2-27.0)	22.7	(22.2-23.1)
55-64	12.4	(12.0-12.8)	44.8	(44.2-45.4)	38.3	(37.7-38.9)
20-64	3.5	(3.4-3.5)	10.9	(10.8-11.0)	8.9	(8.8-9.0)

6.2.3. Heart rate:

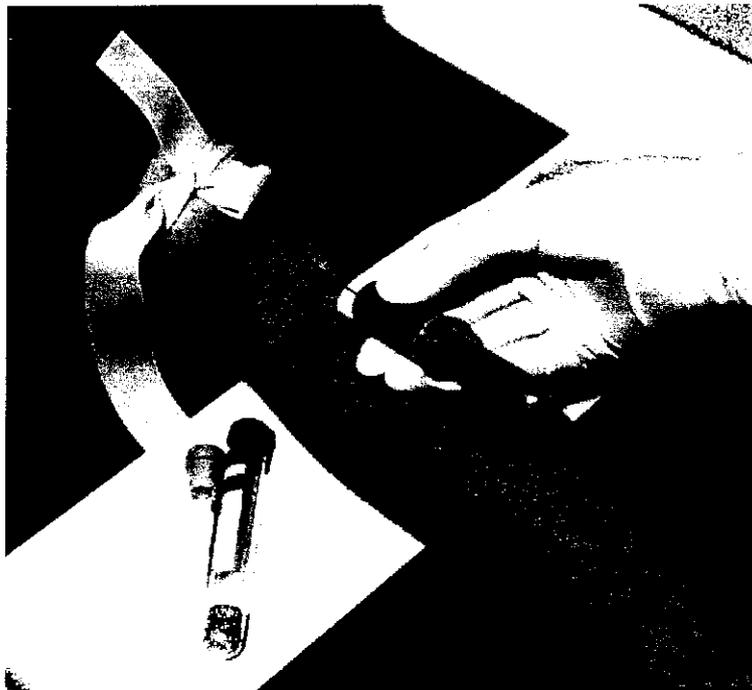
6.2.3.1. Mean heart rate:

Table (72) shows mean heart rate. The overall mean heart rate was 75.6 beats/minute. Women had a higher mean pulse rate than had men (76.1 vs. 75.1 beats/minute). Only one woman had tachycardia (≥ 100 beat/minute).

Table (72): Mean heart rate

Age Group	Beats per minute	
	Mean	(95% CI)
Men	(n =594)	
20-24	74.0	(72.7–75.2)
25-34	75.9	(74.7–77.1)
35-44	75.3	(74.2–76.4)
45-54	76.3	(75.2–77.4)
55-64	73.6	(71.0–76.2)
20-64	75.1	(74.5–75.7)
Women	(n =846)	
20-24	75.7	(74.5–76.8)
25-34	76.2	(75.1–77.2)
35-44	76.5	(75.7–77.3)
45-54	76.5	(75.5–77.5)
55-64	75.5	(73.7–77.3)
20-64	76.1	(75.6–76.6)
Total	(n =1440)	
20-24	74.7	(73.8–75.6)
25-34	76.0	(75.2–76.8)
35-44	75.9	(75.2–76.5)
45-54	76.4	(75.7–77.1)
55-64	74.8	(73.3–76.3)
20-64	75.6	(75.2–76.0)

STEP (3)
Biochemical Investigations



6.3. Step (3): Biochemical measurements

6.3.1. Fasting blood sugar:

6.3.1.1. Mean fasting blood sugar:

Table (73) shows mean fasting blood glucose results excluding those currently on hypoglycemic medications or non-fasting. The overall mean fasting blood sugar level of the study sample was 5.14 mmol/L, being higher among men than among women (5.23 vs. 5.04 mmol/L). There was an increasing trend of the mean fasting blood sugar level as the age advances for all participants, especially among women.

Table (73): Mean fasting blood glucose (mmol/L) excluding those currently on medication for diabetes (excluding non-fasting recipients)

Age Group	Fasting blood glucose (mmol/L)	
	Mean	(95% CI)
Men	(n = 688)	
20-24	4.91	(4.81–5.01)
25-34	5.12	(5.03–5.21)
35-44	5.27	(5.12–5.42)
45-54	6.17	(5.82–6.52)
55-64	5.62	(5.37–5.86)
20-64	5.23	(5.15–5.30)
Women	(n = 1085)	
20-24	4.80	(4.73–4.87)
25-34	4.85	(4.75–4.95)
35-44	5.09	(5.02–5.16)
45-54	5.48	(5.29–5.66)
55-64	5.84	(5.34–6.35)
20-64	5.04	(5.0–5.1)
Total	(n = 1773)	
20-24	4.84	(4.72–4.93)
25-34	5.03	(4.91–5.15)
35-44	5.21	(5.13–5.33)
45-54	5.86	(5.78–5.96)
55-64	5.73	(5.68–5.86)
20-64	5.14	(5.01–5.25)

6.3.1.2. Prevalence of diabetes mellitus:

Table (74) and Figures (46 and 47) show participants with raised fasting blood glucose, or currently on medication for raised blood glucose. The prevalence of raised fasting blood sugar level diagnosed by history of receiving antidiabetic medications was 9.8%. This level was higher among men when compared with women (10.4% vs. 9.2% respectively). Moreover, it was observed that there was an increasing trend of the prevalence of raised blood sugar level- diagnosed by history of receiving antidiabetic medications as the age advances for both genders.

The prevalence of raised fasting blood sugar level diagnosed by this survey (not previously diagnosed) was 2.9%. This rate was higher among men when compared with women (3.2% vs. 2.5%). Excluding the eldest age group (55-64 years), it was observed that there was an increasing trend of the prevalence of survey-diagnosed raised blood sugar level as the age advances for both genders.

The overall prevalence of raised fasting blood sugar level diagnosed by the survey as well as by history of receiving antidiabetic medications was 12.4%. This rate was higher among men when compared with women (13.3% vs. 11.5%). Moreover, it was observed that there was an increasing trend of the prevalence of raised blood sugar level- diagnosed by the survey as well as by history of receiving antidiabetic medications- as the age advances for both genders.

Table (74): Participants with raised fasting blood glucose, or currently on medication for raised blood glucose (excluding non-fasting recipients)

Age Group	Raised blood glucose (7 mmol/L or more) (survey - diagnosed)		Raised blood glucose or currently on medication for diabetes (overall)		Currently on medication for diabetes (questionnaire - diagnosed)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Men	(n =37)		(n =154)		(n =117)	
20-24	0.0	-----	2.0	(0.0-4.7)	2.0	(0.0-4.7)
25-34	1.4	(0.0-3.1)	4.7	(1.6-7.7)	3.3	(0.7-5.8)
35-44	3.2	(0.6-5.8)	14.1	(9.3-18.8)	11.2	(6.9-15.5)
45-54	17.0	(11.0-23.1)	34.8	(28.1-41.6)	21.5	(15.6-27.3)
55-64	4.3	(0.0-10.5)	55.5	(44.2-66.7)	53.4	(42.2-64.7)
20-64	3.2	(2.1-4.4)	13.3	(11.1-15.5)	10.4	(8.4-12.5)
Women	(n =35)		(n =170)		(n =135)	
20-24	0.0	-----	0.0	-----	0.0	-----
25-34	1.1	(0.0-2.4)	3.1	(1.1-5.1)	2.0	(0.4-3.6)
35-44	2.5	(1.0-4.1)	9.1	(6.3-11.8)	6.7	(4.3-9.1)
45-54	7.6	(4.0-11.2)	29.7	(24.2-35.2)	23.9	(18.8-29.1)
55-64	8.7	(1.4-16.0)	42.7	(32.5-52.9)	37.2	(27.3-47.2)
20-64	2.5	(1.6-3.4)	11.5	(9.7-13.2)	9.2	(7.6-10.8)
Total	(n =72)		(n =324)		(n =252)	
20-24	0.0	-----	1.1	(0.0-2.7)	1.1	(0.0-2.7)
25-34	1.3	(0.2-2.3)	3.9	(2.1-5.7)	2.6	(1.1-4.1)
35-44	2.9	(1.4-4.4)	11.6	(8.8-14.3)	9.0	(6.5-11.4)
45-54	11.9	(8.5-15.4)	32.0	(27.7-36.3)	22.8	(19.0-26.7)
55-64	7.2	(1.9-12.4)	48.0	(40.4-55.7)	44.0	(36.5-51.6)
20-64	2.9	(2.2-3.6)	12.4	(11.0-13.8)	9.8	(8.5-11.1)

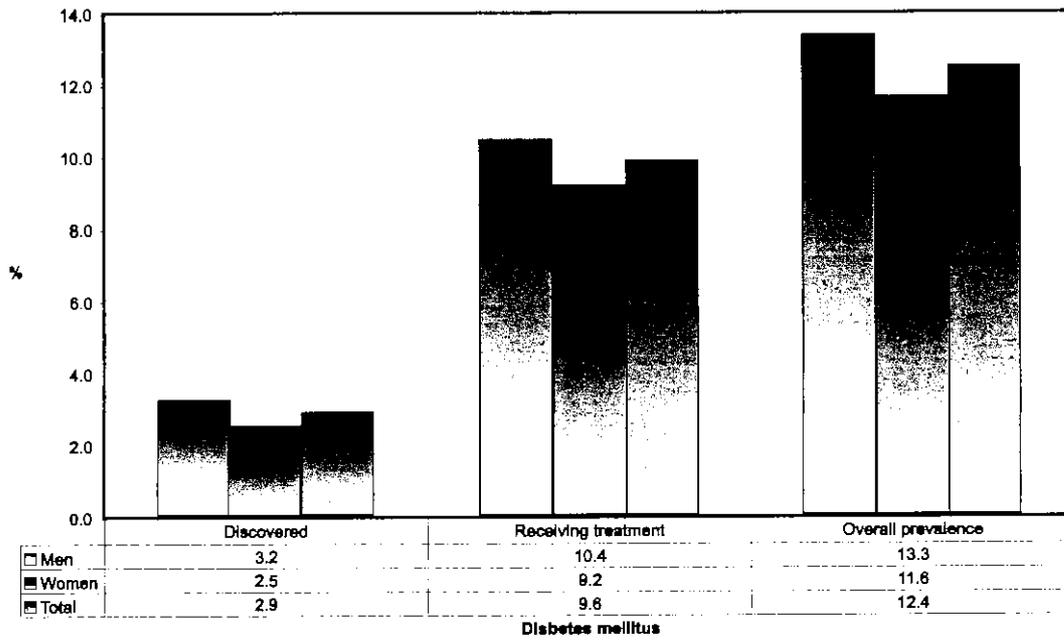


Figure (46): Overall prevalence of diabetes mellitus rates by gender

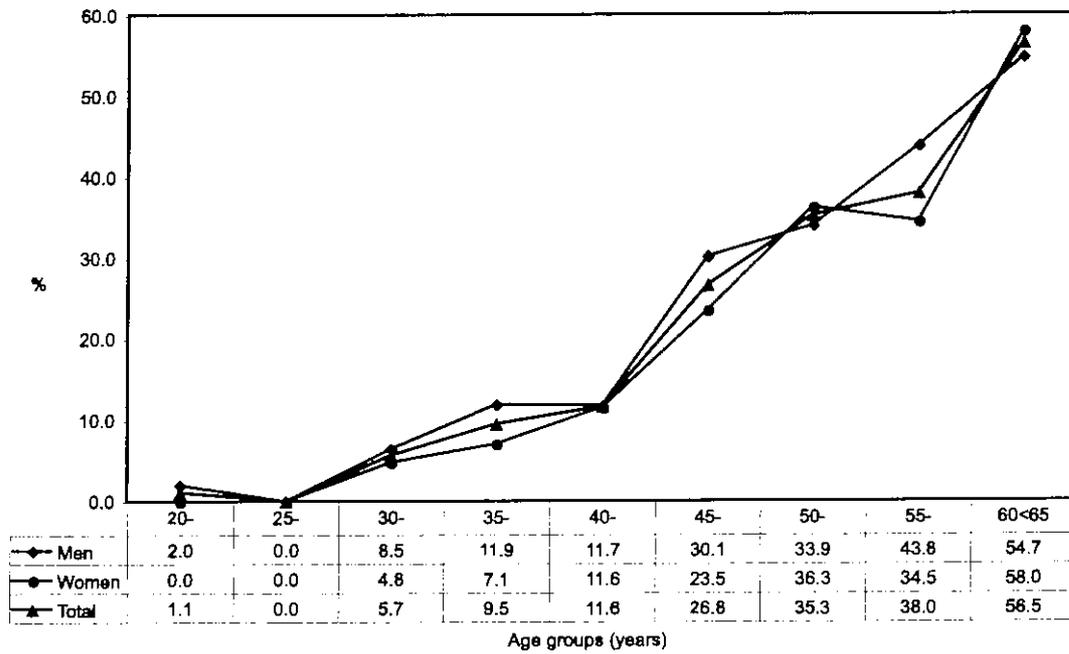


Figure (47): Prevalence of raised fasting blood sugar (≥ 7.0 mmol/L) rates by gender and age groups

6.3.2. Total blood cholesterol:

6.3.2.1. Mean level of total blood cholesterol:

Table (75) shows mean total blood cholesterol results. The overall mean total cholesterol level of the study sample was 4.9 mmol/L, being higher among men than among women (5.0 vs. 4.9 mmol/L). Generally, it was observed that there was an increasing trend of the mean total blood cholesterol level as the age advances for women.

Table (75): Mean total blood cholesterol results in mmol/L (excluding non-fasting recipients)

Age Group	Men (n = 815)		Women (n = 1237)		Total (n = 2052)	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
20-24	4.5	(4.4-4.7)	4.5	(4.4-4.6)	4.5	(4.4-4.6)
25-34	4.9	(4.8-5.1)	4.8	(4.7-4.9)	4.8	(4.8-4.9)
35-44	5.4	(5.3-5.5)	5.1	(5.0-5.2)	5.2	(5.1-5.3)
45-54	5.3	(5.2-5.5)	5.3	(5.2-5.4)	5.3	(5.2-5.4)
55-64	5.0	(4.8-5.2)	5.4	(5.2-5.6)	5.2	(5.1-5.4)
20-64	5.0	(4.9-5.1)	4.9	(4.9-5.0)	4.9	(4.9-5.0)

6.3.2.2. Prevalence of raised total blood cholesterol:

Table (76) and **Figure (48)** show participants with raised cholesterol. Considering a cut off value of 5.2 mmol/L, it was found that the prevalence of raised total blood cholesterol level diagnosed by this survey was 38.6%. This prevalence was higher among men when compared with women (40.1% vs. 37.2%). It was also observed that there was an increasing trend of the prevalence of survey-diagnosed raised total blood cholesterol level as the age advances for both genders specially for women who had apparently high rate at the eldest age group. On the other hand, by considering a more conservative cut off value of 6.5 mmol/L, it was found that the prevalence of raised total blood cholesterol level diagnosed by this survey was 7.2%. This level was higher among men when compared with women (8.1% vs. 6.3% respectively). The same trend with age applies also at this cut off point.

Table (76): Participants with raised total blood cholesterol (excluding non-fasting recipients)

Age Group	Total blood cholesterol ≥ 5.2 mmol/L		Total blood cholesterol ≥ 6.5 mmol/L	
	%	(95% CI)	%	(95% CI)
Men	(n =402)		(n =89)	
20-24	22.8	(15.2–30.5)	2.4	(0.0–5.2)
25-34	35.4	(29.1–41.7)	6.6	(3.3–9.9)
35-44	59.5	(53.3–65.7)	13.7	(9.3–18.0)
45-54	54.7	(48.0–61.4)	13.9	(9.3–18.5)
55-64	37.5	(26.9–48.1)	7.8	(2.1–13.5)
20-64	40.1	(36.6–43.7)	8.1	(6.3–9.9)
Women	(n =545)		(n =96)	
20-24	22.4	(15.8–29.1)	2.9	(0.3–5.5)
25-34	28.8	(23.7–33.8)	5.1	(2.7–7.5)
35-44	43.2	(38.5–47.8)	7.1	(4.7–9.5)
45-54	53.7	(48.0–59.4)	9.6	(6.2–13.0)
55-64	57.6	(48.0–67.2)	10.7	(4.7–16.7)
20-64	37.2	(34.4–39.9)	6.3	(4.9–7.6)
Total	(n =947)		(n =185)	
20-24	22.7	(17.4–27.9)	2.6	(0.7–4.6)
25-34	32.1	(28.1–36.1)	5.9	(3.8–7.9)
35-44	51.5	(47.6–55.5)	10.5	(7.9–13.0)
45-54	54.2	(49.8–58.5)	11.6	(8.8–14.4)
55-64	49.5	(42.2–56.8)	9.5	(5.2–13.8)
20-64	38.6	(36.4–40.9)	7.2	(6.1–8.3)

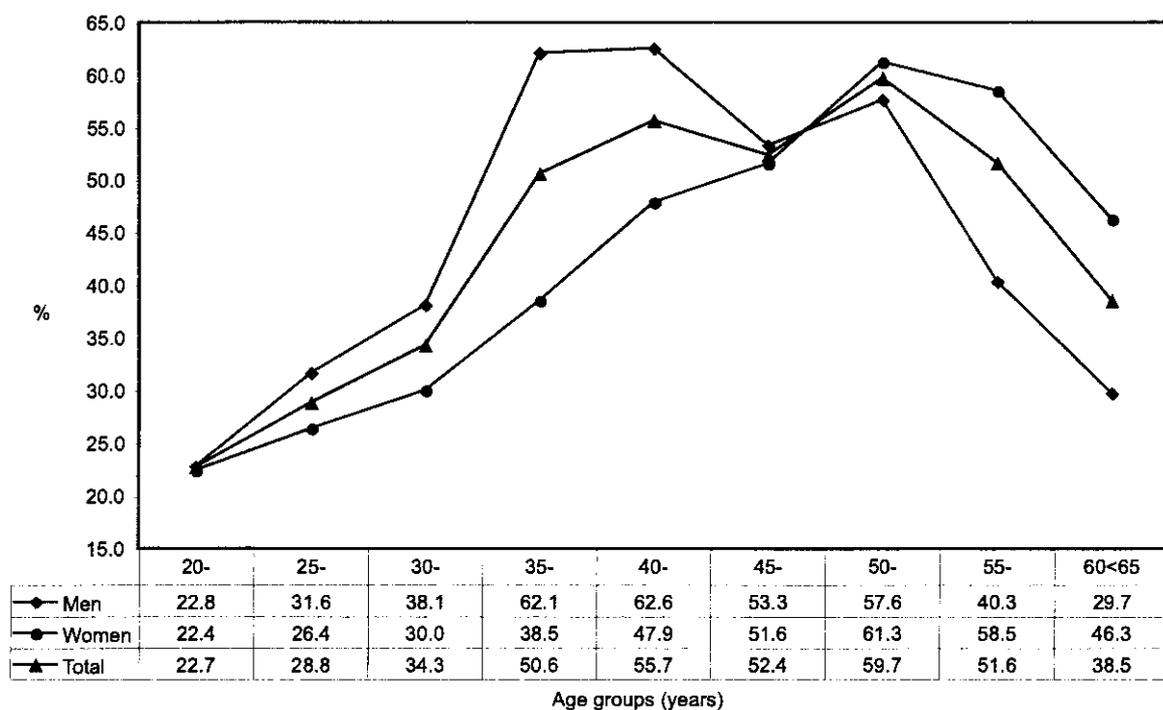


Figure (48): Prevalence of raised total blood cholesterol (≥ 5.2 mmol/L) rates by gender and age groups

6.3.3. High density lipoprotein:

6.3.3.1. Mean level high density lipoprotein:

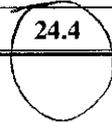
Table (77) and Figure (49) show mean HDL results and participants with low level. The overall mean HDL level of the study sample was 1.07 mmol/L, being higher among women than among men (1.20 vs. 0.94 mmol/L). Generally, it was observed that there was a decreasing trend of the mean HDL level as the age advances for both genders.

6.3.3.2. Prevalence of decreased high density lipoprotein:

At a cut off value of 0.9 mmol/L, it was found that the prevalence of low level of HDL was 24.4%. This prevalence was higher among men when compared with women (38.0% vs. 10.6%). An increasing trend with age was only demonstrated for women as revealed in Figure (49).

Table (77): Mean value (mmol/L) and participants with low HDL level (excluded non-fasting recipients)

Age Group	HDL (mmol/L)		HDL < 0.9 mmol/L	
	Mean	(95% CI)	%	(95% CI)
Men	(n =902)		(n =356)	
20-24	0.99	(0.94–1.03)	30.6	(22.2–38.9)
25-34	0.91	(0.88–0.95)	43.9	(37.4–50.4)
35-44	0.94	(0.91–0.97)	37.3	(31.2–43.4)
45-54	0.93	(0.89–0.95)	39.3	(32.8–45.9)
55-64	0.92	(0.86–0.97)	40.5	(29.8–51.2)
20-64	0.94	(0.9–1.0)	38.0	(34.4–41.5)
Women	(n =1342)		(n =151)	
20-24	1.26	(1.22–1.31)	4.4	(1.2–7.7)
25-34	1.22	(1.18–1.25)	10.0	(6.6–13.4)
35-44	1.19	(1.16–1.22)	12.5	(9.4–15.6)
45-54	1.12	(1.09–1.16)	13.4	(9.5–17.3)
55-64	1.13	(1.07–1.19)	17.2	(9.8–24.7)
20-64	1.20	(1.18–1.22)	10.6	(8.8–12.3)
Total	(n =2244)		(n =507)	
20-24	1.11	(1.07–1.14)	19.3	(14.1–24.4)
25-34	1.06	(1.04–1.09)	26.9	(23.0–30.9)
35-44	1.06	(1.04–1.09)	25.2	(21.6–28.8)
45-54	1.03	(1.01–1.06)	25.2	(21.4–29.0)
55-64	1.05	(1.00–1.09)	26.6	(20.2–33.0)
20-64	1.07	(1.05–1.08)	24.4	(22.3–26.5)



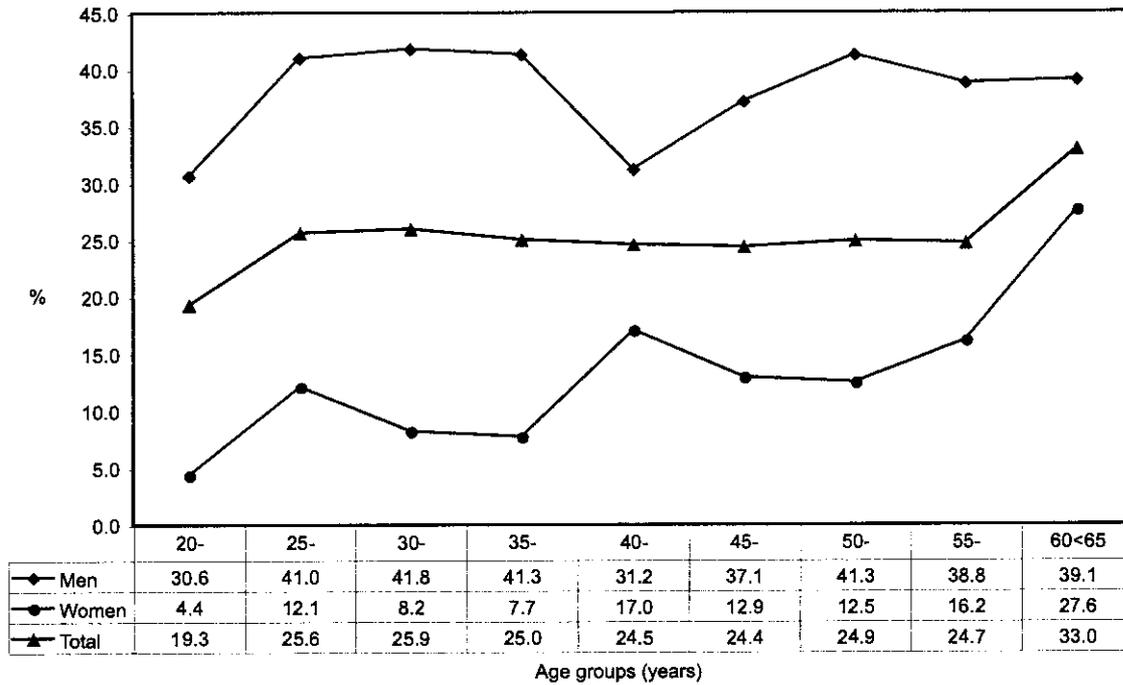


Figure (49): Prevalence of low HDL (< 0.9 mmol/L) rates by gender and age groups

6.3.4. Low density lipoprotein:

6.3.4.1. Mean level of low density lipoprotein:

Table (78) and Figure (50) shows mean LDL and participants with raised level. The overall mean LDL level of the study sample was 3.29 mmol/L, being higher among men than among women (3.37 vs. 3.21 mmol/L, respectively). Generally, it was observed that there was an increasing trend of the mean LDL level as the age advances among women.

6.3.4.2. Prevalence of raised low density lipoprotein:

Considering the cut off value of 3.4 mmol/L, it was found that the prevalence of elevated LDL diagnosed by this survey was 39.4%. This prevalence was higher among men than women (43.8% vs. 34.8%). It was observed that there was an increasing trend of the prevalence of raised LDL level as the age advances for all participants, especially among women.

Table (78): Mean value (mmol/L) and participants with raised LDL level (excluding non-fasting recipients)

Age Group	LDL (mmol/L)		LDL >3.4 mmol/L	
	Mean	(95% CI)	%	(95% CI)
Men	(n = 797)		(n = 381)	
20-24	3.03	(3.02-3.03)	27.3	(26.9-27.8)
25-34	3.33	(3.32-3.34)	42.4	(41.9-42.8)
35-44	3.75	(3.74-3.76)	61.0	(60.5-61.5)
45-54	3.63	(3.62-3.65)	57.1	(56.4-57.9)
55-64	3.33	(3.31-3.35)	41.8	(40.7-42.8)
20-64	3.37	(3.37-3.38)	43.8	(43.6-44.1)
Women	(n = 1225)		(n = 471)	
20-24	2.90	(2.89-2.90)	19.3	(18.9-19.7)
25-34	3.09	(3.08-3.10)	27.9	(27.5-28.4)
35-44	3.34	(3.33-3.35)	41.5	(40.9-42.0)
45-54	3.54	(3.53-3.56)	51.6	(50.9-52.3)
55-64	3.53	(3.52-3.55)	54.6	(53.8-55.5)
20-64	3.21	(3.2-3.2)	34.8	(34.5-35.0)
Total	(n = 2022)		(n = 852)	
20-24	2.97	(2.97-2.98)	23.8	(23.5-24.1)
25-34	3.21	(3.20-3.22)	35.1	(34.8-35.4)
35-44	3.55	(3.54-3.56)	51.5	(51.2-51.9)
45-54	3.55	(3.55-3.59)	54.1	(53.6-54.6)
55-64	3.45	(3.44-3.46)	49.4	(48.8-50.1)
20-64	3.29	(3.29-3.29)	39.4	(39.2-39.5)



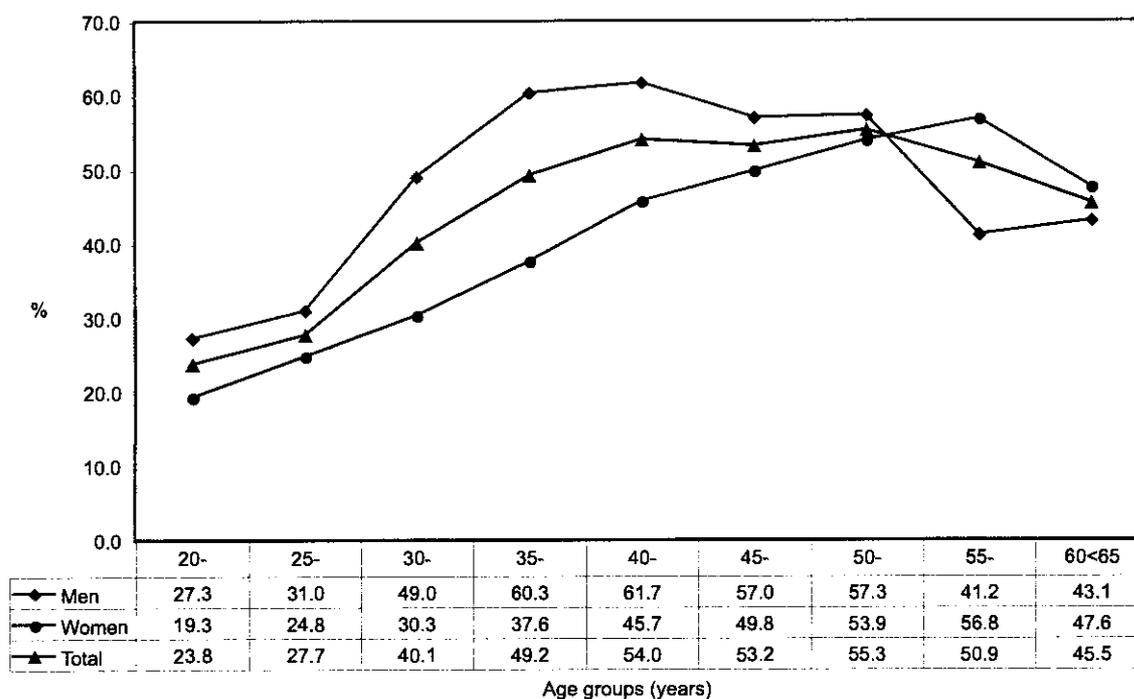


Figure (50): Prevalence of raised LDL (> 3.4 mmol/L) rates by gender and age groups

6.3.5. Triglycerides:

6.3.5.1. Mean level of triglycerides:

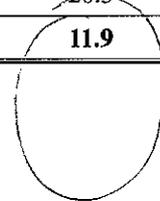
Table (79) and **Figure (51)** show mean triglyceride results and participants with raised level. A mean of 1.35 mmol/L was found for the study participants. Men tended to have a higher mean triglyceride than women (1.51 vs. 1.18 mmol/L). An increasing trend of the mean triglycerides level as the age advances for both genders is observed in **Figure (51)**.

6.3.5.2. Prevalence of raised triglycerides:

At a cut off value of 2.26 mmol/L, it was found that the prevalence of high triglycerides level was 11.9%. This prevalence was higher among men when compared with women (14.7% vs. 9.0%). It was observed that there was an increasing trend of the prevalence of high triglycerides level as the age advances for the whole participants.

Table (79): Mean triglyceride value (mmol/L) and participants with raised level (excluding non-fasting recipients)

Age Group	Triglycerides (mmol/L)		Triglycerides > 2.26 mmol/L	
	Mean	(95% CI)	%	(95% CI)
Men	(n =902)		(n =150)	
20-24	1.09	(0.95–1.23)	5.4	(1.2–9.6)
25-34	1.55	(1.36–1.75)	15.3	(10.6–20.1)
35-44	1.72	(1.54–1.89)	20.2	(15.1–25.3)
45-54	1.77	(1.62–1.91)	18.6	(13.3–23.8)
55-64	1.81	(1.50–2.13)	24.2	(14.8–33.5)
20-64	1.51	(1.42–1.60)	14.7	(12.3–17.1)
Women	(n =1337)		(n =131)	
20-24	0.86	(0.74–0.99)	5.2	(1.6–8.7)
25-34	1.09	(1.00–1.18)	6.1	(3.4–8.8)
35-44	1.21	(1.12–1.31)	7.7	(5.2–10.2)
45-54	1.53	(1.39–1.68)	16.4	(12.1–20.6)
55-64	1.57	(1.38–1.76)	18.1	(10.6–25.6)
20-64	1.18	(1.13–1.24)	9.0	(7.3–10.6)
Total	(n =2239)		(n =281)	
20-24	0.99	(0.89–1.09)	5.3	(2.5–8.1)
25-34	1.32	(1.21–1.43)	10.8	(8.0–13.5)
35-44	1.47	(1.37–1.57)	14.1	(11.1–17.0)
45-54	1.64	(1.54–1.74)	17.4	(14.0–20.7)
55-64	1.67	(1.50–1.84)	20.5	(14.7–26.4)
20-64	1.35	(1.29–1.40)	11.9	(10.4–13.3)



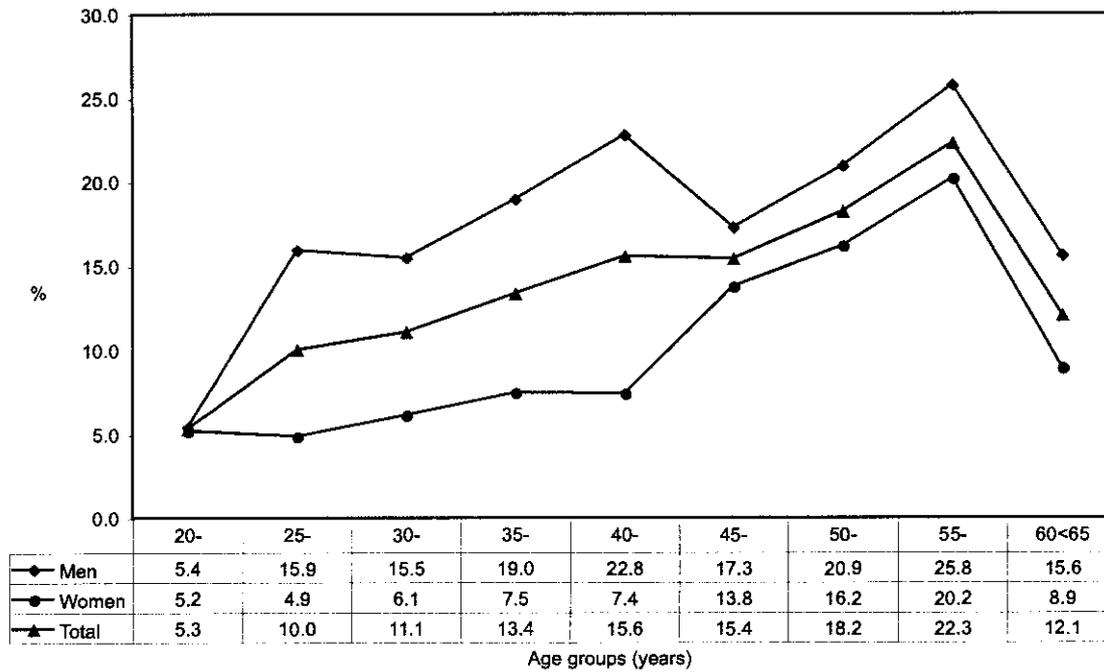


Figure (51): Prevalence of raised triglycerides rates by gender and age groups

6.3.6. Glycosylated hemoglobin:

6.3.6.1. Mean level of glycosylated hemoglobin:

Table (80) and Figure (52) show mean glycosylated hemoglobin and rates of raised level. Participants had mean glycosylated hemoglobin of 5.99%, with higher levels among men than women (6.03% compared with 5.95%). An increasing trend with age progress can be observed especially above the age of 45 years for both genders.

6.3.6.2. Prevalence of raised glycosylated hemoglobin:

Those with raised glycosylated hemoglobin (> 5.8%) constituted 11.4% of the total participants. In contrast with gender differences of the mean, women were more likely to suffer from raised glycosylated hemoglobin than men (11.6% compared with 11.3%).

Table (80): Mean value and participants with raised level of glycosylated hemoglobin (excluding non-fasting recipients)

Age Group	Glycosylated hemoglobin %		Glycosylated hemoglobin >5.8 %	
	Mean	(95% CI)	%	(95% CI)
Men	(n = 814)		(n = 141)	
20-24	5.45	(5.44-5.45)	1.9	(1.8-2.1)
25-34	5.68	(5.67-5.69)	4.5	(4.3-4.7)
35-44	6.19	(6.17-6.21)	11.9	(11.5-12.2)
45-54	7.04	(7.01-7.07)	30.7	(30.0-31.4)
55-64	7.90	(7.85-7.95)	49.9	(48.8-50.9)
20-64	6.03	(6.02-6.03)	11.3	(11.2-11.5)
Women	(n = 1234)		(n = 174)	
20-24	5.27	(5.27-5.27)	0.0	(0.0-0.0)
25-34	5.46	(5.45-5.47)	3.1	(3.0-3.3)
35-44	5.92	(5.90-5.93)	8.8	(8.5-9.2)
45-54	6.99	(6.96-7.02)	29.3	(28.7-29.9)
55-64	7.69	(7.65-7.73)	46.8	(45.9-47.6)
20-64	5.95	(5.94-5.96)	11.6	(11.4-11.7)
Total	(n = 2048)		(n = 315)	
20-24	5.37	(5.36-5.37)	1.1	(1.0-1.2)
25-34	5.57	(5.56-5.57)	3.8	(3.7-3.9)
35-44	6.06	(6.05-6.07)	10.4	(10.2-10.7)
45-54	7.01	(6.99-7.03)	29.9	(29.5-30.4)
55-64	7.77	(7.74-7.80)	48.0	(47.4-48.7)
20-64	5.99	(5.98-5.99)	11.4	(11.3-11.6)

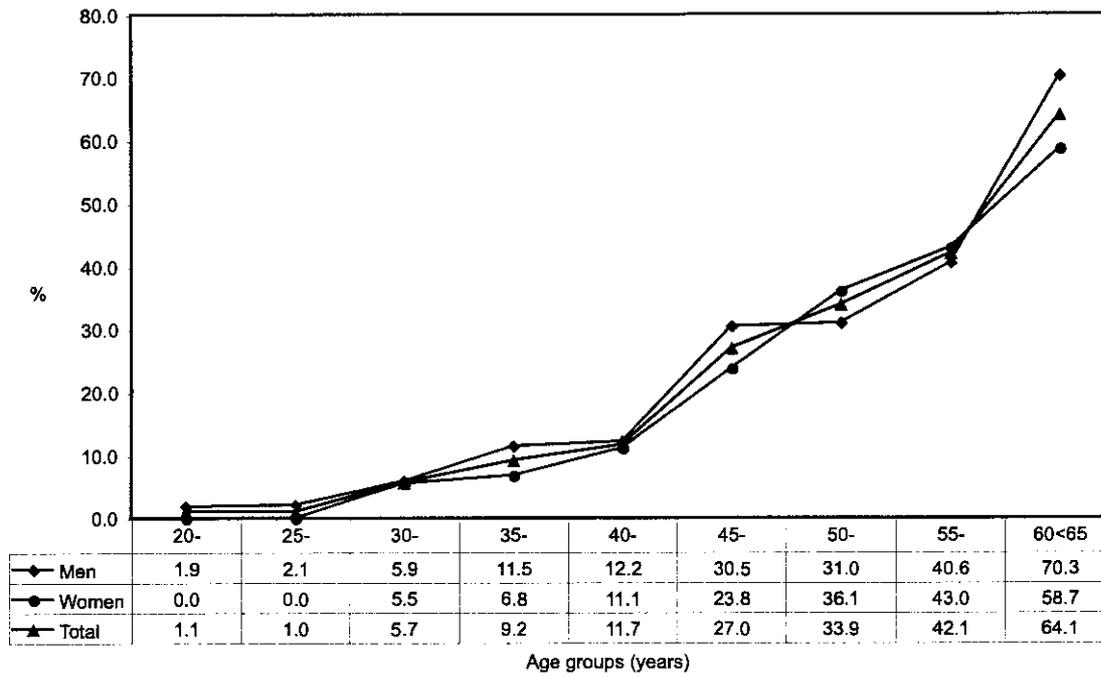


Figure (52): Prevalence of raised glycosylated hemoglobin rates by gender and age groups

6.3.7. Apo-lipoprotein B:

6.3.7.1. Mean level of Apo-lipoprotein B:

Table (81) and Figure (53) show Apo-lipoprotein B mean and participants with raised level. Measurement of Apo-lipoprotein B revealed a mean of 1.02 g/L, with higher level among men than women (1.05 vs. 0.98 g/L). Also, men were more likely to suffer raised level of Apo-lipoprotein B than women (13.95% compared with 13.65%). An increasing trend with age was mainly detected for women.

Table (81): Mean Apo-lipoprotein B and participants with raised level (excluding non-fasting recipients)

Age Group	Apo lipoprotein B g/L		Elevated Apo lipoprotein B	
	Mean	(95% CI)	%	(95% CI)
Men	(n = 815)		(n = 144)	
20-24	0.89	(0.88–0.89)	1.90	(1.77–2.03)
25-34	1.05	(1.05–1.06)	12.65	(12.34–12.96)
35-44	1.16	(1.16–1.16)	26.30	(25.83–26.77)
45-54	1.18	(1.17–1.18)	22.94	(22.31–23.56)
55-64	1.16	(1.14–1.17)	14.11	(13.40–14.83)
20-64	1.05	(1.05–1.05)	13.95	(13.77–14.12)
Women	(n = 1237)		(n = 201)	
20-24	0.81	(0.81–0.81)	2.51	(2.34–2.67)
25-34	0.95	(0.95–0.96)	11.18	(10.88–11.48)
35-44	1.08	(1.07–1.09)	17.60	(17.18–18.03)
45-54	1.10	(1.10–1.11)	23.47	(22.89–24.04)
55-64	1.12	(1.11–1.12)	25.34	(24.60–26.07)
20-64	0.98	(0.98–0.99)	13.65	(13.48–13.83)
Total			(n = 345)	
20-24			2.17	(2.07–2.27)
25-34			11.92	(11.7–12.13)
35-44			22.14	(21.82–22.46)
45-54			23.23	(22.80–23.65)
55-64			20.82	(20.29–21.35)
20-64			13.80	(13.68–13.93)

: >1.33 g/L for men and >1.26 g/L for women.

6.3.7.2. Prevalence of raised Apo-lipoprotein B:

The overall prevalence of Apo. lipoprotein was 13.8%. The rate, generally, increased with age to reach a maximum at the age of 50-55 year for both men (23.5%) and women (30.3%).

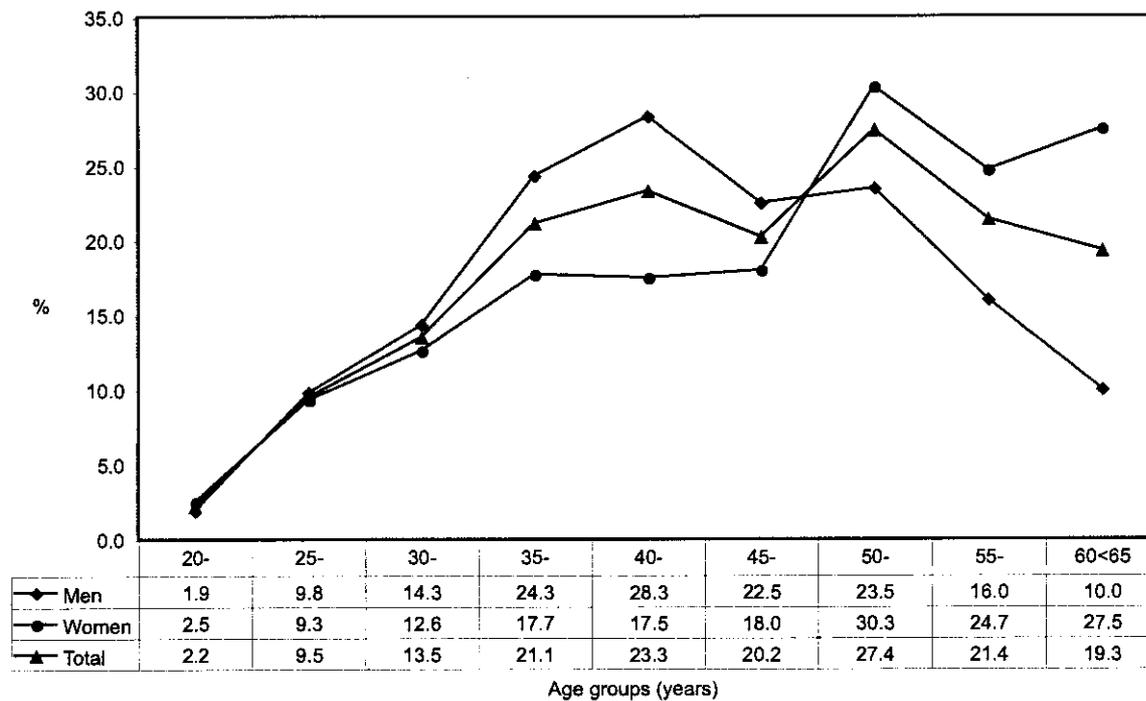


Figure (53): Prevalence of raised Apo-lipoprotein B rates by gender and age groups.

6.4. Combined risk factors:

6.4.1. Prevalence of combined 3 risk factors:

Table (82) and Figure (54) show summary combined risk factors. The overall prevalence of low risk (i.e. none of the risk factors) was 0.6%, without gender difference. On the other hand, the overall prevalence of high risk (i.e. three or more risk factors) was 58.6%. The prevalence rate was higher among men than among women (61.7% vs. 55.4%). The prevalence of high risk respondents shows an increasing trend as the age advances. By categorizing the age of participants into two groups, it was found that those aged 45-64 years had a substantial higher proportion of high risk than that of those aged 20-44 years (70 vs. 55.4%, respectively). However, clear gender differences can be observed with age where almost similar proportions of men can be observed at these 2 age categories (61.4% and 62.7%) on the other hand, 48.5% of women were at high risk under the age of 45 years compared with 75.6% above this age.

Table (82): Summary of combined risk factors

Age Group	Low risk (none of the risk factors)		Raised risk (at least 3 of the risk factors)	
	%	(95% CI)	%	(95% CI)
Men	(n =4)		(n =561)	
20-24	1.0	(0.0-3.0)	48.5	(39.3-57.7)
25-34	0.5	(0.0-1.6)	67.9	(61.8-74.1)
35-44	0.0	-----	65.9	(59.8-71.9)
45-54	0.4	(0.0-1.3)	57.8	(51.2-64.5)
55-64	1.2	(0.0-3.5)	67.7	(57.5-77.9)
20-44	0.5	(0.0-1.3)	61.4	(57.1-65.7)
45-64	0.7	(0.0-1.6)	62.7	(57.2-68.2)
20-64	0.6	(0.0-1.2)	61.7	(58.0-65.3)
Women	(n =8)		(n =755)	
20-24	0.0	-----	35.1	(27.3-42.8)
25-34	0.7	(0.0-1.8)	49.4	(43.4-55.3)
35-44	0.3	(0.0-0.8)	58.8	(54.1-63.5)
45-54	1.9	(0.2-3.5)	67.2	(61.7-72.6)
55-64	0.0	-----	80.5	(72.8-88.2)
20-44	0.4	(0.0-0.8)	48.5	(44.9-52.1)
45-64	1.1	(0.1-2.1)	75.6	(71.3-79.9)
20-64	0.6	(0.2-1.0)	55.4	(52.4-58.4)
Total	(n =12)		(n =1316)	
20-24	0.6	(0.0-1.7)	42.8	(36.5-49.1)
25-34	0.6	(0.0-1.4)	59.2	(54.8-63.6)
35-44	0.1	(0.0-0.4)	62.5	(58.6-66.4)
45-54	1.2	(0.3-2.2)	62.9	(58.7-67.2)
55-64	0.5	(0.0-1.4)	75.4	(69.2-81.6)
20-44	0.5	(0.0-0.9)	55.4	(52.6-58.3)
45-64	0.9	(0.2-1.6)	70.0	(66.5-73.4)
20-64	0.6	(0.2-0.9)	58.6	(56.2-61.0)

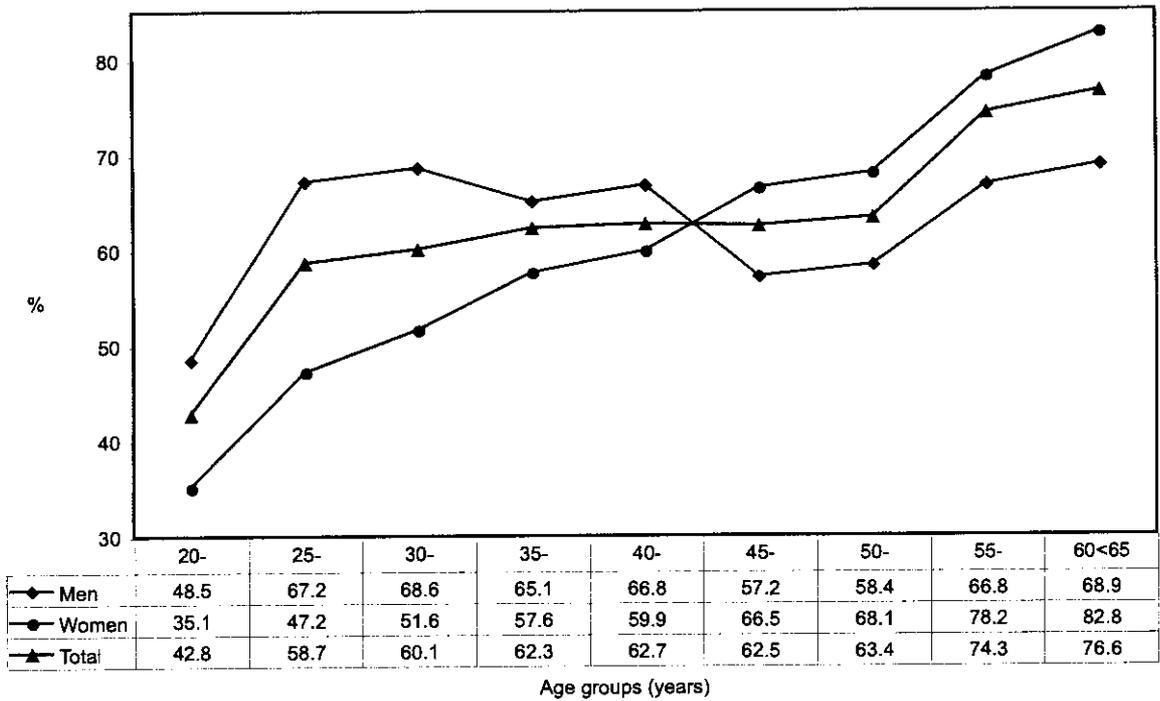


Figure (54): Prevalence rates of combined 3-risk factors by gender and age groups

6.4.2. Summary of prevalence of risk factors:

Figures (55 & 56) depict distribution of the survey participants according to some studied risk factors and gender. Women had higher rates of eating less than 5 servings of fruits and/or vegetables (82.8%), low total daily physical activity (63.2%), and overweight obesity (77.4%), when compared with men (79.2%, 47.8% and 73.6% respectively). On the other hand, men had higher rates of smoking (37.8%), alcohol (5.1%), hypertension (21.3%), diabetes mellitus (13.3%), high total cholesterol (40.1%), high HDL (38%) and high triglycerides (14.7%), when compared with women (3%, 0.2%, 19.7%, 11.5%, 37.2%, 10.6% and 9% respectively).

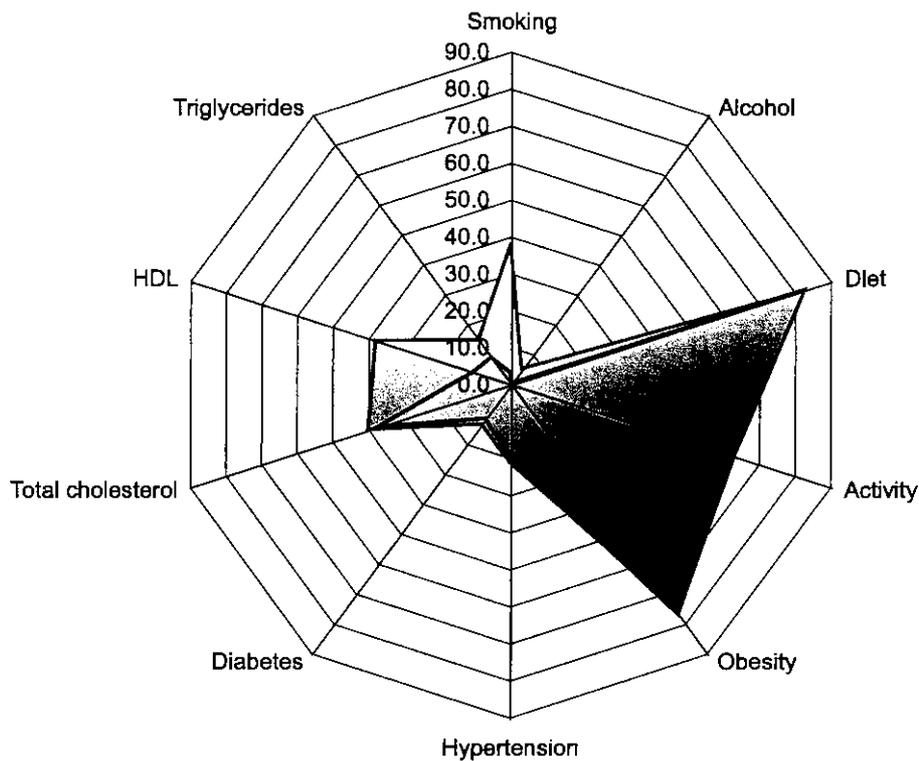


Figure (55): Prevalence of high risk rates by gender

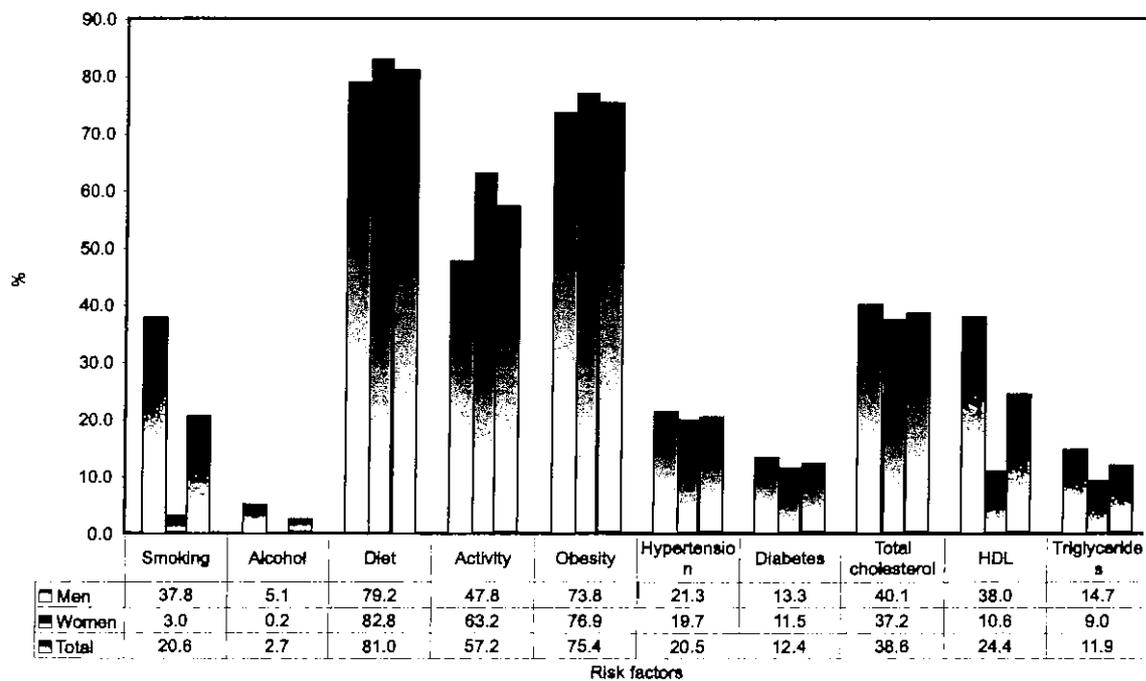


Figure (56): Summary of prevalence of risk factors by gender

Recommendations

7. RECOMMENDATIONS

The results of this study clearly revealed high rates of most of the risk factors of the chronic non communicable diseases. This indicates that major health problems related to chronic non communicable diseases will emerge during the few next coming years. Based upon the results of this study, it can be recommended that:

7.1. Health policy and future plans:

- Comprehensive health policies dealing with chronic non communicable disease risk factors have to be developed. Planning effective implementation of control and prevention measures that deal with chronic NCDs. This should be combined with providing sufficient health budget and empowering human resources. Specifically tailored training programmes should be designed for health care staff to enable them to implement effective intervention programmes. Plans should be comprehensive and cover all groups of the community.
- Coordination among all health sectors dealing with chronic NCDs.
- Cooperation with all agencies and parties dealing with chronic NCDs:
 - Ministry of Commerce: to subsidize the cost of fruit and vegetable.
 - Ministry of Awqaf: to strengthen the religious approach of controlling risk factors of chronic NCDs.
 - Ministry of Education: to integrate simple curricula, at different education stages, that illustrate the role of risk factors of chronic NCDs and how to control these factors. Plans have to be developed to provide healthy foods at the school canteen. Sport activities should be encouraged.
 - Agricultural and Fisheries Agency: to establish attractive walking tracks in the parking areas.
 - Youth and Sport Agency: to provide comprehensive plans to strengthen sport clubs and centers.
 - Ministry of High Education: to develop / strengthen curricula dealing with prevention and control of chronic NCDs and the risk factors associated with them in the medical and social colleges.
 - NGOs: encourage NGOs to have an active role in controlling risk factors of chronic NCDs.
 - Mass media: to raise general awareness of the population about the importance of controlling risk factors of chronic NCDs.
- Strengthening the role of health promotion to prevent and control risk factors of chronic NCDs. Effective plans have to be developed and applied at all possible settings such as mosques, schools, and other public places.

7.2. Specific Interventions:

- Adopting the comprehensive approach for controlling chronic NCDs with the aim of controlling or modifying one or more risk factor on the community level.
- Implementing long term programs that aim at lowering consumption of high- calories

- food and increasing consumption of fruit and vegetable.
- Encouraging practicing regular physical activities as a part of the comprehensive risk factors control plan.
 - Fighting all form of tobacco smoking

Development and implementation of new evidence based intervention programmes that suite the Kuwaiti community.

Other strategies dealing with high risk population should also be considered. Secondary and tertiary prevention plans should be developed and implemented in the hospitals and primary health care settings.

7.3. Surveillance:

Establishing a surveillance system adopting the stepwise comprehensive approach; starting by the core and then adding the extended and optional risk indicators.

7.4. Healthy environment:

Improving all environmental elements that might affect risk factors of chronic NCDs.

7.5. Empowerment and skill improvement:

Planning competency based training programmes for all health care workers whether in the primary health care settings or in the secondary and tertiary hospitals and other health centers. Standard guidelines dealing with management of chronic NCDs should be prepared and adopted. These guidelines should be tailored for the Kuwaiti health system.

7.6. Improvement of health services:

Improving all types of health services dealing with chronic NCDs. Provding recent diagnostic and therapeutic modalities that can meet the high prevalence of these diseases.

7.7. Research studies:

Carrying out in depth studies for risk factors of chronic NCDs to reveal the roots of these behaviours and how to effectively deal with them. Other chronic health problems should be included such as stroke and injuries with special emphasis on road traffic injuries.

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Appendices

APPENDIX I

Members of National Committee of EMAN Project for Chronic Non Communicable Diseases

Main Committee

D. Youssif Ahmad Al-Nesf	Chairman
Dr. Laila Al-Dosary	member
Dr. Nawal Al-Hamad	member
D. Mounira Al-Arouj	member
D. Adel Al-Asfour	member
D. Laila Al-Jassim	member
D. Ibrahim Al-Rashdan	member
D. Adnan Al-Gharably	member
D. Medhat Al-Shazly	member
D. Alaa Al-Fararjy	member

Administrative and Financial Committee

Ahmad Al-Kandary	Financial
Omar Awad Mohamed	Financial
Moustafa Al-Salamin	Administrative
Abd Al-Ameer Aly Abd Allah	Administrative
Rasha Farouk Abd Al-Ghafar	Administrative

Field Team Work

Al-Ahmadi District (Al-Qrain Center)	
D. Hoda Youssif Al-ghareeb	Lila Abd Allah Al-Awadi
D. Mohamed Esam Al-Baba	Abd Al-Galil Ali Al-Qalaf
Nour Mohamed Al-Dousary	Manal Mourshed Al-Azmi
Roukia Hamza Abbas	Nagat Matar Al-Anzi
Fawzia Mohamed Ammar	Afaf Abd Al-Qader Osman
Hawali District (Al-Shikh Nasser Saoud Al-Sabah Center)	
D. Mohamed Darouish Hassan	Nehad Abd Al-Qader Hamamy
D. Youssria Yahia Hefzy	Lamees Mohamed Saeed
Magdy Tawfik Soliman	Shimaa Mohamed Mal Allah
Hanan Aly al-Khars	Safa Khalifa Al-Khalaf
Mona Annad Firiga	Dalal Hassan Al-fadly
Capital District (Abd Al-Rahman Al-Abd Al-Moghni Center)	
D. Asia Saad Al-Hamdan	Mounira Saleh Almollah
D. Amina Abd Al-Kareem Fareed	Khaldah Abd Al-Wahab Alabd Allah
Nawal haji Mohamed	Faten Mohamed Ahmad
Magda Ali Salih	Amal ali Metwali
Nawal Mohssen Al-Motairy	Entsar Saad Al-Haifi
Amany Awad Abd Allah	
Jahraa District (Al-Eyoon Center)	
D. Mohamed Abd Al-Fattah Al-Menshwai	Esmat Fiki gad Al-Sayed
D. Maged Mohamed Al-Taweel	Fawzia Eid Soultan Al-Saeedi
Latifa Mazeed Al-Qahtani	Mona Sorouri Awad Al-Saeedi
Ali Mohamed Hassan Nagi	Fahima Khazaal Al-Anzi
Housnia Abd Al-Fattah Mohamed	Nawal Farah Al-Dalmani
Farawania District (Al-Andulus Center)	
D. Fatma Al-Kharji	Amal Mejbl Al-Baha
D. hanadi Rabab	Dala Moutlaq Al-Anzi
Samah Qassem Darouish	Amna Gamaan Al-Azmi
Refaa Aagami Al-Moutri	Laila Abd Al-Hassan Al-Mahdy
Mohamed Haddad Al=Fadly	Wafaa Ghadban Mashari
Laboratories (Al-Amir Hospital Laboratory)	
Sedika Al-Abrash	Laboratories
Seham Salih Awad Al-Eissa	Laboratories
Gawad Ali Mohamed Karimi	Laboratories

APPENDIX II

Resolutions and Decrees related to EMAN project in Kuwait

(a)

Thirtieth session

58TH Conference

Muscat 5-6/1/1426H

14-15/2/2005

Resolution No.(5)

Control of Noncommunicable Diseases

(EMAN Network)

Resolution

1. Appeal to those States that have not yet begun to accelerate the preparation and implementation of appropriate national plans (STEPwise Approach) and connection with EMAM during the first half of the year 2005.
2. Work on the implementation of programs for the prevention and control of communicable and noncommunicable diseases, within a comprehensive and integrated health system in primary health care based on the “dual Intervention” method.
3. Call for activating the “Global Strategy on Diet, Physical Activity and Health” in the relevant health programs and departments, Ministry of Health, as it involves methodological frames at different global, regional and national levels in addition to determining the role of the World Health Organization and government policies, and public organizations.
4. The Member States have to perform in-depth evaluation of primary health care and to identify its role in the prevention and management of noncommunicable diseases and to identify the difficulties and solutions to enable PHCCs’ role for such a group of diseases.
5. Request from the State of Kuwait to introduce its “Health Promotion” programs, as a collective umbrella of all other programs to combat noncommunicable diseases, in the next conference in Manama.
6. Call of in-charge personnel of preventive programs, especially EPI programs and communicable diseases control, in the GCCC to participate in the VII International Forum on Immunizations, that will be held in Dubai from 5-7 March 2005 under the slogan “Immunization Against Diseases and Immune Therapy”.. so as to set recommendations related to new issues by the forum for a next meeting of the Council.

(b)
Thirty first Session
Sixty Conference
Kingdom of Bahrain
28-29/1/1427H
27-28/2/2006

Based on Resolution No.(5) for the 58th session (Muscat mid-February 2005), which called the Member States of the Council to accelerate their participation in EMAN and implementation of the appropriate national plan of STEPwise Approach)

Resolution

1- to approve the holding of a Gulf workshop in coordination and cooperation with the Regional Office of the World Health Organization for the Eastern Mediterranean (EMRO), in the State of Kuwait during July 2006, for the purpose of putting “EMAN network” into practice, through monitoring, analysis of the current situation and identify the difficulties and obstacles in the GCC States and setting a time-based plan of action with specific objectives.

(c)
The State of Kuwait
Ministry of Health
Ministerial Decree (313) in 2003

Establishment of a committee to follow-up implementation of the “EMAN Network” to control non-communicable diseases in the State of Kuwait in collaboration with EMRO

Minister of Health:

- Proceeding from the bonds of cooperation with the World Health Organization (EMRO) in all aspects of health, particularly control of non-communicable diseases.,
- As the MOH is careful to cooperate and participate in the EMAN network to combat such diseases, the World Health Organization selected the State of Kuwait as a regional anti-diabetic centre,
- And coping with the policy and strategy of the Ministry of Health that aim at prevention of non-communicable diseases, and
- Based on the requirements of public health and interest work,
The following resolution is issued:

Article I:

Formation a committee to follow up implementation of a project to combat non-communicable diseases prepared by the World Health Organization, headed by Dr. Yusuf Ahmed Al-Nisf - Assistant Undersecretary for Medical Services Support and membership of:

- Dr. Laila Al-Dosari - Director of the Primary Health Care Department
- Dr. Nawal Al-Hamd - Director of the Department of Nutrition and Feeding
- Dr. Adel Al-Asfour - Director of the Center Hussain Makki Juma.
- Dr. Laila Al-Jassam - Health Education directorate.
- Dr. Adnan Gharblli – Head of Chronic Diseases.
- Dr. Munira Al-Arooj – Internist in Al-Amiri Hospital.
- Dr. Ibrahim Rashdan – Cardiologist Chest Hospital.
- Dr. Alaa Al-Frangi - Quality Control Physician, Jahra Hospital.
- Dr. Medhat El-Shazly - Public Health Specialist.

Article II :

This committee is responsible for the following tasks:

- 1- Study the protocol proposed by the WHO to implement EMAN project to combat non-communicable diseases in the State of Kuwait.
- 2- Develop operational programs and plan of action for implementation and determine the role of various sectors and the timetable for the various phases.
- 3- Putting necessary subsidiary programs and the formation of task forces to accomplish program-related tasks.
- 4- Establishing a national information centre for EMAN network to combat noncommunicable diseases in coordination with EMRO.
- 5- Carrying out necessary administrative and operational for implementing the program.
- 6- Contact with departments and relevant agencies for coordination of their efforts.
- 7- Representation of the State of Kuwait in EMAN-related meetings of WHO.

Article III:

The Committee holds its meetings at the invitation of the chairman - which are only valid after attendance of the majority of its members - and the Committee can hold its meetings in non-office hours.

Article IV:

The Committee can get help from others, including deemed non-members. It hiring experts, the WHO and invited them to attend the meetings, if required.

Article V:

The Committee will select from its members a reporter for preparation of the agenda and call for the meeting in coordination with the Chairman, to follow up the implementation of the resolutions and recommendations of the Committee.

Article VI:

The Committee will send a periodical progress report to HE the Minister, with a copy of it to the Undersecretary.

Article VII:

This resolution is disseminated to relevant departments necessary for its implementation, and its history.

(d)

WHO Regional Office for the Eastern Mediterranean

January 21, 2003

18 ZulQeeda 1423 H

PCHR 00965-4865287 – Kuwait

HE Dr. Mohammed Ahmed Al-Jarallah,

May God protect him.

May Peace and Allah's Mercy and Blessings are upon you, then..

I was pleased to receive your letter, in which you informed me that MOH, the State of Kuwait has approved to join EMAN network to combat non-communicable diseases.

It is a pleasure and an honour for joining this network, which will work to reduce the level of non-communicable diseases, by reducing their risk factors.

Please accept my highest consideration,

Dr. Hussein Abdul Razzaq AlGazaery

Regional Director

WHO, EMRO

(e)
WHO, EMRO
July 15, 2002
5 Jumada AlOwla1423 H

His Excellency Prof. Dr. Osama Bin Abdul Majeed Shobokshi
Minister of Health
Ministry of Health
Riyadh
Saudi Arabia

HE Prof. Dr. Osama Bin Abdul Majeed Shobokshi, May God preserve him,

May Peace and Allah's Mercy and Blessings are upon you, then..

It is my honor to inform you that the Eastern Mediterranean Region of the WHO in the process of establishing a new program entitled (Eastern Mediterranean Approach of non-communicable diseases, or EMAN).

This network has been proposed in the consultation previously held in Cairo from 24 to 26 June 2001, which demanded establishing an integrated regional network of non-communicable diseases, as one of the initiatives aimed at the prevention of major non-communicable diseases and health promotion, as well as reducing some of the common factors, such as smoking, unhealthy nutrition and physical inactivity and the promotion of healthy lifestyles in the various communities, through the adoption of some coordinated and comprehensive actions. Note that the main purpose of the network is to improve health in the countries of the Eastern Mediterranean through the reduction of mortality and morbidity of NCD, through the implementation of an integrated cooperative program for the prevention of these diseases and health promotion.

Attainment of this goal requires the availability of mechanisms and methodologies for effective cooperative contribute to the implementation of integrated activities for the prevention and control of non-communicable diseases. This objective also requires recognition of the existence of common risk factors of major non-communicable diseases (which mainly related to lifestyle). This network promote countries of the region to cooperate together to combat these factors, in order to reduce the incidence of non-communicable diseases, with emphasis on the need to include preventive measures in various health care, and support. Countries of the Region face two main problems: Hypertension, which reaches 26% incidence rate and Diabetes, which incidence rate ranges between 7% and 25%. These problems constitute a

major challenge to the health care systems in countries of the region which necessitates these country to set priorities in relation to monitor, early diagnosis and treatment of these diseases, and adherence to those priorities.

Will be made available to countries participating in EMAN network, an opportunity to cooperate in the field of vocational education, in addition to working together on the preparation of necessary resource and materials.

Note that the following steps should be taken in order to join the network:

- (A) Situation analysis of non-communicable diseases at the national level.
- (B) Commitment to the implementation of community-based programs,
- (C) Carrying out a survey on the level to assess the epidemiological situation of non-communicable diseases and their related risk factors,
- (D) Provide documented information about health services and available community structures, which could help to address the noncommunicable diseases.

Two networks had been developed in the frame of the WHO:

Countrywide Integrated Noncommunicable Diseases Intervention Programme, in the European Region, and (CINDI) and the network of health promotion programs and prevention of diseases in the Region of the Americas (CARMEN).

These networks involved in the application of the principles of integrated prevention and control of non-communicable diseases, each containing several frames for the application of knowledge and represent areas of broad expertise and can be guided by its experience in the different WHO regions, regarding how to take use of the knowledge and facing challenges of prevention of non-communicable diseases.

The EMRO has chosen the Kingdom to be among the first countries to adopt this new network and because of available sophisticated health services, and the attention given to research and implement its scientific programs in the field of NCD, as well as the designation of one of liaison officers, so that we contact them directly in the activities required for implementation.

I am sure you will agree with me that achieving success requires continued cooperation by all parties concerned.

Please accept my highest consideration,

Copy to:

- HE Dr. Youssef Saad bin Tarrad, Undersecretary of the Ministry of Exterior for Economic and Cultural Affairs, Ministry of Exterior, Riyadh
- Mr. Hassan Mahmoud Al-Fakhry: General supervisor of the Department of International Health, Ministry of Health, Riyadh
- Mr. Resident Representative of the United Nations Development Program, KSA.
Office of the Representative of the World Health Organization, Saudi Arabia

إقرار الموافقة على المشاركة بالدراسة

عزيزي المشترك:

لقد تم اختيارك لتكون مشتركاً معنا ضمن دراسة المسح الوطني للأمراض المزمنة غير المعدية وهذا هو سبب زيارتك لنا اليوم.

وهذه الدراسة يتم القيام بها ضمن جهود وزارة الصحة في دولة الكويت لدراسة العوامل المؤدية للأمراض المزمنة غير المعدية الأكثر شيوعاً وهي مرض السكر وأمراض القلب وضغط الدم والسمنة... الخ، ومكافحتها.

ويتم إجراء هذه الدراسة بالتعاون مع منظمة الصحة العالمية WHO-EMRo ولذلك نحتاج تعاونك معنا لملء الاستبيان والإجابة الدقيقة على الأسئلة، كذلك عمل الفحص اللازم والذي يتضمن قياس (طولك، وزنك، قياس ضغط الدم) وسيتم أخذ عينة دم منك لعمل تحاليل الدم مثل (نسبة السكر، الكوليسترول ونسبة الدهون الثلاثية).

إن كل المعلومات التي ستدلي بها في هذه الدراسة ستكون سرية وستستخدم فقط في مجال البحث وليس لأي أغراض أخرى، حيث سيتم التعامل مع المعلومات وفقاً لأخلاقيات البحوث الطبية وبما يحفظ خصوصية المعلومات.

عزيزي المشترك:

بالطبع إن موافقتك على المشاركة معنا ستكون مكسباً لكويتنا الحبيبة في دعم التطوير في المجال الصحي... ولك حرية الموافقة على المشاركة بالدراسة أو الرفض... وفي حالة موافقتك فإن لك حرية رفض الإجابة على أي سؤال من أسئلة الدراسة.

التوقيع

فهل أنت موافق على المشاركة بالدراسة؟

نعم

لا

نشكر لك تعاونك معنا،،

الدكتور/ يوسف أحمد النصف

وكيل وزارة الصحة المساعد

رئيس المشروع

رقم مسلسل الاستمارة

الرقم المدني

الموافقة على إجراء المقابلة والاشتراك في البحث			
إذا لا	<input type="checkbox"/>	① نعم ② لا	I6 الموافقة قرأت شفويا للمشارك
إذا لا	<input type="checkbox"/>	① نعم ② لا	I7 تمت الموافقة والتوقيع على الإقرار
إنهاء المقابلة	<input type="checkbox"/>		I9a وقت بدء المقابلة (24 ساعة)
	<input type="checkbox"/>		I9b وقت إنتهاء المقابلة (24 ساعة)

البيانات الشخصية للمشارك بالبحث	
	I10 اسم العائلة
	I11 الاسم الأول
<input type="checkbox"/>	I12 الرقم المدني
<input type="checkbox"/>	I13 تليفون المنزل
<input type="checkbox"/>	I14 تليفون العمل
<input type="checkbox"/>	I15 بيجر
<input type="checkbox"/>	I16 محمول (إختياري)

ملحوظة :

البيانات الشخصية للمشارك بالبحث سيتم التعامل معها بسرية وحسب أخلاقيات البحوث الطبية وسيتم فصل هذا الجزء عن باقي الاستمارة

Step (1): Demographic Information

خطوة (1): معلومات سكانية

الرمز	ملاحظات	الإجابة	البيان / السؤال	الرقم
<input type="checkbox"/>		① ذكر ② أنثى	النوع	C1
<input type="checkbox"/>		يوم / شهر / سنة /	تاريخ الميلاد	C2
<input type="checkbox"/> <input type="checkbox"/>		سنة	العمر	C3
<input type="checkbox"/> <input type="checkbox"/>		سنة	ما هو إجمالي عدد السنوات التي أمضيتها بالدراسة؟ (ما عدا الحضنة ورياض الأطفال).	C4a
<input type="checkbox"/>		① لا أقرأ ولا أكتب (لم أذهب للمدرسة) ② أقرأ وأكتب (أقل من الابتدائي) ③ ابتدائي ④ متوسط ⑤ ثانوي ⑥ دبلوم / أقل من جامعي ⑦ جامعي ⑧ دراسات عليا ⑨ رفض الإجابة	ما هو أعلى مستوى تعليمي وصلت إليه بالدراسة؟ (المرحلة الدراسية التي أتممتها).	C4b
<input type="checkbox"/>		① أعزب ② متزوج ③ أرملة ④ مطلق	الحالة الاجتماعية	C5
<input type="checkbox"/>	إذا لا اذهب إلى C7	① نعم ② لا	وجود قرابة بين الوالدين؟	C6a
<input type="checkbox"/>			حدد نوع القرابة	C6b
<input type="checkbox"/> <input type="checkbox"/>		العدد	عدد أفراد الأسرة (المقيمين معك بنفس السكن)	C7
<input type="checkbox"/> <input type="checkbox"/>		① لا أعمل (قادر على العمل) ② لا أعمل (غير قادر على العمل) ③ موظف حكومي ④ موظف غير حكومي ⑤ صاحب عمل ⑥ متطوع ⑦ تلميذ / طالب ⑧ ربة منزل ⑨ متقاعد ⑩ رفض الإجابة	أي من الفئات التالية تصف نوع عملك الأساسي خلال الإثني عشر شهراً الماضية؟	C8
<input type="checkbox"/> <input type="checkbox"/>		① أقل من ٢٥٠ ② من ٢٥٠ إلى أقل من ٥٠٠ ③ من ٥٠٠ إلى أقل من ٧٥٠ ④ من ٧٥٠ إلى أقل من ١٠٠٠ ⑤ من ١٠٠٠ إلى أقل من ١٢٥٠ ⑥ من ١٢٥٠ إلى أقل من ١٥٠٠ ⑦ من ١٥٠٠ إلى أقل من ١٧٥٠ ⑧ من ١٧٥٠ إلى أقل من ٢٠٠٠ ⑨ من ٢٠٠٠ فأكثر ⑩ رفض الإجابة	متوسط الدخل الشهري للأسرة بالدينار الكويتي خلال آخر ١٢ شهر	C9

Step (1): Behavioral Measures

خطوة (1): معلومات سلوكية

Tobacco Use (Section S)

التدخين (فقرة (S))

سأقوم الآن بسؤالك بعض الأسئلة حول بعض عاداتك ذات العلاقة بالصحة مثل التدخين والكحول والتغذية والنشاط الجسماني. وسنبدأ بالتدخين.

الرقم	البيان / السؤال	الإجابة	ملاحظات	الرمز
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التدخين الحالي

<input type="checkbox"/>	هل تدخن حالياً أي نوع من أنواع التبغ مثل السجائر أو الشيشة الخ...؟	نعم لا	① ②	في حالة لا اذهب إلى S4
<input type="checkbox"/>	هل تدخن حالياً يومياً؟	نعم لا	① ②	في حالة لا اذهب إلى S4
<input type="checkbox"/> <input type="checkbox"/>	كم كان عمرك عندما بدأت التدخين يومياً؟	بالسنوات لا أتذكر	سنة ⑦⑦	في حالة الإجابة اذهب إلى S3
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	إذا كانت الإجابة على السؤال السابق لا أتذكر منذ متى وأنت تدخن يومياً؟ (أذكر الفترة الزمنية؟)	بالسنوات أو بالشهور أو بالأسابيع لا أتذكر	سنة شهر أسبوع ⑦⑦	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	في المتوسط ما هي الكمية التي تقوم بتدخينها يومياً من هذه الأنواع؟	سجائر سجائر لف غليون سيجار شيشة أي أنواع أخرى (حدد)	سجائرة سجائرة غليون سيجار شيشة أي أنواع أخرى (حدد)	

التدخين السابق

<input type="checkbox"/>	هل سبق لك التدخين يومياً؟ (في الماضي)	نعم لا	① ②	في حالة لا اذهب إلى A1a
<input type="checkbox"/> <input type="checkbox"/>	كم كان عمرك عندما أقلعت عن التدخين؟	بالسنوات لا أتذكر	سنة ⑦⑦	في حالة الإجابة اذهب إلى S6a
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	إذا كانت الإجابة على السؤال السابق لا أتذكر منذ متى وأنت متوقف عن التدخين يومياً؟ (أذكر الفترة الزمنية)	بالسنوات أو بالشهور أو بالأسابيع لا أتذكر	سنة شهر أسبوع ⑦⑦	
<input type="checkbox"/> <input type="checkbox"/>	كم كان عمرك عندما بدأت التدخين يومياً؟	بالسنوات لا أتذكر	سنة ⑦⑦	في حالة الإجابة اذهب إلى S7
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	إذا كانت الإجابة على السؤال السابق لا أتذكر ماهي مدة تدخينك السابقة؟ (أذكر الفترة الزمنية)	بالسنوات أو بالشهور أو بالأسابيع لا أتذكر	سنة شهر أسبوع ⑦⑦	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	عندما كنت تدخن (في الماضي) ماذا كان متوسط استهلاكك اليومي من هذه الأنواع؟ (الكمية التي كنت تقوم بتدخينها يومياً)	سجائر سجائر لف غليون سيجار شيشة أي أنواع أخرى (حدد)	سجائرة سجائرة غليون سيجار شيشة أي أنواع أخرى (حدد)	

Alcohol Consumption (Section A)		مشروبات روحية (فقرة A)	
الرمز	ملاحظات	الإجابة	البيان / السؤال
<input type="checkbox"/>	في حالة لا اذهب إلى D1a	① نعم ② لا	هل سبق لك شرب مشروبات كحولية؟ (مثل الويسكي أو البيرة بالكحول أو النبيذ)
<input type="checkbox"/>	في حالة لا اذهب إلى D1a	① نعم ② لا	هل سبق لك شرب مشروبات كحولية خلال السنة الماضية؟
<input type="checkbox"/>		① يوماً ② 5 - 6 أيام بالأسبوع ③ 1 - 4 أيام بالأسبوع ④ 1 - 3 أيام بالشهر ⑤ أقل من مرة بالشهر	خلال السنة الماضية ما هو معدل شربك (حتى ولو كأساً واحداً)؟
<input type="checkbox"/>		عدد لا أتذكر (77)	كم كأس تشربها حالياً في اليوم الواحد في المتوسط؟
<input type="checkbox"/>		○ ○ السبت ○ ○ الأحد ○ ○ الإثنين ○ ○ الثلاثاء ○ ○ الأربعاء ○ ○ الخميس ○ ○ الجمعة	خلال الأيام السبعة الماضية كم مقياس من المشروبات الكحولية (كأس) شربت كل يوم من الأيام التالية؟ (أدخل 77 في حالة لا أتذكر)

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الغذاء (فقرة D) **Diet (Section D)**

سأقوم الآن بسؤالك بعض الأسئلة عن الفواكه والخضراوات التي تتناولها وأسأعرض عليك بعض الصور التوضيحية. أرجو أن تحاول الإجابة حسب الكميات التي تتناولها في المتوسط، من الفواكه والخضراوات.

الرقم	البيان / السؤال	الإجابة	ملاحظات	الرمز
D1a	كم يوماً في الأسبوع تتناول عادة الفواكه الطازجة (عدا التمر)؟	عدد الأيام لا أتذكر	في حالة صفر اذهب إلى D2a	<input type="checkbox"/>
D1b	كم حصة من الفواكه الطازجة تتناول في اليوم الواحد عادة؟	عدد الحصص لا أتذكر		<input type="checkbox"/>
D2a	كم يوماً في الأسبوع تتناول خضار عادة؟ (ما عدا البطاطا)	عدد الأيام لا أتذكر	في حالة صفر اذهب إلى D3	<input type="checkbox"/>
D2b	كم حصة من الخضراوات تتناول في اليوم الواحد عادة؟	عدد الحصص لا أتذكر		<input type="checkbox"/>
D3	كم يوماً في الأسبوع تتناول الوجبات السريعة عادة؟	عدد الأيام لا أتذكر		<input type="checkbox"/>
D4	ما نوع الدهن أو الزيت الذي تستخدمه غالباً للطهي ولإعداد الطعام في المنزل؟ (أذكر نوعاً واحداً فقط)	① دهن حيواني أو زبد ② دهن صناعي (مارجرين) ③ زيوت نباتية ④ زيت النخيل ⑤ أخرى (حدد النوع) ⑥ لا أستعمل ⑦ لا أعرف		<input type="checkbox"/>

كم يوماً في الأسبوع تتناول عادة المأكولات أو المشروبات الآتية؟

D5	التمر	عدد الأيام بالأسبوع	<input type="checkbox"/>
D6	حبوب الفطور الكاملة (خبز أسمر / أرز أسمر)	عدد الأيام بالأسبوع	<input type="checkbox"/>
D7	لحم الضأن / الغنم	عدد الأيام بالأسبوع	<input type="checkbox"/>
D8	لحم البقر	عدد الأيام بالأسبوع	<input type="checkbox"/>
D9	السمك	عدد الأيام بالأسبوع	<input type="checkbox"/>
D10	لحم الطيور / الدواجن	عدد الأيام بالأسبوع	<input type="checkbox"/>
D11	الحلويات (كيك - جاتوه - كنافة - بقلاوة - شيكولاته)	عدد الأيام بالأسبوع	<input type="checkbox"/>
D12	مشروبات غازية (كوكا كولا - سفن أب - فانتا)	عدد الأيام بالأسبوع	<input type="checkbox"/>
D13	عصائر طبيعية	عدد الأيام بالأسبوع	<input type="checkbox"/>
D14	مشروبات أخرى (فيمتو - تانج)	عدد الأيام بالأسبوع	<input type="checkbox"/>

النشاط الجسماني (فقرة P)

سأقوم الآن بسؤالك بعض الأسئلة عن النشاط الجسماني الذي تبذله في خلال الأسبوع العادي. رجاء الإجابة على الأسئلة حتى لو تعتقد أنك لا تقوم بأي نشاط جسماني. فكر أولاً بالنشاط الجسماني أثناء العمل مهما كان نوع عملك. والمقصود بالنشاط الجسماني الشاق هو النشاط الذي يتطلب بذل الجهد ويترتب عليه زيادة كبيرة بالتنفس أو بضربات القلب أما النشاط الجسماني المتوسط فهو النشاط الذي يترتب عليه زيادة بسيطة بالتنفس أو بضربات القلب.

الرقم	البيان / السؤال	الإجابة	ملاحظات	الرمز
النشاط الجسماني أثناء العمل				
P1	هل طبيعة عملك يغلب عليها الجلوس أو الوقوف أثناء العمل؟ (أو المشي لمدة لا تزيد عن 10 دقائق)؟	نعم لا	① ②	إذا نعم اذهب إلى P6
P2	هل طبيعة عملك تتطلب بذل نشاطاً جسمانياً شاقاً لمدة 10 دقائق على الأقل بصورة مستمرة (حمل أشياء ثقيلة - الحفر - أعمال المبانى)؟	نعم لا	① ②	إذا لا اذهب إلى P4
P3a	كم يوماً في الأسبوع تقوم بنشاط شاق كجزء من عملك؟	عدد الأيام بالأسبوع		
P3b	كم من الوقت في اليوم الواحد تقوم بنشاط شاق أثناء العمل؟	دقيقة/أو دقائق ساعة		
P4	هل طبيعة عملك تتطلب نشاطاً متوسطاً (المشي بسرعة - حمل أشياء خفيفة) لمدة 10 دقائق على الأقل بصورة مستمرة؟	نعم لا	① ②	إذا لا اذهب إلى P6
P5a	كم يوماً في الأسبوع العادي تقوم بنشاط جسماني متوسط أثناء العمل؟	عدد الأيام بالأسبوع		
P5b	كم من الوقت في اليوم الواحد تقوم بنشاط جسماني متوسط كجزء من عملك؟	دقيقة/أو دقائق ساعة		
P6	ما هو إجمالي عدد ساعات العمل اليومية في أسبوع العمل العادي؟	عدد الساعات		

النشاط الجسماني أثناء التنقل ما بين الأماكن المختلفة

سأقوم الآن بسؤالك بعض الأسئلة عن النشاط الجسماني خارج أوقات العمل (مثل الذهاب للمسجد أو للسوق... الخ).

P7	هل تذهب إلى أماكن معينة سيراً على الأقدام لمدة 10 دقائق على الأقل بصورة مستمرة؟	نعم لا	① ②	إذا لا اذهب إلى P9
P8a	كم يوماً في الأسبوع العادي تسير على الأقدام لمدة 10 دقائق على الأقل بصورة مستمرة للتنقل بين الأماكن؟	عدد الأيام بالأسبوع		
P8b	كم من الوقت تسير على الأقدام للتنقل في اليوم العادي؟	دقيقة/أو دقائق ساعة		

النشاط الجسماني أثناء وقت الفراغ

سأقوم الآن بسؤالك بعض الأسئلة عن النشاط الجسماني أثناء وقت الفراغ (مثل ممارسة الرياضة).

P9	هل تقضى وقت الفراغ بالجلوس أو الاستلقاء أو عمل أي نشاط بدني لا تزيد مدته عن 10 دقائق في المرة الواحدة؟	نعم لا	① ②	إذا نعم اذهب إلى P14
P10	هل تقضى وقت الفراغ في عمل شاق يزيد عن 10 دقائق مستمرة في المرة الواحدة (جرى - رفع أثقال - رياضة عنيفة)؟	نعم لا	① ②	إذا لا اذهب إلى P12
P11a	كم يوماً في الأسبوع العادي تقوم بنشاط جسماني شاق؟	عدد الأيام بالأسبوع		
P11b	كم من الوقت في اليوم العادي تقوم بنشاط جسماني شاق أثناء وقت الفراغ؟	دقيقة/أو دقائق ساعة		
P12	هل يشمل وقت الفراغ القيام بنشاط جسماني متوسط لمدة 10 دقائق على الأقل في المرة الواحدة (مشى سريع - سباحة)؟	نعم لا	① ②	إذا لا اذهب إلى P14
P13a	كم يوماً في الأسبوع العادي تقوم بنشاط جسماني متوسط أثناء وقت الفراغ؟	عدد الأيام بالأسبوع		
P13b	كم من الوقت في اليوم الواحد تقوم بنشاط جسماني متوسط أثناء وقت الفراغ؟	دقيقة/أو دقائق ساعة		
P14	في الأسبوع الماضي كم من الوقت أمضيت جالسا أو مستلقيا في اليوم الواحد (ما عدا أوقات النوم)؟	دقيقة/أو دقائق ساعة		

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Clinical History (Section H)		التاريخ المرضي للأسرة (فقرة (H))	
الرمز	ملاحظات	الإجابة	البيان / السؤال
<input type="checkbox"/>		① نعم ② لا ⑦ لا أعرف	H1 هل يعاني أحد أفراد الأسرة من ارتفاع ضغط الدم؟
<input type="checkbox"/>		① نعم ② لا ⑦ لا أعرف	H2 هل يعاني أحد أفراد الأسرة من مرض القلب؟
<input type="checkbox"/>		① نعم ② لا ⑦ لا أعرف	H3 هل يعاني أحد أفراد الأسرة من أورام؟
<input type="checkbox"/>		① نعم ② لا ⑦ لا أعرف	H4 هل يعاني أحد أفراد الأسرة من أمراض الكلى؟
<input type="checkbox"/>		① نعم ② لا ⑦ لا أعرف	H5 هل يعاني أحد أفراد الأسرة من مرض السكر؟

التاريخ المرضي للمشارك

Hypertension (Section Hyp)		ارتفاع ضغط الدم (فقرة (Hyp))	
<input type="checkbox"/>		① خلال 12 شهرا الماضية ② منذ 1 - 3 سنوات ③ لم يتم منذ أكثر من 3 سنوات	Hyp1 متى تم قياس ضغط الدم لك آخر مرة بواسطة الطبيب؟
<input type="checkbox"/>	إذا لا اذهب إلى Diabl	① نعم ② لا	Hyp2 هل عانيت من ارتفاع ضغط الدم؟
<input type="checkbox"/>		يوم/شهر/سنة / /	Hyp3a تاريخ تشخيص المرض
<input type="checkbox"/>		سنة	Hyp3b مدة المرض

هل تتبع حالياً أحد هذه العلاجات كما وصفها الطبيب لعلاج ارتفاع ضغط الدم؟

<input type="checkbox"/>		① نعم ② لا	Hyp4 أي أدوية لعلاج ضغط الدم
<input type="checkbox"/>		① نعم ② لا	Hyp5 نظام غذائي خاص
<input type="checkbox"/>		① نعم ② لا	Hyp6 نصيحة أو علاج لإنقاص الوزن
<input type="checkbox"/>		① نعم ② لا ③ غير مدخن	Hyp7 نصيحة أو علاج للإقلاع عن التدخين (إذا كنت مدخن)
<input type="checkbox"/>		① نعم ② لا	Hyp8 نصيحة للقيام بنشاط جسماني
<input type="checkbox"/>		① نعم ② لا	Hyp9 علاجات طبيعية أو أعشاب

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Diabetes Mellitus (Section Diab)		مرض السكر (فقرة Diab)	
الرقم	البيان / السؤال	الإجابة	ملاحظات
Diab1	متى تم قياس نسبة السكر بالدم آخر مرة؟	① خلال 12 شهر الماضية ② منذ 1 - 3 سنوات ③ لم يتم ذلك منذ أكثر من 3 سنوات	<input type="checkbox"/>
Diab2	هل سبق أن أخبرك الطبيب أنك مصاب بمرض السكر؟	① نعم ② لا	<input type="checkbox"/> إذا لا اذهب إلى Carl
Diab3a	تاريخ تشخيص مرض السكر	يوم / شهر / سنة	<input type="checkbox"/>
Diab3b	مدة المرض	سنة	<input type="checkbox"/> <input type="checkbox"/>

هل تتبع حالياً أحد هذه العلاجات كما وصفها الطبيب للسيطرة على مرض السكر؟

Diab4	أنسولين (حقن)	① نعم ② لا	<input type="checkbox"/>
Diab5	أقراص لعلاج مرض السكر	① نعم ② لا	<input type="checkbox"/>
Diab6	نظام غذائي خاص	① نعم ② لا	<input type="checkbox"/>
Diab7	نصيحة أو علاج لإنقاص الوزن	① نعم ② لا	<input type="checkbox"/>
Diab8	نصيحة أو علاج للإقلاع عن التدخين (إذا كنت مدخن)	① نعم ② لا ③ غير مدخن	<input type="checkbox"/>
Diab9	نصيحة للقيام بنشاط جسماني	① نعم ② لا	<input type="checkbox"/>
Diab10	علاج بالأعشاب	① نعم ② لا	<input type="checkbox"/>

ممارسات المريض تجاة النصائح الطبية لعلاج مرض السكر

Diab11	هل تقوم بالكشف الدوري حسب التعليمات؟	① نعم ② لا	<input type="checkbox"/>
Diab12	هل تتبع النظام الغذائي الخاص الموصوف لك؟	① نعم ② لا	<input type="checkbox"/>
Diab13	هل تأخذ علاج مرض السكر بانتظام؟	① نعم ② لا	<input type="checkbox"/>
Diab14	هل تقوم بتحليل الدم للسكر بنفسك؟	① نعم ② لا	<input type="checkbox"/>
Diab15	هل تقوم بتنظيم جرعات دواء مرض السكر بنفسك؟	① نعم ② لا	<input type="checkbox"/>
Diab16	خلال الشهرين الماضيين هل حضرت أو شاركت بأي ندوات للتوعية الصحية بشأن مرض السكر؟	① نعم ② لا	<input type="checkbox"/>
Diab17	ما هو أهم مصدر لمعلوماتك عن مرض السكر؟	① طبيب ② ممرضة ③ ندوات صحية ④ وسائل الإعلام (تلفزيون - صحافة) ⑤ الأقارب والأصدقاء ⑥ نشرات توعية صحية ⑦ وسائل أخرى (حدد)	<input type="checkbox"/>

رقم مسلسل الاستمارة

أمراض القلب (فقرة Car)		Cardiac Diseases (Section Car)	
الرقم	البيان / السؤال	الإجابة	ملاحظات
Car1	هل أخبرك الطبيب أنك مصاب بمرض بالقلب؟	① نعم ② لا	إذا لا اذهب إلى MI
Car2a	تاريخ تشخيص المرض	يوم/شهر/سنة	
Car2b	مدة الإصابة بالمرض	سنة	
Car3	هل عانيت من جلطة قلبية حادة لزممت دخولك المستشفى أكثر من خمسة أيام؟	① نعم ② لا	
Car4	هل أجريت لك قسطرة قلبية لإجراء مداخلة البالون أو الدعامة؟	① نعم ② لا	
Car5	هل أجريت لك عملية جراحة القلب المفتوح لزراعة الشرايين؟	① نعم ② لا	
Car6	هل دخلت المستشفى خلال العام الماضي بسبب مرض القلب؟	① نعم ② لا	

هل تتبع حالياً أحد هذه العلاجات كما وصفها الطبيب للسيطرة على المرض (أمراض القلب)؟			
Car7	أدوية لمرض القلب أو الشرايين	① نعم ② لا	
Car8	نظام غذائي خاص	① نعم ② لا	
Car9	نصيحة أو علاج لإنقاص الوزن	① نعم ② لا	
Car10	نصيحة أو علاج للإقلاع عن التدخين (إذا كنت مدخن)	① نعم ② لا ③ غير مدخن	
Car11	نصيحة للقيام بنشاط جسماني	① نعم ② لا	

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Step (2): Physical Measurements

خطوة (٢): القياسات البدنية

الطول والوزن			
الرقم	البيان	الإجابة	ملاحظات
M1	اسم ورمز القائم بالقياس (الباحث)	<input type="checkbox"/> <input type="checkbox"/>
M2a	رمز جهاز قياس الطول	<input type="checkbox"/> <input type="checkbox"/>
M2b	رمز جهاز قياس الوزن	<input type="checkbox"/> <input type="checkbox"/>
M3	الطول	سم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M4	الوزن	كغ	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

قياس الخصر (ما عدا النساء الحوامل)			
M5	لنساء فقط (هل حامل)؟	نعم لا	إذا نعم اذهب إلى M9 <input type="checkbox"/>
M6	اسم ورمز القائم بالقياس (الباحث)	<input type="checkbox"/> <input type="checkbox"/>
M7	رمز مقياس الخصر	<input type="checkbox"/> <input type="checkbox"/>
M8	قياس الخصر	سم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

قياس ضغط الدم			
M9	اسم ورمز القائم بالقياس (الباحث)	<input type="checkbox"/> <input type="checkbox"/>
M10	رمز جهاز قياس ضغط الدم	<input type="checkbox"/> <input type="checkbox"/>
M11	نوع مقياس رباط الزند	صغير متوسط كبير	<input type="checkbox"/>
M12a	قراءة أولى	انقباضي	مم زئبق
M12b		انبساطي	مم زئبق
M13a	قراءة ثانية	انقباضي	مم زئبق
M13b		انبساطي	مم زئبق
M14a	قراءة ثالثة	انقباضي	مم زئبق
M14b		انبساطي	مم زئبق

معدل النبض			
M15a	قراءة أولى	عدد/دقيقة	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M15b	قراءة ثانية	عدد/دقيقة	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M15c	قراءة ثالثة	عدد/دقيقة	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

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Step (3): Biochemical Measurements

خطوة (3): القياسات المعملية

الرمز	ملاحظات	البيان / الإجابة	السؤال	الرقم
<input type="checkbox"/>		① نعم ② لا	خلال ال 12 ساعة الماضية هل أكلت أو شربت شيئاً غير الماء؟	B
<input type="checkbox"/>		ساعة	الفترة الزمنية بين آخر طعام أو مشروب محلي بالسكر (غير الماء) وبين وقت أخذ عينة الدم	B1a
<input type="checkbox"/>	<input type="checkbox"/>	دقيقة	وقت أخذ عينة الدم (24 ساعة)	B1b
<input type="checkbox"/>	<input type="checkbox"/>		إسم الفني القائم بأخذ عينة الدم والرمز	B1c

Fasting Blood Sugar

نسبة السكر في الدم (صائم)

<input type="checkbox"/>		اسم ورمز فني المختبر	B2
<input type="checkbox"/>		رمز جهاز تحليل عينة السكر بالدم	B3
<input type="checkbox"/>	<input type="checkbox"/>	القياس (mmol/l)	B5

Blood Lipids

الدهنيات في الدم

<input type="checkbox"/>		اسم ورمز فني المختبر القائم بالقياس	B6
<input type="checkbox"/>		رمز جهاز تحليل عينة الدهون بالدم	B7
<input type="checkbox"/>	<input type="checkbox"/>	قياس الكوليسترول (mmol/L)	B8
<input type="checkbox"/>	<input type="checkbox"/>	قياس الدهنيات الثلاثية (mmol/L)	B8a
<input type="checkbox"/>	<input type="checkbox"/>	قياس HDL (mmol/L)	B8b
<input type="checkbox"/>	<input type="checkbox"/>	قياس LDL (mmol/L)	B8c

Random Blood Sugar

نسبة السكر في الدم (عشوائي)

<input type="checkbox"/>		اسم ورمز فني المختبر	B9
<input type="checkbox"/>		رمز الجهاز	B10
<input type="checkbox"/>	<input type="checkbox"/>	القياس (mmol/L)	B11

HbA1c

جليكوزيلاتد هيموجلوبين

<input type="checkbox"/>		اسم ورمز فني المختبر	B12
<input type="checkbox"/>		رمز جهاز تحليل عينة السكر بالدم	B13
<input type="checkbox"/>	<input type="checkbox"/>	القياس (%)	B14

ApoB

<input type="checkbox"/>		اسم ورمز فني المختبر	B15
<input type="checkbox"/>		رمز جهاز تحليل عينة السكر بالدم	B16
<input type="checkbox"/>	<input type="checkbox"/>	القياس (gm/L)	B17

اسم المدقق (تدقيق الفحوص المخبرية بالمختبرات)	الرمز	التوقيع	التاريخ
	<input type="checkbox"/>		<input type="checkbox"/>

رقم مسلسل الاستمارة □□□□

تدقيق استمارة البحث،

التدقيق الميداني بالمنطقة	
الاسم	
الرمز	□□
التوقيع	
التاريخ	□□□□ / □□ / □□

التدقيق المكتبي بإدارة المشروع	
الاسم	
الرمز	□□
التوقيع	
التاريخ	□□□□ / □□ / □□

إدخال البيانات بإدارة المشروع	
الاسم	
الرمز	□□
التوقيع	
التاريخ	□□□□ / □□ / □□

تدقيق إدخال البيانات بإدارة المشروع	
الاسم	
الرمز	□□
التوقيع	
التاريخ	□□□□ / □□ / □□

