



REPUBLIC OF LEBANON
MINISTRY OF PUBLIC HEALTH



World Health
Organization

WHO STEPWISE APPROACH FOR NON-COMMUNICABLE DISEASES RISK FACTOR SURVEILLANCE

Lebanon, 2016-2017



September 2017

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Acronyms

ANOVA	Analysis of Variance
BMI	Body Mass Index
CAS	Central Administration for Statistics
CDC	Centers for Disease Prevention and Control
CI	Confidence Interval
CRD	Connecting Research to Development
CVD	Cardio Vascular Diseases
EMRO	Eastern Mediterranean Regional Office
EPI	Expanded Program for Immunization
HDL	High-Density Lipoprotein
ISO	International Organization for Standardization
IT	Information Technology
IRB	Institutional Review Board
ISPED	Institut de Santé Publique, d'Épidémiologie et de Développement
LCRP	Lebanon Crisis Response Plan
LMIC	Low-and Middle-Income Countries
MoPH	Ministry of Public Health
NCD	Non-Communicable Disease
ODK	Open Data Kit
PHC	Primary Healthcare Center
PPS	Probability Proportionate to Size
PSU	Primary Sampling Unit
QR	Quick Response
SPSS	Statistical Package for Social Sciences
SSU	Secondary Sampling Unit
STEPS	STEPwise Approach to Surveillance
UNHCR	United Nation High Commissioner for Refugees
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Acknowledgement

Special acknowledgment goes to the Director General of the Ministry of Public Health, Dr. Walid Ammar for his guidance, and Dr Randa Hamade, head of the Primary Health Care department for facilitating the process of phase 3 of the study.

Particular thanks go to primary health care centers coordinators, fieldworkers, and nurses, and to everyone who assisted in completing this project.

Acknowledgment also goes to Dr. Gabriele Riedner, WHO Representative in Lebanon Country Office, for her unconditional support and Dr. Alissar Rady for her technical guidance all through the design and implementation process, and the country office team as well as the team at WHO Regional Office.

This STEPwise approach to non-communicable diseases surveillance would not have been possible without the generous financial support of the Government of Japan.

This STEPwise survey was conducted by the Connecting Research to Development center, contracted by and under the guidance of WHO and with the overall supervision of the MOPH team.



Executive Summary

The absence of a comprehensive and robust surveillance system for non-communicable diseases (NCD) in Lebanon necessitates the need for periodic assessments of the prevalence rates and the associated risk factors. The objectives of these assessments are to monitor disease trends, predict future public health project caseloads, and estimate the burden of chronic diseases leading to the planning of evidence-based interventions.

In response to key knowledge gaps regarding NCD prevalence in Lebanon and further to the Syrian crisis that changed the social structure and exerted tremendous pressure on the healthcare system overall capacity, the aim of this study was to estimate the prevalence of risk factors for NCDs among Lebanese and Syrian refugee populations.

This study used the World Health Organization STEPwise approach for the surveillance of NCD risk factors. The Arabic version of the STEPS instrument was adapted to the Lebanese setting. A national cross-sectional survey using a two-stage cluster sampling design was conducted, and two samples were taken for this survey. Data analysis was conducted using Epi Info. A data book was compiled. Collected data from the sample was weighted to provide prevalence estimates at population level.

The size for the Lebanese sample was 1899 participants and that for the Syrians was 2134. Two fifth (38.0%) of the Lebanese sample and one third (31.1%) of the Syrian sample reported to be current smokers. In addition, 23.4% of the Lebanese sample and 1.8% of the Syrian sample reported to be current drinkers.

Vegetables and fruits consumption was considered moderately low, among both samples consuming 1.8 servings per day of both fruits and vegetable for the Lebanese sample and 0.9 and 1.1 servings per day of fruits and vegetable, respectively, for the Syrians sample, with one fifth of both samples adding salt to their meals.

Regarding overweight and obesity, 37.9% and 27.0% of the Lebanese sample were overweight and obese, respectively. As for the Syrian sample, 34.2% and 28.6% were overweight and obese respectively.

Around thirty percent of the Lebanese respondents (35.3%) and the interviewed Syrians (32.8%) had elevated blood pressure.

As for diabetes, 4.2% of the Lebanese sample had impaired fasting glycaemia, and 10.5% had raised blood glucose or currently on medications for diabetes. Among the Syrian sample, 5.2% had impaired fasting glycaemia and 9.4% had raised blood glucose or currently on medications for diabetes; 65.4% of the Lebanese sample and 48.8% of the Syrian sample had raised total cholesterol; and 37.6% of the Lebanese men and 42.0% of the Lebanese women had low High-Density Lipoprotein (HDL) cholesterol levels, as for the Syrians, 48.5% of the men and 55.3% of the women had low HDL cholesterol levels.

1. Introduction

1.1. Non-Communicable Diseases

Non-communicable diseases (NCDs) include cardiovascular diseases (CVDs), cancer, diabetes, and chronic respiratory diseases (World Health Organization, 2016). The global burden of NCDs is on the rise, especially in low and middle income countries (LMICs), where it is a leading cause of morbidity and mortality. In 2015, NCDs caused 71% of global deaths, with cardiovascular diseases being the major cause of death (Table 1) (WHO, 2016). In addition, more than three quarters of these deaths were in LMICs, having 48% of the latter occurring before the age of 70 (pre-mature death) (WHO, 2016).

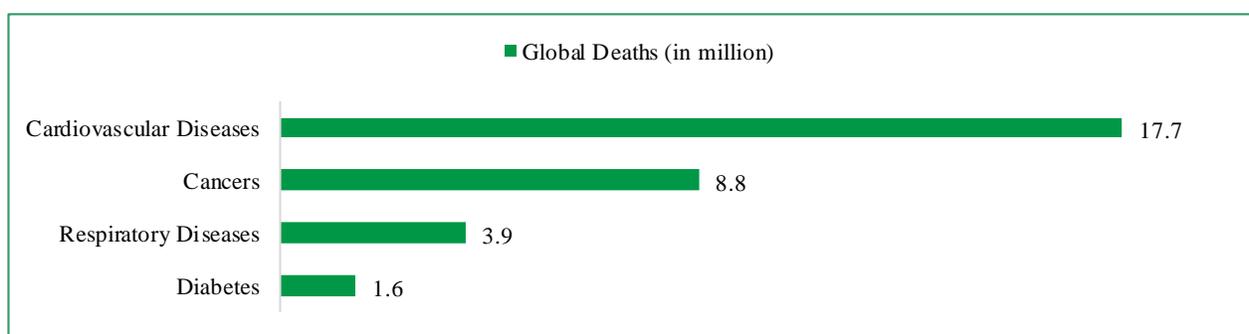


Figure 1: Global causes of deaths (WHO, 2016)

The burden of NCDs impacts the communities' health status and quality of life as well as overstretches the health system structure, capacity and expenditure. Thus prevention and control of NCDs is necessary to mitigate their economic and social adverse effects (WHO, 2014).

1.2. NCD Risk Factors

Although NCDs are diseases of adulthood, yet their roots derive from life style determinants very early in life. There are multiple risk factors that can be prevented and controlled at an earlier stage to avert or delay the onset of such diseases to name few, biological makeups, unhealthy lifestyle choices, and environmental conditions. Focusing on behavioral aspects, tobacco use, harmful alcohol intake, unhealthy diets, and physical inactivity are the four main behavioral risk factors for developing NCDs (WHO, 2014; WHO, 2017).

Tobacco contains an extremely addictive psychoactive element known as nicotine, and hence its use poses a major threat to health. Globally, an estimated 6 million deaths per year are resulted by direct tobacco use (WHO, 2016). Moreover the number is expected to exceed 8 million deaths in the year 2030 if left uncontrolled (WHO, 2011). As for harmful alcohol intake, it led for 5.9% of global deaths in 2012 (WHO, 2015). Moving forward to unhealthy diets, diets with low fruits and vegetables intake attributes to 1.7 million deaths yearly (WHO, 2014). Fruits and vegetable

consumption decreases the risk for many diseases including cardiovascular diseases, and stomach and colorectal cancers (WHO, 2014). Lastly, physical inactivity is associated with 3.2 million deaths globally (WHO, 2014).

Worldwide, the leading biological risk factor for the development of NCDs, in 2015, is raised blood pressure, which contributed to 19% of global deaths (WHO, 2017). Others risk factors include hyperglycemia, hyperlipidemia, overweight and obesity (WHO, 2017).

Elevated blood pressure accounted for 9.4 million global deaths in 2010 (WHO, 2014). Overweight and obesity lead to 3.4 million deaths yearly (WHO, 2014). It was estimated that 1.9 billion adults (above the age of 18) were overweight and over 600 million adults were obese in 2014 (WHO, 2016). Hyperglycemia accounted for 1.6 million global deaths in 2015 (WHO, 2015). As for raised blood cholesterol, it caused 2.6 million global deaths in 2014 (WHO, 2014).

1.3. WHO STEPwise Approach to Surveillance

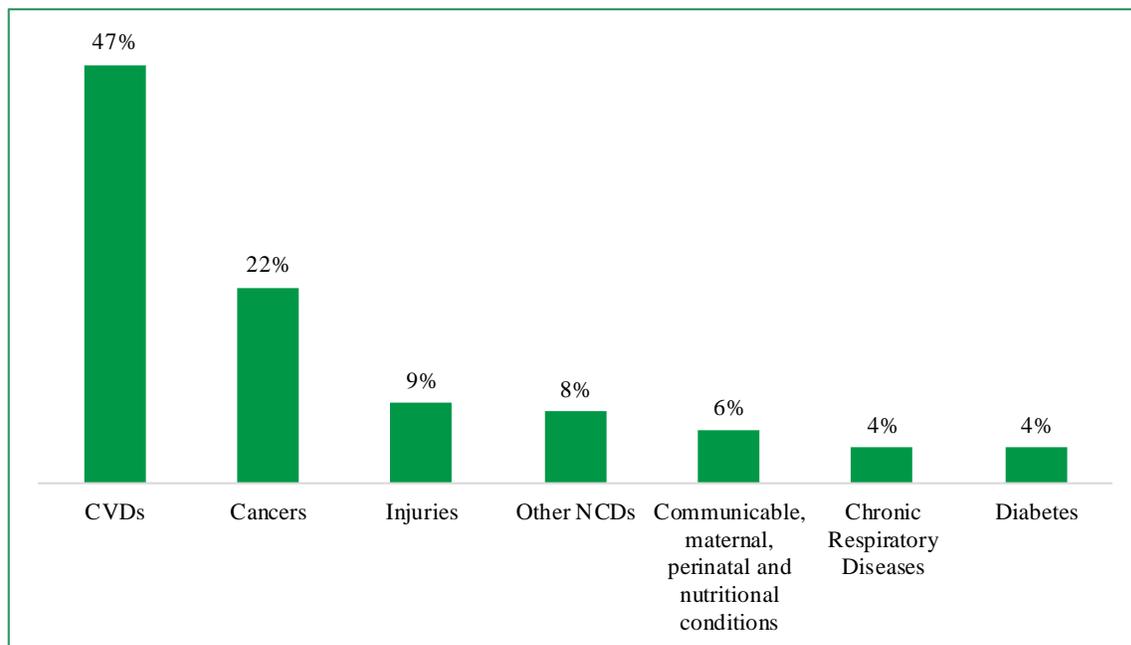
The World Health Organization (WHO) developed in 2002 the STEPwise approach to Surveillance (STEPS) suggesting a standardized method to collect, analyze, and share data among WHO member countries (Riley et al., 2016; WHO, 2014). The main objective of STEPS is to collect core information on NCDs' risk factors in order to estimate the diseases' trends and progression and define suitable interventions, ultimately aiding countries in shaping and reinforcing their disease surveillance ability (WHO, 2016). Moreover, another aim for STEPS is to prevent NCD epidemics before they arise by facilitating the planning and determining of public health priorities for health services and by monitoring and evaluating national interventions (WHO, 2016).

The corresponding STEPS instrument consists of three different phases to assess the different risk factors through a survey questionnaire, physical measurements, and biochemical measurements (WHO, 2016). The instrument consists of core, extended, and optional modules.

The use of the standardized STEPS questionnaire and protocols proved to be both beneficial to monitor trends within a country, and also to compare across different countries (WHO, 2014).

1.4. NCDs Situation in Lebanon and Study Rationale

National prevention and control programs for NCDs in Lebanon date back to 1997, when the Ministry of Public Health (MoPH) (WHO, 2014) established the first national NCD program,



launched with its several awareness and prevention campaigns

(WHO & MoPH, 2016). In 2014, NCDs accounted for 85% of the total mortality rates in Lebanon; the main causes of deaths were CVDs, 47% of total deaths, cancers, 22%, chronic respiratory diseases, 4%, and diabetes, 4% (WHO, 2014). The main identified risk factors were current tobacco smoking (32%), and raised blood pressure (28.8%) (WHO, 2014).

Figure 2: Proportional mortality in Lebanon, 2014 (WHO, 2014)

Due to national political and organizational hurdles, the program by the ministry discontinued and was replaced by various disease-specific committees within the ministry in 2007. In 2009, in response to the growing need for understanding trends in chronic disease risk factors, the STEPS was adopted to study a nationally representative sample of 1982 Lebanese adults aged between 25 and 64 years (Sibai & Hwalla, 2010). Results showed striking levels of low physical activity, 45.8% of the sample (Sibai & Hwalla, 2010). 41% of the sample consumed alcohol in the past 12 months, 38.5% were current smokers and 27.4% were obese (Sibai & Hwalla, 2010). As for the combined risk factors, 55.6% of the participants had 1-2 risk factors (Sibai & Hwalla, 2010). The inadequate management of NCDs in Lebanon, including under-diagnosis and lack of treatment, was of a high concern, due to its effect on the quality of life, the high costs for the affected population, and overstressing the healthcare system. Following this study, multiple initiatives were implemented towards NCDs' management by various public agencies and civil societies, with the joint guidance of the MoPH and WHO Lebanon office.

The most recent strategy that reemphasized a comprehensive, multi-sectoral approach to address the increasing burden of NCDs in Lebanon was adopted in year 2016 under the National Non Communicable Disease Prevention and Control Plan (NCD-PCP) (WHO & MoPH, 2016). The

plan highlights the need of cooperation for the development of public health policies, provision of disease prevention services, enhancement of research activities on NCDs, and the application of surveillance systems.

While Lebanon hosts around 1.5 million Syrian refugees since year 2011, the demand for NCDs care services has rapidly increased. Nowadays there is an urgent need for preventive actions to avert the ongoing rise of NCDs prevalence in Lebanon, as well as to improve the care for individuals affected by NCDs. In 2016, the Lebanon Crisis Response Plan (LCRP) reported that 14% of the Syrians in Lebanon were in need of chronic diseases care (LCRP, 2017). The need for continuous care and medical treatment is evident and poses a tremendous pressure on the Lebanese healthcare system.

NCDs profiling is urgently needed, especially since an assessment carried out for the United Nations High Commissioner for Refugees (UNCHR) in 2015 indicated that both Lebanese and Syrian beneficiaries accessing primary healthcare centers (PHCs) were increasingly requesting NCDs consultations and continuous provision of medications (Research Center, Sagesse University, 2015).

Consequently, WHO Lebanon Office assigned an expert team to complete this research study. The team specialized in chronic disease surveillance, behavioral sciences, biochemical surveillance, and quantitative data analysis. It was represented by the consultancy firm Connecting Research to Development (CRD) with expertise from Bordeaux School of Public Health- Institut de Santé Publique, d'Épidémiologie et de Développement (ISPED), and an International Organization for Standardization (ISO) accredited laboratory in Lebanon.

This document represents the results generated from the study.

1.5. Objectives

The main objective of this study was to assess the prevalence of behavioral and biological NCDs' risk factors among the Lebanese population and Syrian refugees, aged 18 to 69 years.

Other objectives included:

- To estimate the prevalence of tobacco use, alcohol consumption, unhealthy dietary habits, and physical inactivity among surveyed participants;
- To estimate the prevalence of high blood pressure, overweight and obesity, high blood sugar, and high total cholesterol among surveyed participants;
- To assess the difference in prevalence of NCD risk factors between males and females, and different age groups among the surveyed participants;
- To provide evidence for planning and evaluating health promotion activities and prevention campaigns targeting NCDs.

2. Methods

2.1. Study Population

This study is a national study that targeted all 8 governorates of Lebanon.

The survey targeted the Lebanese population and Syrian refugees residing in communities across Lebanon, aged 18 to 69 years. Steps 1, 2, and 3 were administered on all participants who consented. Inclusion and exclusion criteria were set as presented in Table 1.

Table 1: Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none">Lebanese population and Syrian refugees (both registered and non-registered residing in Lebanon)Males and femalesAged 18 to 69 years old	<ul style="list-style-type: none">Pregnant women (from the weight, height, waist and hip circumferences measurement in Step 2 and all of Step 3)

2.2. Sample Size

The calculation of sample size was based on the recommended values for the STEPS survey (WHO, 2016). Two samples were collected for each of the Lebanese population and Syrian refugees.

For the Lebanese sample, the initial sample size was determined by assuming a level of confidence measure of 1.96, a margin of error of 0.05, a risk factor prevalence of 0.5, and a design effect of 1.5. $p=0.5$ (50%) was chosen to produce the largest sample size, thus allowing us to account for all possibilities without relying on previous data, leading to a needed sample size of 576. The calculated sample size was multiplied by 4 (number of age-sex groups) and divided by 0.8 to account for an anticipated response rate of 80%. The final sample size was 2880 (720 participants for each of the 4 age-sex groups).

The size of the Syrian sample was calculated using the same parameters listed above, and was determined at 2880 target participants, 720 participants for each of the 4 age-sex groups. The 4 age-sex groups were:

Females 18 - 44 years	Females 45 - 69 years	Males 18 - 44 years	Males 45 - 69 years
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The total sample size was 5760.

2.3. Sampling

2.3.1. Survey Design

A national cross-sectional survey adopting a two-stage cluster sampling design was conducted for Steps 1, 2 and 3.

2.3.2. Sample Frame

The sampling frames references used were the population distribution in Lebanon 2014, retrieved from the Central Administration for Statistics (CAS) and the Syrian population distribution data 2015, retrieved from UNHCR. 144 clusters were selected for the Lebanese sample and 144 clusters for the Syrian sample.

The Primary Sampling Units (PSUs) were cadastral areas (cadasters) and the Secondary Sampling Units (SSUs) were the households. Twenty participants were recruited from each cluster.

The latest available population estimates (cadastral data) were used, to randomly recruit PSUs by Probability Proportionate to Size (PPS). To account for the issue of the variability in the cadasters' sizes, very small cadasters (<200 individuals) were combined with neighboring PSUs before selecting the sample, to enhance the likelihood of finding 20 target participants. On the other hand, cadasters with a large population size that were guaranteed to be sampled at least twice were handled as strata and each stratum were assigned a fixed number of random starting points based on how often it was selected with certainty. This was done using satellite images divided into grids, previously obtained from the Centers for Disease Control and Prevention (CDC)¹ for all Lebanese cadasters.

For the Lebanese sample, the research team relied on the standard Expanded Program for Immunization (EPI) method for a systematic random selection of the households. Accordingly, within each selected PSU, households were identified using a systematic random approach following the WHO-UNICEF-EPI cluster method. The fieldworkers started with the highest floor on the right side of a building. If the household hosted an eligible participant, they proceeded with data collection, if not, they visited a second household which is selected by skipping 5 households. If during sampling, non-Lebanese households were selected, the fieldworker skipped them in a straight line until a Lebanese household was identified. This method has been previously used for national surveys in Lebanon. One participant was randomly selected within each household, using the eSTEPS application. Households were chosen until the target of 20 participants was reached.

¹ These maps have been prepared by the Geospatial Research, Analysis, and Services Program at CDC.

The PSUs for the Syrian refugees' sample were identified, using the most recent available refugee estimates to randomly recruit PSUs by PPS. The same measures aforementioned were done to account for the variation in the cadasters' sizes. The WHO-UNICEF- EPI cluster method was employed to select households. The fieldworkers targeted Syrian households; accordingly, when during sampling, non-Syrian households were selected, the fieldworker skipped them in a straight line until a Syrian household was identified. One participant was randomly selected within each household, using the eSTEPS application.

For both samples, following STEPS' team recommendations, sampling of participants was done without replacement, i.e. once a person was selected that person was not replaced with another one. Efforts were made to include all selected households. If the house was unoccupied at the time of the visit or if an adult was not available for an interview at the time of the visit, that house was revisited up to 4 times, with different visiting times. The number of refusals and non-responses was recorded.

2.4. Scope

This study used the WHO STEPwise approach for the surveillance of NCD risk factors. It included all core and extended modules in Steps 1, 2, and 3 and the optional tobacco policy module. More details on the purpose of each module and the collected information and measurements are found in Table 2.

Table 2: Lebanon's STEPS survey scope

STEP	Modules	Purpose
1	Core	Basic demographic information
		Tobacco smoking
		Alcohol consumption
		Fruit and vegetable consumption
		Physical activity
		History of raised blood pressure, raised total cholesterol and cardiovascular diseases
		Lifestyle advice
		Cervical cancer screening
	Expanded	Level of education, marital and employment status, and household income
		Cessation of tobacco smoking, smokeless tobacco use, and exposure to environmental tobacco smoke
		Alcohol use disorders
		Oil and consumption, meals outside a home, awareness of too much salt as a health problem, and control of salt intake
		Sedentary behavior
Optional	Tobacco policy	
2	Core	Blood pressure
		Height and weight

		Waist circumference
	Expanded	Heart rate Hip circumference
3	Core	Urinary sodium and creatinine;
		Blood glucose
		Total cholesterol
	Expanded	Triglycerides HDL

2.5. Instrument

The Arabic version of the STEPS instrument was adopted to the Lebanese setting by adding examples and amending the show cards that are compatible with the Lebanese context. The Arabic version was already tested in other countries in the region, as for example Egypt. The following items with corresponding questions were added:

- Location of the household: governorate, district, cadaster, cluster, and barcode/Quick Response (QR) code;
- Nationality: for Syrians and registration within UNHCR;
- Comorbidities.

The final STEPS instrument and corresponding show cards can be found in Annex 1.

2.6. Staff Recruitment and Training

The roles and responsibilities of each personnel involved during study were clearly set prior to the study implementation. A total of 61 local interviewers' teams, from all the governorates, were recruited and trained on the implementation plan prepared for the study in order to ensure quality data generation. The implementation plan including the organizational structure, training material and reporting mechanisms can be reviewed in Annex 1.

2.7. Pilot Study

The pilot testing was carried out before data collection in a residential area that was not included in the study sample. The data collected during the pilot testing was not included in the final dataset and analysis. Only Steps 1 and 2 were piloted with the main aim to assess the refusal and completion rates, identify problems in the tool and table usage, and determine challenges in the field method.

2.8. Data Collection

Data collection was carried out over a period of three months. Teams were mobilized into corresponding clusters daily, with supervision provided by field supervisors. eSTEPS application was used, where data was collected using tablets through Open Data Kit (ODK).

The teams conducted household visits to fill the questionnaire and to take the physical measurements (Steps 1 and 2) with the participant randomly selected by the eSTEPS application.

The physical measurements were done using SECA stadiometers 213 and SECA 803 for height and weight, respectively. The waist and hips circumferences were measured using Body Mass Index (BMI) girth measuring tape. As for the blood pressure, systolic and diastolic, and heart rate, OMRON M6 comfort was used, and three readings were taken. Details on protocols for measurements are found in the implementation plan (Annex 1). In parallel, participants were provided with urine cups to bring to the PHC.

After completing Steps 1 and 2, the participants were referred, on specific dates, to the pre-assigned PHC for blood withdrawal. The centrifuged blood and urine samples were collected from the different centers and sent to the central laboratory for biochemical measurements. The laboratory procedures are found in the implementation plan (Annex 1).

2.9. Data Downloading

Throughout the data collection phase, data collector teams uploaded the data on daily basis. The statistical team performed regular checks on the quality of the data being collected through some basic descriptive analyses and by checking for duplicates and other errors. All the issues that were appraised by the statistical team were immediately communicated to the data collectors in order to avoid reoccurrence of errors.

Before downloading the data from ONA server, all tablets were checked to ensure that completed surveys were uploaded to the server. On each device, the “Submit Records” from the eSTEPS application home screen was tapped to check if there were any records still to be submitted. Only once this check was done on all devices used for data collection, the downloading process was performed.

Two datasets were downloaded from ONA server; one for STEPS 1 and 2 and the second for STEP 3. The 2 datasets were compiled together using the barcodes and QR codes assigned for each participant. The team also matched the name and age of the participant to guarantee that there were no duplicates.

2.10. Analysis Information

2.10.1. Data Cleaning

Data cleaning was performed using the Statistical Package for Social Sciences (SPSS) Version 21. This step included checking for duplicates, missing, or conflicting data and implausible or illogical responses; performing descriptive statistics, frequency tables to look for outliers; checking variables and value labels, for example for typing mistakes and wrong scales; making sure that variables were of the appropriate type (numerical or string); and proper coding of missing data, skip pattern or unanswered questions.

2.10.2. Data Weighing

Weighing the data was a critical step, to have representative results of the entire population. For all the Steps, collected data from the sample was weighed to provide prevalence estimates at the level of the population. The weighing accounted for age groups and gender.

As for the Lebanese, such calculation was based on the latest epidemiological data from the CAS and the United Nations. As for the Syrians, calculations were based on the latest epidemiological data from UNHCR, 2017.

2.10.3. Data Analysis

Data analysis was conducted using Epi Info for descriptive and advanced analyses. A data book was compiled using Epi Info.

Simple descriptive statistics with means, proportions and frequency distributions were conducted for the prevalence and risk factors. 95% confidence intervals (CIs) were used as a measure of precision on the estimated population parameters. Bivariate analysis was conducted as follows: T-tests to compare continuous data between groups, Chi-square tests to assess relationships between variables and Analysis of Variance (ANOVA) for continuous variables allowing comparisons across more than two groups. In situations where normality assumptions were not met, non-parametric equivalents of the above tests were used (Fisher's exact test, Kruskal Wallis test, etc).

All the cutoffs for the analysis were used as recommended by WHO, taken from the STEPS manual (WHO, 2016).

2.11. Ethical Considerations

The ethical approval for conducting this survey was obtained from the Research Development and Innovation Department at WHO – Eastern Mediterranean Regional Office (EMRO) as well

as from the Institutional Review Board (IRB) of the Sagesse University in Beirut, Lebanon (Ref#:IRB011116).

Throughout the project implementation, the personnel followed ethical guidelines. Protecting research participants, anticipating harms, avoiding undue intrusion, rights to confidentiality and anonymity, intellectual property rights and involvement in research ahead of other requirements, whether for their own gain or that of the study took all priority.

Consent forms were obtained from each person who participated in the study:

- For participants older than 21 years of age, informed consent was directly obtained;
- For participants between 18 and 21 years of age, parent's or legal guardian's consent was obtained.

Each participant was provided with a copy of the consent form. The interviewers thoroughly explained its content. If participants were illiterate, they were asked to stamp on the consent form after obtainment of the necessary information verbally. Interviewers stressed that participation was voluntary and confidentiality was ensured. Also, interviewers explained that in case of refusal to participate, this would not affect the person in any way. Participants had the right to withdraw their consent or discontinue participation at any time, without penalty. If at any time and for any reason, participants preferred not to answer any question, they were free to skip those questions. Further, all participants were assured of no harm and no direct benefit from participating; no monetary incentives were used during the recruitment. There were no adverse events anticipated from blood withdrawal and urine specimen collection. All participants were provided with the results of their blood pressure, anthropometric measurements and biochemical measurements when their participation was completed.

To ensure confidentiality of data, each survey had a unique identifier (barcode or QR code) that was linked to the area where the fieldwork took place. All information collected were de-identified, kept confidential, stored at CRD Offices, shared with WHO Country Office Lebanon and WHO EMRO and used only for this study.

3. Results

3.1. Results for Lebanese

3.1.1. Demographic Characteristics

A total 1899 Lebanese participants were enrolled in this study, out of which 796 (41.9%) were men and 1103 (58.1%) were women. In terms of age groups, 799 (42.1%) individuals were aged 18–44 years and 1100 (57.9%) were aged 45–69 years (Table 3).

Table 3: Distribution of the sample, by sex and age group of the Lebanese study population

Age group and sex of respondents						
Age Group (years)	Men		Women		Both Sexes	
	n	%	n	%	n	%
18-44	323	40.4	476	59.6	799	42.1
45-69	473	43.0	627	57.0	1100	57.9
18-69	796	41.9	1103	58.1	1899	100.0

The average number of years spent in education was 10.2 years, with the male respondents spending an average of 10.3 years and the females spending on average 10.2 years (Table 4). The younger age group tended to have slightly more years of schooling in comparison with the older age group.

Table 4: Mean number of years of education, by sex and age group of the Lebanese study population

Mean number of years of education						
Age Group (years)	Men		Women		Both Sexes	
	n	Mean	n	Mean	n	Mean
18-44	273	12.0	428	12.0	701	12.0
45-69	411	9.2	517	8.7	928	8.9
18-69	684	10.3	945	10.2	1629	10.2

Survey results showed that about 7.9% of the population had no formal schooling or had not completed primary school, 20.7% had completed primary school, 22.7% had completed secondary school, 15.3% had completed high school, 15.4% had completed college or university and 1.9% had completed a postgraduate degree (Table 5).

Table 5: Highest level of education, by age group of the Lebanese study population

Highest level of education								
Age Group (years)	Both Sexes							
	n	% No formal schooling	% Less than primary school	% Primary school completed	% Secondary school completed	% High school completed	% College/ University completed	% Post graduate degree completed
18-44	716	3.2	10.3	17.6	22.8	17.5	26.0	2.7
45-69	1030	11.2	20.0	22.9	22.6	13.9	8.1	1.4
18-69	1746	7.9	16.0	20.7	22.7	15.3	15.4	1.9

Three quarters (75%) of the survey respondents were married, 17.1% had never been married, 5.5% were widowed, 1.8% were divorced, 0.6% were separated and none were cohabiting (Table 6). The proportion of individuals that had never been married was higher among women (17.9%) than men (15.9%) and the proportion of people widowed was four times higher among women (7.9%) than among men (2%).

Table 6: Marital status, by age group of the Lebanese study population

Marital status							
Age Group (years)	Both Sexes						
	n	% Never married	% Currently married	% Separated	% Divorced	% Widowed	% Cohabiting
18-44	762	29.3	67.2	0.4	2.0	1.2	0.0
45-69	1084	8.6	80.4	0.7	1.8	8.5	0.0
18-69	1846	17.1	75.0	0.6	1.8	5.5	0.0

Of the Lebanese survey respondents, less than half (47.2%) were employed (77.3% men and 26.5% women). The survey results show that of the 47.2% employed individuals, 6.2% of respondents were government employees, 26.6% were not government employees and 14.4% were self-employed (Table 7). Men were predominantly employed in non-governmental institutions and organizations (9.2%) or were self-employed (31.5%) and were more likely to be employed in governmental institutions (9.2%).

Table 7: Employment status, by age group of the Lebanese study population

Employment status					
Age Group (years)	Both Sexes				
	n	% Government employee	% Non-government employee	% Self-employed	% Unpaid
18-44	741	5.7	32.1	13.8	48.1
45-69	1073	6.5	22.8	14.9	55.7
18-69	1814	6.2	26.6	14.4	52.8

3.1.2. Tobacco Use

The survey participants were asked about their current smoking status, previous smoking experience, the age they started smoking, duration of smoking, the quantity of tobacco smoked daily, use of smokeless tobacco, types of tobacco products used, and duration of exposure to second-hand smoke.

The percentage of current smokers (daily and non-daily smokers) of all tobacco products among all respondents was 38.0% (95% CI: 34.0–41.9). There were more male smokers (47.6%) among the respondents than female (29.0%) (Table 8). The proportion of current daily and non-daily smokers was almost equal in the two age groups of the study population (Figure 3).

Table 8: Percentage of current smokers, by sex and age group of the Lebanese study population

Percentage of current smokers									
Age Group (years)	Men			Women			Both Sexes		
	n	% Current smoker	95% CI	n	% Current smoker	95% CI	n	% Current smoker	95% CI
18-44	323	48.6	41.8-55.4	476	28.2	22.2-34.2	799	38.4	33.8-43.0
45-69	473	45.5	40.4-50.5	627	30.3	24.4-36.2	1100	37.2	33.0-41.5
18-69	796	47.6	42.3-52.9	1103	29.0	23.9-34.1	1899	38.0	34.0-41.9

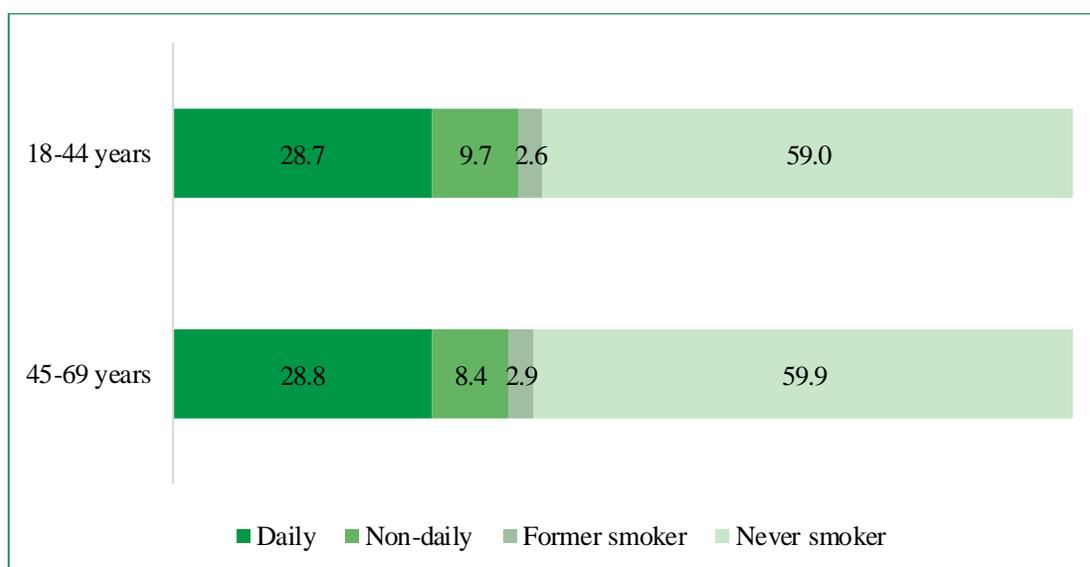


Figure 3: Smoking status, by age group of the Lebanese study population

Among all current smokers of both sexes, 75.6% smoked daily. The proportion of daily smokers among men was 82.4%, which was higher than that of women (65.2%), and the population group with the highest prevalence of daily smokers was men aged 18–44 years (83.8%) (Figure 4).

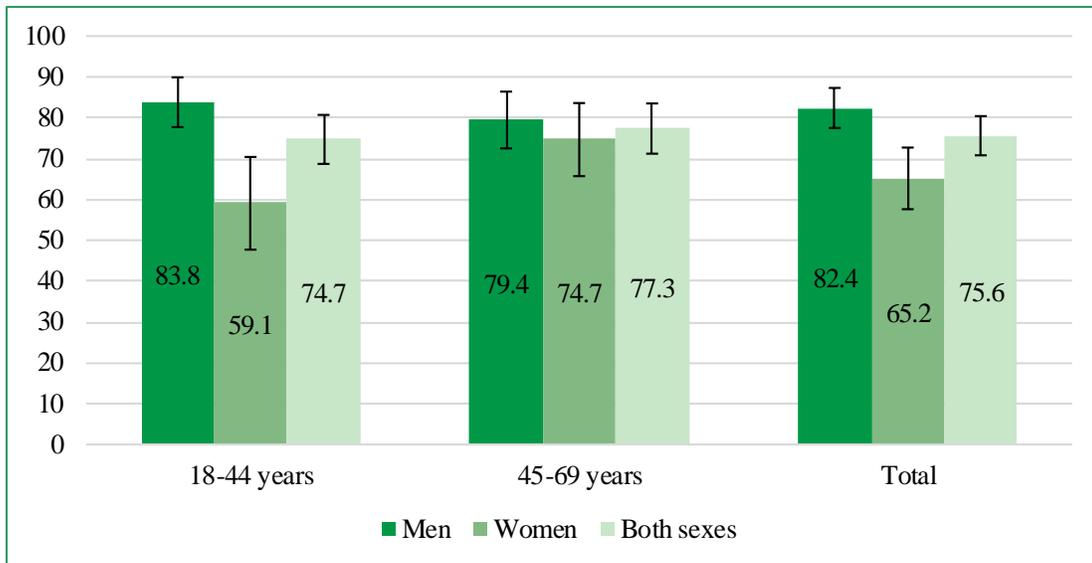
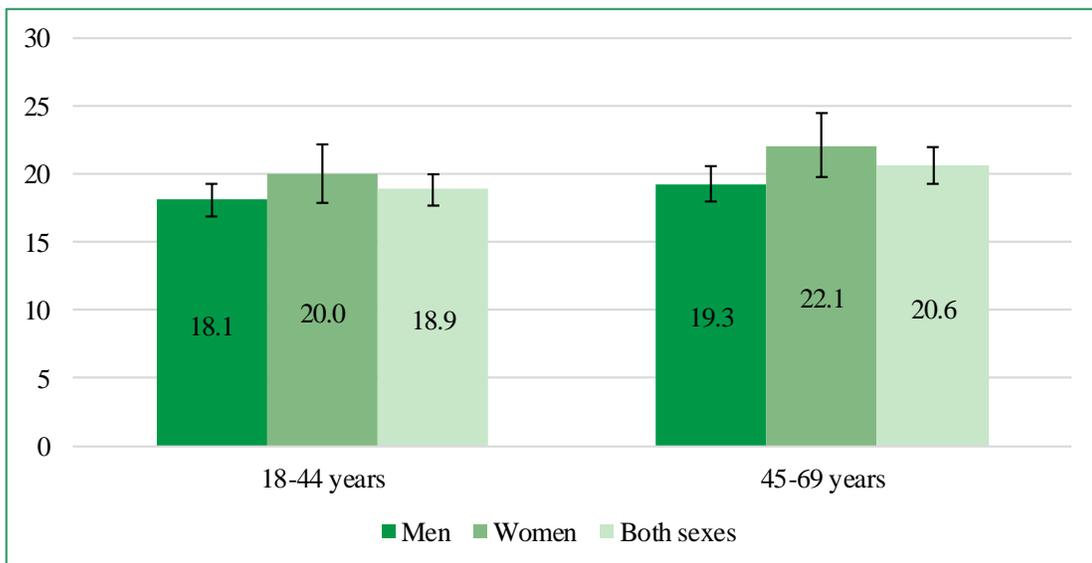


Figure 4: Percentage of current daily smokers among smokers, by sex and age group of the Lebanese study population

The mean age for smoking initiation was at 19.5 years, yet women started at an older age compared to men (mean age = 18.5 years for men vs. 20.8 years for women). There was almost no difference between the age groups among both sexes in terms of the mean age of starting smoking and it varied from 18.9 years old in the age group 18–44 years to 20.6 years old in the age group 45–69 years (Figure 5). The mean duration of smoking for the smoker participants was 21.5 years. The older age group had a longer mean duration of smoking, 33.7 years compared to 14.3 years for the younger age group. The majority of smokers (83.7%) smoked manufactured



cigarettes (Figure 6).

Figure 5: Mean age of starting smoking, by sex and age group of the Lebanese study population

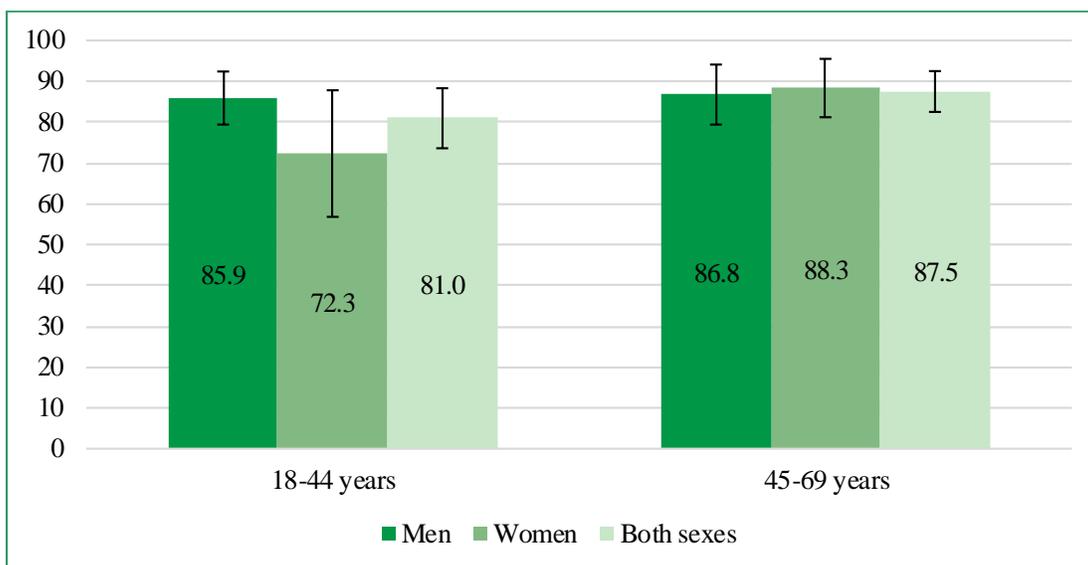


Figure 6: Percentage of smokers who use manufactured cigarettes among daily smokers, by sex and age group of the Lebanese study population

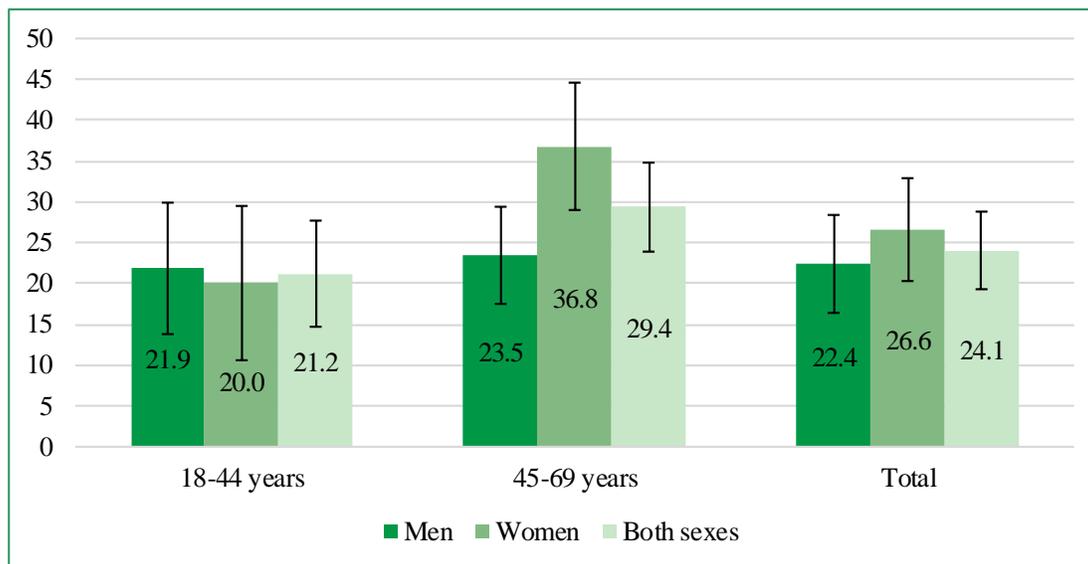
The majority of daily smokers (82.2%) smoked over 10 cigarettes per day (Figure 7). The highest percentage of male daily smokers smoked 15–24 cigarettes per day (42.5%, 95% CI: 31.4–53.5), compared with 33.1% of women (95% CI: 17.2–48.9) that smoked more than 25



cigarettes per day.

Figure 7: Distribution of daily smokers by quantity of manufactured or hand-rolled cigarettes smoked per day, by sex of the Lebanese study population

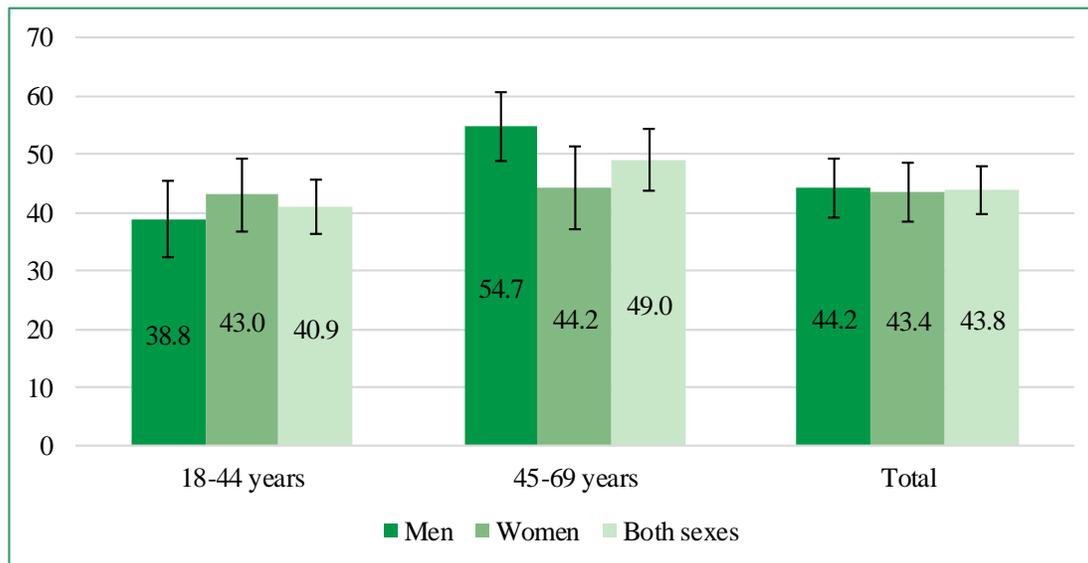
Of the total number of currently smoking respondents, about 24.1% had tried to stop smoking during the last year (22.4% of men (95% CI: 16.4–28.4) and 26.6% of women (95% CI: 20.3–



32.9)) (Figure 8). Approximately, 37.0% of male respondents (95% CI: 30.7–43.7) and 41.0% of females (95% CI: 30.9–50.8) among smokers who had visited a doctor or other health worker in the past 12 months had been advised to stop smoking.

Figure 8: Percentage of current smokers who had tried to stop smoking during the past 12 months, by sex and age group of the Lebanese study population

About 43.8% of respondents in the study population were exposed to second-hand smoke at home. Contrary to expectations, men were more exposed than women (44.2% vs. 43.4%) (Figure 9). A significant difference between the sexes can't be observed in exposure to second-hand smoke in the workplace: the distribution of second-hand smoking at work was 44.8% for men



(95% CI: 38.2–51.3) and 34.2% for women (95% CI: 27.4–40.9) (Figure 10).

Figure 9: Percentage of respondents exposed to second-hand smoke in the home during the past 30 days, by sex and age group of the Lebanese study population

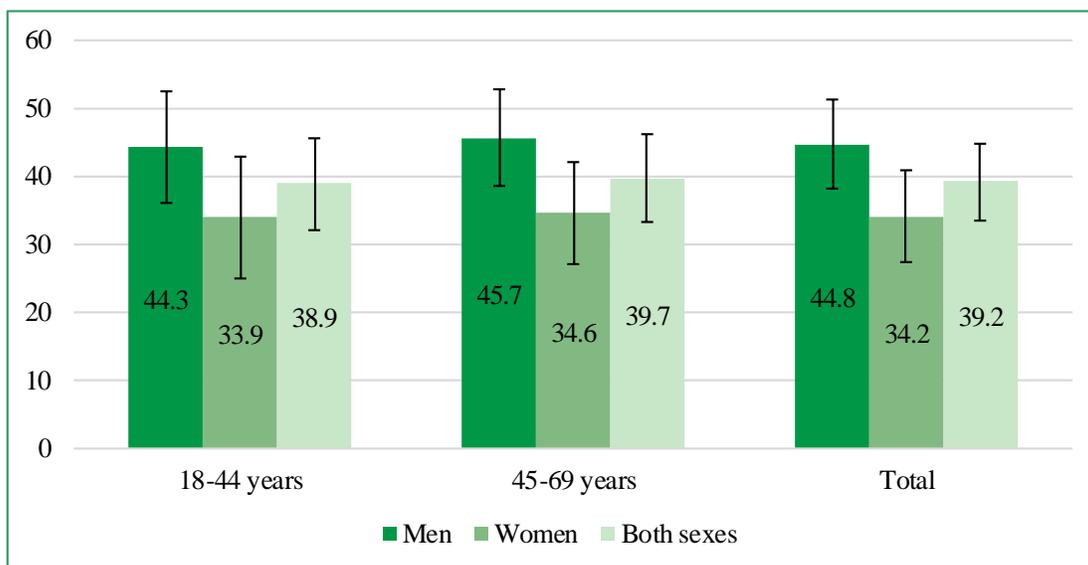


Figure 10: Percentage of respondents exposed to second-hand smoke in the workplace during the past 30 days, by sex and age group of the Lebanese study population

3.1.3. Alcohol Consumption

Alcohol consumption patterns, frequency of alcohol drinking and risks associated with alcohol consumption were studied according to the sex and age of the survey respondents.

Among all respondents in the age group 18–69 years, 23.4% (95% CI: 18.5–28.2) had consumed alcohol during the past 30 days. The proportion of males (28.1%, 95% CI: 21.9–34.3) was higher than that of females (18.9%, 95% CI: 13.3–24.6) (Figure 11).

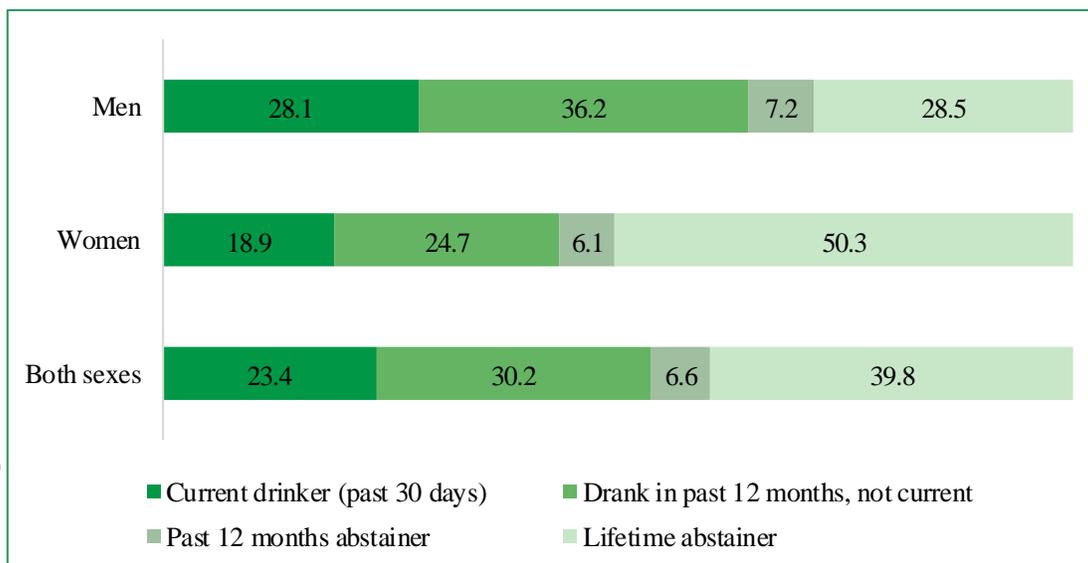


Figure 11: Alcohol consumption status, by sex of the Lebanese study population

Among the past 12 months alcohol abstainers, 12.3% stopped drinking due to health reasons having the majority among men, and increasing in the older age group (Table 9).

Table 9: Stopping drinking due to health reasons, by sex and age group of the Lebanese study population

Stopping drinking due to health reasons									
Age Group (years)	Men			Women			Both Sexes		
	n	% stopping due to health reasons	95% CI	n	% stopping due to health reasons	95% CI	n	% stopping due to health reasons	95% CI
18-44	21	12.1	0.0-26.3	40	4.2	0.0-11.3	61	8.6	0.3-16.9
45-69	29	21.8	8.7-34.8	44	19.4	7.8-30.9	73	20.4	12.5-28.4
18-69	50	14.6	2.4-26.9	84	9.6	3.0-16.3	134	12.3	5.2-19.4

The alcohol consumption pattern was further analyzed by elucidating the frequency of drinking in the past 30 days and the number of standard drinks per drinking occasion. In the past 30 days current alcohol drinkers had consumed alcohol on average on 3.3 occasions (95% CI: 2.6–4.1), with men attesting to 3.7 occasions (95% CI: 2.6–4.7) and women to 2.9 occasions (95% CI: 1.9–4.0) (Figure 12).

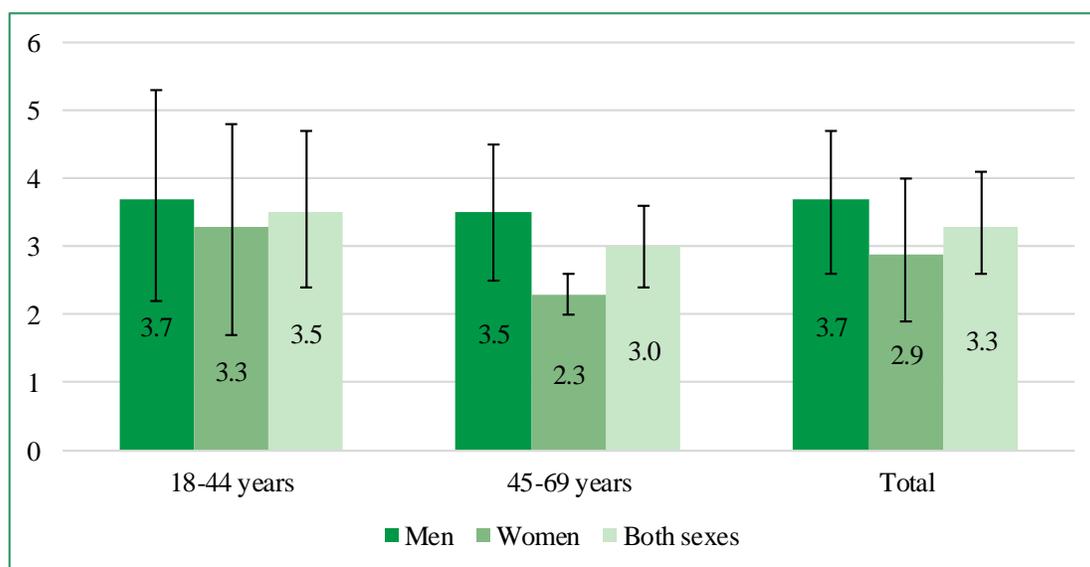


Figure 12: Mean number of drinking occasions in the past 30 days among current (past 30 days) drinkers, by sex and age group of the Lebanese study population

Current drinkers consumed on average 2.2 drinks per drinking occasion (95% CI: 1.8–2.5), with men consuming 2.4 drinks (95% CI: 1.8–3.0) and women consuming 1.8 drinks (95% CI: 1.5–2.1). In both age groups men consumed more standard drinks per drinking occasion than women (Figure 13).

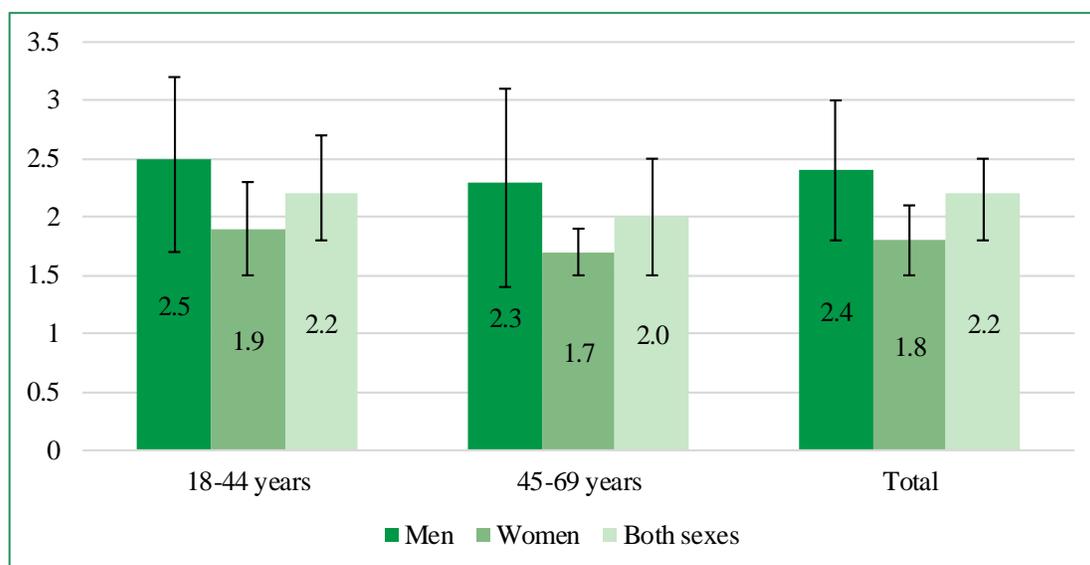


Figure 13: Mean number of standard drinks per drinking occasion among current (past 30 days) drinkers, by sex and age group of the Lebanese study population

The risk associated with alcohol consumption was assessed in current (past 30 days) drinkers based on the average amount of alcohol consumed per drinking occasion in the past 30 days. Results showed that 64.9% of all current drinkers (95% CI: 56.1–73.7) had a low risk associated with alcohol consumption; 28.5% (95% CI: 18.7–38.3) had a medium risk; and 6.6% (95% CI: 0.7–12.4) had a high risk (Table 10).

Table 10: High-, intermediate-, and low-volume drinking levels among current (past 30 days) drinkers, by sex and age group of the Lebanese study population

High-end, intermediate, and lower-end level drinking among current (past 30 days) drinkers							
Age Group (years)	Both sexes						
	n	% high-end	95% CI	% intermediate	95% CI	% lower-end	95% CI
18-44	136	9.0	0.2-17.7	30.5	17.5-43.6	60.5	48.8-72.1
45-69	213	2.1	0.4-3.8	24.7	17.7-31.8	73.2	66.0-80.4
18-69	349	6.6	0.7-12.4	28.5	18.7-38.3	64.9	56.1-73.7

Among the survey respondents, 19.2% of the respondents had consumed six or more drinks on a single occasion at least once during the past 30 days. A total of 21.8% of men (95% CI: 15.9–27.7) and 16.8% of women (95% CI: 11.2–22.4) reported having consumed six or more drinks at least once during the last 30 days. It is alarming that the proportion of people reporting this experience is higher in the younger age group for both men and women (Figure 14).

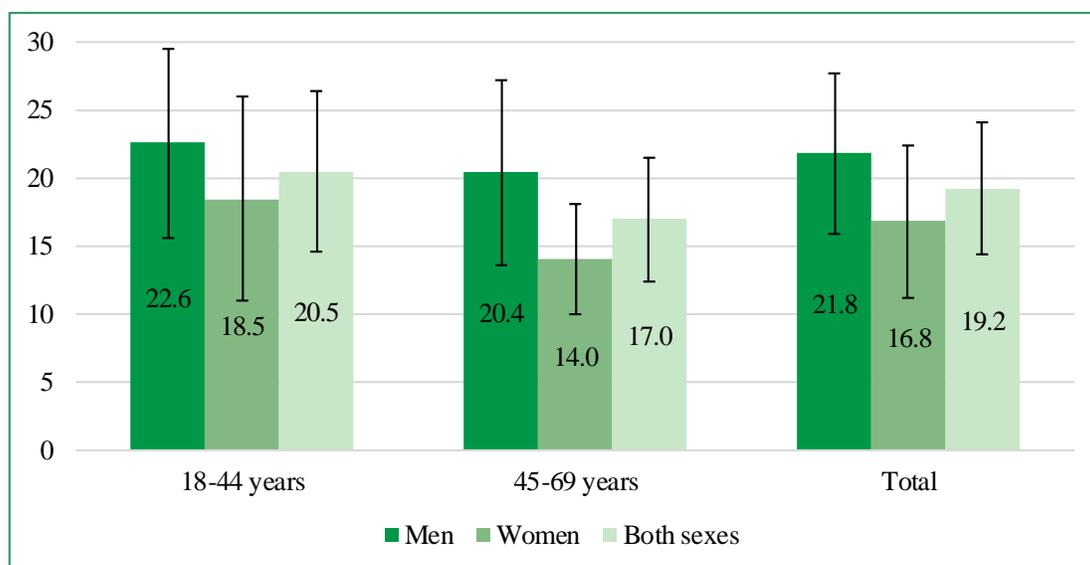


Figure 14: Consumption of six or more drinks on a single occasion at least once during the past 30 days among total population, by sex and age group of the Lebanese study population

Almost one third of the current (past 30 days) drinkers reported consuming unrecorded alcohol (homebrewed alcohol, alcohol brought across the Lebanese border, alcohol not intended for drinking or other untaxed alcohol) during the past seven days: 24.5% among men (95% CI: 16.3–32.7) and 39.5% of women (95% CI: 19.3–59.6) (Table 11).

Table 11: Consumption of unrecorded alcohol, by sex and age group of the Lebanese study population

Consumption of unrecorded alcohol									
Age Group (years)	Men			Women			Both Sexes		
	n	% consuming unrecorded alcohol	95% CI	n	% consuming unrecorded alcohol	95% CI	n	% consuming unrecorded alcohol	95% CI
18-44	73	28.3	15.9-40.6	69	46.3	21.2-71.4	142	36.0	23.0-48.9
45-69	135	17.7	11.4-24.0	89	25.9	14.3-37.4	224	21.0	15.0-27.0
18-69	208	24.5	16.3-32.7	158	39.5	19.3-59.6	366	30.8	20.9-40.6

3.1.4. Unhealthy Diet

Consumption of fruit and vegetables was assessed in the survey population by sex and age. The mean number of days on which Lebanese respondents consumed fruits and vegetables in a typical week were respectively 4.9 days (95% CI: 4.7–5.2) and 5.1 days (95% CI: 4.8–5.3). Among the different age-sex groups, the mean number of days were almost equivalent (Table 12). As for the average number of servings of both fruits and vegetables consumed per day was equal to 1.8 (Table 13).

Table 12: Mean number of days on which fruits and vegetables were consumed in a typical week, by sex and age group of the Lebanese study population

Mean number of days fruit consumed in a typical week									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of days	95% CI	n	Mean number of days	95% CI	n	Mean number of days	95% CI
18-44	263	4.7	4.2-5.1	442	5.0	4.7-5.3	705	4.8	4.6-5.1
45-69	447	4.9	4.5-5.3	591	5.1	4.8-5.3	1038	5.0	4.7-5.3
18-69	710	4.8	4.4-5.1	1033	5.0	4.8-5.3	1743	4.9	4.7-5.2
Mean number of days vegetables consumed in a typical week									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of days	95% CI	n	Mean number of days	95% CI	n	Mean number of days	95% CI
18-44	260	4.8	4.3-5.2	439	5.2	4.9-5.5	699	5.0	4.7-5.3
45-69	428	4.8	4.5-5.1	584	5.4	5.1-5.7	1012	5.1	4.9-5.4
18-69	688	4.8	4.5-5.1	1023	5.3	5.0-5.5	1711	5.1	4.8-5.3

Table 13: Mean number of servings of fruit and vegetables on average per day, by sex and age group of the Lebanese study population

Mean number of servings of fruit on average per day									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI
18-44	261	1.7	1.4-2.0	438	1.8	1.4-2.2	699	1.8	1.5-2.1
45-69	447	1.8	1.5-2.2	587	1.7	1.5-2.0	1034	1.8	1.5-2.1
18-69	708	1.8	1.5-2.0	1025	1.8	1.5-2.1	1733	1.8	1.5-2.0
Mean number of servings of vegetables on average per day									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI
18-44	258	1.7	1.5-2.0	436	1.9	1.6-2.2	694	1.8	1.6-2.1
45-69	426	1.7	1.4-2.0	582	2.0	1.7-2.3	1008	1.9	1.6-2.2
18-69	684	1.7	1.5-1.9	1018	2.0	1.7-2.2	1702	1.8	1.6-2.1

The majority of respondents (43.3%) of both sexes consumed one to two servings of fruit and/or vegetables per day (44.6% of men and 42.3% of women). About 9.5% of the study population reported not consuming fruit or vegetables at all (Figure 15).

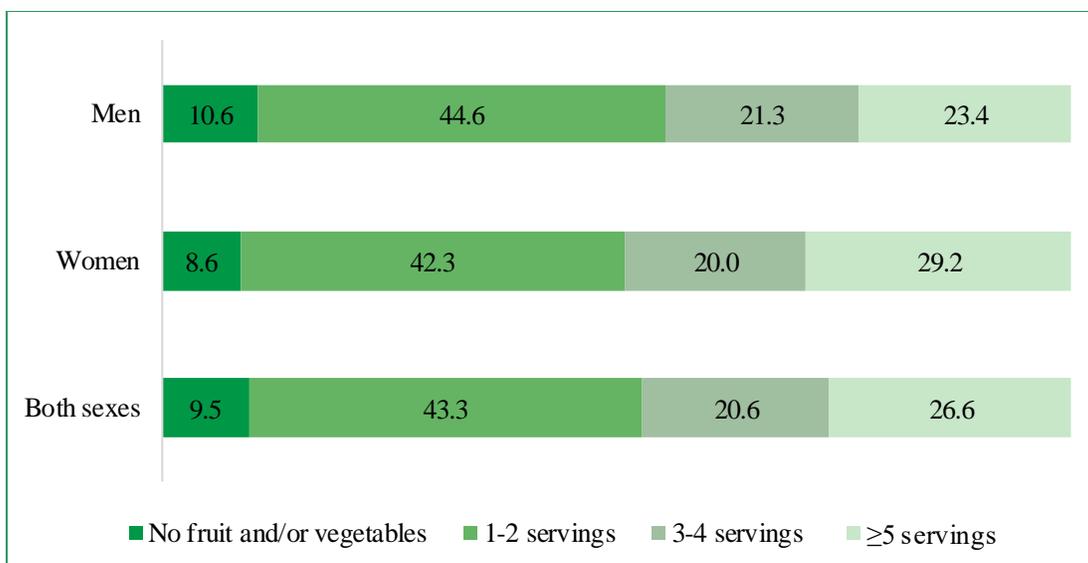


Figure 15: Distribution of respondents by number of servings of fruit and/or vegetables per day, by sex of the Lebanese study population

Consumption of salt was analysed in the study population by asking the individuals that were interviewed questions regarding the frequency, quantity and type of salt used in their household, their cooking habits and their attitude towards dietary salt. The majority of respondents of all ages (23.1%, (95% CI: 18.5–27.8)) add salt always or often before eating or when eating, with substantial difference between sexes. Consumption of iodized salt was found to decrease with age (Figure 16).

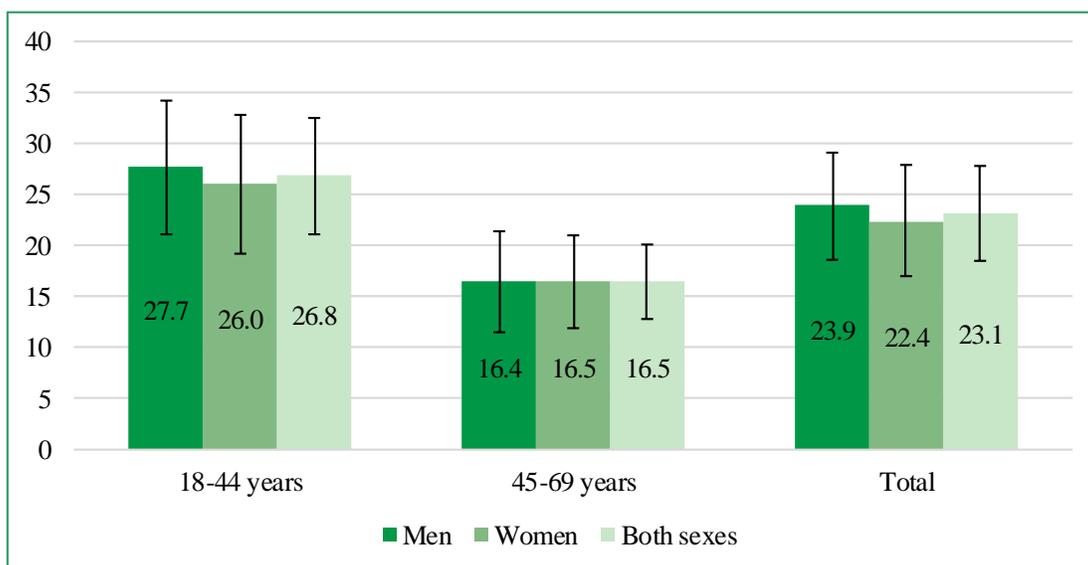


Figure 16: Percentage of respondents who always or often add salt or salty sauce to their food before eating or as they are eating, by sex and age group of the Lebanese study population

A total of 25.9% of respondents mentioned that they added salt always or often when cooking or preparing food at home. The percentage of men was lower than that of women (24.7%, 95% CI: 19.8–29.5 vs. 26.9%, 95% CI: 22.3–31.4) (Table 14).

Table 14: Percentage of respondents always or often adding salt when cooking or preparing food at home, by sex and age group of the Lebanese study population

Add salt always or often when cooking or preparing food at home									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
18-44	290	26.8	20.6-33.0	466	27.7	22.5-32.9	756	27.3	22.8-31.8
45-69	441	20.6	14.3-27.0	616	25.5	19.5-31.4	1057	23.3	18.5-28.2
18-69	731	24.7	19.8-29.5	1082	26.9	22.3-31.4	1813	25.9	22.0-29.8

Respondents were asked how often they consumed processed food high in salt. Among all survey participants, 20.7% (95% CI: 17.1–24.3) gave an affirmative answer. The percentage of men (23.8%, 95% CI: 19.0–28.6) who reported eating processed food high in salt was higher than that of women (18.1%, 95% CI: 13.9–22.3). The proportion of respondents eating such foods decreased with age (Figure 17).

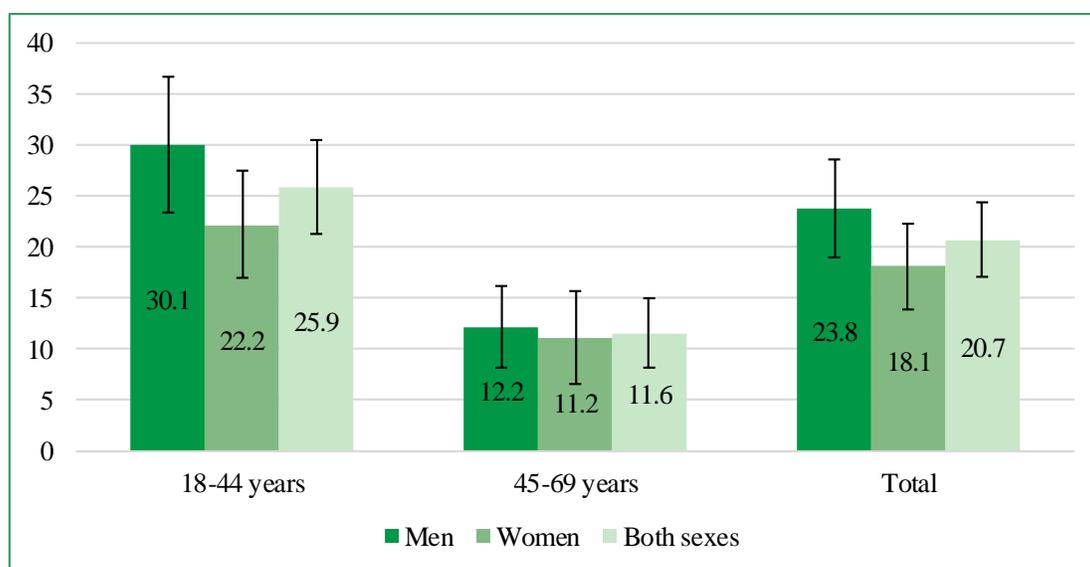


Figure 17: Percentage of respondents who always or eating processed foods high in salt, by sex and age group of the Lebanese study population

Only 14.0% of all respondents believed that they consume too much and far too much salt. The percentage of men with this perception was higher than that of women. The proportion of women who thought they consume too little and far too little is lower (38.1%) than that of men (42.4%), while the percentages of those using (in their opinion) “just the right amount” was higher for women respondents (48.3%) (Figure 18).

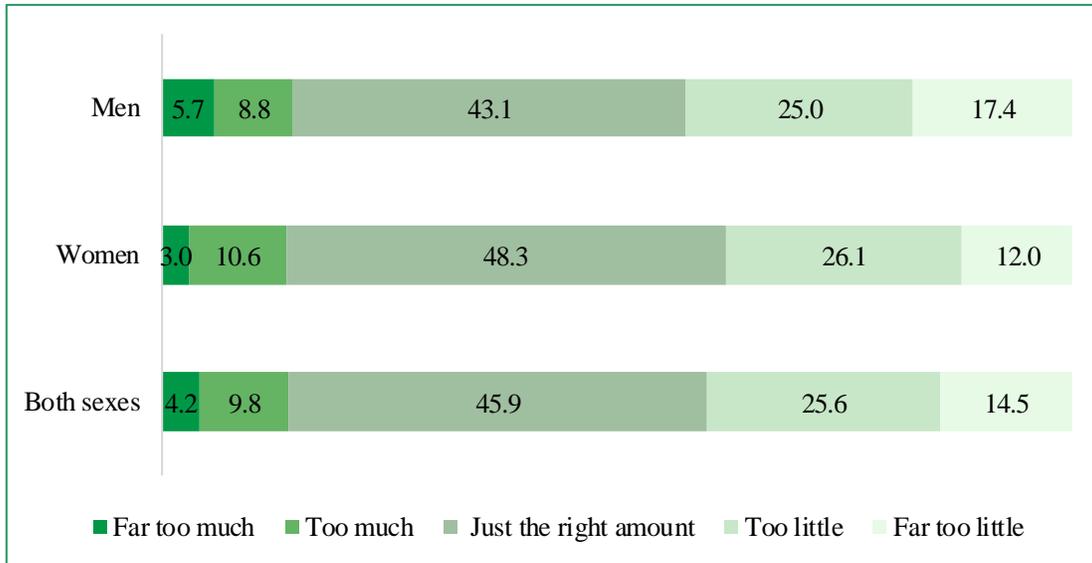


Figure 18: Self-reported quantity of salt consumed, by sex of the Lebanese study population

Although half (52.7%) of the respondents were aware that salt can cause serious health problems (Table 15), only 23.0% of them considered lowering salt in diet to be very important; 56.4% thought this was somewhat important; and 20.6% thought it was not at all important. The proportion of women who considered lowering salt in their diet to be very or somewhat important was higher (81.8%) than that of men (76.4%) (Figure 19).

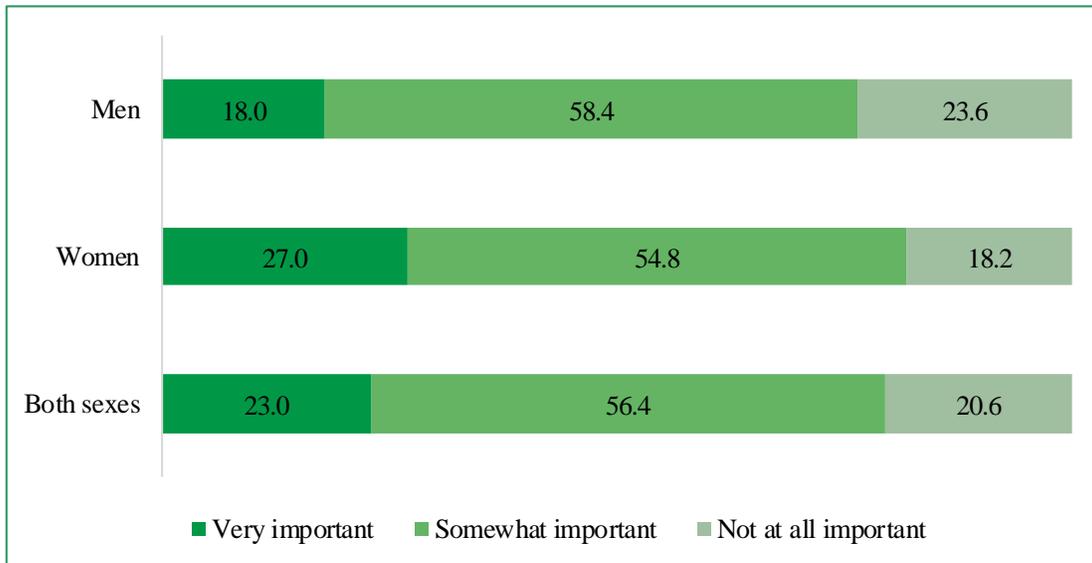
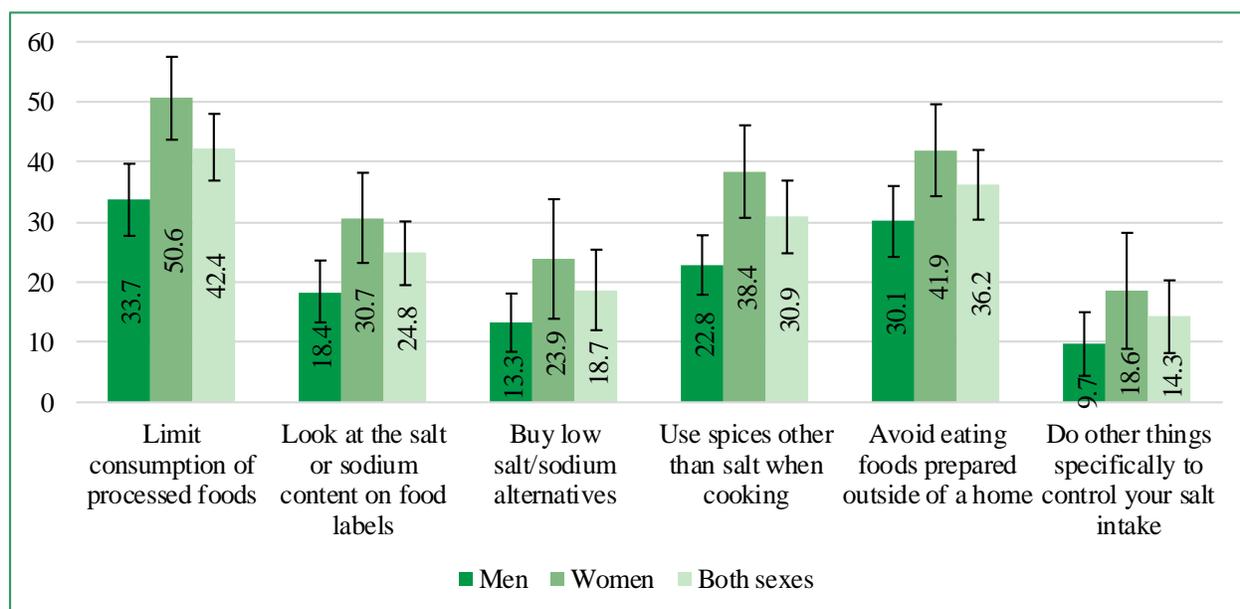


Figure 19: Importance of lowering salt in diet, by sex of the Lebanese study population

Table 15: Percentage of respondents thinking that consuming too much salt could cause serious health problems, by sex and age group of the Lebanese study population

Think consuming too much salt could cause serious health problem									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
18-44	323	44.3	37.0-51.5	476	56.1	45.4-66.8	799	50.2	42.6-57.8
45-69	473	57.0	48.5-65.4	627	57.3	47.7-67.0	1100	57.2	49.2-65.1
18-69	796	48.5	42.4-54.7	1103	56.5	46.8-66.3	1899	52.7	45.7-59.6

Respondents were asked what actions they took to control salt intake on a regular basis. The analysis showed that less than half (42.4%) of the study population undertook actions to limit their consumption of processed foods high in salt. A difference was identified between sexes: 50.6% (95% CI: 43.7–57.5) for women and 33.7% (95% CI: 27.7–39.7) for men. Only 24.8% (95% CI: 19.5–30.1) of respondents mentioned that they looked at the salt or sodium content on food labels, and 18.7% of them (95% CI: 12.0–25.4) affirmed that they bought low-salt/sodium



alternatives (Figure 20).

Figure 20: Percentage of respondents taking specific action to control salt intake, by sex of the Lebanese study population

On average, the number of reported meals eaten outside the home was 1.9 for both sexes and across all ages (95% CI: 1.7–2.2), 2.3 meals (95% CI: 2.0–2.6) for men and 1.6 meals for women (95% CI: 1.3–1.9). There was a difference between age groups, with an average of 2.3 meals eaten outside the home in the age group 18– 44 years, and 1.4 meals for the age group 45–69 years (Figure 21).

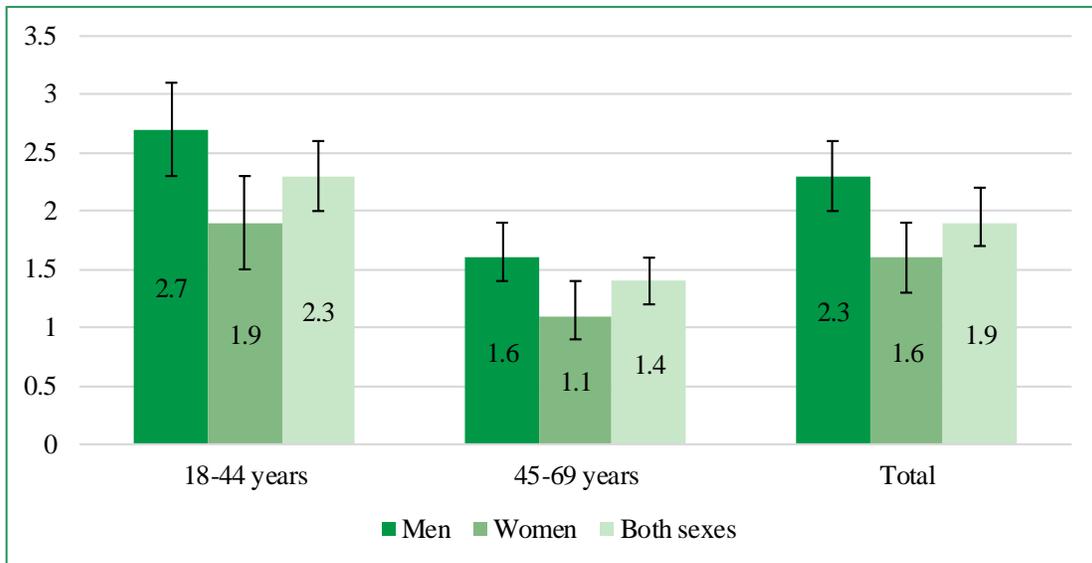
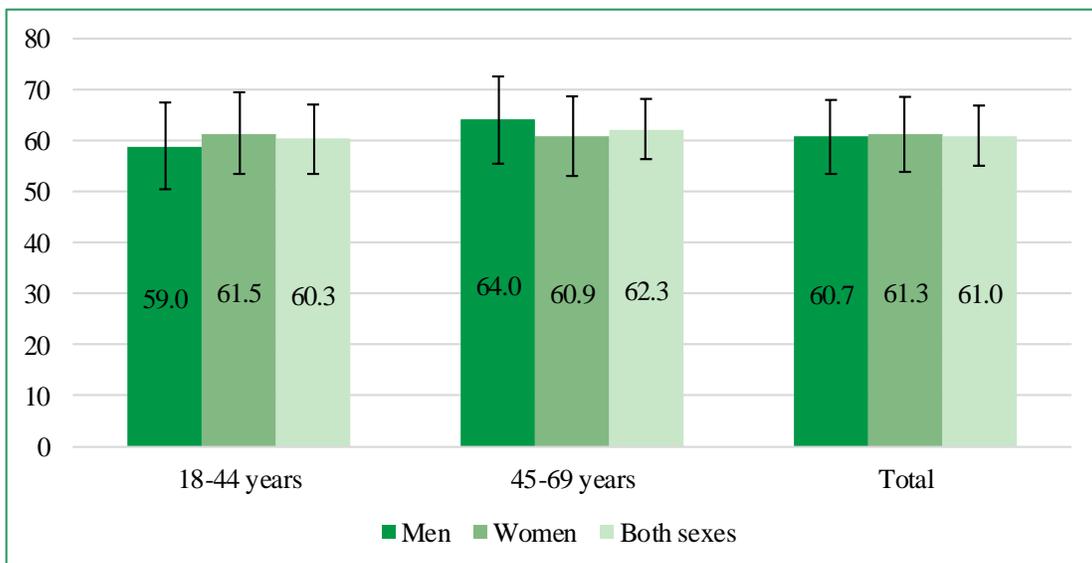


Figure 21: Mean number of meals eaten outside the home, by sex and age group of the Lebanese study population

3.1.5. Physical Activity

Physical activity in the study population was analyzed using continuous indicators, such as time spent participating in different physical activities, as well as categorical indicators, such as cut-off points for specific amounts of physical activity. Total physical activity per day was recorded, taking into account all domains (work-, transport- and recreation-related activities). Analysis of the collected data showed that two thirds (61.0%, 95% CI: 55.1–66.9) of the Lebanese individuals in the study population did not meet WHO recommendations on physical activity



(Figure 22).

Figure 22: Proportion of respondents not meeting WHO recommendations on physical activity for health, by sex and age group of the Lebanese study population

According to WHO recommendations, 71.1% of the study population fell into the low level of physical activity category; 14.0% were attributed to the moderate-level activity group; and 14.9% were in the high level of activity group. The difference was recorded between the sexes, with 69.3% of men (95% CI: 61.7–76.8) and 72.8% of women (95% CI: 67.3–78.3) in the low-level activity group, while 18.7% of men (95% CI: 12.8–24.6) and 11.5% of women (95% CI: 7.3–15.6) were in the high-level activity category (Figure 23).

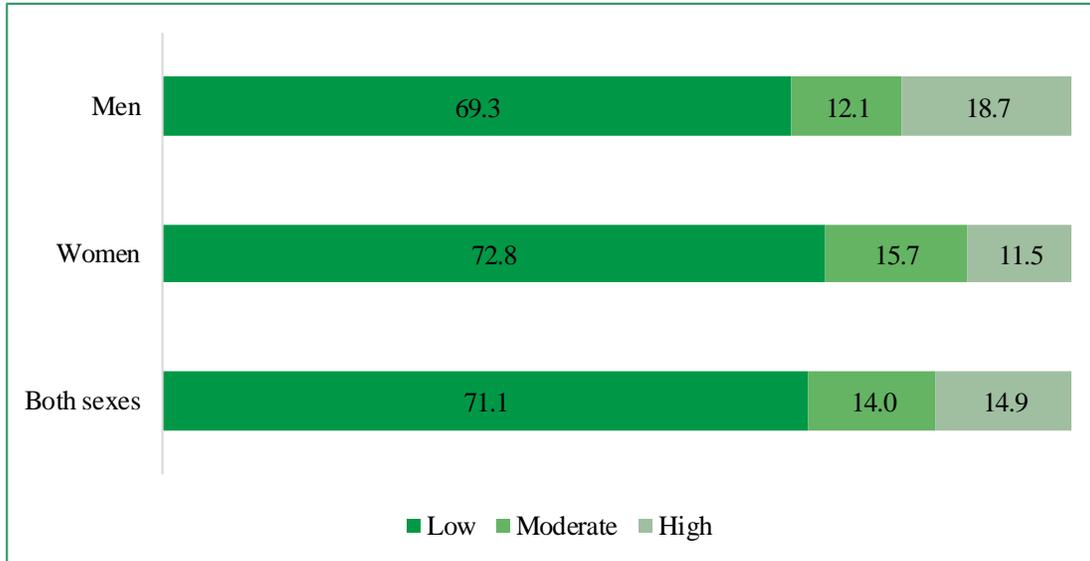
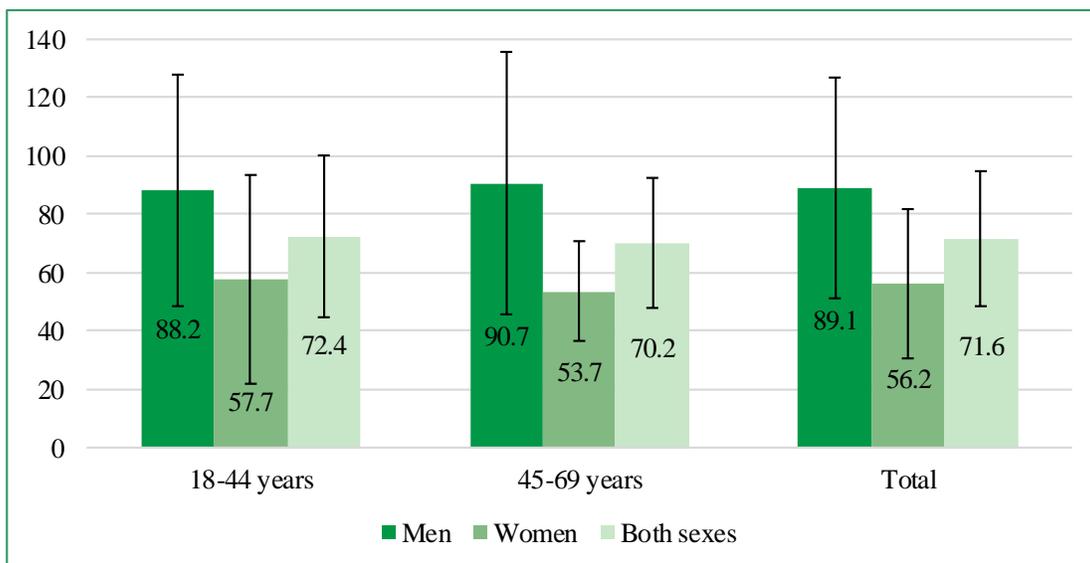


Figure 23: Level of total physical activity according to WHO recommendations, by sex of the Lebanese study population

Respondents aged 18–69 years carried out an average of 71.6 minutes of physical activity per day, with a difference between men (89.1 minutes, 95% CI: 51.2–126.9) and women (56.2



minutes, 95% CI: 30.6–81.8) (Figure 24).

Figure 24: Mean minutes of total physical activity per day, by sex and age group of the Lebanese study population

In terms of the amount of time spent on physical activity, the greatest differences between sexes were found in work-related activities (Figure 25).

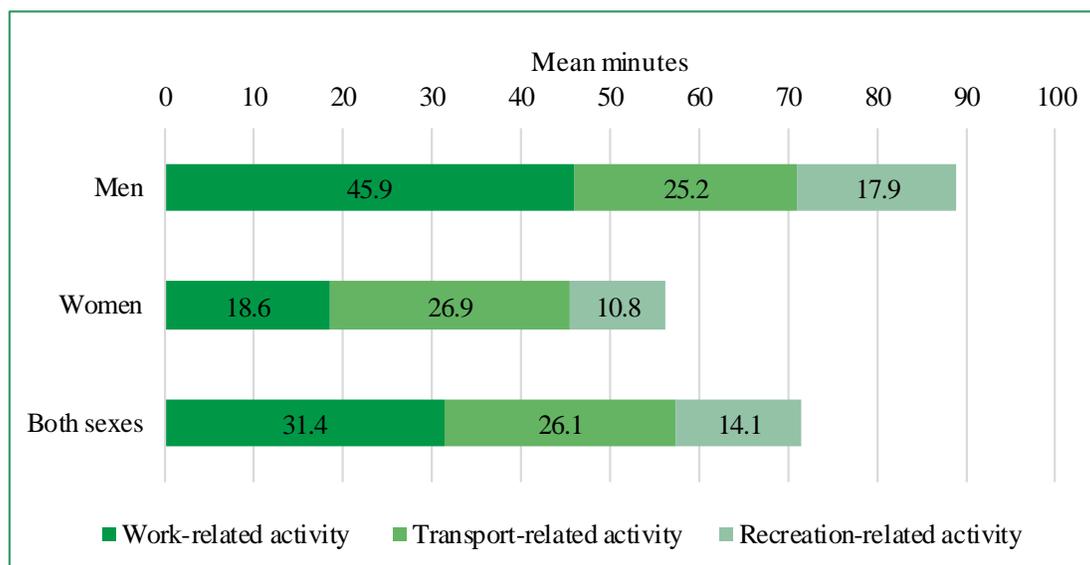


Figure 25: Mean minutes of physical activity per day, by type of activity and sex of the Lebanese study population

3.1.6. History of Raised Blood Pressure

Respondents were asked whether they had ever undergone blood pressure measurement and whether they had been diagnosed with high blood pressure. Among both age groups, 36.2% reported that their blood pressure had never been measured; 46.7% had undergone blood pressure measurement but had not been diagnosed with hypertension; 5.8% had been diagnosed with high blood pressure more than a year before; and 11.3% had been diagnosed with hypertension within the 12 months prior to the interview.

A total of 37.7% of men (95% CI: 32.1–43.3) had never had their blood pressure measured, compared with 34.8% of women (95% CI: 28.6–41.0). The percentage of women diagnosed with high blood pressure during the previous 12 months was equal (11.1%, 95% CI: 8.7–13.6) to that of men (11.5%, 95% CI: 8.6–14.3) (Figure 26).

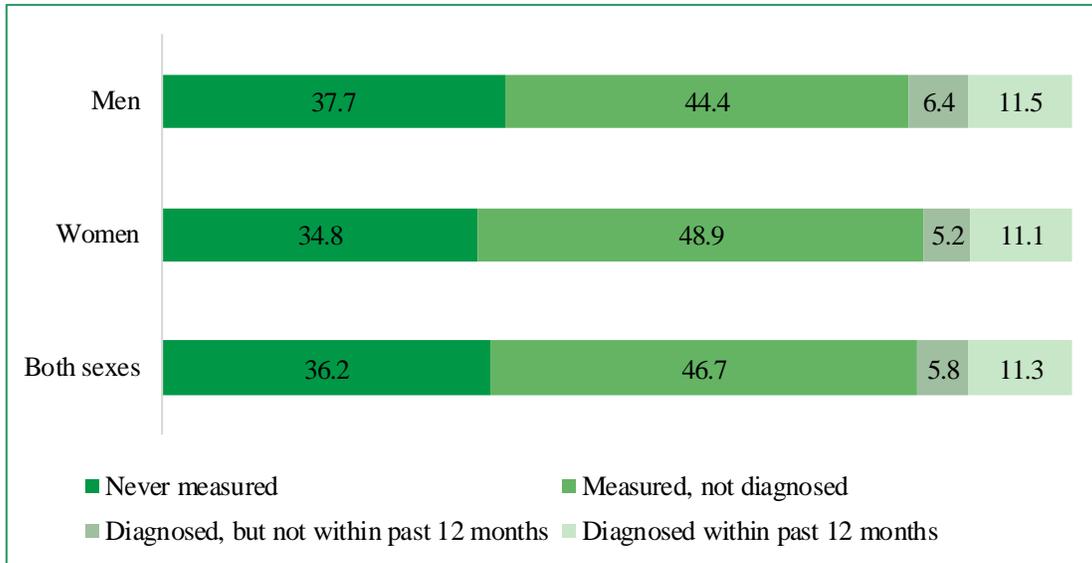


Figure 26: Blood pressure measurement and diagnosis, by sex of the Lebanese study population

Of all respondents aged 18–69 years diagnosed with high blood pressure, 63.0% were taking medication prescribed by a doctor or health worker, with 40.8% (95% CI: 29.0–52.6) aged 18–44 years and 74.7% (95% CI: 67.8–81.6) aged 45–69 years (Figure 27).

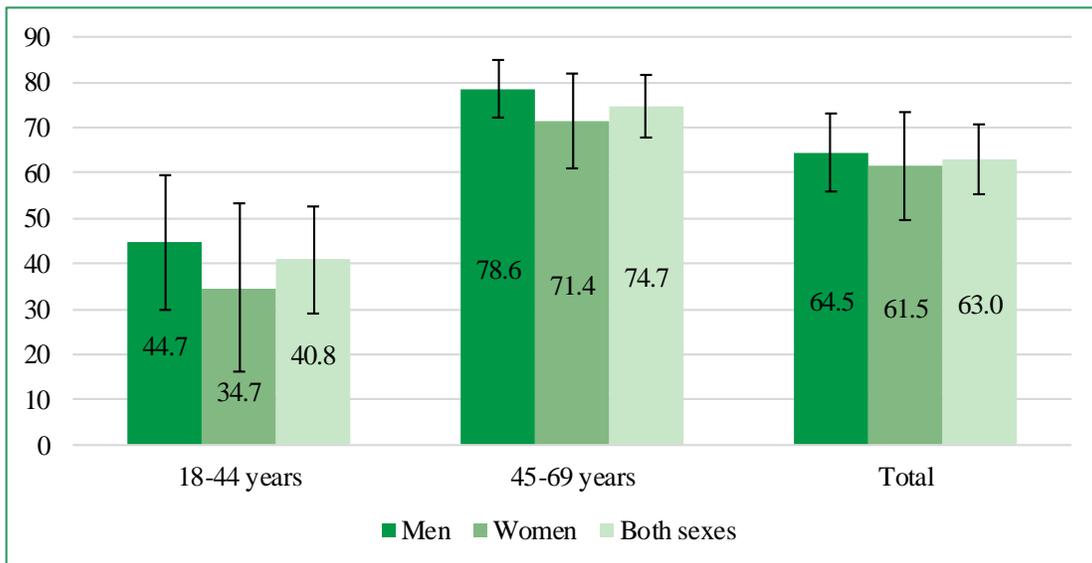


Figure 27: Proportion currently taking medication for raised blood pressure prescribed by doctor or health worker among those diagnosed, by sex and age group of the Lebanese study population

3.1.7. History of Diabetes

History of diabetes, including blood sugar measurement, established diagnosis and treatment for diabetes were analyzed. Of all the respondents, 62.3% had never had their blood sugar measured and 31.4% of them had undergone the test but had not been diagnosed with diabetes. A total of 1.0% of the respondents of all ages had been diagnosed with high blood glucose more than 12 months before the survey and 5.3% within the previous 12 months.

The percentage of men of all ages who had never had their blood glucose measured was 64.4% (95% CI: 58.4–70.3), compared with 60.4% of women of the same age group (95% CI: 54.0–66.9). The proportion of those who had undergone blood sugar measurement but had not been diagnosed was 28.4% (95% CI: 22.8–34.0) in men and 34.1% (95% CI: 27.7–40.6) in women (Figure 28).

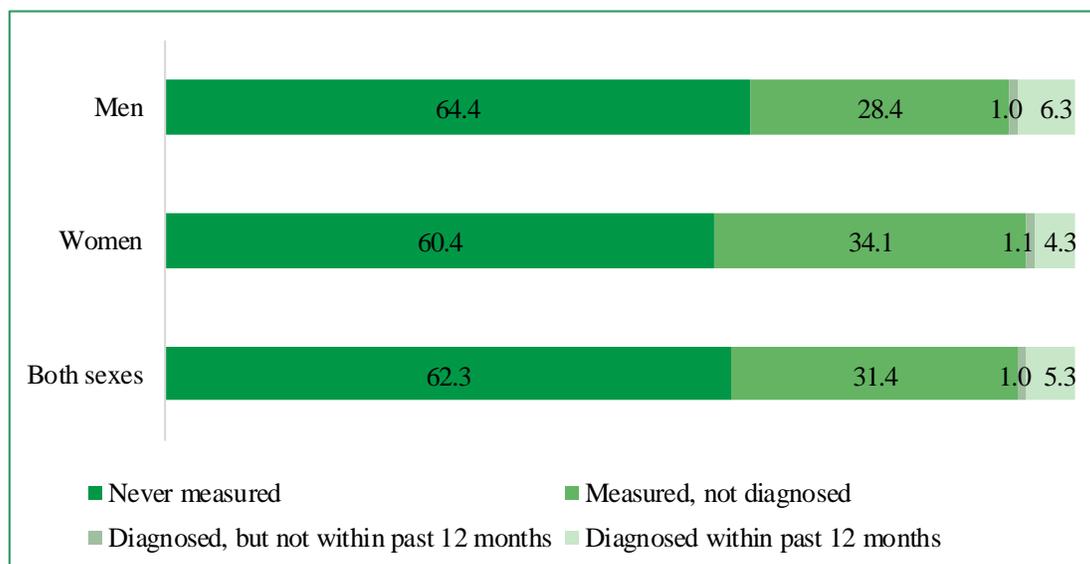


Figure 28: Blood sugar measurement and diagnosis, by sex of the Lebanese study population

Respondents previously diagnosed with raised blood sugar or diabetes were asked whether they had been prescribed any medication for diabetes by a health worker during the previous two weeks, or whether they were taking insulin for diabetes prescribed by a doctor or other health worker. 87.3% of men (95% CI: 80.8–93.7) and 85.5% of women (95% CI: 75.5–95.6) taking any medication for diabetes prescribed by a doctor or a health worker. For those taking insulin, with 34.5% of men (95% CI: 22.7–46.3) and 33.1% of women (95% CI: 24.2–42.0) taking insulin recommended by a doctor or a health worker (Figure 29).

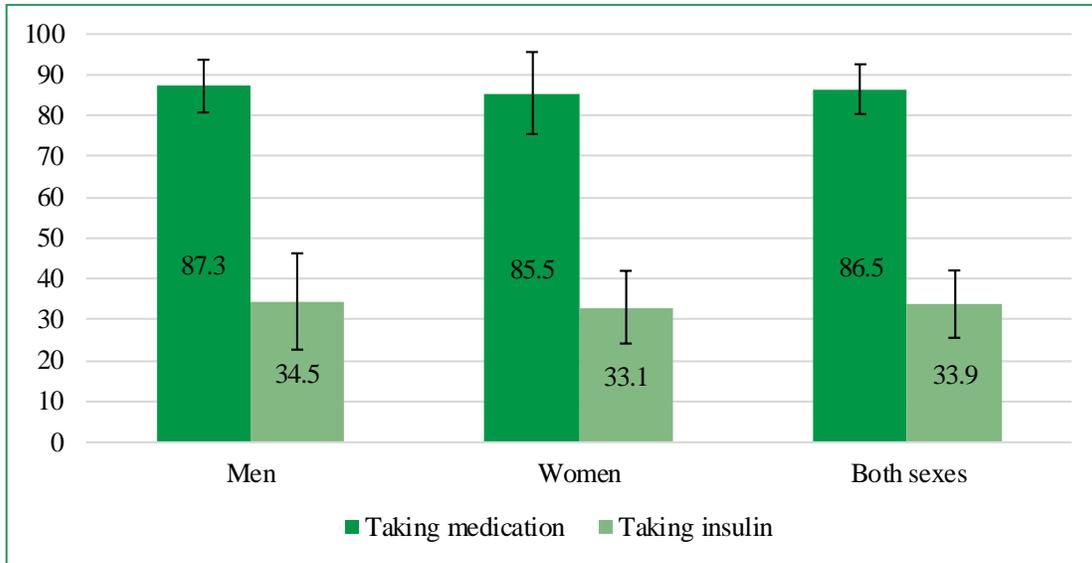


Figure 29: Proportion of respondents taking any medication or insulin prescribed for diabetes among those previously diagnosed, by sex of the Lebanese study population

3.1.8. History of Raised Total Cholesterol

A total of 68.7% of respondents of all ages declared that they never had their blood cholesterol measured, while 22.5% had undergone a test for blood cholesterol level but had not been diagnosed with raised cholesterol. Only 1.9% of the study population had been diagnosed with a high level of cholesterol more than 12 months before the interview, and 6.9% within the past year (Figure 30).

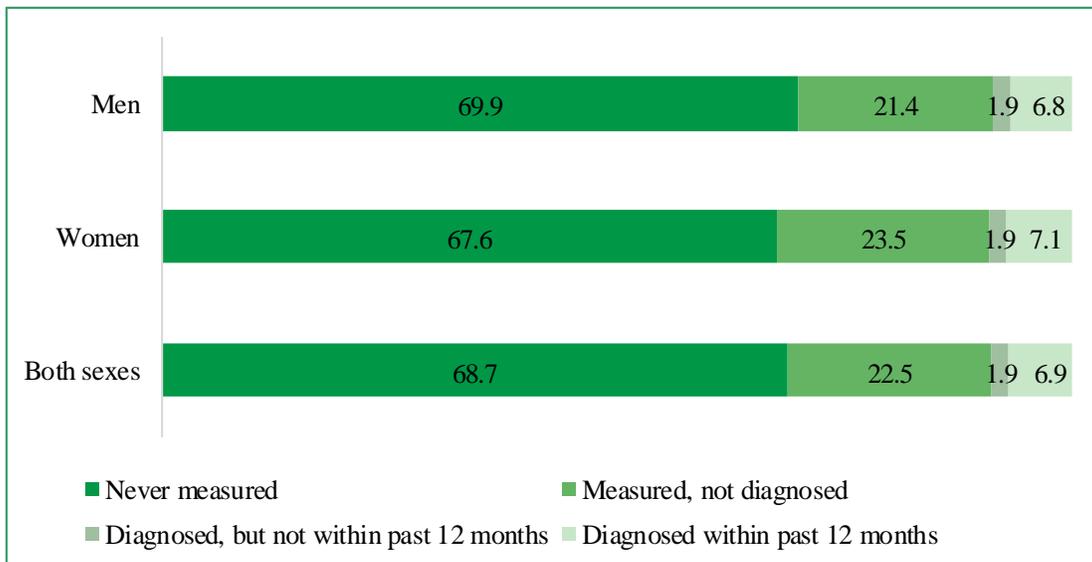


Figure 30: Total cholesterol measurement and diagnosis, by sex of the Lebanese study population

3.1.9. History of Cardiovascular Diseases (CVDs)

Among all respondents, 4.7% reported having ever had a heart attack or chest pain from heart disease or stroke and prevalence was found to increase gradually with age, from 3.9% (95% CI: 2.2–5.6) in the age group 18–44 years to 6.1% (95% CI: 4.1–8.1) in the age group 45–69 years. Men reported cases of heart attack or stroke more frequently (6.1%, 95% CI: 3.7–8.5) than women (3.4%, 95% CI: 1.9–4.8) (Figure 31).

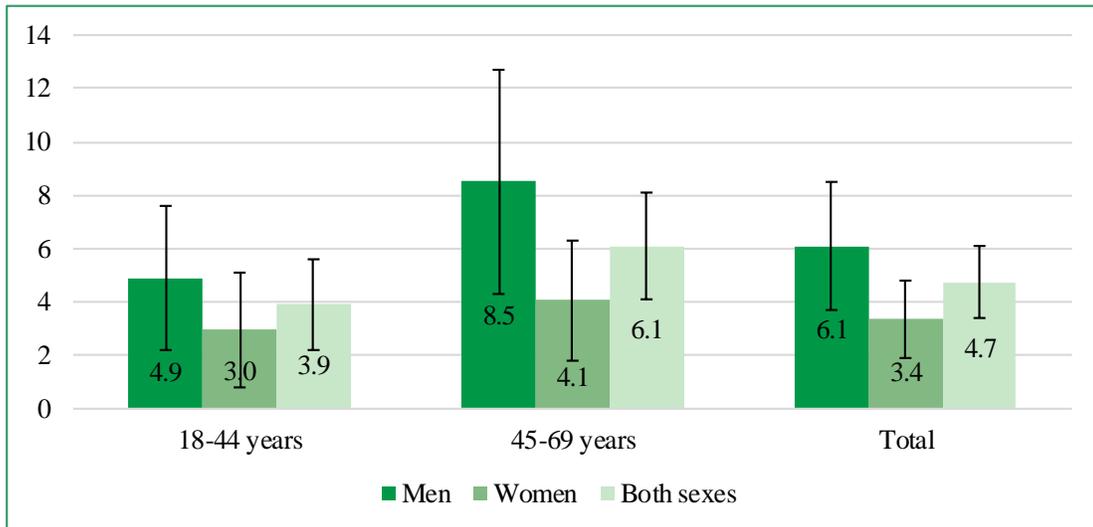


Figure 31: Percentage of respondents having ever had a heart attack or chest pain from heart disease or a stroke, by sex and age group of the Lebanese study population

A total of 8.4% of all respondents reported regularly taking aspirin and 8.1% of them also took statins to prevent or treat heart disease. The proportion of men that reported using aspirin for prevention or treatment of CVDs was higher as that of females: 10.3% for males (95% CI: 7.7–13.0) and 6.5% for females (95% CI: 4.8–8.2) (Figure 32).

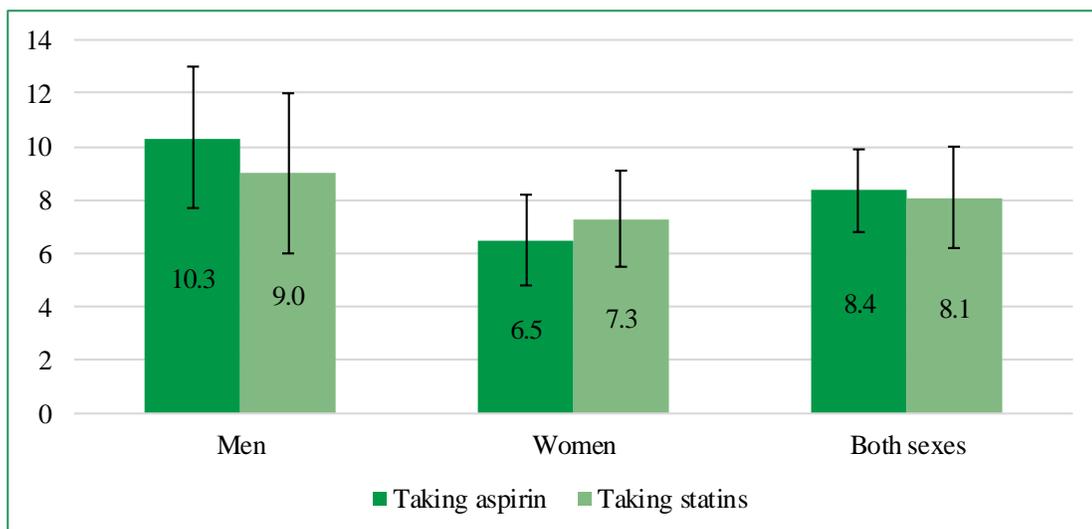


Figure 32: Percentage of respondents currently taking regularly aspirin or/and statins to prevent or treat heart disease, by sex of the Lebanese study population

3.1.10. Lifestyle Advice

Respondents were asked whether they received different types of lifestyle advice from a doctor or a health worker during the past three years. 35.2% of respondents had been advised to stop smoking or not to start: 35.4% among men and 34.9% among women. 38.2% of respondents had been advised to reduce salt in their diet: 35.0% among men and 41.1% among women. 39.1% of respondents had been advised to eat at least five servings of fruit and/or vegetables each day: 37.4% among men and 40.7% among women. 41.4% of respondents had been advised to reduce fat in their diet: 38.2% among men and 44.3% among women. 44.2% of respondents had been advised to start or to do more physical activity: 37.1% among men and 50.8% among women. 46.4% of respondents had been advised to maintain a healthy body weight or to lose weight: 38.6% among men and 53.7% among women (Figure 33).

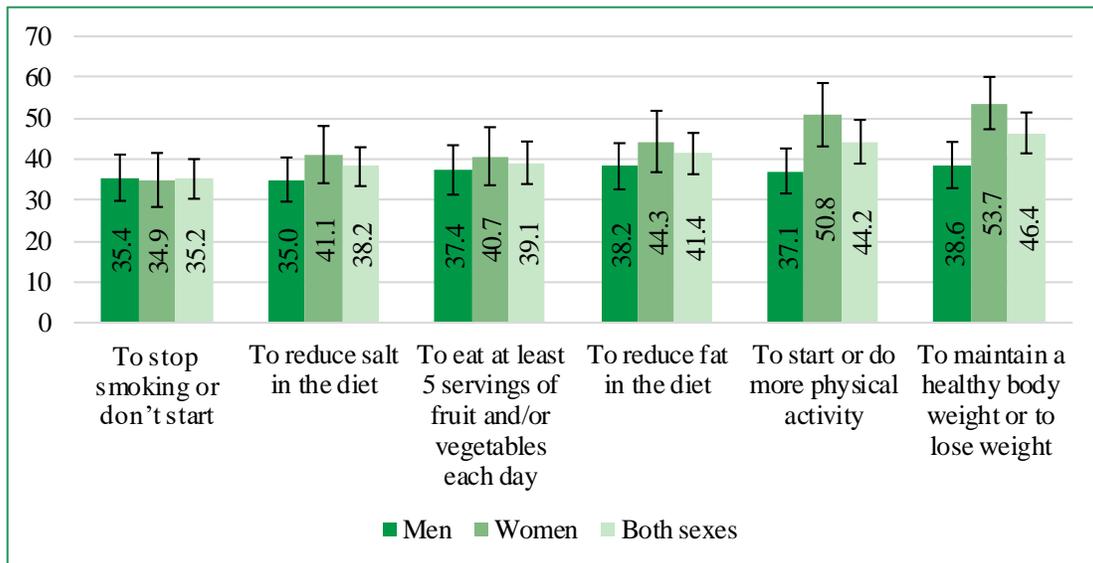


Figure 33: Percentage of respondents reporting having received lifestyle advice from a doctor or health worker during the past three years, by sex of the Lebanese study population

3.1.11. Cervical Cancer Screening

Female respondents were asked whether they had ever had a screening test for cervical cancer. Of all the women aged 18–69 years participating in the study, 17.1% (95% CI: 13.8–20.5) reported ever having undergone a screening test for cervical cancer. The highest prevalence of testing among women was in the age group 45–59 years, with 21.6% (95% CI: 17.5–25.7) compared to 14.4% (95% CI: 10.1–18.8) in the age group 18–44 years (Figure 34).

The percentage of female respondents aged 30–49 years that had ever undergone screening for cervical cancer was 18.0% (95% CI: 12.5–23.6).

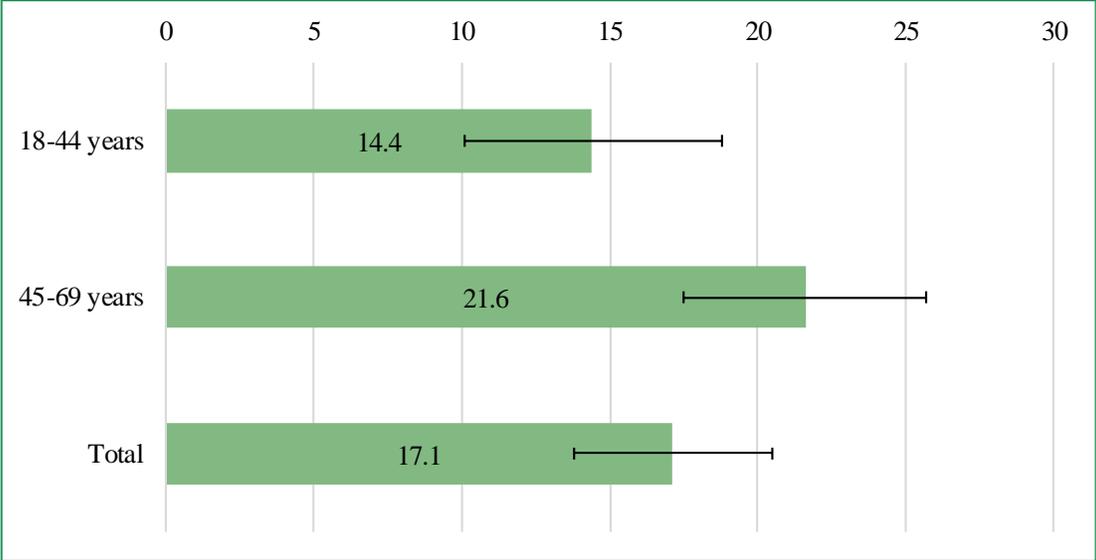


Figure 34: Percentage of women tested for cervical cancer, by age group of the Lebanese study population

3.1.12. Physical Measurements

Hypertension as a risk factor for NCD was assessed by means of blood pressure measurement. Mean SBP in the study population was 127.1 mmHg (95% CI: 124.7-129.6); 130.5 mmHg for men (95% CI: 127.4–133.5) and 123.9 mmHg (95% CI: 121.0–126.8) for women. Mean DBP was 76.1 mmHg (95% CI: 74.9–77.3) in the study population; 77.4 mmHg (95% CI: 75.5–79.3) in men and 74.9 mmHg (95% CI: 73.7–76.0) in women (Figure 35).

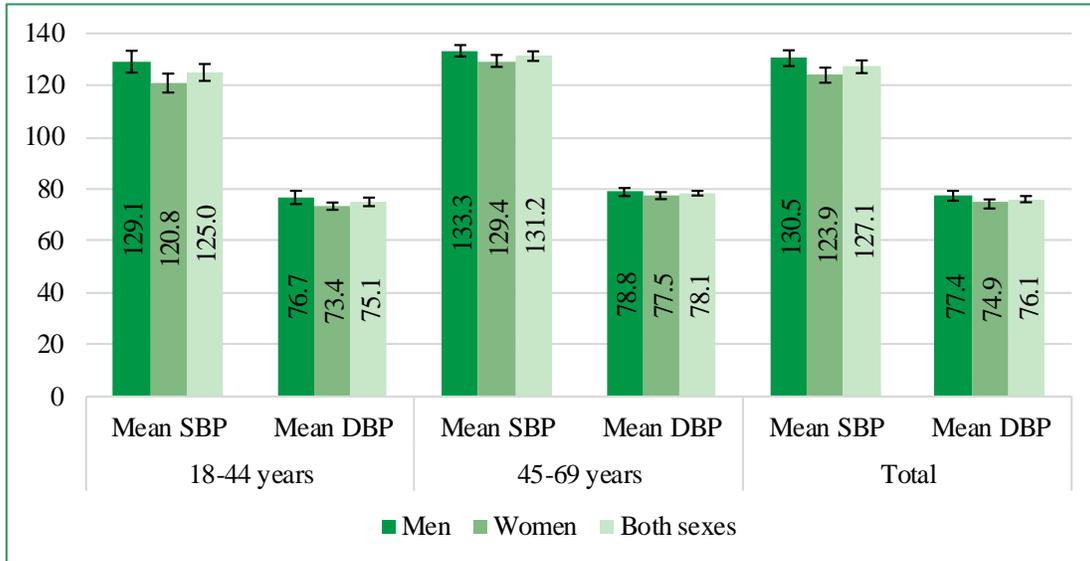
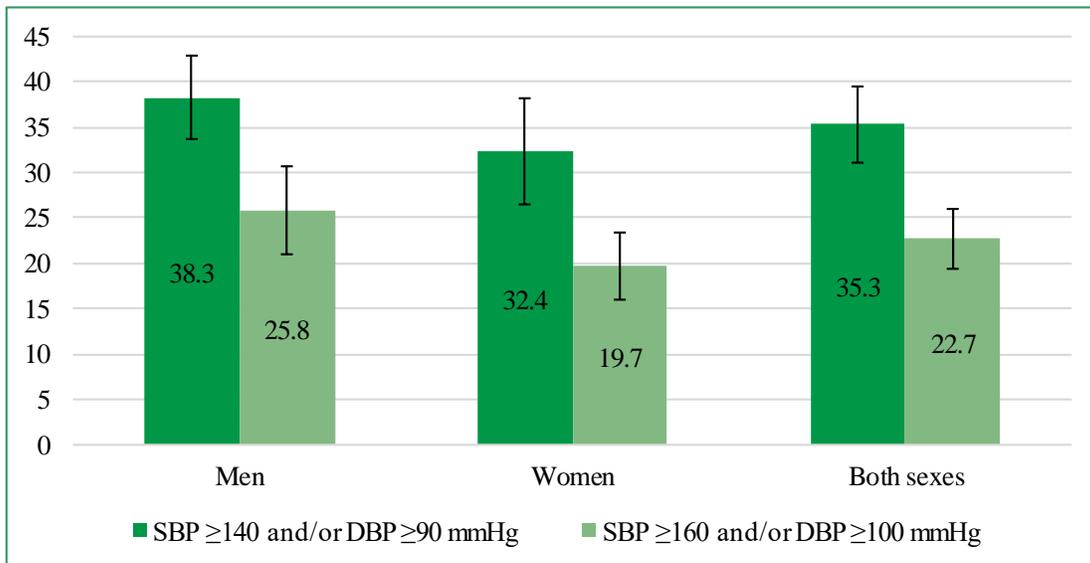


Figure 35: Mean SBP and DBP (mmHg), by sex and age group of the Lebanese study population

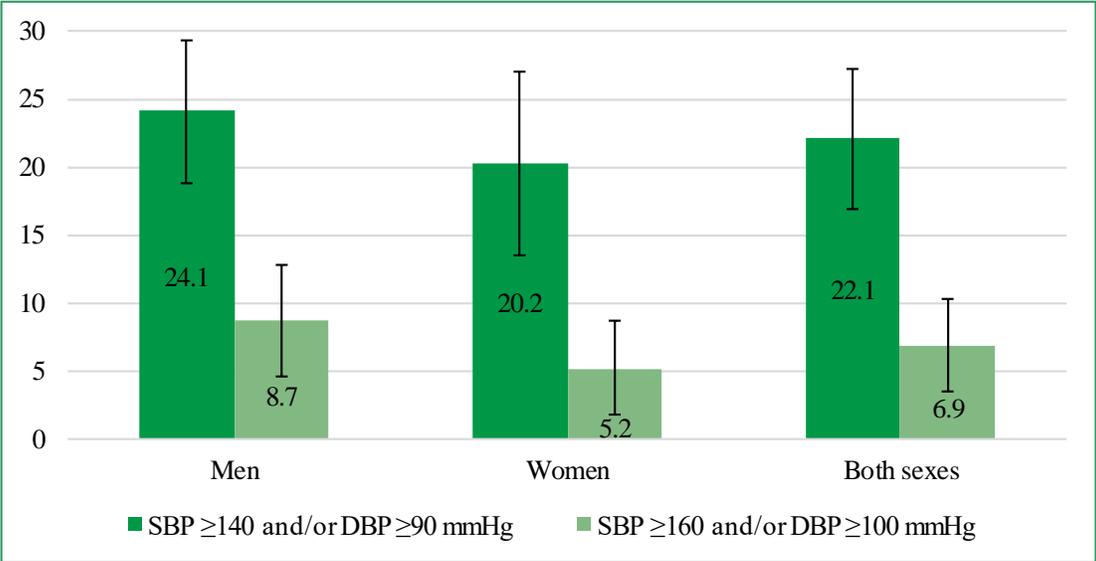
The prevalence of hypertension in the study population was 35.3% (95% CI: 31.1–39.5); 38.3% (95% CI: 33.7–42.9) for men and 32.4% (95% CI: 26.5–38.2) for women. The percentage of those with an SBP of ≥ 160 mmHg and/or a DBP of ≥ 100 mmHg, or taking medication for raised blood pressure was 22.7% (95% CI: 19.4–26.0); 25.8% (95% CI: 21.0–30.7) for men and 19.7%



(95% CI: 16.0–23.4) for women (Figure 36).

Figure 36: Percentage of respondents with raised blood pressure, or currently taking medication for raised blood pressure, by sex of the Lebanese study population

Of all the respondents not currently taking medication for hypertension, 22.1% (95% CI: 16.9–27.2) had an SBP of ≥ 140 mmHg and/or a DBP of ≥ 90 mmHg. The proportion of men in this category was 24.1% (95% CI: 18.8–29.3) and that of women was 20.2% (95% CI: 13.5–27.0)



(Figure 37).

Figure 37: Percentage of respondents with raised blood pressure, excluding those taking medication for raised blood pressure, by sex of the Lebanese study population

Respondents identified as having high blood pressure (SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg) and those taking medication for raised blood pressure were analyzed together: 30.5% (95% CI: 23.1–37.9) of them were taking medication for high blood pressure (SPB < 100 mmHg and DBP < 90 mmHg). A total of 17.6% (95% CI: 13.6–21.6) were taking medication but still had increased blood pressure (SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg). The remaining 51.9% (95% CI: 43.1–60.8) were not taking medication but had increased blood pressure (Figure 38).

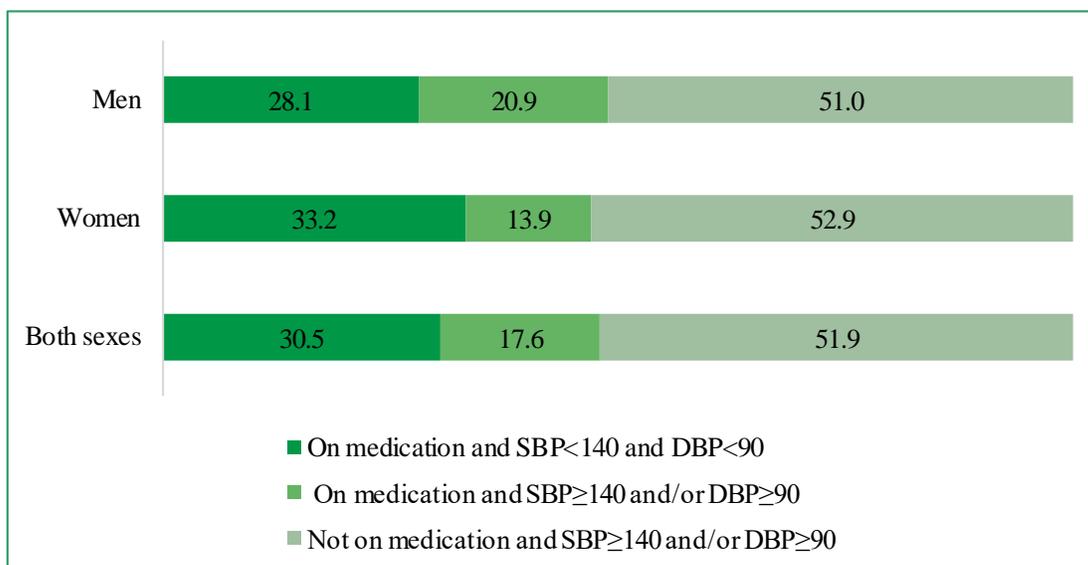


Figure 38: Respondents with treated and/or controlled blood pressure among those with raised blood pressure or currently taking medication, by sex of the Lebanese study population

Anthropometric measurements such as height, weight, and waist and hip circumference were used to calculate BMI and mean waist-to-hip ratio (WHR) in order to estimate the prevalence of overweight and obesity in the study population (excluding pregnant women) by age, sex and area of residence.

Male respondents were on average 174.1 cm tall (95% CI: 173.0–175.1) and weighed on average 83.9 kg (95% CI: 82.2–85.6), and females were on average 162.4 cm tall (95% CI: 161.6–163.2) and weighed on average 71.7 kg (95% CI: 70.2–73.2) (Table 16).

Table 16: Mean height and weight, by sex and age group of the Lebanese study population

Mean height (cm)						
Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
18-44	299	175.1	173.7-176.5	427	162.6	161.4-163.8
45-69	437	171.9	170.8-173.0	565	162.1	161.4-162.9
18-69	736	174.1	173.0-175.1	992	162.4	161.6-163.2

Mean weight (kg)						
Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
18-44	298	83.8	81.6-86.0	427	69.9	67.7-72.1
45-69	438	84.1	82.2-86.1	560	74.8	73.4-76.2
18-69	736	83.9	82.2-85.6	987	71.7	70.2-73.2

Mean BMI for the study population (both sexes) was 27.4 (95% CI: 27.1–27.8); 27.7 (95% CI: 27.1–28.2) for men and 27.2 (95% CI: 26.6–27.8) for women (Figure 38).

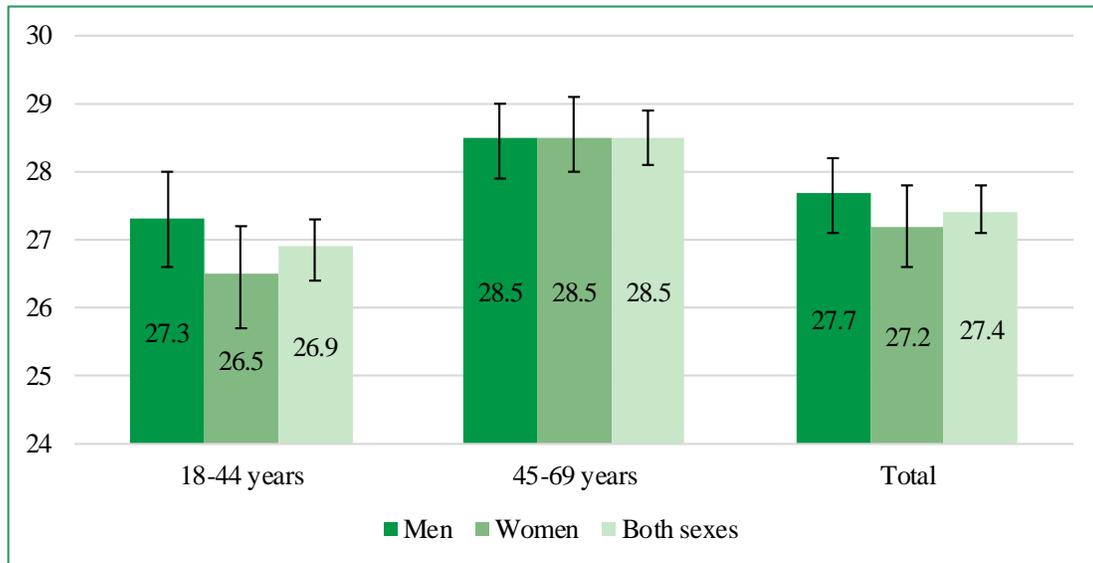


Figure 39: Mean BMI (kg/m²), by sex and age group of the Lebanese study population

The study population was grouped into four BMI categories: underweight (BMI <18.5), normal weight (BMI 18.5–24.9), overweight (BMI 25.0–29.9) and obese (BMI ≥30.0). A total of 64.9% of all respondents (both sexes) had a BMI greater than 25 and thus fell into the overweight or obese categories; 33.6% were grouped in the normal weight category and 1.5% in the underweight category (Figure 40).

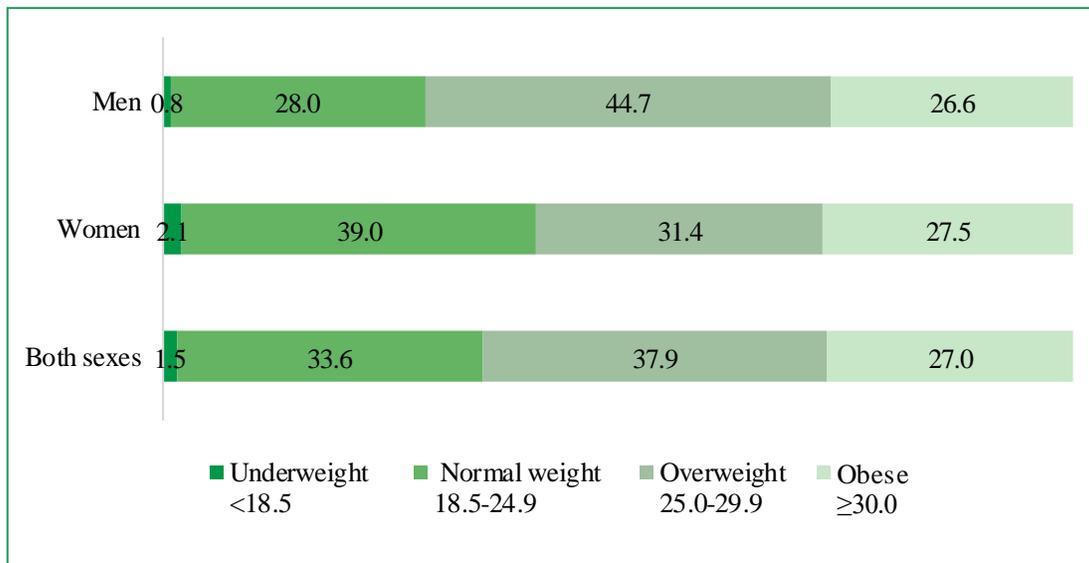


Figure 40: Distribution by BMI category, by sex of the Lebanese study population

WHR was computed for all respondents (excluding pregnant women), using measurements of waist and hip circumferences. Results showed a WHR equal to 0.9 for both sexes. WHO defines obesity as having a WHR above 0.90 for males and above 0.86 for females. The values for both sexes in the current study were found to be at the lower limit of obesity. Almost no differences were found between the various age groups in terms of mean WHR (Table 17).

Table 17: Mean waist-to-hip ratio, by sex and age group of the Lebanese study population

Mean waist / hip ratio						
Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
18-44	290	0.9	0.9-1.0	424	0.9	0.9-0.9
45-69	408	1.0	0.9-1.0	555	0.9	0.9-0.9
18-69	698	0.9	0.9-1.0	979	0.9	0.9-0.9

3.1.13. Biochemical Measurements

Mean fasting blood glucose level was found to be 99.7 mg/dL (95% CI: 94.8–104.5) in the total study population, including those currently taking medication for diabetes; 104.0 mg/dL (95% CI: 96.2–111.7) in men and 95.6 mg/dL (95% CI: 90.2–101.0) in women. Figures for mean fasting blood glucose were lowest in the age group 18–44 years (95.3 mg/dL, 95% CI: 88.1–102.6) and highest in the age group 45–69 years (107.6 mg/dL, 95% CI: 103.1–112.0) (Figure 41).

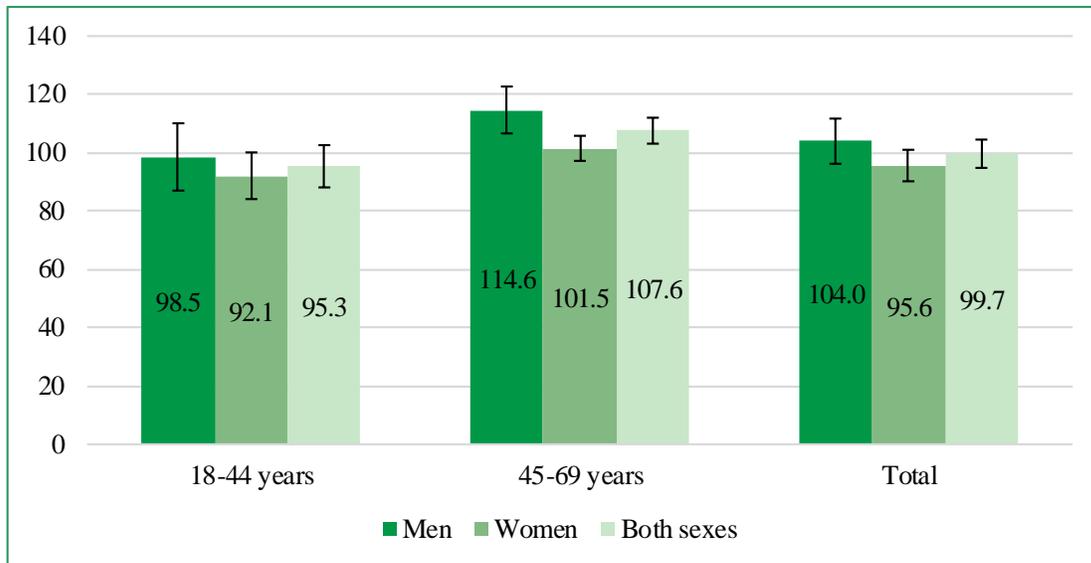


Figure 41: Mean fasting blood glucose level (mg/dL), by sex and age group of the Lebanese study population

Respondents were considered to have impaired fasting glycaemia (IFG) if the plasma venous values were between 110 mg/dL and 126 mg/dL. Non-fasting subjects were excluded. A total of 4.2% of the study population was found to have IFG: it was detected in 5.6% of men (95% CI: 3.6–7.6) and 2.8% of women (95% CI: 1.5–4.1) (Figure 42).

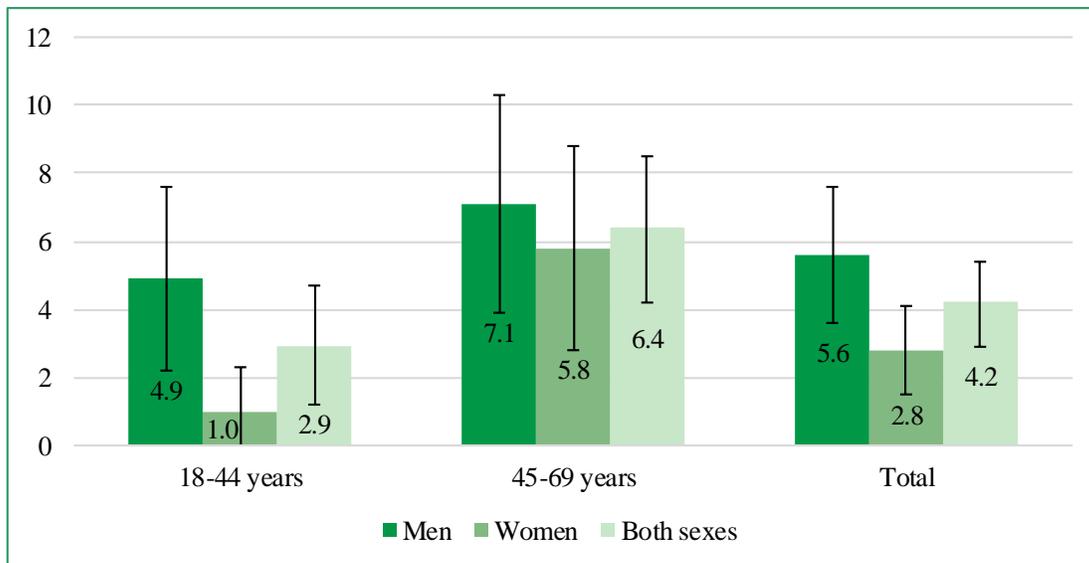


Figure 42: Prevalence of impaired fasting glycaemia, by sex and age group of the Lebanese study population

A total of 10.5% of the study population had a blood glucose level of ≥ 126 mg/dL, with 12.8% (95% CI: 9.5–16.1) in men and 8.3% (95% CI: 4.4–12.1) in women (Figure 43).

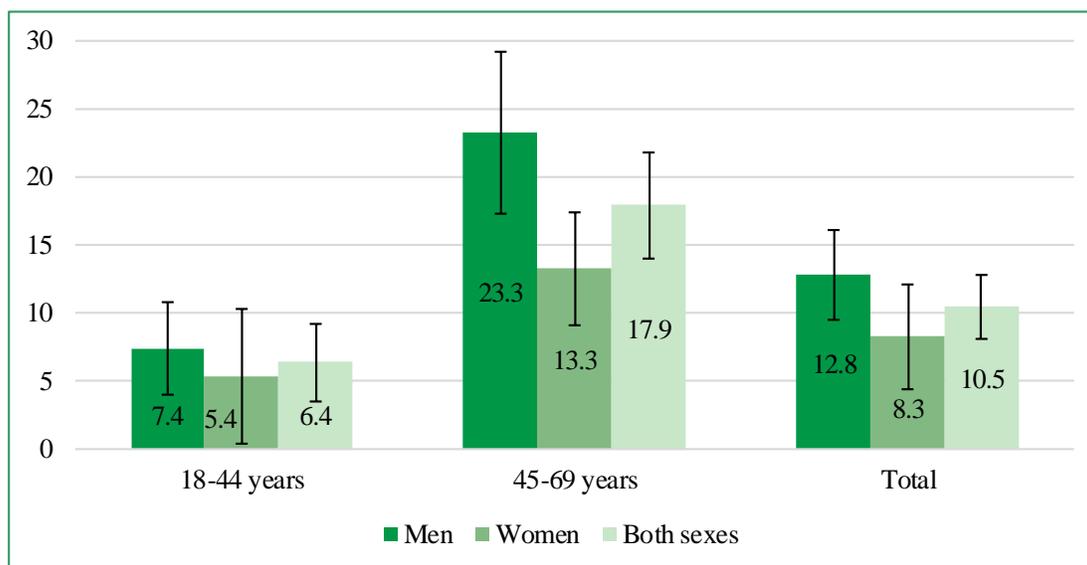


Figure 43: Prevalence of raised blood glucose or currently taking medication for diabetes, by sex and age group of the Lebanese study population

Blood cholesterol level was tested in the study population, including participants receiving cholesterol-lowering medication. Mean total blood cholesterol of the survey population was 208.1 mg/dL (95% CI: 203.1–213.1); 203.2 mg/dL (95% CI: 196.1–210.3) in men and 212.7 mg/dL (95% CI: 202.7–222.6) in women (Table 18).

Table 18: Mean total cholesterol (mg/dL), by sex and age group of the Lebanese study population

Age Group (years)	Mean total cholesterol (mg/dl)								
	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
18-44	159	196.0	186.2-205.8	297	206.4	189.2-223.6	456	201.2	193.3-209.1
45-69	286	217.2	209.2-225.2	455	223.2	216.0-230.4	741	220.5	215.2-225.7
18-69	445	203.2	196.1-210.3	752	212.7	202.7-222.6	1197	208.1	203.1-213.1

Respondents that were currently taking medication for raised cholesterol were also included in these categories. A total of 65.4% of the study population had a blood cholesterol level of ≥ 190 mg/dL, and 30.4% had a blood cholesterol level of ≥ 240 mg/dL (Figure 44).

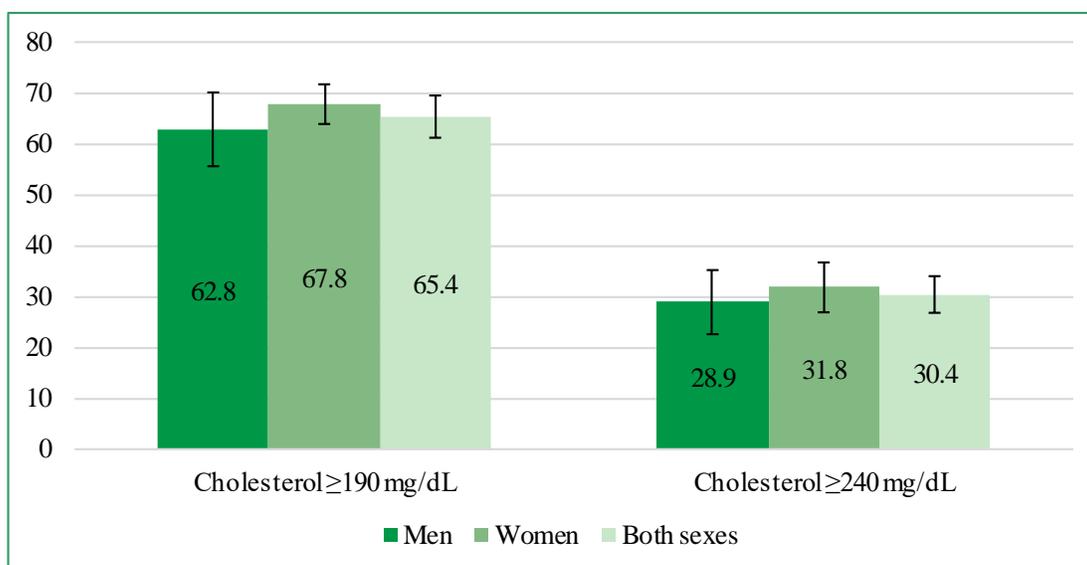


Figure 44: Percentage of respondents with a total cholesterol level of ≥ 190 and ≥ 240 mg/dL, or currently taking medication for raised cholesterol, by sex of the Lebanese study population

The mean level of High-Density Lipoprotein (HDL) cholesterol in all respondents' blood was 48.2 mg/dL (95% CI: 46.7–49.7), with a higher level found in women (53.5 mg/dL, 95% CI: 51.2–55.8) than in men (42.4 mg/dL, 95% CI: 41.4–43.5) (Table 19).

Table 19: Mean HDL (mg/dL), by sex and age group of the Lebanese study population

Age Group (years)	Mean HDL (mg/dL)								
	Men			Women			Both Sexes		
n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI	
18-44	159	40.8	39.4-42.2	297	53.7	50.8-56.7	456	47.3	45.5-49.1
45-69	287	45.6	43.9-47.4	455	53.2	51.2-55.2	742	49.7	48.3-51.2
18-69	446	42.4	41.4-43.5	752	53.5	51.2-55.8	1198	48.2	46.7-49.7

Among women, 42.0% (95% CI: 37.3–46.8) had an HDL level of less than 50 mg/dL. Among men, 37.6% (95% CI: 32.0–43.3) had an HDL level of less than 40 mg/dL (Figure 45).

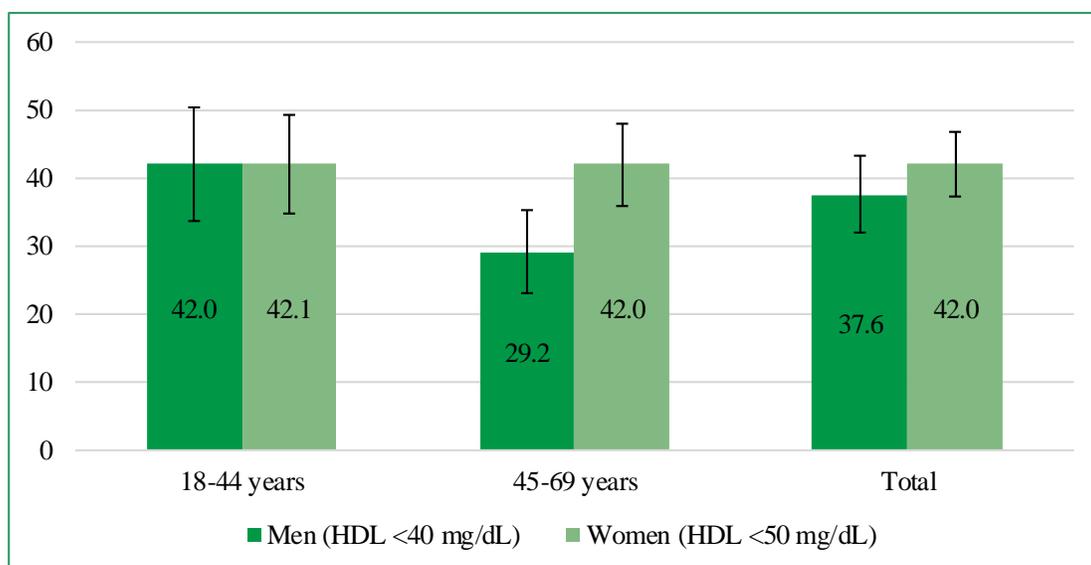


Figure 45: Proportion of population with decreased HDL cholesterol, by sex and age group of the Lebanese study population

3.1.14. Cardiovascular Disease Risk

Respondents aged 40–69 years were assessed to establish those with a 10-year CVD risk of $\geq 30\%$, and those with existing CVD. A 10-year CVD risk of $\geq 30\%$ is defined according to age, sex, blood pressure, smoking status (current smokers or individuals who stopped smoking less than one year before the assessment), total cholesterol, and diabetes (previously diagnosed or with a fasting plasma glucose concentration of >126 mg/dL).

The percentage of respondents in the age group 40–69 years falling within the category of 10-year CVD risk of $\geq 30\%$ or with existing CVD was 8.2% (95% CI: 5.1–11.3). Prevalence of this was much higher among men at 10.9% (95% CI: 5.1–16.6) than among women at 6.1% (95% CI: 2.3–10.0). Among respondents in the age group 40–54 years, 6.0% (95% CI: 1.8–10.2) were found to have a 10-year CVD risk of $\geq 30\%$ or existing CVD, compared with 12.5% (95% CI: 7.6–17.5) for this indicator in the age group 55–69 years (Table 20).

Table 20: Percentage of respondents with a 10-year CVD risk ($\geq 30\%$) or with existing CVD, by sex and age group of the Lebanese study population

Percentage of respondents with a 10-year CVD risk $\geq 30\%$ or with existing CVD									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
40-54	154	7.0	0.0-14.3	318	5.4	0.3-10.5	472	6.0	1.8-10.2
55-69	140	15.9	8.0-23.9	175	8.2	4.1-12.3	315	12.5	7.6-17.5
40-69	294	10.9	5.1-16.6	493	6.1	2.3-10.0	787	8.2	5.1-11.3

Of the aforementioned group of respondents (40–69 years old, with a 10-year CVD risk of $\geq 30\%$, including those with existing CVD), 58.6% (95% CI: 36.6–80.6) were receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes (Figure 46).

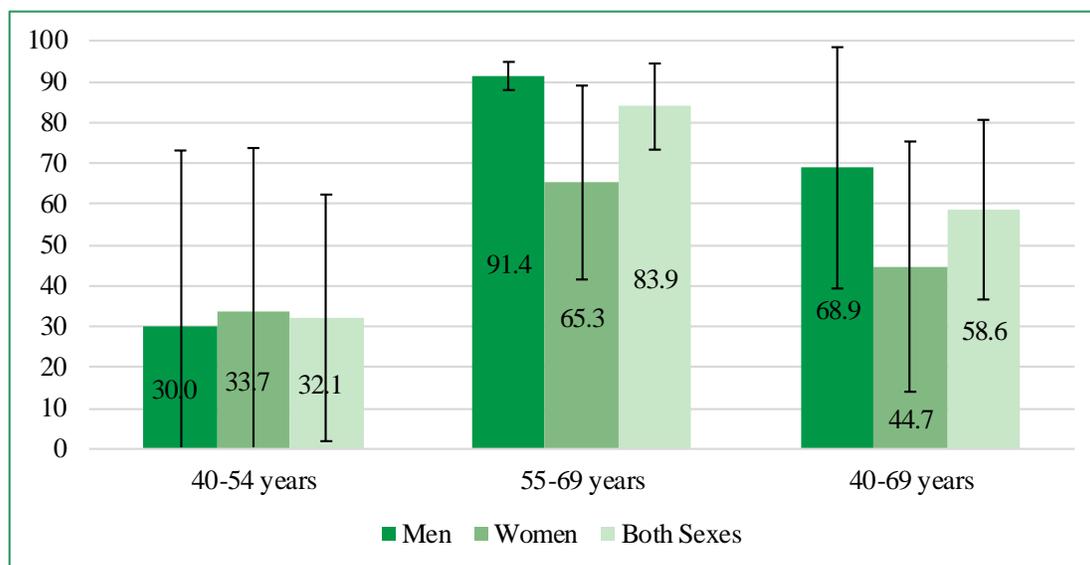


Figure 46: Percentage of eligible individuals receiving drug therapy and counselling to prevent heart attacks and strokes, by sex and age group of the Lebanese study population

3.1.15. Summary of Combined Risk Factors

The percentage of respondents with 0, 1–2 or 3–5 risk factors by age group and sex are presented in (Figure 47). In 2.8% (95% CI: 1.3–4.3) of the study population, none of the abovementioned five risk factors were identified; 45.8% (95% CI: 42.0–49.7) of the respondents had 1–2 risk factors; and 51.4% (95% CI: 46.8–55.9) has 3–5 of the risk factors listed. Prevalence of 3–5 combined risk factors was much higher in the age group 45–69 years (63.1%, 95% CI: 58.7–67.5), while prevalence of 1–2 risk factors was higher in the age group 18–44 years (52.1%, 95% CI: 46.7–57.5). A higher proportion of men had 3–5 risk factors (58.2%, 95% CI: 51.7–64.7) than women (45.7%, 95% CI: 39.5–51.9). In addition, the percentage of women with 1–2 risk factors (50.0%, 95% CI: 44.6–55.5) was higher than that of men (40.7%, 95% CI: 34.4–47.0). None of the above-mentioned risk factors were identified in 1.0% of men (95% CI: 0.0–2.4), and the percentage of women with none of the risk factors was 4.3% (95% CI: 1.7–6.8).

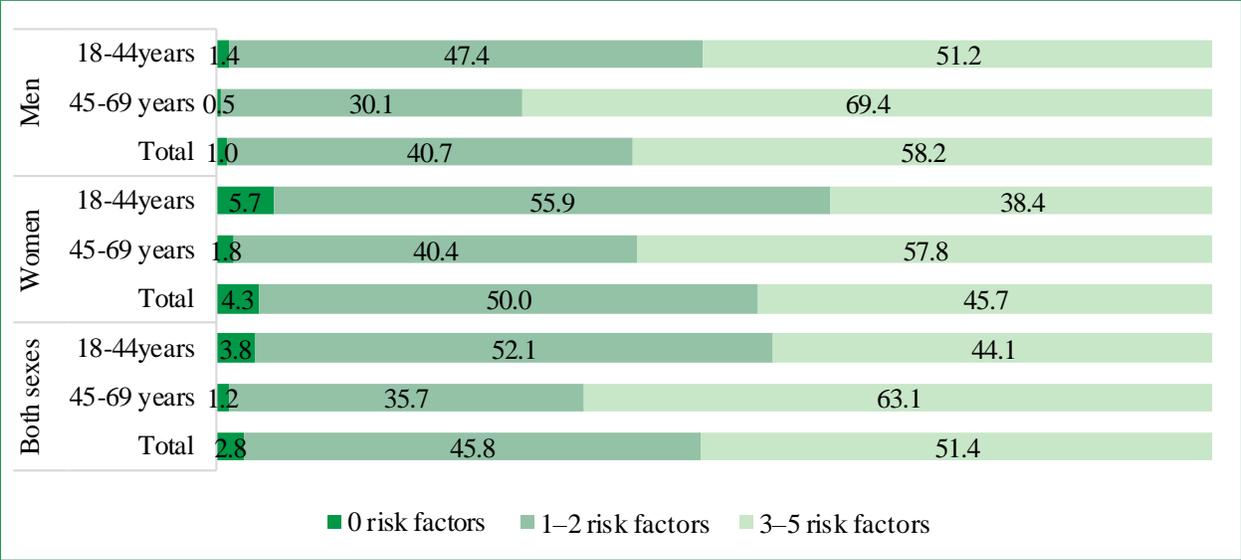


Figure 47: Summary of combined risk factors, by sex and age group of the Lebanese study population

3.2. Results for Syrians

3.2.1. Demographic Characteristics

A total of 2137 Syrian participants were enrolled in this study, out of which 1258 (59.0%) were women and 876 (41.0%) were men. In terms of age groups, 1418 (66.4%) individuals were aged 18–44 years and 716 (33.6%) were aged 45–69 years (Table 21).

Table 21: Distribution of the sample, by sex and age group of the Syrian study population

Age group and sex of respondents						
Age Group (years)	Men		Women		Both Sexes	
	n	%	n	%	n	%
18-44	530	37.4	888	62.6	1418	66.4
45-69	346	48.3	370	51.7	716	33.6
18-69	876	41.0	1258	59.0	2134	100.0

The average number of years spent in education was 6.0 years, with the male respondents spending an average of 6.6 years and the females spending on average 5.4 years (Table 22). The younger age group tended to have slightly more years of schooling in comparison with the older age group.

Table 22: Mean number of years of education, by sex and age group of the Syrian study population

Mean number of years of education						
Age Group (years)	Men		Women		Both Sexes	
	n	Mean	n	Mean	n	Mean
18-44	452	7.0	702	6.3	1154	6.6
45-69	304	6.0	267	3.1	571	4.6
18-69	756	6.6	969	5.4	1725	6.0

Survey results showed that about 51.5% of the population had no formal schooling or had not completed primary school, 27.0% had completed primary school, 13.8% had completed secondary school, 5.5% had completed high school, 2.0% had completed college or university and 0.2% had completed a postgraduate degree (Table 23).

Table 23: Highest level of education, by age group of the Syrian study population

Highest level of education								
Age Group (years)	Both Sexes							
	n	% No formal schooling	% Less than primary school	% Primary school completed	% Secondary school completed	% High school completed	% College/ University completed	% Post graduate degree completed
18-44	1378	17.7	27.4	30.8	15.5	6.2	2.1	0.3
45-69	686	37.6	26.7	19.4	10.3	4.2	1.7	0.0
18-69	2064	24.3	27.2	27.0	13.8	5.5	2.0	0.2

About 82.0% of the survey respondents were married, 7.8% had never been married, 6.6% were widowed, and 1.9% were divorced (Table 24). The proportion of individuals that had never been married was higher among men (12.4%) than women (4.6%) and the proportion of people widowed was seven times higher among women (10.3%) than among men (1.4%).

Table 24: Marital status, by age group of the Syrian study population

Marital status							
Age Group (years)	Both Sexes						
	n	% Never married	% Currently married	% Separated	% Divorced	% Widowed	% Cohabiting
18-44	1413	11.0	82.4	1.0	1.8	3.6	0.1
45-69	710	1.3	82.8	1.1	2.1	12.7	0.0
18-69	2123	7.8	82.6	1.0	1.9	6.6	0.0

Of the Syrian survey respondents, 20.0% were employed (42.2% men and 5.1% women). The survey results show that of the 20.0% employed individuals, 0.1% of respondents were government employees, 13.8% were not government employees and 6.1% were self-employed (Table 25). Men were predominantly employed in non-governmental institutions and organizations (28.2%) or were self-employed (14.0%).

Table 25: Employment status, by age group of the Syrian study population

Employment status					
Age Group (years)	Both Sexes				
	n	% Government employee	% Non-government employee	% Self-employed	% Unpaid
18-44	1373	0.1	15.8	7.0	77.1
45-69	690	0.1	9.9	4.2	85.8
18-69	2063	0.1	13.8	6.1	80.0

3.2.2. Tobacco Use

The survey participants were asked about their current smoking status, previous smoking experience, the age they started smoking, duration of smoking, the quantity of tobacco smoked daily, use of smokeless tobacco, types of tobacco products used, and duration of exposure to second-hand smoke.

The percentage of current smokers (daily and non-daily smokers) of all tobacco products among all respondents was 31.1% (95% CI: 27.9–34.3). There were more male smokers (54.9%) among the respondents than female (13.3%) (Table 26). The proportion of current daily and non-daily smokers was higher in the older age group (Figure 48).

Table 26: Percentage of current smokers, by sex and age group of the Syrian study population

Percentage of current smokers									
Age Group (years)	Men			Women			Both Sexes		
	n	% Current smoker	95% CI	n	% Current smoker	95% CI	n	% Current smoker	95% CI
18-44	530	55.7	50.7-60.7	888	11.6	7.9-15.2	1418	30.1	26.5-33.7
45-69	346	52.1	44.0-60.1	370	20.6	15.4-25.8	716	34.9	29.9-39.9
18-69	876	54.9	50.1-59.7	1258	13.3	9.8-16.7	2134	31.1	27.9-34.3

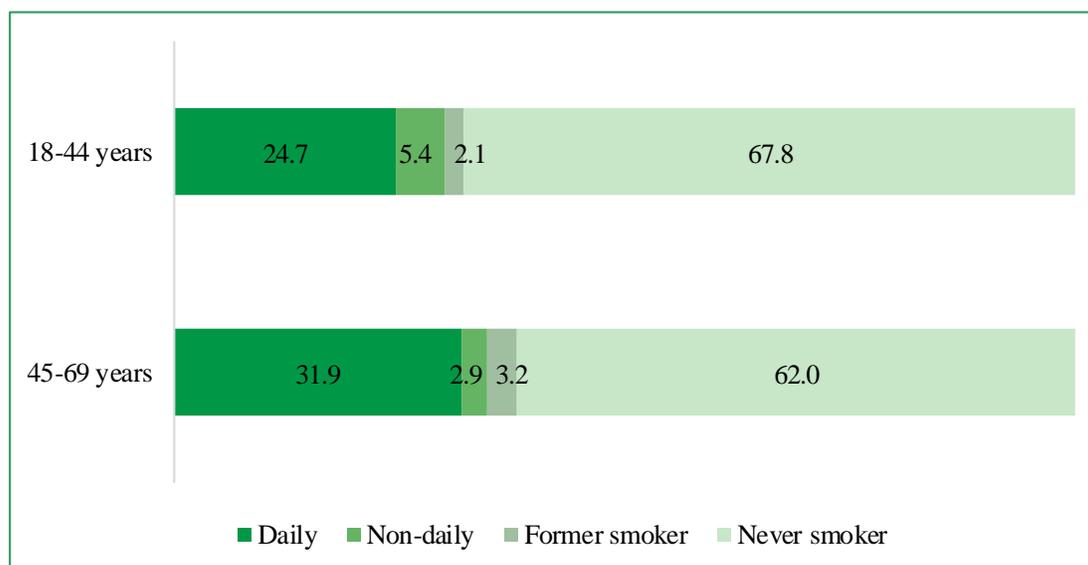


Figure 48: Smoking status, by age group of the Syrian study population

Among all current smokers of both sexes, 84.1% smoked daily. The proportion of daily smokers among men was 87.9%, which was higher than that of women (72.3%), and the population group with the highest prevalence of daily smokers was men aged 45–69 years (94.4%) (Figure 49).

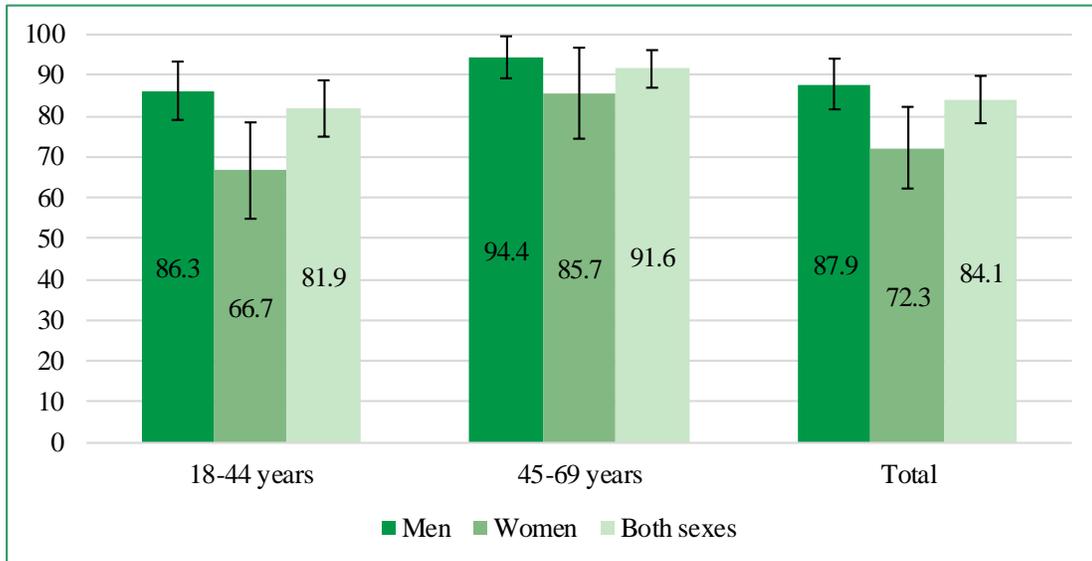


Figure 49: Percentage of current daily smokers among smokers, by sex and age group of the Syrian study population

The mean age for smoking initiation was at 19.3 years, yet women started at an older age compared to men (mean age = 18.1 years for men vs. 23.4 years for women). There was almost no difference between the age groups among both sexes in terms of the mean age of starting smoking and it varied from 18.7 years old in the age group 18–44 years to 21.3 years old in the age group 45–69 years (Figure 50). The mean duration of smoking for the smoker participants was 17.4 years. The older age group had a longer mean duration of smoking, 32.3 years compared to 12.7 years for the younger age group. The majority of smokers (93.9%) smoked manufactured cigarettes (Figure 51).

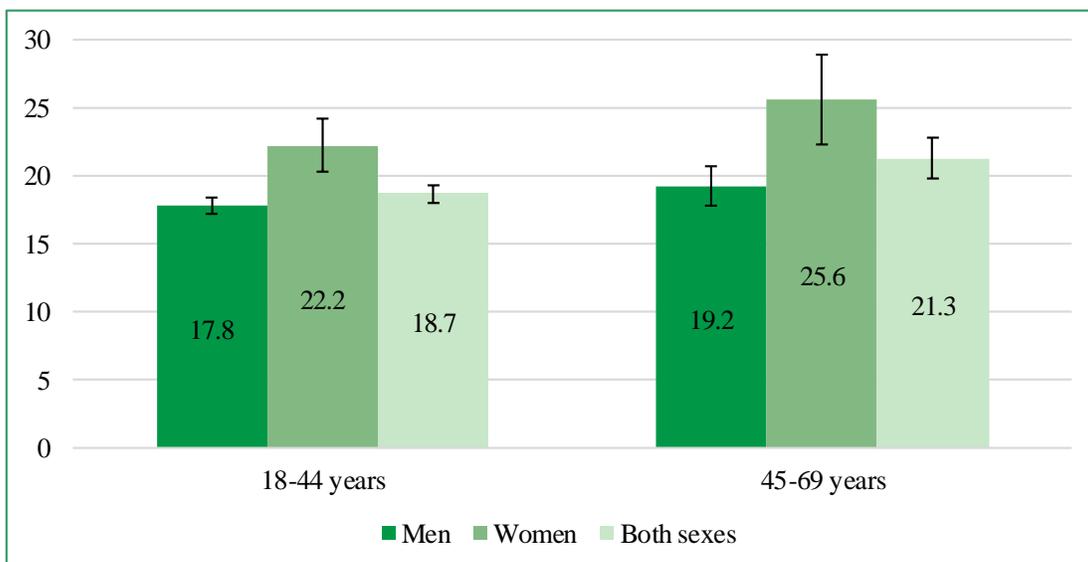


Figure 50: Mean age of starting smoking, by sex and age group of the Syrian study population

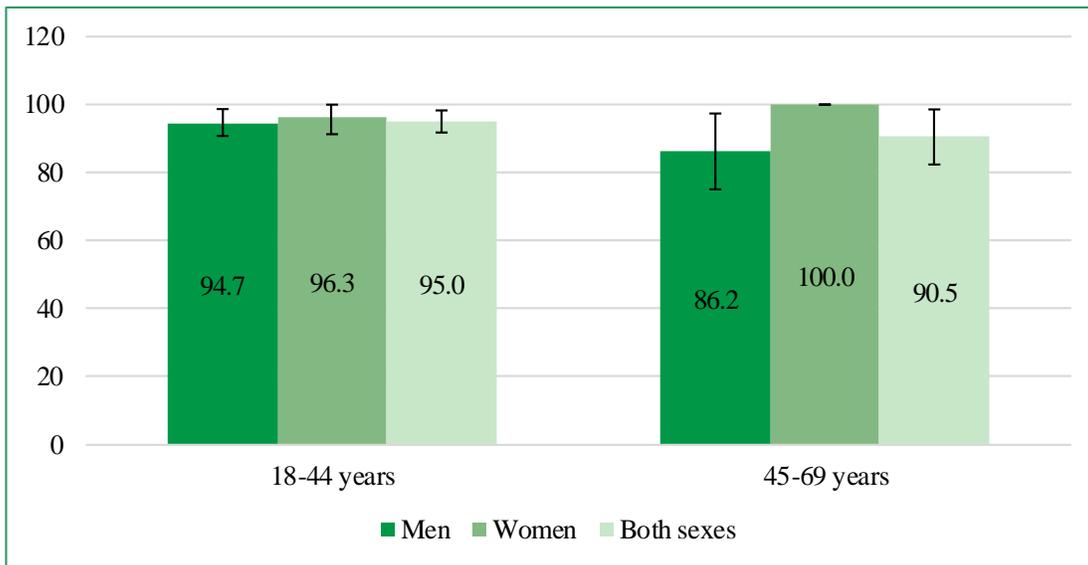
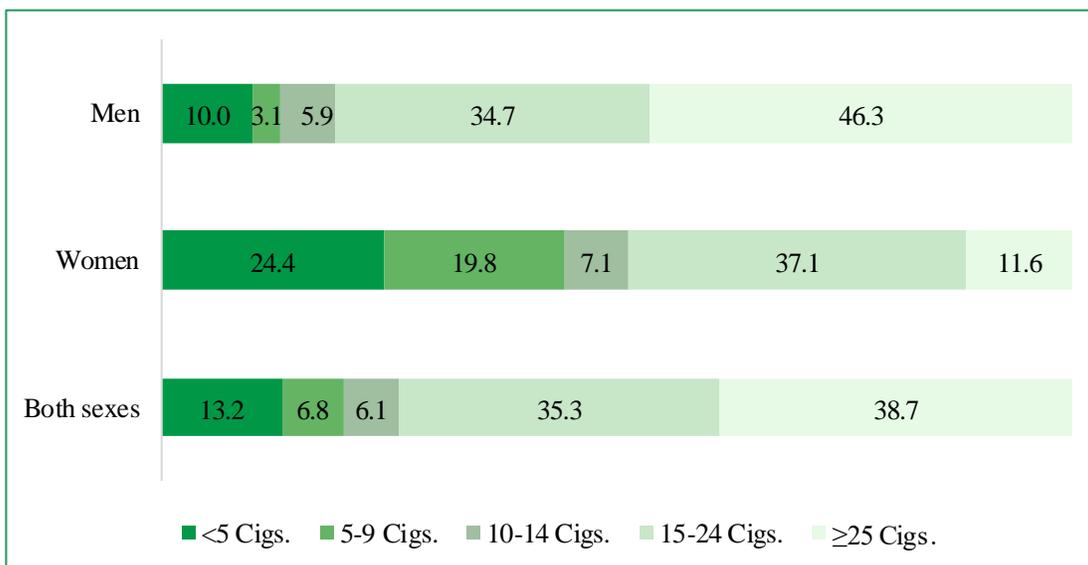


Figure 51: Percentage of smokers who use manufactured cigarettes among daily smokers, by sex and age group of the Syrian study population

The majority of daily smokers (80.1%) smoked over 10 cigarettes per day (Figure 52). The highest percentage of male daily smokers smoked more than 25 cigarettes per day (46.3%, 95% CI: 36.3–56.2), compared with 37.1% of women (95% CI: 26.0–48.2) that smoked 15–24



cigarettes per day.

Figure 52: Distribution of daily smokers by quantity of manufactured or hand-rolled cigarettes smoked per day, by sex of the Syrian study population

Of the total number of currently smoking respondents, about 25.2% had tried to stop smoking during the last year (24.4% of men (95% CI: 17.8–30.9) and 27.6% of women (95% CI: 18.7–36.6)) (Figure 53). Approximately, 42.6% of male respondents (95% CI: 33.6–51.5) and 31.0% of females (95% CI: 22.2–39.8) among smokers who had visited a doctor or other health worker in the past 12 months had been advised to stop smoking.

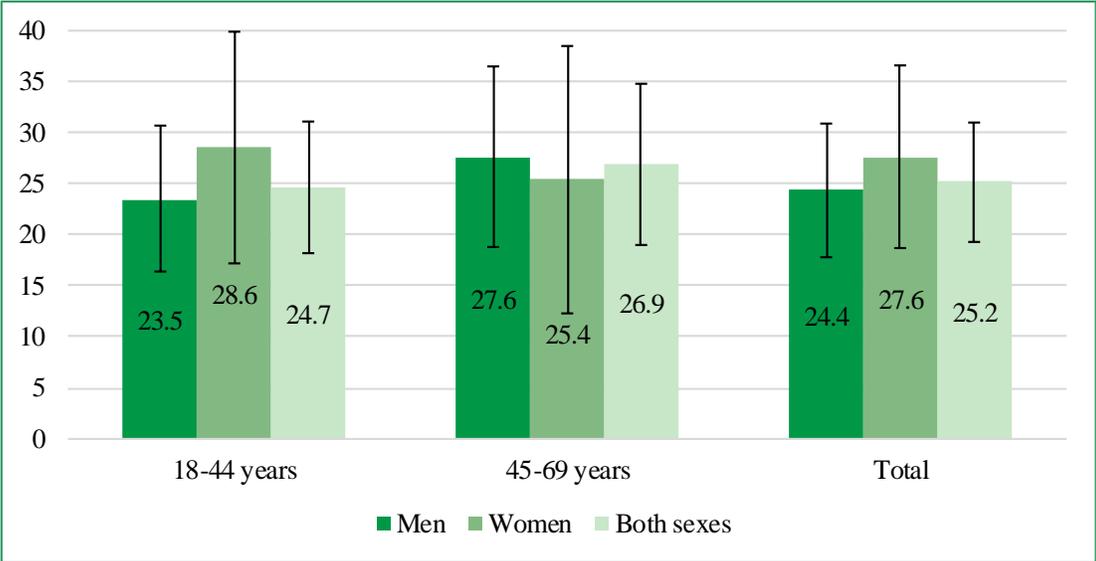


Figure 53: Percentage of current smokers who had tried to stop smoking during the past 12 months, by sex and age group of the Syrian study population

About 51.9% of respondents in the study population were exposed to second-hand smoke at home. Contrary to expectations, men were more exposed than women (60.4% vs. 45.7%) (Figure 54). The distribution of second-hand smoking at work was 60.6% for men (95% CI: 54.0–67.2) and 39.8% for women (95% CI: 31.5–48.1) (Figure 55).

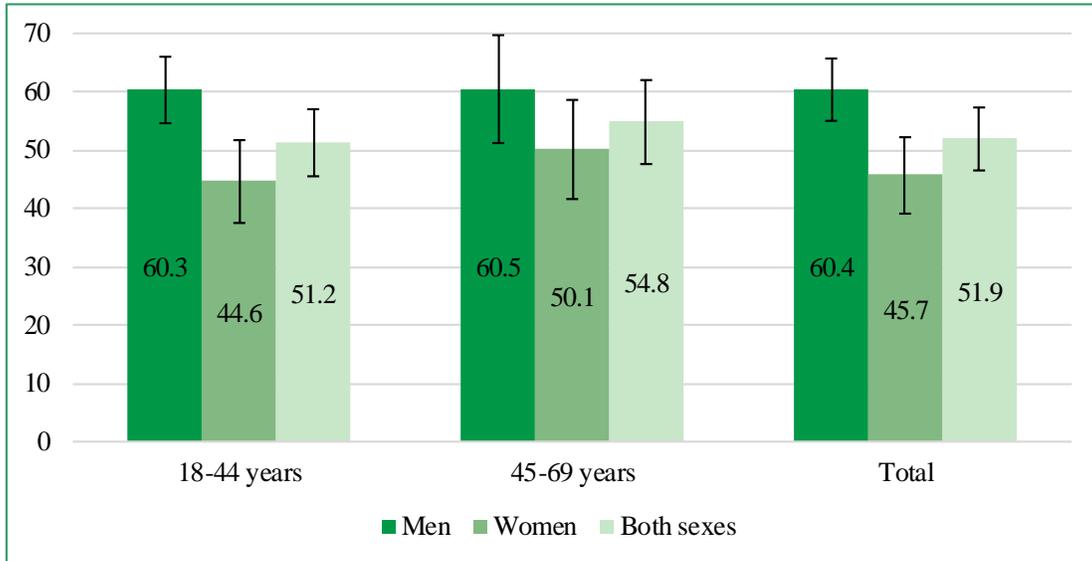


Figure 54: Percentage of respondents exposed to second-hand smoke in the home during the past 30 days, by sex and age group of the Syrian study population

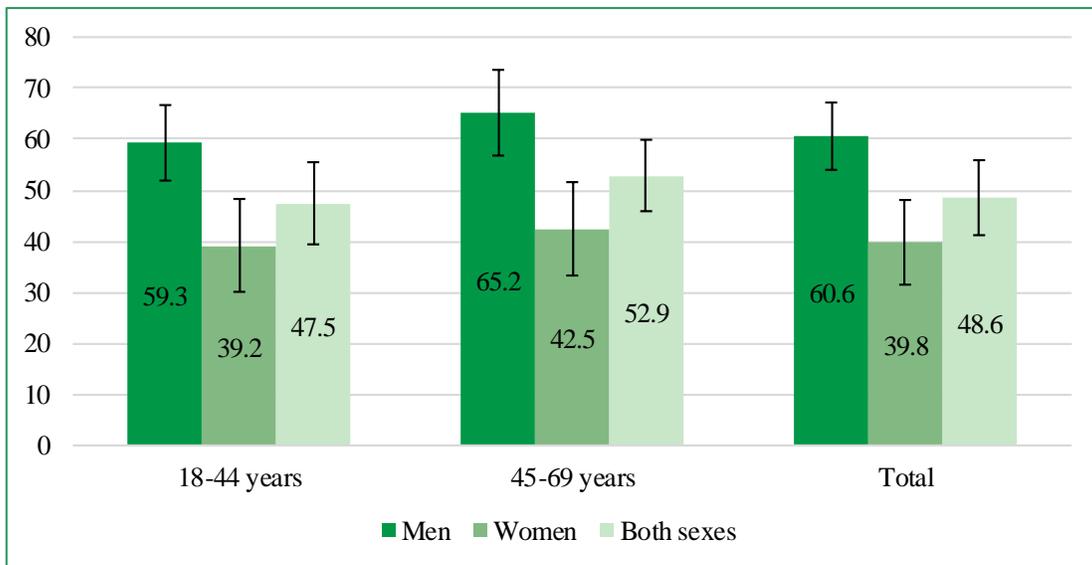


Figure 55: Percentage of respondents exposed to second-hand smoke in the workplace during the past 30 days, by sex and age group of the Syrian study population

3.2.3. Alcohol Consumption

Alcohol consumption patterns, frequency of alcohol drinking and risks associated with alcohol consumption were studied according to the sex and age of the survey respondents.

Among all respondents in the age group 18–69 years, 1.8% (95% CI: 0.6–3.0) had consumed alcohol during the past 30 days. The proportion of males (3.1%, 95% CI: 0.9–5.2) was higher than that of females (0.9%, 95% CI: 0.0–2.0) (Figure 56).

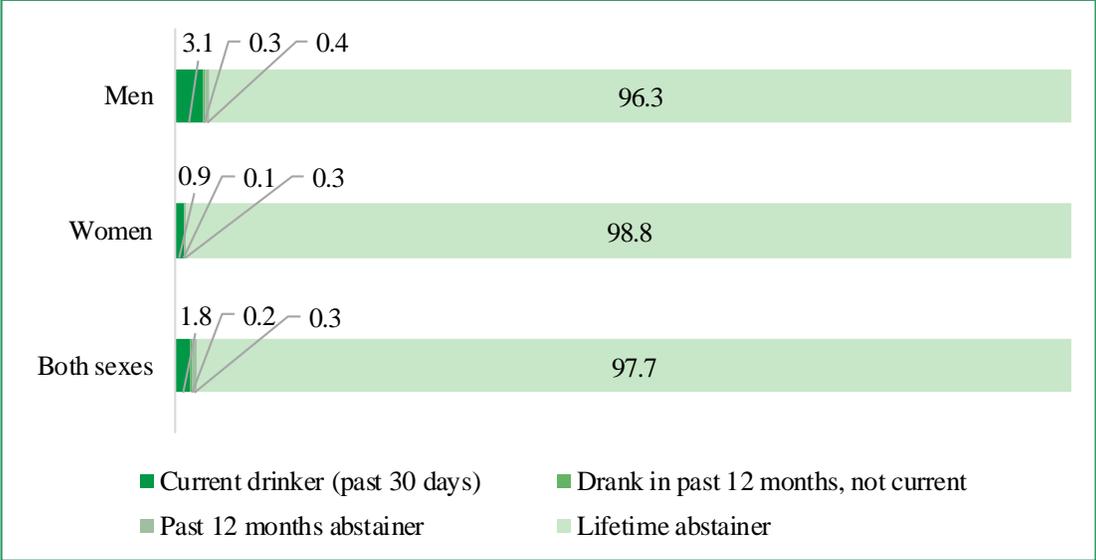


Figure 56: Alcohol consumption status, by sex of the Syrian study population

The alcohol consumption pattern was further analyzed by elucidating the frequency of drinking in the past 30 days and the number of standard drinks per drinking occasion. In the past 30 days current alcohol drinkers had consumed alcohol on average on 3.0 occasions (95% CI: 2.1–3.8), with men attesting to 3.3 occasions (95% CI: 2.3–4.3) and women to 2.1 occasions (95% CI: 0.6–3.6) (Figure 57).

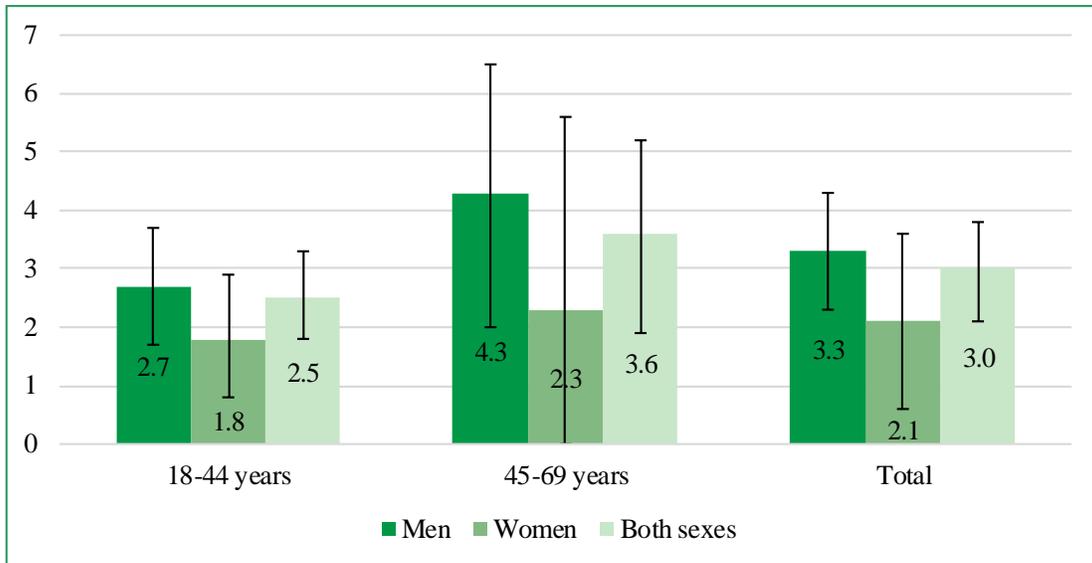
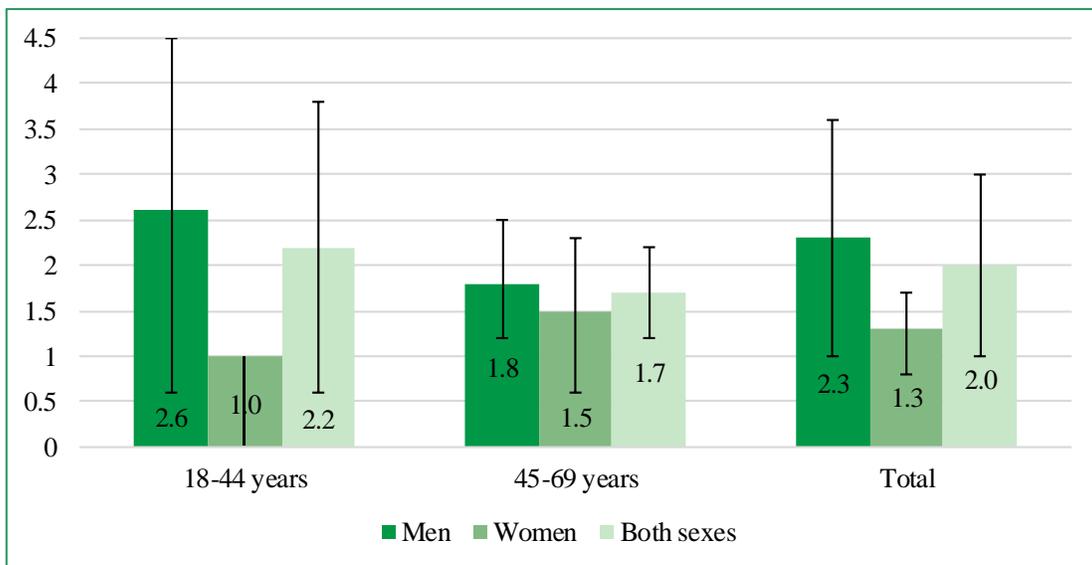


Figure 57: Mean number of drinking occasions in the past 30 days among current (past 30 days) drinkers, by sex and age group of the Syrian study population

Current drinkers consumed on average 2.0 drinks per drinking occasion (95% CI: 1.0–3.0), with men consuming 2.3 drinks (95% CI: 1.0–3.6) and women consuming 1.3 drinks (95% CI: 0.8–1.7). In both age groups men consumed more standard drinks per drinking occasion than women



(Figure 58).

Figure 58: Mean number of standard drinks per drinking occasion among current (past 30 days) drinkers, by sex and age group of the Syrian study population

The risk associated with alcohol consumption was assessed in current (past 30 days) drinkers based on the average amount of alcohol consumed per drinking occasion in the past 30 days. Results showed that 74.3% of all current drinkers (95% CI: 58.5–90.0) had a low risk associated

with alcohol consumption; 21.7% (95% CI: 7.4–36.0) had a medium risk; and 4.0% (95% CI: 1.6–6.4) had a high risk (Table 27).

Table 27: High-, intermediate-, and low-volume drinking levels among current (past 30 days) drinkers, by sex and age group of the Syrian study population

High-end, intermediate, and lower-end level drinking among current (past 30 days) drinkers							
Age Group (years)	Both sexes						
	n	% high-end	95% CI	% intermediate	95% CI	% lower-end	95% CI
18-44	12	7.2	2.9-11.4	19.0	7.7-30.2	73.9	58.3-89.4
45-69	23	0.0	0.0-0.0	25.2	2.0-48.4	74.8	51.6-98.0
18-69	35	4.0	1.6-6.4	21.7	7.4-36.0	74.3	58.5-90.0

Among the survey respondents, 1.4% of men (95% CI: 0.1–2.7) but none of the women reported having consumed six or more drinks on a single occasion at least once during the last 30 days. It is alarming that the proportion of people reporting this experience is higher for the men in the younger age group (Figure 59).

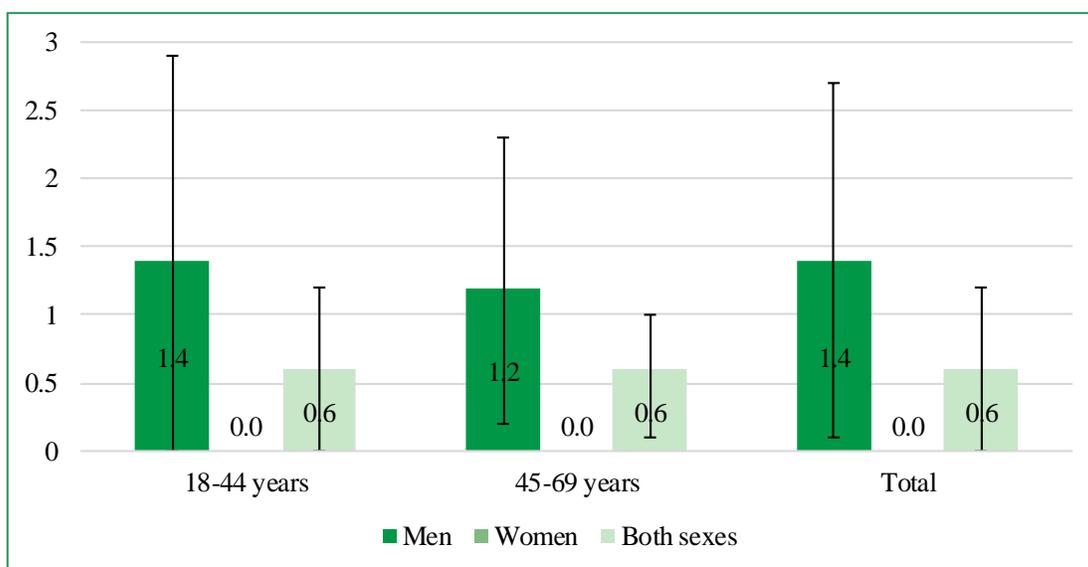


Figure 59: Consumption of six or more drinks on a single occasion at least once during the past 30 days among total population, by sex and age group of the Syrian study population

Only 2.9% (95% CI: 0.0–6.8) of the current (past 30 days) male drinkers reported consuming unrecorded alcohol (homebrewed alcohol, alcohol brought across the Lebanese border, alcohol not intended for drinking or other untaxed alcohol) during the past seven days. None of the women reported having consumed any type of unrecorded alcohol (Table 28).

Table 28: Consumption of unrecorded alcohol, by sex and age group of the Syrian study population

Consumption of unrecorded alcohol

Age Group (years)	Men			Women			Both Sexes		
	n	% consuming unrecorded alcohol	95% CI	n	% consuming unrecorded alcohol	95% CI	n	% consuming unrecorded alcohol	95% CI
18-44	10	0.0	0.0-0.0	0	0.0	0.0-0.0	12	0.0	0.0-0.0
45-69	17	7.5	0.0-17.2	0	0.0	0.0-0.0	23	4.8	0.0-11.7
18-69	27	2.9	0.0-6.8	0	0.0	0.0-0.0	35	2.1	0.0-5.0

3.2.4. Unhealthy Diet

Consumption of fruit and vegetables was assessed in the survey population by sex and age. The mean number of days on which Syrian respondents consumed fruits and vegetables in a typical week were respectively 3.5 days (95% CI: 3.3–3.7) and 4.1 days (95% CI: 3.9–4.4). Among the different age-sex groups, the mean number of days were almost equivalent (Table 29). As for the average number of servings of fruits and vegetables consumed per day were respectively 0.9 servings (95% CI: 0.8–1.0) and 1.1 servings (95% CI: 1.0–1.2) (Table 30).

Table 29: Mean number of days on which fruits and vegetables were consumed in a typical week, by sex and age group of the Syrian study population

Mean number of days fruit consumed in a typical week									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of days	95% CI	n	Mean number of days	95% CI	n	Mean number of days	95% CI
18-44	499	3.5	3.2-3.8	777	3.6	3.3-3.9	1276	3.6	3.3-3.8
45-69	324	3.0	2.6-3.3	328	3.4	3.0-3.7	652	3.2	2.9-3.5
18-69	823	3.4	3.2-3.7	1105	3.5	3.3-3.8	1928	3.5	3.3-3.7
Mean number of days vegetables consumed in a typical week									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of days	95% CI	n	Mean number of days	95% CI	n	Mean number of days	95% CI
18-44	489	4.2	3.9-4.5	767	4.3	4.0-4.6	1256	4.2	4.0-4.5
45-69	322	3.6	3.2-4.0	327	4.0	3.6-4.4	649	3.8	3.5-4.2
18-69	811	4.1	3.8-4.3	1094	4.2	4.0-4.5	1905	4.1	3.9-4.4

Table 30: Mean number of servings of fruit and vegetables on average per day, by sex and age group of the Syrian study population

Mean number of servings of fruit on average per day									
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Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI
18-44	484	1.0	0.8-1.1	754	0.9	0.7-1.0	1238	0.9	0.8-1.0
45-69	319	0.8	0.6-0.9	323	1.0	0.7-1.3	642	0.9	0.7-1.1
18-69	803	0.9	0.8-1.1	1077	0.9	0.8-1.0	1880	0.9	0.8-1.0
Mean number of servings of vegetables on average per day									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI
18-44	475	1.2	1.0-1.4	753	1.1	0.9-1.2	1228	1.1	1.0-1.3
45-69	316	0.9	0.8-1.0	321	1.2	0.9-1.5	637	1.1	0.9-1.2
18-69	791	1.2	1.0-1.3	1074	1.1	1.0-1.2	1865	1.1	1.0-1.2

The majority of respondents (57.2%) of both sexes consumed one to two servings of fruit and/or vegetables per day (54.5% of men and 59.3% of women). About 25.5% of the study population reported not consuming fruit or vegetables at all (Figure 60).

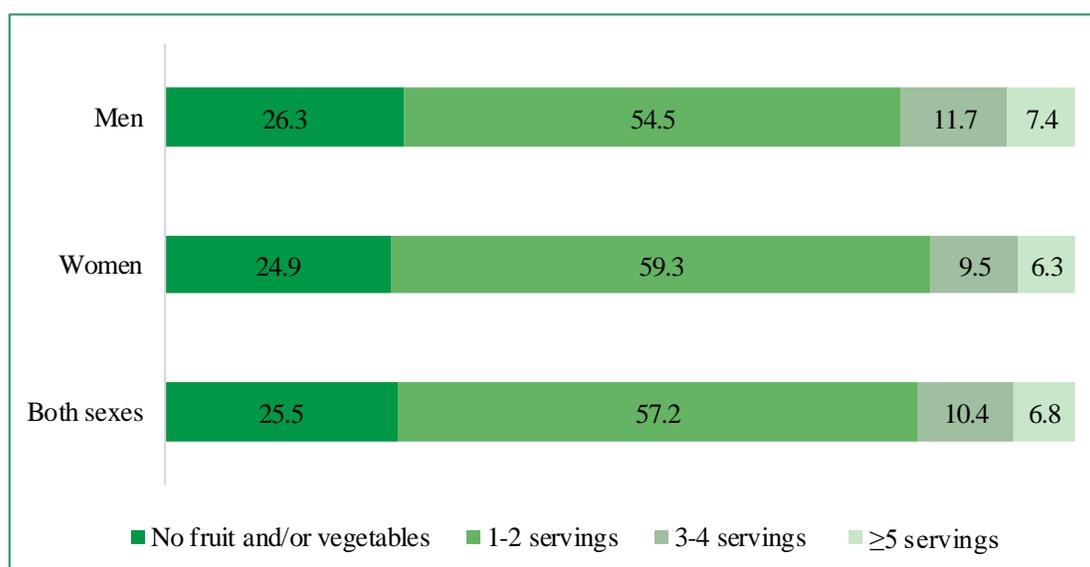


Figure 60: Distribution of respondents by number of servings of fruit and/or vegetables per day, by sex of the Syrian study population

Consumption of salt was analysed in the study population by asking the individuals that were interviewed questions regarding the frequency, quantity and type of salt used in their household, their cooking habits and their attitude towards dietary salt. The majority of respondents of all ages (19.3%, (95% CI: 15.5–23.1)) add salt always or often before eating or when eating, with

substantial difference between sexes. Consumption of iodized salt was found to decrease with age (Figure 61).

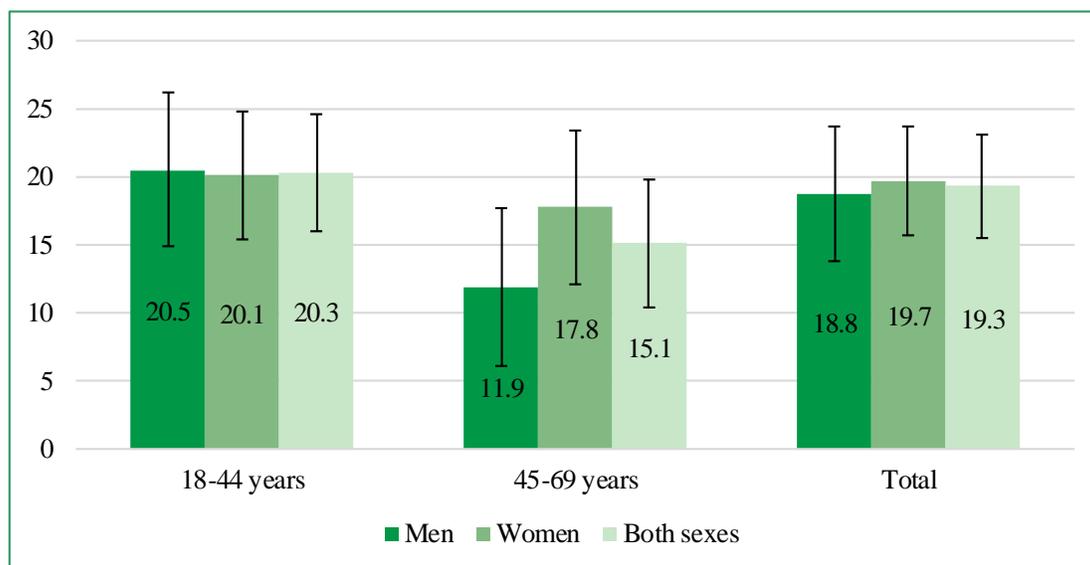


Figure 61: Percentage of respondents who always or often add salt or salty sauce to their food before eating or as they are eating, by sex and age group of the Syrian study population

A total of 26.2% of respondents mentioned that they added salt always or often when cooking or preparing food at home. The percentage of men was lower than that of women (25.8%, 95% CI: 20.1–31.4 vs. 26.5%, 95% CI: 21.5–31.4) (Table 31).

Table 31: Percentage of respondents always or often adding salt when cooking or preparing food at home, by sex and age group of the Syrian study population

Add salt always or often when cooking or preparing food at home									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
18-44	501	28.0	21.5-34.6	862	27.2	21.7-32.6	1363	27.5	22.6-32.4
45-69	333	17.1	10.9-23.4	357	23.4	16.6-30.1	690	20.6	14.8-26.3
18-69	834	25.8	20.1-31.4	1219	26.5	21.5-31.4	2053	26.2	21.6-30.8

Respondents were asked how often they consumed processed food high in salt. Among all survey participants, 10.8% (95% CI: 7.5–14.2) gave an affirmative answer. The percentage of men (12.1%, 95% CI: 8.0–16.2) who reported eating processed food high in salt was higher than that of women (9.9%, 95% CI: 6.2–13.6). The proportion of respondents eating such foods decreased with age (Figure 62).

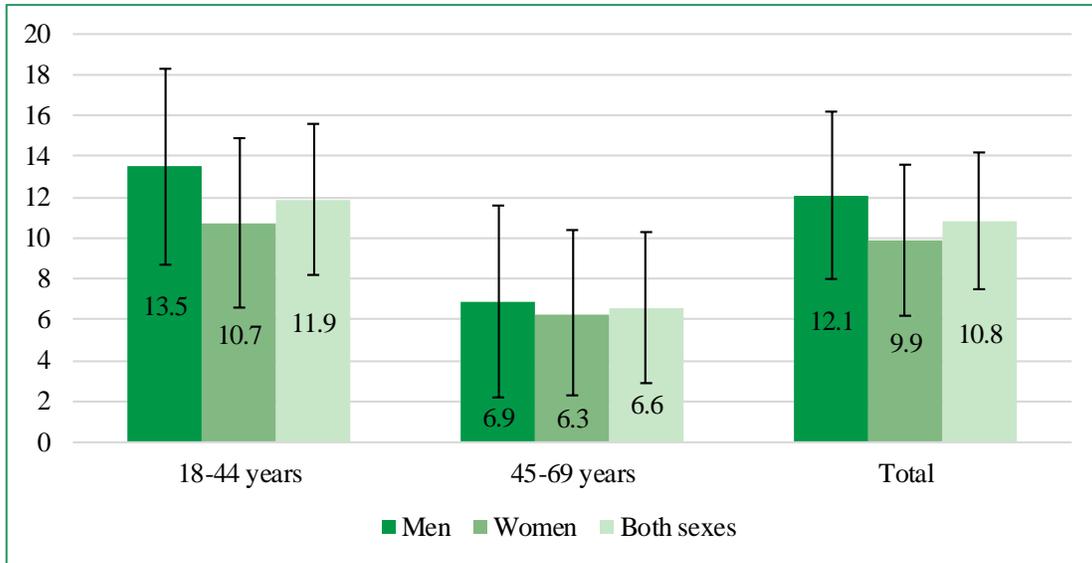


Figure 62: Percentage of respondents who always or eating processed foods high in salt, by sex and age group of the Syrian study population

Only 13.8% of all respondents believed that they consume too much and far too much salt. The percentage of men with this perception was higher than that of women. The proportion of women who thought they consume too little and far too little (32.0%) was almost equal to that of men (31.0%), while the percentages of those using (in their opinion) “just the right amount” was 54.6% for both sexes (Figure 63).

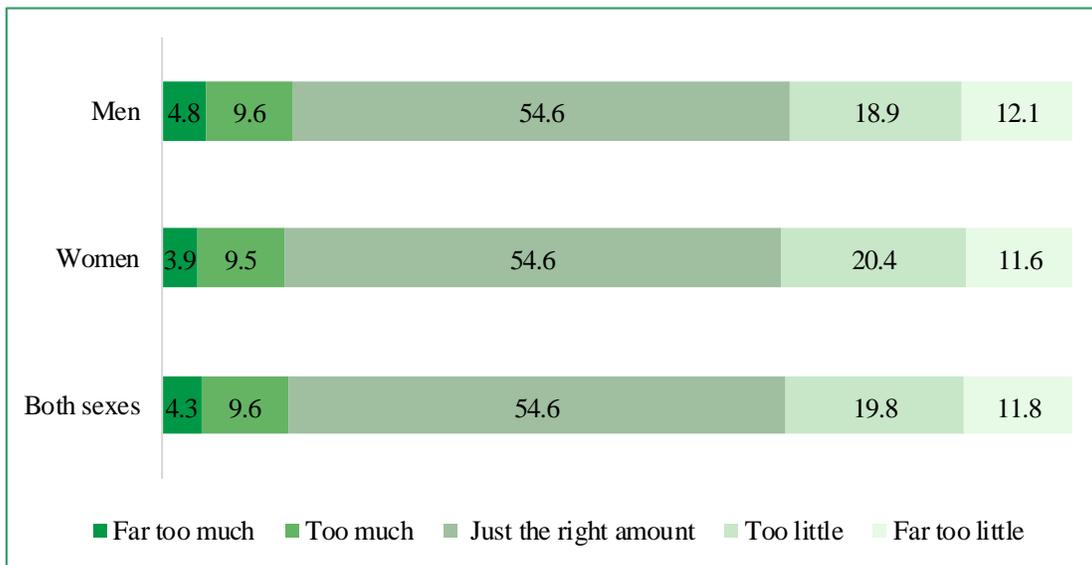


Figure 63: Self-reported quantity of salt consumed, by sex of the Syrian study population

Although half (47.6%) of the respondents were aware that salt can cause serious health problems (Table 32), only 14.0% of them considered lowering salt in diet to be very important; 60.4% thought this was somewhat important; and 25.5% thought it was not at all important. The

proportion of women who considered lowering salt in their diet to be very or somewhat important was higher (76.9%) than that of men (70.7%) (Figure 64).

Table 32: Percentage of respondents thinking that consuming too much salt could cause serious health problems, by sex and age group of the Syrian study population

Think consuming too much salt could cause serious health problem									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
18-44	530	43.8	35.4-52.1	888	48.1	42.0-54.2	1418	46.3	40.6-52.0
45-69	346	55.6	47.3-64.0	370	51.3	42.5-60.1	716	53.3	46.1-60.4
18-69	876	46.3	38.6-53.9	1258	48.7	43.1-54.3	2134	47.6	42.3-53.0

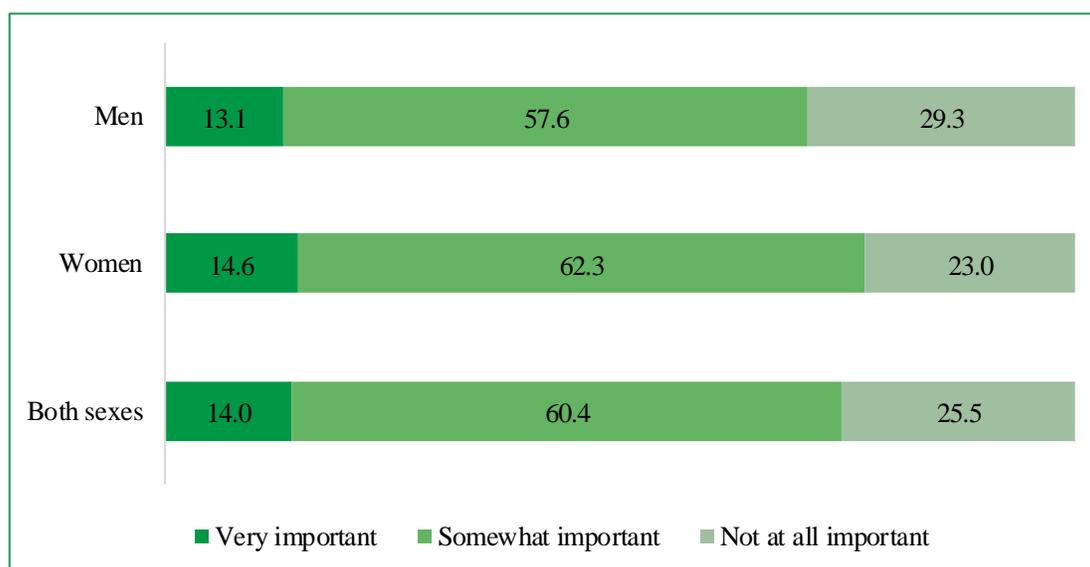


Figure 64: Importance of lowering salt in diet, by sex of the Syrian study population

Respondents were asked what actions they took to control salt intake on a regular basis. The analysis showed that 39.7% of the study population undertook actions to limit their consumption of processed foods high in salt. A difference was identified between sexes: 43.2% (95% CI: 35.5–50.8) for women and 35.1% (95% CI: 29.5–40.6) for men. Only 14.8% (95% CI: 9.4–20.3) of respondents mentioned that they looked at the salt or sodium content on food labels, and 9.6% of them (95% CI: 5.2–13.9) affirmed that they bought low-salt/sodium alternatives (Figure 65).

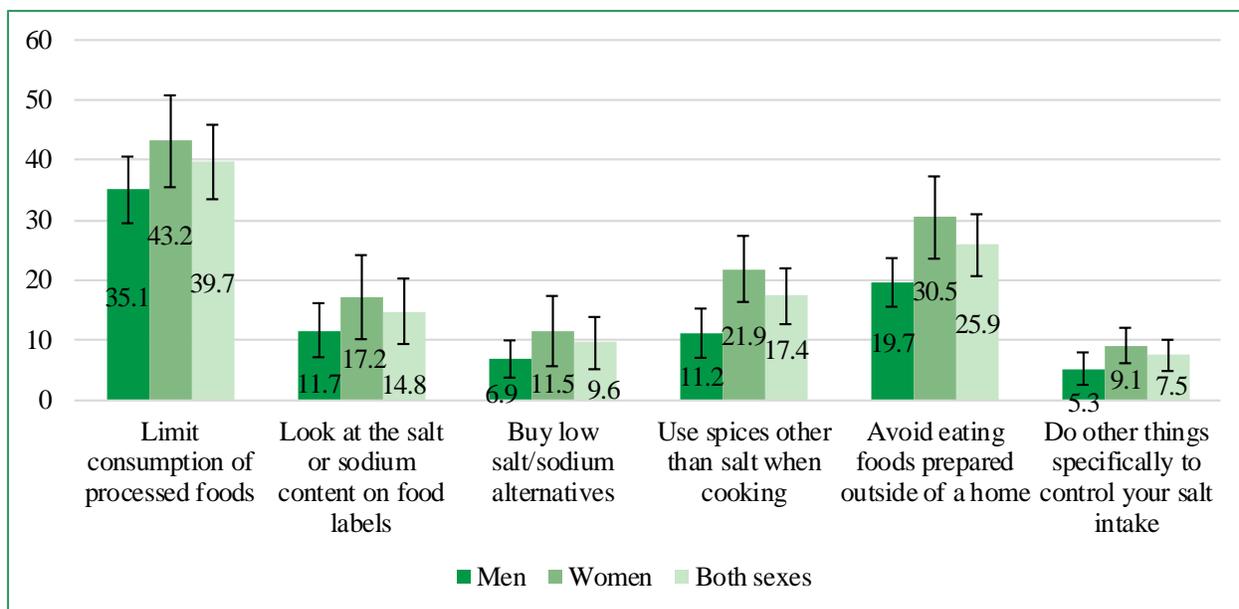


Figure 65: Percentage of respondents taking specific action to control salt intake, by sex of the Syrian study population

On average, the number of reported meals eaten outside the home was 1.2 for both sexes and across all ages (95% CI: 0.8–1.5), 1.4 meals (95% CI: 1.0–1.8) for men and 1.0 meal for women (95% CI: 0.7–1.4). There was a difference between age groups, with an average of 1.3 meals eaten outside the home in the age group 18–44 years, and 0.7 meals for the age group 45–69 years (Figure 66).

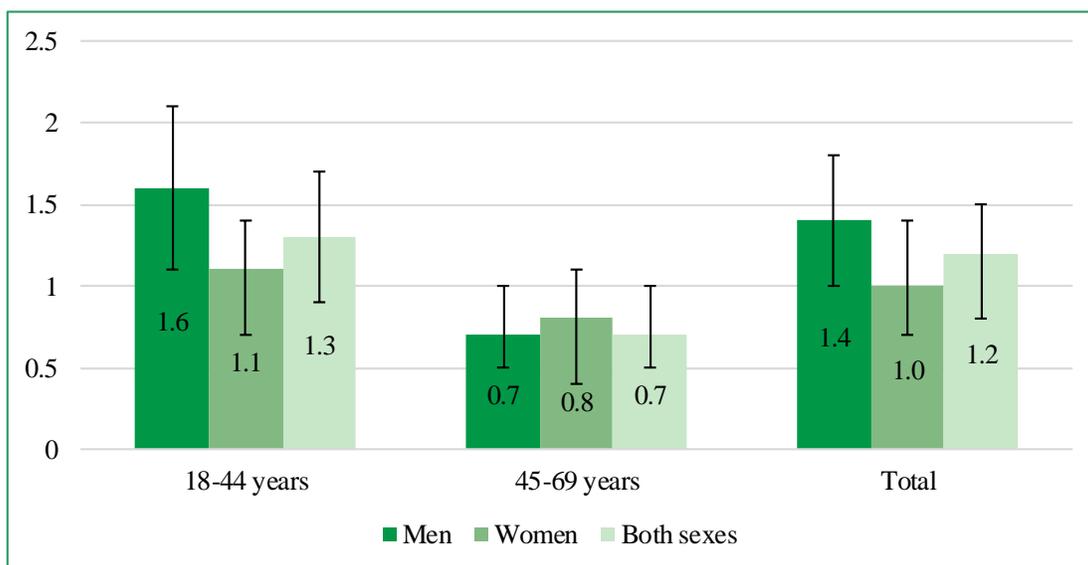


Figure 66: Mean number of meals eaten outside the home, by sex and age group of the Syrian study population

3.2.5. Physical Activity

Physical activity in the study population was analyzed using continuous indicators, such as time spent participating in different physical activities, as well as categorical indicators, such as cut-off points for specific amounts of physical activity. Total physical activity per day was recorded, taking into account all domains (work-, transport- and recreation-related activities). Analysis of the collected data showed that two thirds (61.7%, 95% CI: 56.1–67.4) of the Syrian individuals in the study population did not meet WHO recommendations on physical activity (Figure 67).

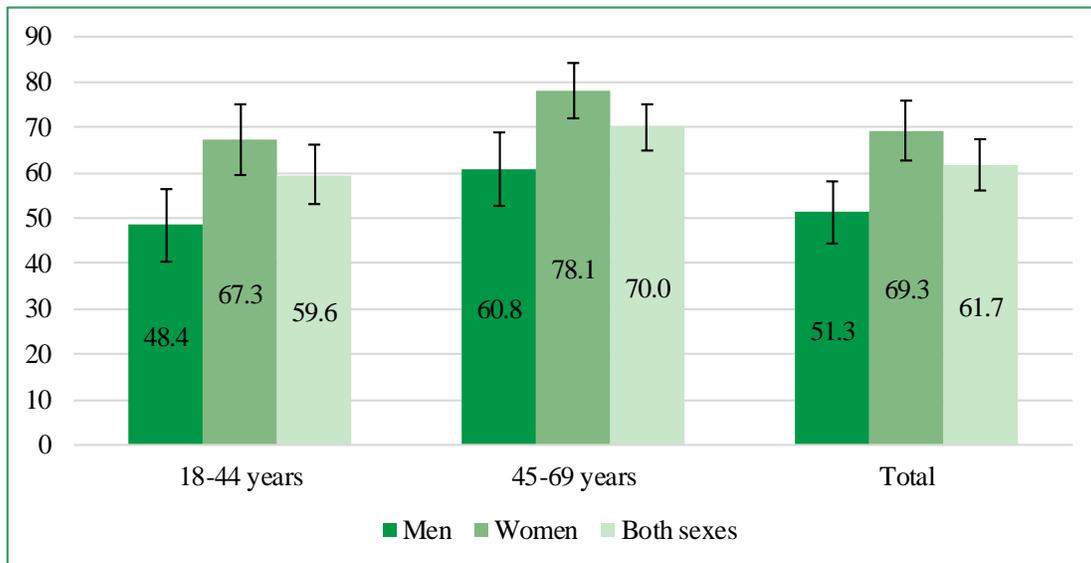


Figure 67: Proportion of respondents not meeting WHO recommendations on physical activity for health, by sex and age group of the Syrian study population

According to WHO recommendations, 68.6% of the study population fell into the low level of physical activity category; 13.7% were attributed to the moderate-level activity group; and 17.6% were in the high level of activity group. The difference was recorded between the sexes, with 58.3% of men (95% CI: 51.9–64.7) and 76.1% of women (95% CI: 70.3–81.9) in the low-level activity group, while 25.2% of men (95% CI: 20.1–30.3) and 12.2% of women (95% CI: 7.4–17.0) were in the high-level activity category (Figure 68).

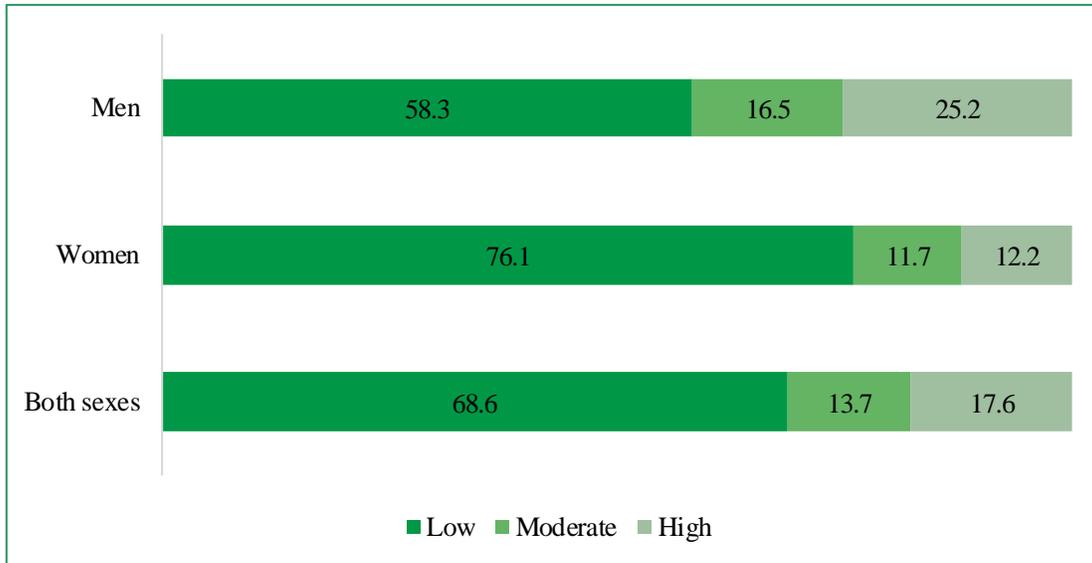


Figure 68: Level of total physical activity according to WHO recommendations, by sex of the Syrian study population

Respondents aged 18–69 years carried out an average of 81.8 minutes of physical activity per day, with a difference between men (131.0 minutes, 95% CI: 94.9–167.1) and women (46.2 minutes, 95% CI: 23.9–68.5) (Figure 69).

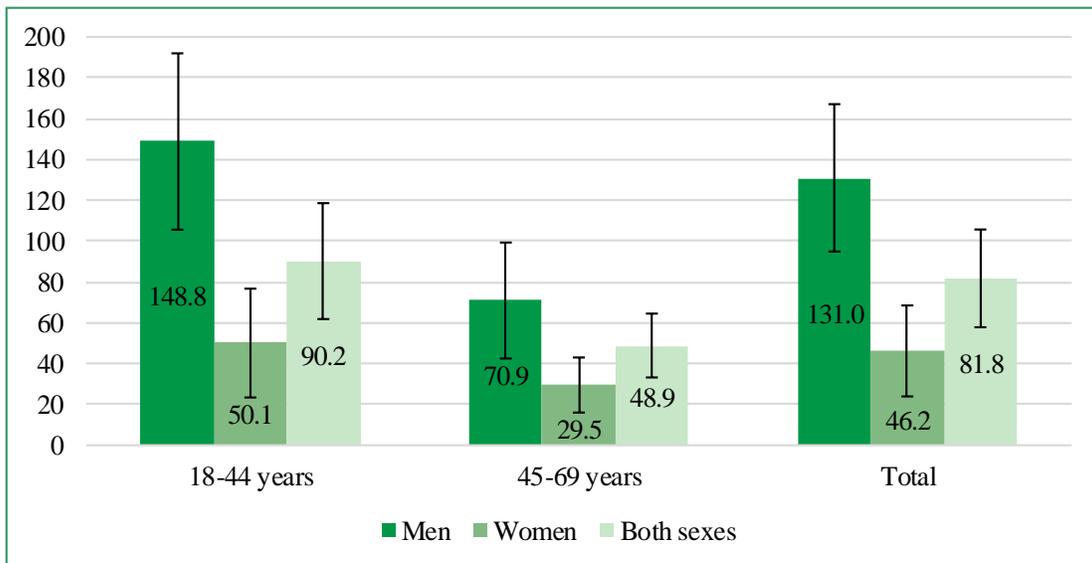


Figure 69: Mean minutes of total physical activity per day, by sex and age group of the Syrian study population

In terms of the amount of time spent on physical activity, the greatest differences between sexes were found in work-related activities (Figure 70).

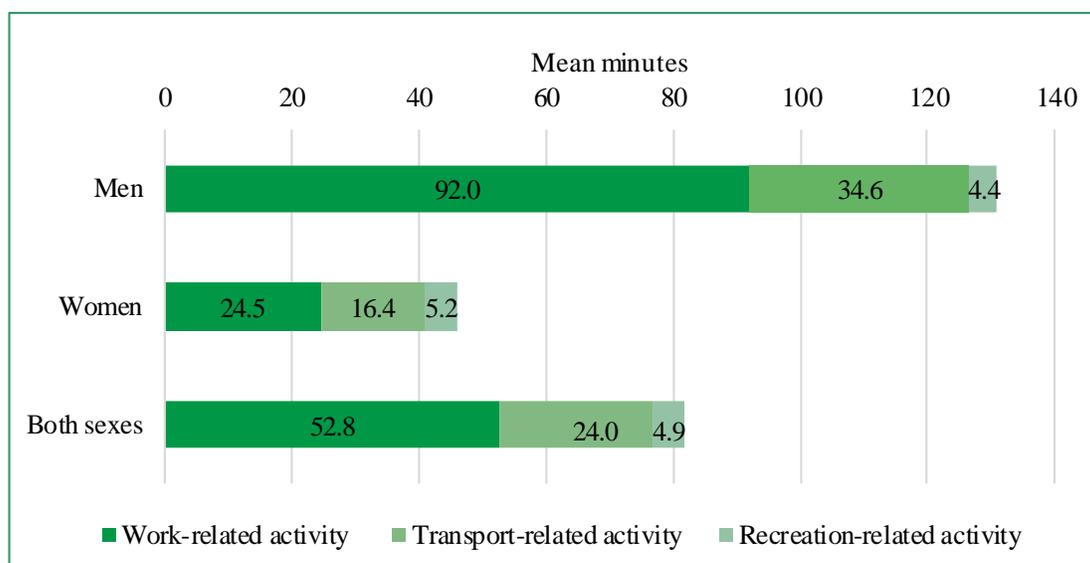


Figure 70: Mean minutes of physical activity per day, by type of activity and sex of the Syrian study population

3.2.6. History of Raised Blood Pressure

Respondents were asked whether they had ever undergone blood pressure measurement and whether they had been diagnosed with high blood pressure. Among all age groups, 55.6% reported that their blood pressure had never been measured; 33.5% had undergone blood pressure measurement but had not been diagnosed with hypertension; 2.5% had been diagnosed with high blood pressure more than a year before; and 8.4% had been diagnosed with hypertension within the 12 months prior to the interview.

A total of 62.3% of men (95% CI: 55.7–68.9) had never had their blood pressure measured, compared with 50.6% of women (95% CI: 45.5–55.7). The percentage of women diagnosed with high blood pressure during the previous 12 months was higher (10.2%, 95% CI: 7.5–12.9) than that of men (6.0%, 95% CI: 4.2–7.8) (Figure 71).

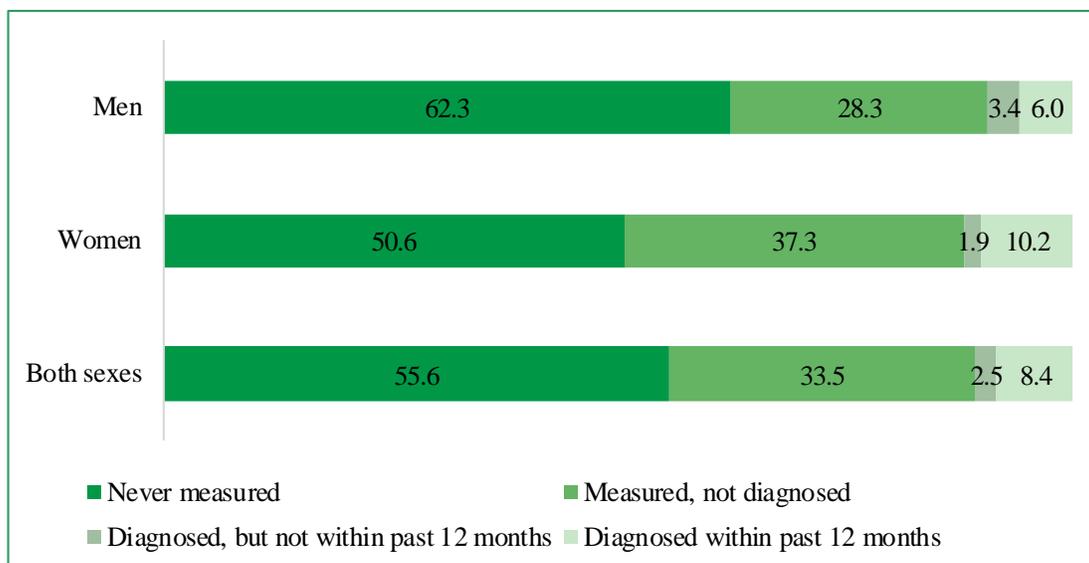


Figure 71: Blood pressure measurement and diagnosis, by sex of the Syrian study population

Of all respondents aged 18–69 years diagnosed with high blood pressure, 63.4% were taking medication prescribed by a doctor or health worker, with 40.3% (95% CI: 26.4–54.3) aged 18–44 years and 81.2% (95% CI: 73.4–89.0) aged 45–69 years (Figure 72).

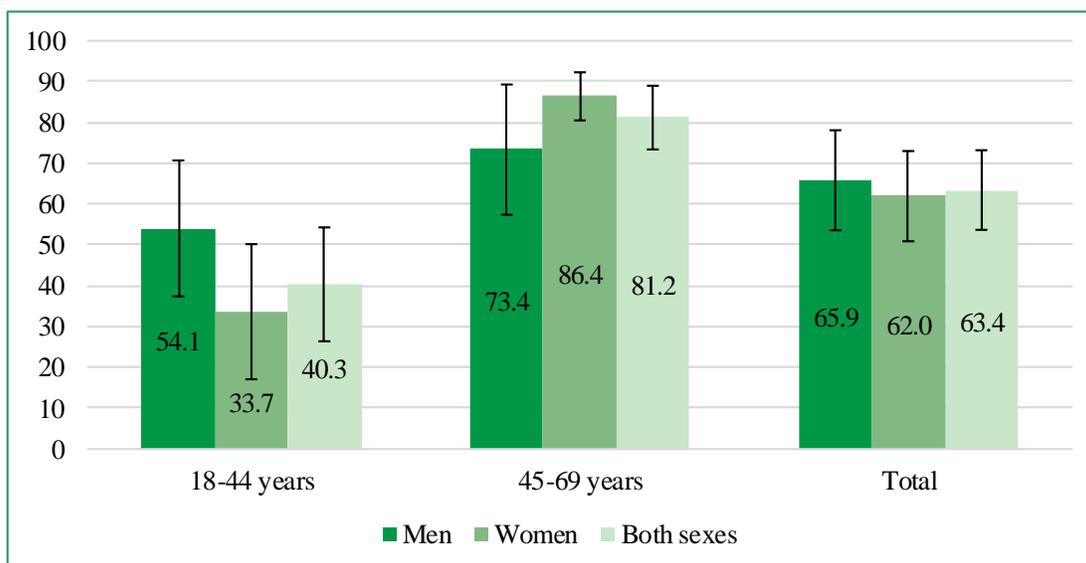


Figure 72: Proportion currently taking medication for raised blood pressure prescribed by doctor or health worker among those diagnosed, by sex and age group of the Syrian study population

3.2.7. History of Diabetes

History of diabetes, including blood sugar measurement, established diagnosis and treatment for diabetes were analyzed. Of all the respondents, 82.7% had never had their blood sugar measured

and 12.5% of them had undergone the test but had not been diagnosed with diabetes. A total of 0.7% of the respondents of all ages had been diagnosed with high blood glucose more than 12 months before the survey and 4.1% within the previous 12 months.

The percentage of men of all ages who had never had their blood glucose measured was 84.2% (95% CI: 80.0–88.4), compared with 81.6% of women of the same age group (95% CI: 77.7–85.4). The proportion of those who had undergone blood sugar measurement but had not been diagnosed was 10.6% (95% CI: 7.1–14.1) in men and 13.9% (95% CI: 10.9–17.0) in women (Figure 73).

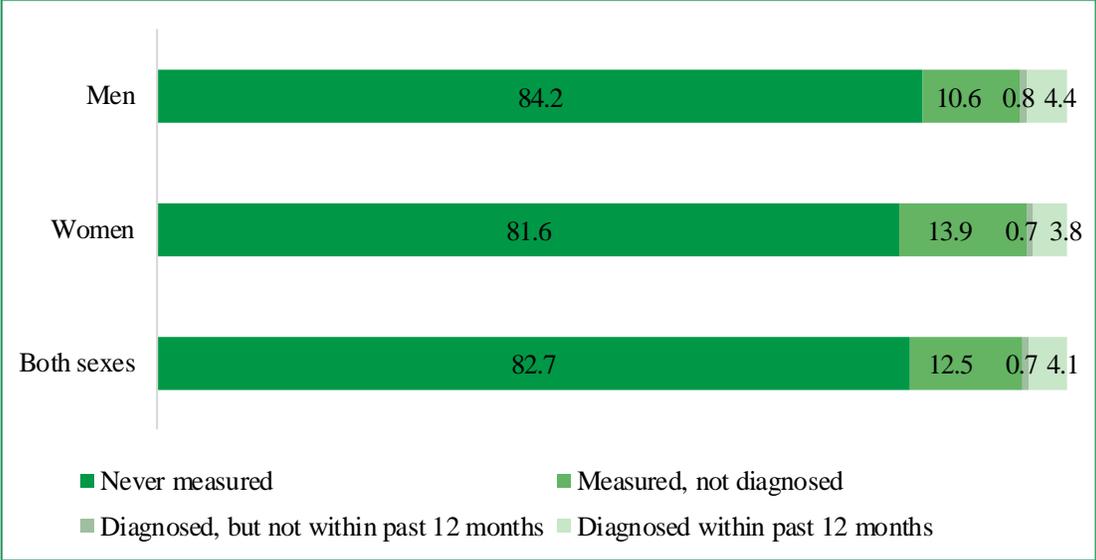


Figure 73: Blood sugar measurement and diagnosis, by sex of the Syrian study population

Respondents previously diagnosed with raised blood sugar or diabetes were asked whether they had been prescribed any medication for diabetes by a health worker during the previous two weeks, or whether they were taking insulin for diabetes prescribed by a doctor or other health worker. 95.8% of men (95% CI: 90.6–100.0) and 86.3% of women (95% CI: 78.3–94.4) taking any medication for diabetes prescribed by a doctor or a health worker. For those taking insulin, with 33.4% of men (95% CI: 10.9–56.0) and 25.8% of women (95% CI: 11.2–40.4) taking insulin recommended by a doctor or a health worker (Figure 74).

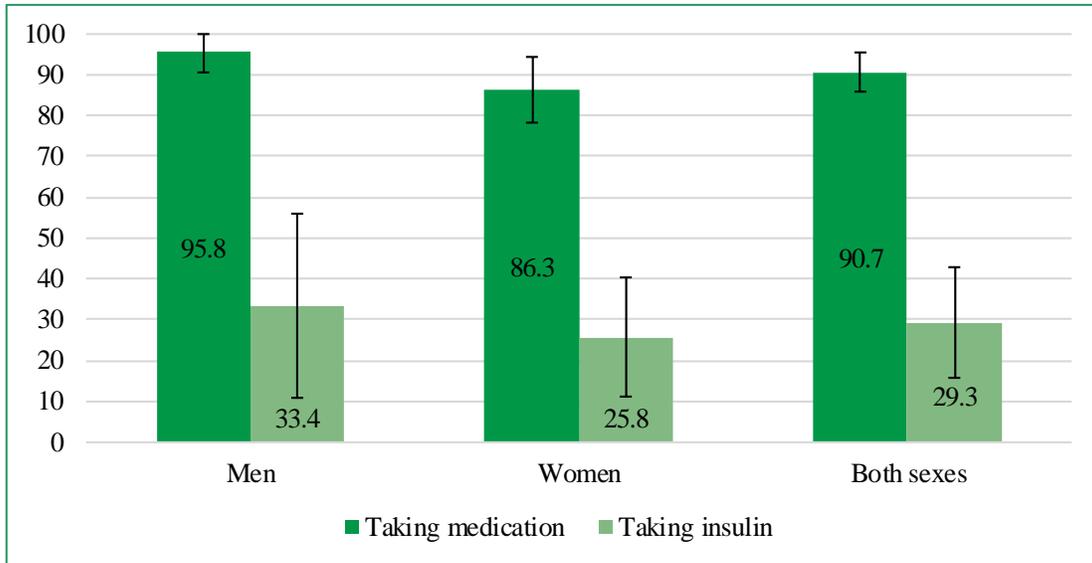


Figure 74: Proportion of respondents taking any medication or insulin prescribed for diabetes among those previously diagnosed, by sex of the Syrian study population

3.2.8. History of Raised Total Cholesterol

A total of 90.3% of respondents of all ages declared that they never had their blood cholesterol measured, while 6.7% had undergone a test for blood cholesterol level but had not been diagnosed with raised cholesterol. Only 0.5% of the study population had been diagnosed with a high level of cholesterol more than 12 months before the interview, and 2.6% within the past year (Figure 75).

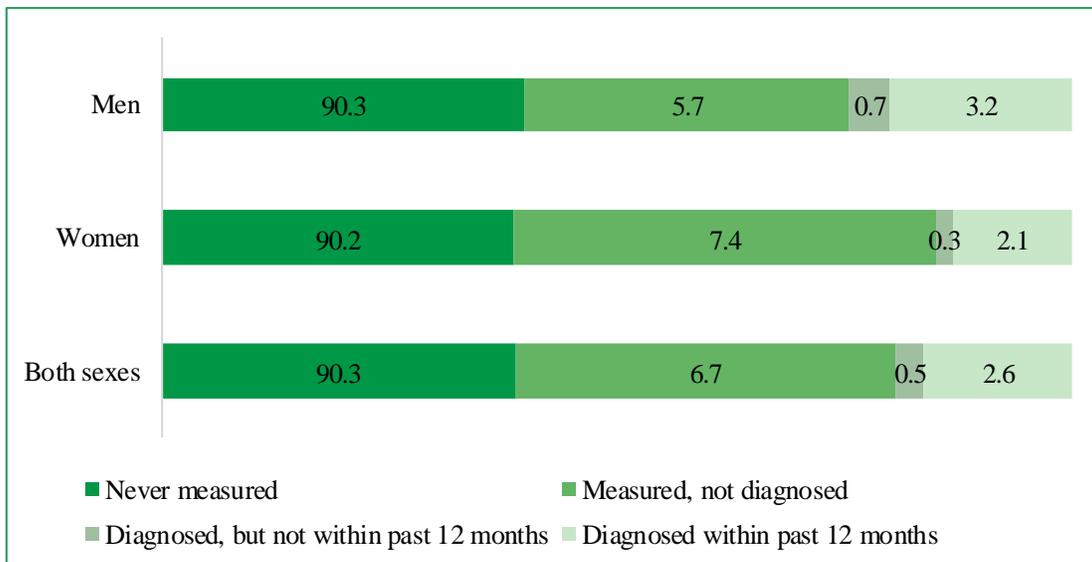
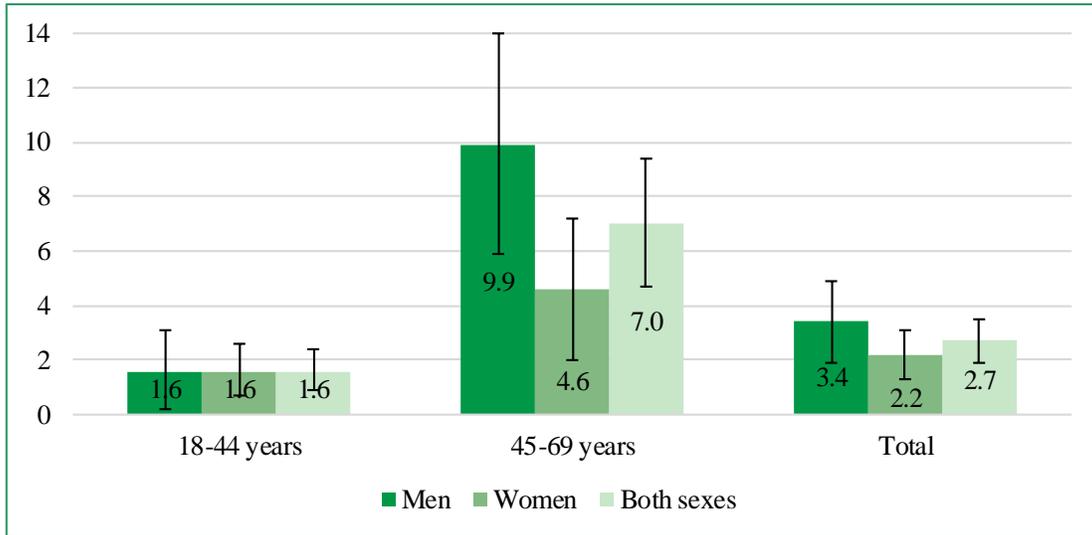


Figure 75: Total cholesterol measurement and diagnosis, by sex of the Syrian study population

3.2.9. History of Cardiovascular Diseases (CVDs)

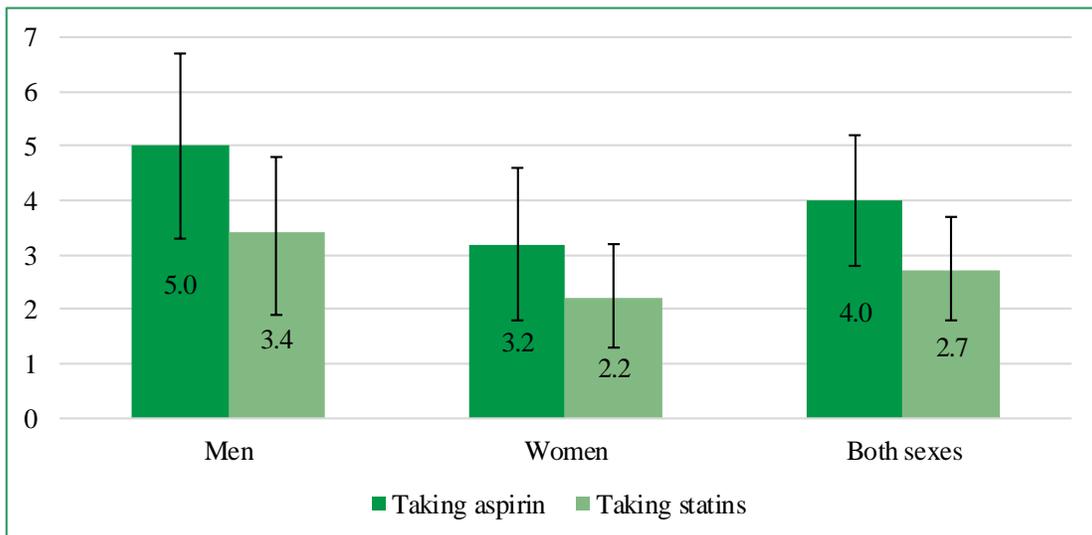
Among all respondents, 2.7% reported having ever had a heart attack or chest pain from heart disease or stroke and prevalence was found to increase gradually with age, from 1.6% (95% CI: 0.9–2.4) in the age group 18–44 years to 7.0% (95% CI: 4.7–9.4) in the age group 45–69 years. Men reported cases of heart attack or stroke more frequently (3.4%, 95% CI: 1.9–4.9) than



women (2.2%, 95% CI: 1.3–3.1) (Figure 76).

Figure 76: Percentage of respondents having ever had a heart attack or chest pain from heart disease or a stroke, by sex and age group of the Syrian study population

A total of 4.0% of all respondents reported regularly taking aspirin and 2.7% of them also took statins to prevent or treat heart disease. The proportion of men that reported using aspirin for prevention or treatment of CVDs was higher as that of females: 5.0% for males (95% CI: 3.3-



6.7) and 3.2% for females (95% CI: 1.8–4.6) (Figure 77).

Figure 77: Percentage of respondents currently taking regularly aspirin or/and statins to prevent or treat heart disease, by sex of the Syrian study population

3.2.10. Lifestyle Advice

Respondents were asked whether they received different types of lifestyle advice from a doctor or a health worker during the past three years. 33.4% of respondents had been advised to stop smoking or not to start: 39.9% among men and 28.5% among women. 35.1% of respondents had been advised to reduce salt in their diet: 35.0% among men and 35.1% among women. 32.6% of respondents had been advised to eat at least five servings of fruit and/or vegetables each day: 31.7% among men and 33.3% among women. 33.0% of respondents had been advised to reduce fat in their diet: 32.6% among men and 33.3% among women. 29.9% of respondents had been advised to start or to do more physical activity: 29.6% among men and 30.1% among women. 31.4% of respondents had been advised to maintain a healthy body weight or to lose weight: 30.2% among men and 32.3% among women (Figure 78).

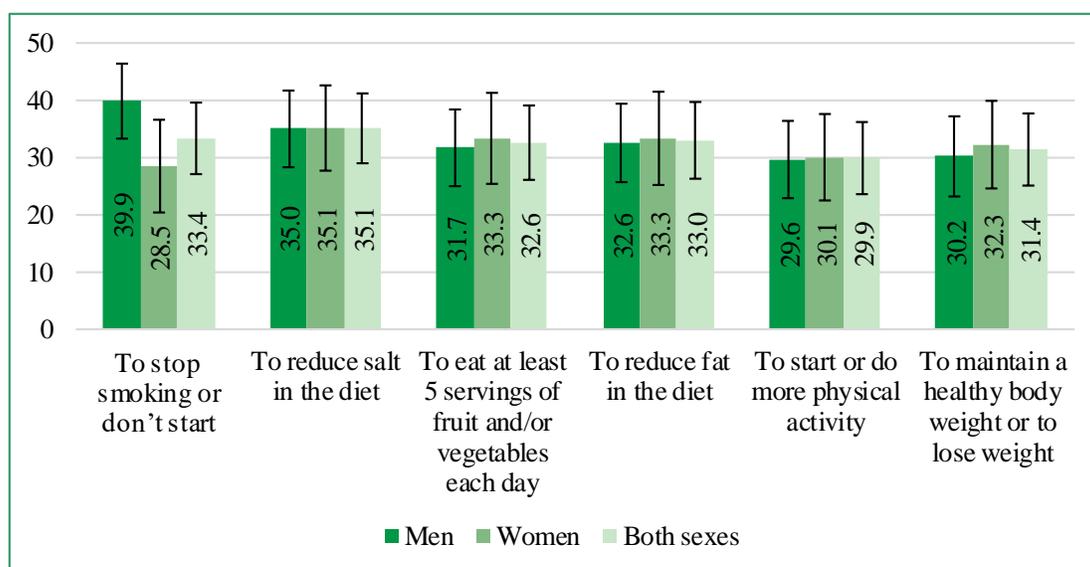


Figure 78: Percentage of respondents reporting having received lifestyle advice from a doctor or health worker during the past three years, by sex of the Syrian study population

3.2.11. Cervical Cancer Screening

Female respondents were asked whether they had ever had a screening test for cervical cancer. Of all the women aged 18–69 years participating in the study, 2.6% (95% CI: 1.5–3.8) reported ever having undergone a screening test for cervical cancer. The highest prevalence of testing among women was in the age group 45–59 years, with 5.8% (95% CI: 1.9–9.7) compared to 1.9% (95% CI: 0.6–3.2) in the age group 18–44 years (Figure 79).

The percentage of female respondents aged 30–49 years that had ever undergone screening for cervical cancer was 2.1% (95% CI: 0.3–3.9).

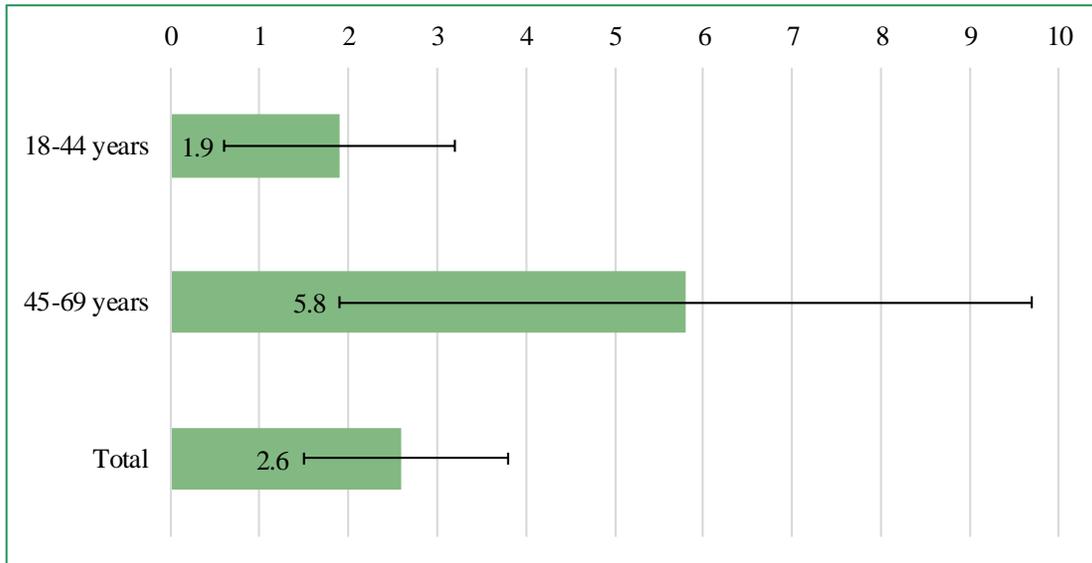
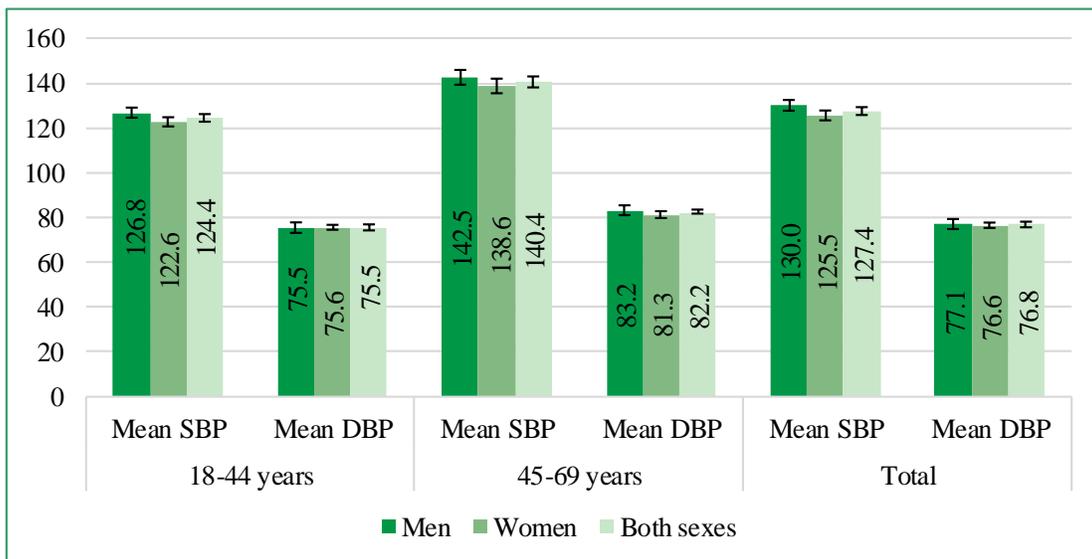


Figure 79: Percentage of women tested for cervical cancer, by age group of the Syrian study population

3.2.12. Physical Measurements

Hypertension as a risk factor for NCD was assessed by means of blood pressure measurement. Mean SBP in the study population was 127.4 mmHg (95% CI: 125.7–129.2); 130.0 mmHg for men (95% CI: 127.6–132.4) and 125.5 mmHg (95% CI: 123.3–127.7) for women. Mean DBP was 76.8 mmHg (95% CI: 75.6–78.1) in the study population; 77.1 mmHg (95% CI: 74.8–79.3)



in men and 76.6 mmHg (95% CI: 75.5–77.7) in women (Figure 80).

Figure 80: Mean SBP and DBP (mmHg), by sex and age group of the Syrian study population

The prevalence of hypertension in the study population was 32.8% (95% CI: 28.8–36.8); 39.2% (95% CI: 34.3–44.2) for men and 28.0% (95% CI: 23.0–33.0) for women. The percentage of those with an SBP of ≥ 160 mmHg and/or a DBP of ≥ 100 mmHg, or taking medication for raised blood pressure was 15.8% (95% CI: 13.2–18.5); 19.0% (95% CI: 15.2–22.9) for men and 13.4% (95% CI: 10.4–16.5) for women (Figure 81).

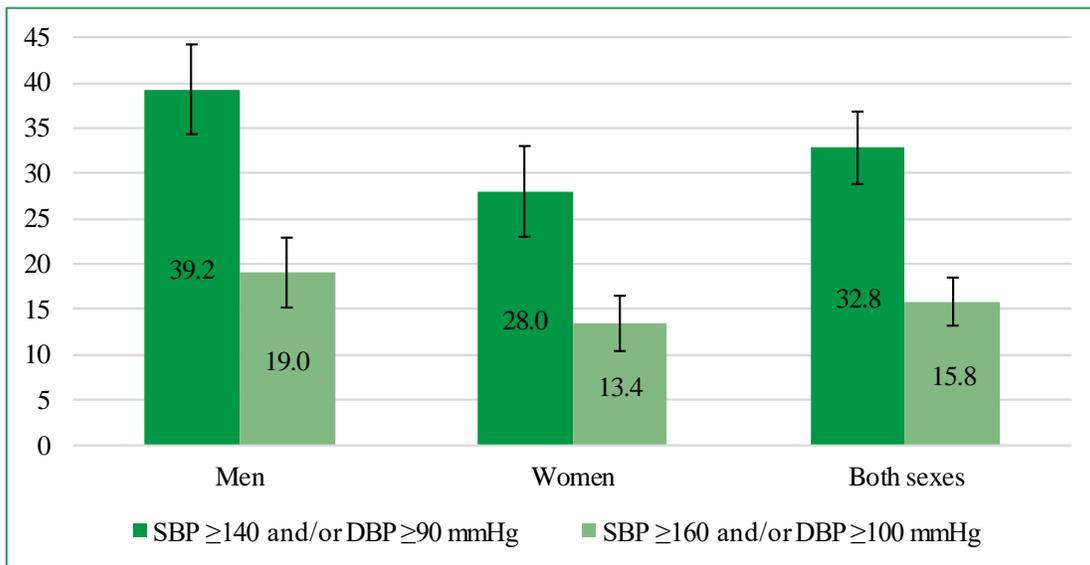
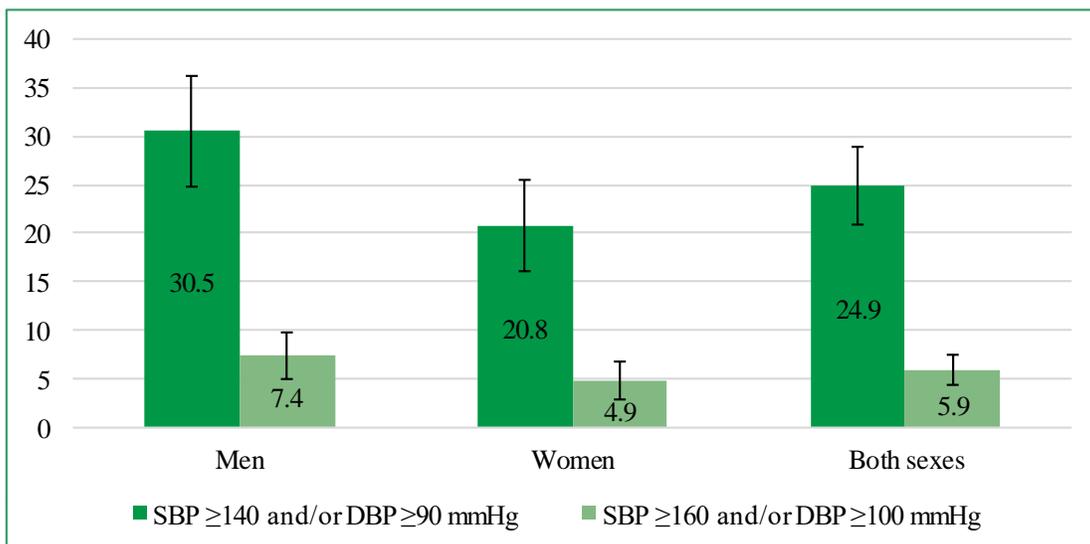


Figure 81: Percentage of respondents with raised blood pressure, or currently taking medication for raised blood pressure, by sex of the Syrian study population

Of all the respondents not currently taking medication for hypertension, 24.9% (95% CI: 20.9–28.9) had an SBP of ≥ 140 mmHg and/or a DBP of ≥ 90 mmHg. The proportion of men in this category was 30.5% (95% CI: 24.8–36.2) and that of women was 20.8% (95% CI: 16.1–25.5)



(Figure 82).

Figure 82: Percentage of respondents with raised blood pressure, excluding those taking medication for raised blood pressure, by sex of the Syrian study population

Respondents identified as having high blood pressure (SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg) and those taking medication for raised blood pressure were analyzed together: 16.9% (95% CI: 10.8–22.9) of them were taking medication for high blood pressure (SPB < 100 mmHg and DBP < 90 mmHg). A total of 15.2% (95% CI: 11.3–19.2) were taking medication but still had increased blood pressure (SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg). The remaining 67.9% (95% CI: 61.3–74.6) were not taking medication but had increased blood pressure (Figure 83).

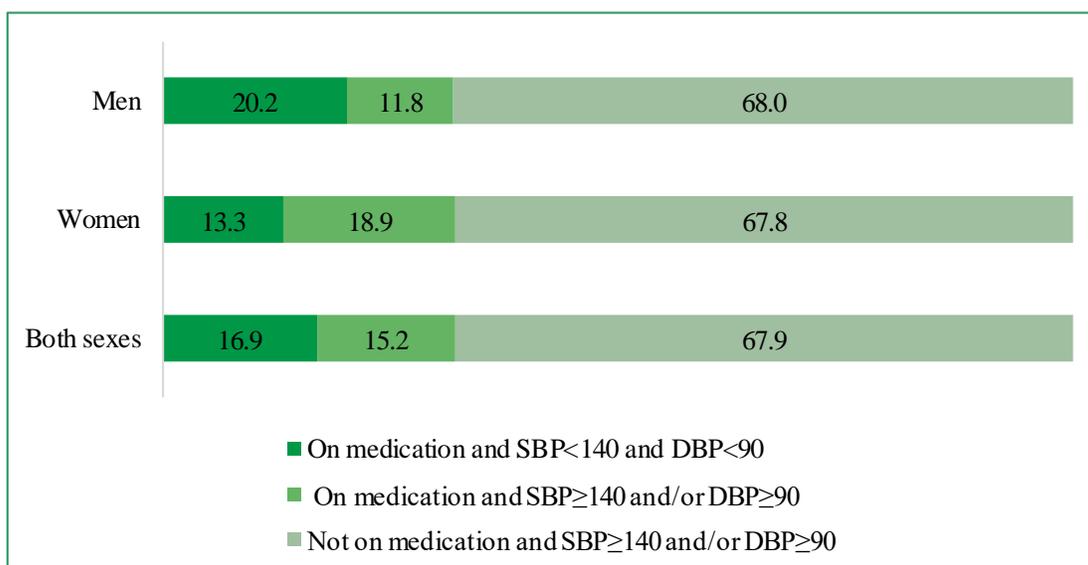


Figure 83: Respondents with treated and/or controlled blood pressure among those with raised blood pressure or currently taking medication, by sex of the Syrian study population

Anthropometric measurements such as height, weight, and waist and hip circumference were used to calculate BMI and mean waist-to-hip ratio (WHR) in order to estimate the prevalence of overweight and obesity in the study population (excluding pregnant women) by age, sex and area of residence.

Male respondents were on average 170.7 cm tall (95% CI: 169.7–171.7) and weighed on average 77.1 kg (95% CI: 75.5–78.6), and females were on average 160.3 cm tall (95% CI: 159.3–161.3) and weighed on average 72.1 kg (95% CI: 70.9–73.3) (Table 33).

Table 33: Mean height and weight, by sex and age group of the Syrian study population

Mean height (cm)

Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
18-44	500	171.1	169.9-172.2	789	160.5	159.4-161.6
45-69	315	169.0	167.5-170.5	337	159.5	158.3-160.8
18-69	815	170.7	169.7-171.7	1126	160.3	159.3-161.3

Mean weight (kg)						
Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
18-44	499	76.2	74.4-78.0	786	70.4	69.1-71.7
45-69	317	80.4	78.4-82.4	335	79.6	77.4-81.7
18-69	816	77.1	75.5-78.6	1121	72.1	70.9-73.3

Mean BMI for the study population (both sexes) was 27.4 (95% CI: 26.9–27.8); 26.4 (95% CI: 25.9–27.0) for men and 28.1 (95% CI: 27.5–28.7) for women (Figure 84).

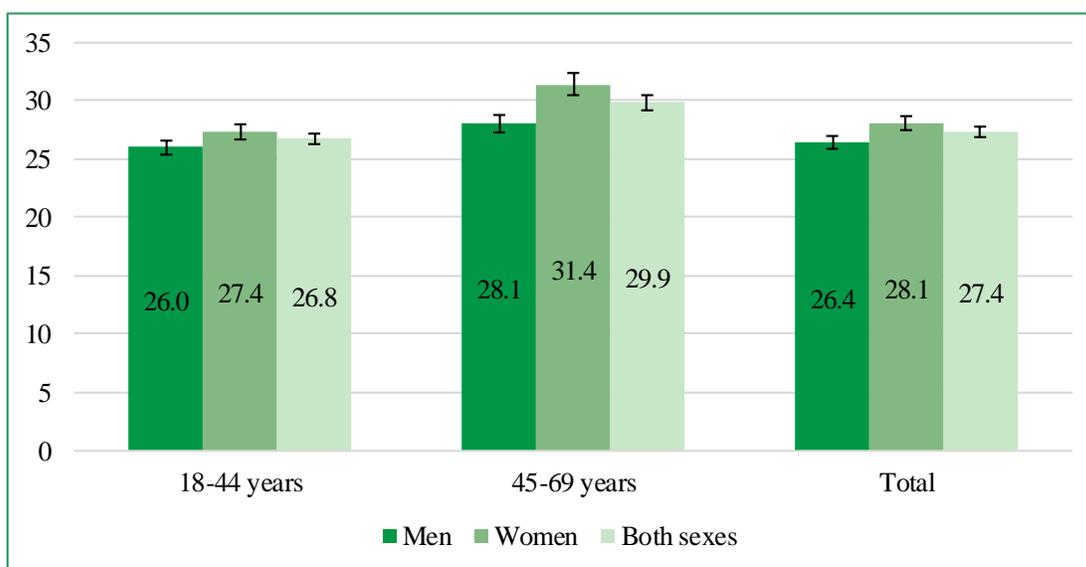


Figure 84: Mean BMI (kg/m²), by sex and age group of the Syrian study population

The study population was grouped into four BMI categories: underweight (BMI <18.5), normal weight (BMI 18.5–24.9), overweight (BMI 25.0–29.9) and obese (BMI ≥30.0). A total of 62.8% of all respondents (both sexes) had a BMI greater than 25 and thus fell into the overweight or obese categories; 35.6% were grouped in the normal weight category and 1.7% in the underweight category (Figure 85).

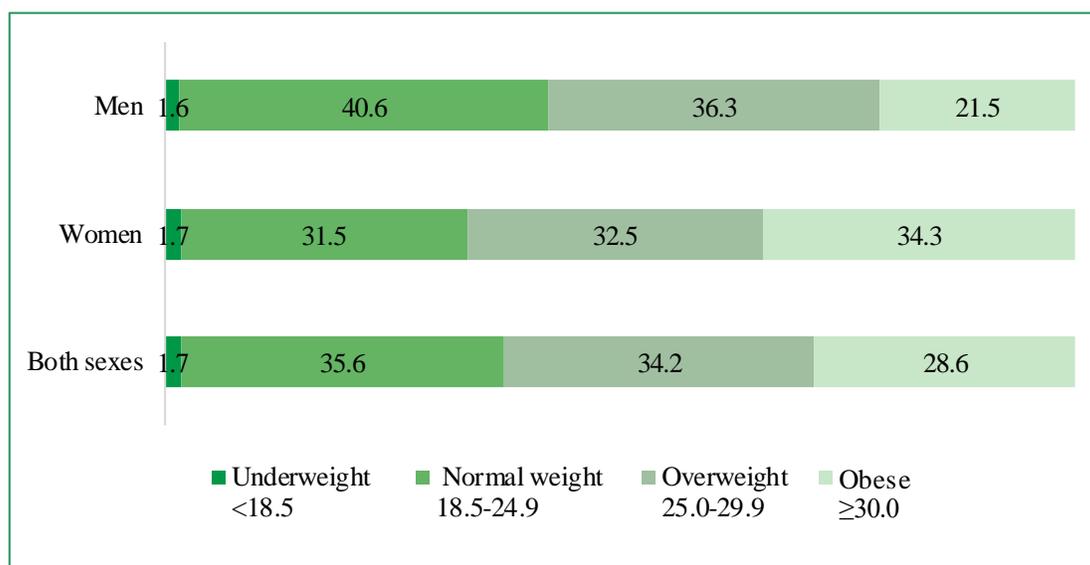


Figure 85: Distribution by BMI category, by sex of the Syrian study population

WHR was computed for all respondents (excluding pregnant women), using measurements of waist and hip circumferences. Results showed a WHR equal to 0.9 for both sexes. WHO defines obesity as having a WHR above 0.90 for males and above 0.86 for females. The values for both sexes in the current study were found to be at the limit of obesity. Almost no differences were found between the various age groups in terms of mean WHR (Table 34).

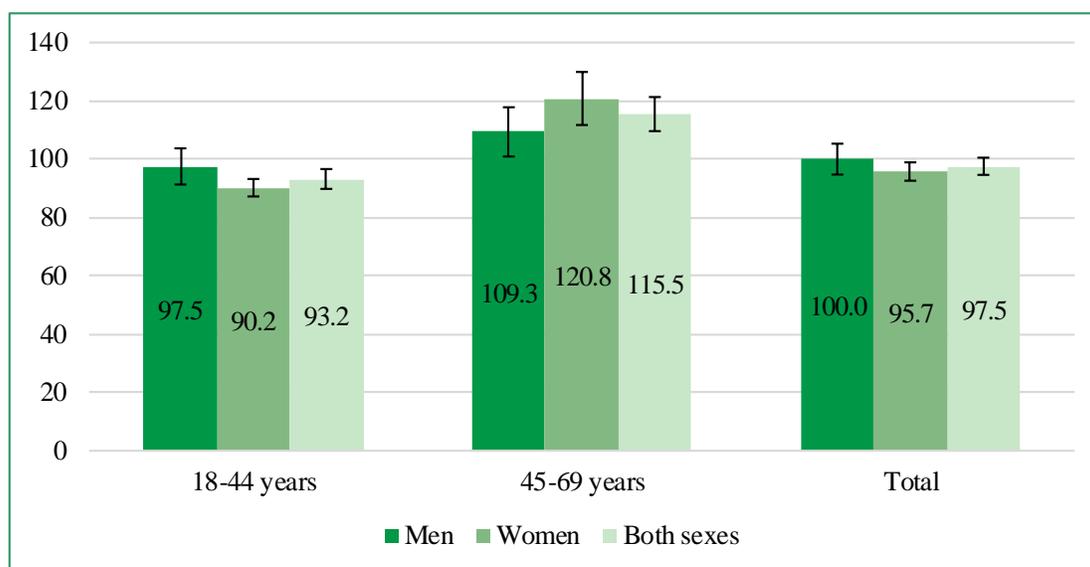
Table 34: Mean waist-to-hip ratio, by sex and age group of the Syrian study population

Age Group (years)	Mean waist / hip ratio					
	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
18-44	480	1.0	0.9-1.0	793	0.9	0.9-0.9
45-69	313	1.0	1.0-1.0	337	0.9	0.9-1.0
18-69	793	1.0	0.9-1.0	1130	0.9	0.9-0.9

3.2.13. Biochemical Measurements

Mean fasting blood glucose level was found to be 97.5 mg/dL (95% CI: 94.6–100.5) in the total study population, including those currently taking medication for diabetes; 100.0 mg/dL (95%

CI: 94.7–105.3) in men and 95.7 mg/dL (95% CI: 92.6–98.9) in women. Figures for mean fasting blood glucose were lowest in the age group 18–44 years (93.2 mg/dL, 95% CI: 89.8–



96.6) and highest in the age group 45–69 years (115.5 mg/dL, 95% CI: 109.6–121.3) (Figure 86).

Figure 86: Mean fasting blood glucose level (mg/dL), by sex and age group of the Syrian study population

Respondents were considered to have impaired fasting glycaemia (IFG) if the plasma venous values were between 110 mg/dL and 126 mg/dL. Non-fasting subjects were excluded. A total of 5.2% of the study population was found to have IFG: it was detected in 6.8% of men (95% CI: 2.7–11.0) and 4.0% of women (95% CI: 2.4– 5.6) (Figure 87).

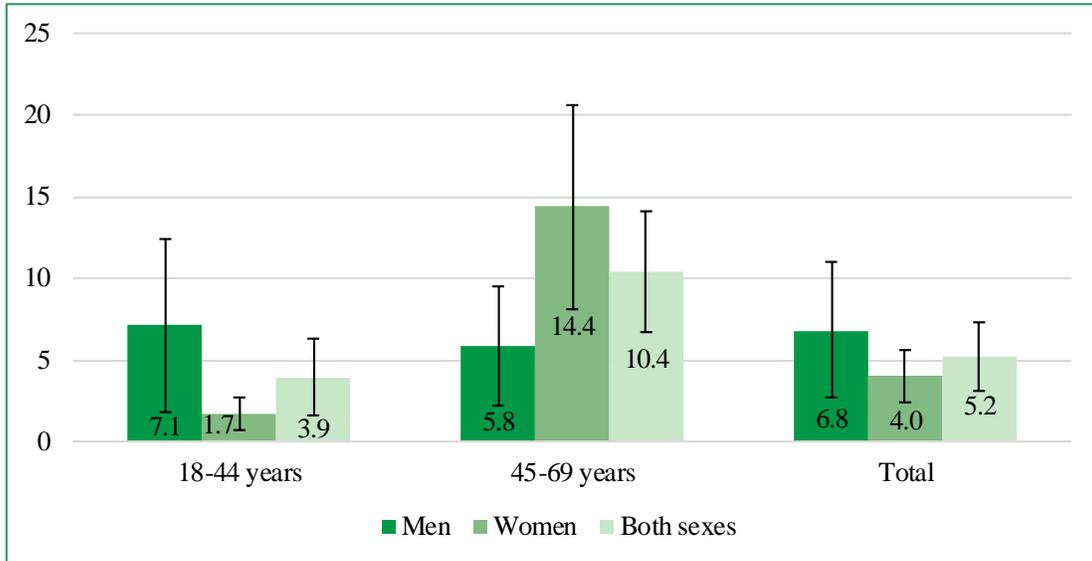


Figure 87: Prevalence of impaired fasting glycaemia, by sex and age group of the Syrian study population

A total of 9.4% of the study population had a blood glucose level of ≥ 110 mg/dL, with 10.9% (95% CI: 6.8–15.0) in men and 8.3% (95% CI: 5.8–10.7) in women (Figure 88).

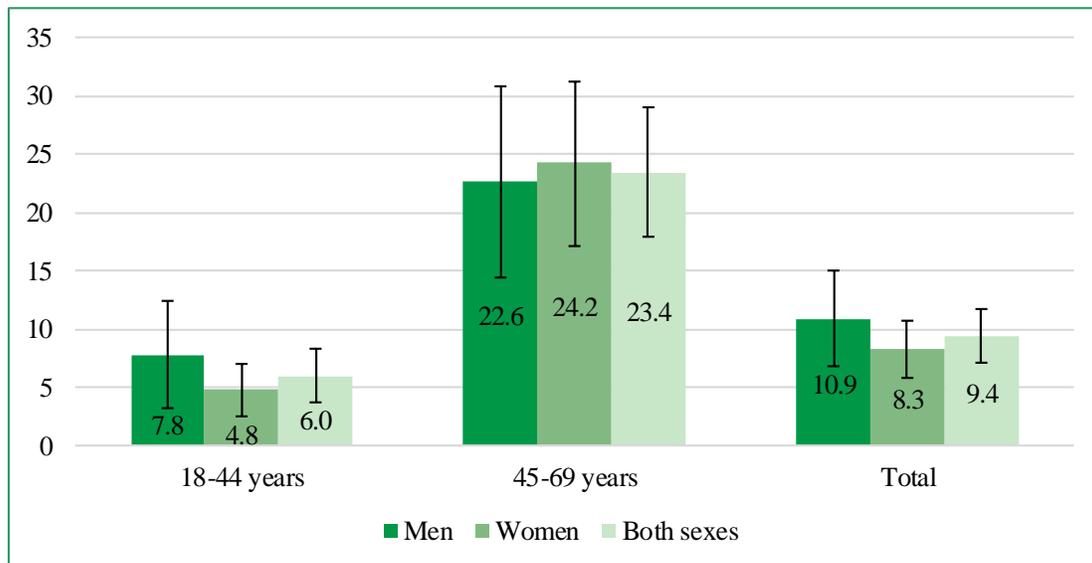


Figure 88: Prevalence of raised blood glucose or currently taking medication for diabetes, by sex and age group of the Syrian study population

Blood cholesterol level was tested in the study population, including participants receiving cholesterol-lowering medication. Mean total blood cholesterol of the survey population was

191.1 mg/dL (95% CI: 187.1–195.1); 192.5 mg/dL (95% CI: 185.9–199.1) in men and 190.1 mg/dL (95% CI: 186.2–193.9) in women (Table 35).

Table 35: Mean total cholesterol (mg/dL), by sex and age group of the Syrian study population

Mean total cholesterol (mg/dl)									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
18-44	235	188.2	180.1-196.2	508	185.9	181.8-190.0	743	186.8	182.5-191.2
45-69	233	208.4	199.7-217.1	267	208.2	202.0-214.4	500	208.3	202.8-213.8
18-69	468	192.5	185.9-199.1	775	190.1	186.2-193.9	1243	191.1	187.1-195.1

Respondents that were currently taking medication for raised cholesterol were also included in these categories. A total of 48.8% of the study population had a blood cholesterol level of ≥ 190 mg/dL, and 14.6% had a blood cholesterol level of ≥ 240 mg/dL (Figure 89).

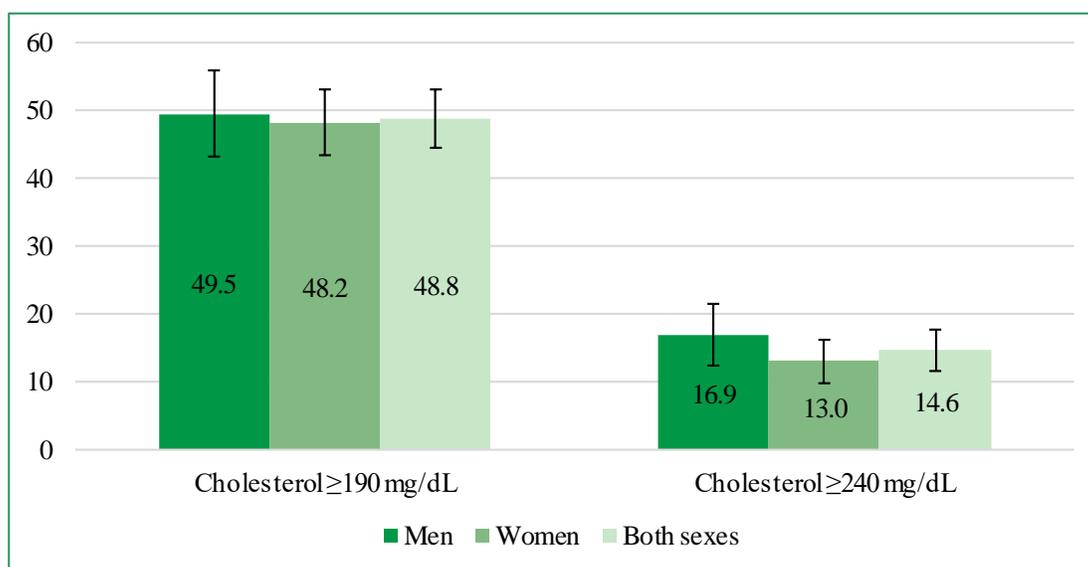


Figure 89: Percentage of respondents with a total cholesterol level of ≥ 190 and ≥ 240 mg/dL, or currently taking medication for raised cholesterol, by sex of the Syrian study population

The mean level of HDL cholesterol in all respondents' blood was 45.5 mg/dL (95% CI: 44.5–46.5), with a higher level found in women (48.7 mg/dL, 95% CI: 47.6–49.9) than in men (41.1 mg/dL, 95% CI: 39.7–42.6) (Table 36).

Table 36: Mean HDL (mg/dL), by sex and age group of the Syrian study population

Mean HDL (mg/dL)									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
18-44	235	41.4	39.7-43.2	508	48.9	47.7-50.2	743	45.8	44.6-47.0
45-69	233	40.1	38.5-41.7	267	47.8	46.1-49.6	500	44.3	43.2-45.4
18-69	468	41.1	39.7-42.6	775	48.7	47.6-49.9	1243	45.5	44.5-46.5

Among women, 55.3% (95% CI: 50.2–60.5) had an HDL level of less than 50 mg/dL. Among men, 48.5% (95% CI: 41.3–55.6) had an HDL level of less than 40 mg/dL (Figure 90).

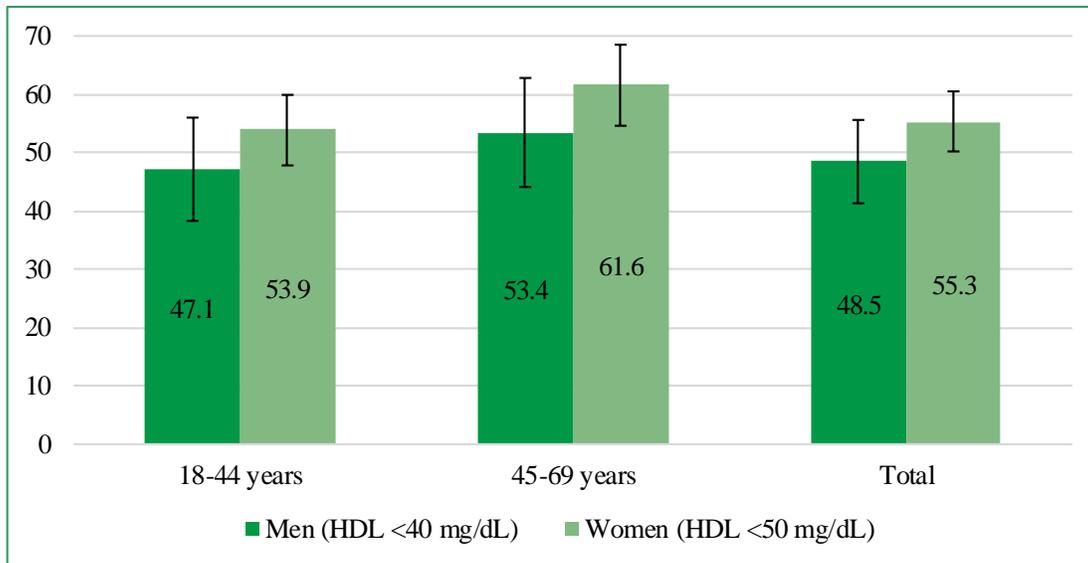


Figure 90: Proportion of population with decreased HDL cholesterol, by sex and age group of the Syrian study population

3.2.14. Cardiovascular Disease Risk

Respondents aged 40–69 years were assessed to establish those with a 10-year CVD risk of $\geq 30\%$, and those with existing CVD. A 10-year CVD risk of $\geq 30\%$ is defined according to age, sex, blood pressure, smoking status (current smokers or individuals who stopped smoking less than one year before the assessment), total cholesterol, and diabetes (previously diagnosed or with a fasting plasma glucose concentration of >126 mg/dL).

The percentage of respondents in the age group 40–69 years falling within the category of 10-year CVD risk of $\geq 30\%$ or with existing CVD was 9.7% (95% CI: 6.3–13.1). Prevalence of this was much higher among men at 13.7% (95% CI: 7.5–19.9) than among women at 6.2% (95% CI: 2.2–10.2). Among respondents in the age group 40–54 years, 5.8% (95% CI: 2.6–8.9) were found to have a 10-year CVD risk of $\geq 30\%$ or existing CVD, compared with 24.0% (95% CI: 15.0–32.9) for this indicator in the age group 55–69 years (Table 37).

Table 37: Percentage of respondents with a 10-year CVD risk ($\geq 30\%$) or with existing CVD, by sex and age group of the Syrian study population

Percentage of respondents with a 10-year CVD risk $\geq 30\%$ or with existing CVD									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
40-54	167	7.5	2.1-12.9	202	4.3	0.1-8.5	369	5.8	2.6-8.9
55-69	90	35.5	19.9-51.1	85	13.3	3.5-23.2	175	24.0	15.0-32.9
40-69	257	13.7	7.5-19.9	287	6.2	2.2-10.2	544	9.7	6.3-13.1

Of the aforementioned group of respondents (40–69 years old, with a 10-year CVD risk of $\geq 30\%$, including those with existing CVD), 47.2% (95% CI: 35.7–58.8) were receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes (Figure 91).

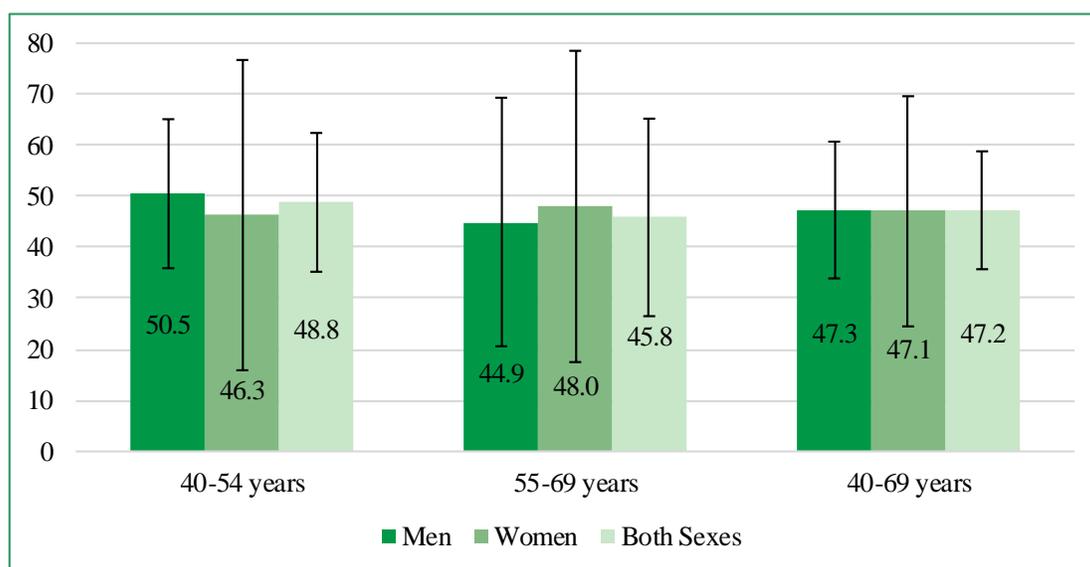


Figure 91: Percentage of eligible individuals receiving drug therapy and counselling to prevent heart attacks and strokes, by sex and age group of the Syrian study population

3.2.15. Summary of Combined Risk Factors

The percentage of respondents with 0, 1–2 or 3–5 risk factors by age group and sex are presented in (Figure 92). In 0.5% (95% CI: 0.1–0.9) of the study population, none of the abovementioned five risk factors were identified; 39.8% (95% CI: 35.8–43.7) of the respondents had 1–2 risk factors; and 59.8% (95% CI: 55.8–63.8) has 3–5 of the risk factors listed. Prevalence of 3–5 combined risk factors was much higher in the age group 45–69 years (82.9%, 95% CI: 78.7–87.2), while prevalence of 1–2 risk factors was higher in the age group 18–44 years (45.6%, 95%

CI: 40.9–50.2). A higher proportion of men had 3–5 risk factors (65.9%, 95% CI: 60.2–71.5) than women (54.9%, 95% CI: 49.7–60.0). In addition, the percentage of women with 1–2 risk factors (44.6%, 95% CI: 39.5–49.7) was higher than that of men (33.8%, 95% CI: 28.2–39.3). None of the above-mentioned risk factors were identified in 0.4% of men (95% CI: 0.1–0.6), and the percentage of women with none of the risk factors was 0.5% (95% CI: 0.0–1.0).

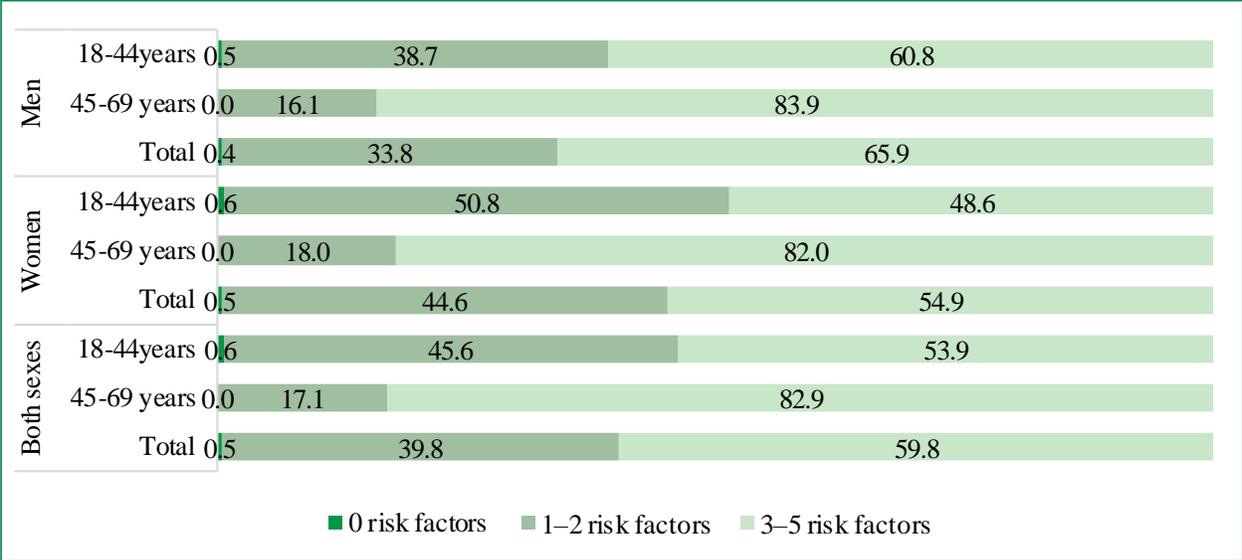


Figure 92: Summary of combined risk factors, by sex and age group of the Syrian study population

4. Discussion

Comparing this STEPS study and the one done earlier shows a slight increase in the prevalence of the biological risk factors, and a slight decrease in the behavioral risk factors (Sibai & Hwalla, 2010). NCDs cause more than 2.2 million deaths yearly in the Eastern Mediterranean region (WHO, 2017). Yet, some NCD risk factors might not be as prevalent in Lebanon compared to other countries in the region (Hwalla, 2016). Raised blood pressure, glucose, and cholesterol, along with tobacco use and following a healthy diet should be the priority intervention due to their high levels. In order to have control over NCDs, monitoring is a must, as it is the key to mold the interventions and policies. It is not only limited to monitoring of risk factors but also checking the availability of healthy habits to be adapted by the population (accessibility to fruits by Syrian refugees). Yet this should occur in a sensitive manner especially among the vulnerable populations in Lebanon, including the Syrian refugees.

This STEPS survey shows the efforts that are put together in order to prevent NCDs in Lebanon. This survey serves as great evidence to prove that NCDs are prevalent among the Lebanese and Syrian populations and this study has identified risk factors that should be targeted by policy makers and take proper actions to prevent these risk factors.

In order to prevent the prevalent risk factors, effective promotion and education should be present. Since NCDs are preventable there is an urgent need to have commitment to prevent them by having social and health service response.

The most important strength of this survey is that it is nationally representative, to the Lebanese and Syrian population. Yet it is worth mentioning, that this survey is self-reported and some of the risk factors might be under estimated or over estimated by the respondents. Some reporting over estimation might be that the participants did not abide by the fasting instructions properly, the blood results might be overestimated. The participants might considered some of the topics sensitive such as alcohol consumption or tobacco use and thus leading to under reporting.

5. Recommendations

The following recommendations arise from this study:

- Increasing awareness of the community on the importance of early detection for raised blood pressure, diabetes and hyperlipidemia through ensuring regular and annual mass screenings at the PHC level under the supervision of the MoPH, in addition to have proper control and treatment among those diagnosed, by insuring the provision of pharmaceuticals;
- Strengthening and supporting NCD preventive programs at MoPH; including continuous surveillance of the NCD data;
- Reinforcing community awareness and supporting health education program on the importance of consultations and follow-up of NCDs;
- Strengthening NCD care integration within the PHC services and ensuring ease in its accessibility by the Lebanese and Syrians;
- Reinforcing the integration of the NCD program within the PHC network all across the country;
- Establishing a national forum to enhance and show the importance of a healthy lifestyle through increasing mass media campaign on healthy diets and physical activity, in collaboration with different ministries;
- Increasing taxes and prices on some tobacco-products, alcohol, and adopt national policies that limit and eliminate saturated fatty acids and industrially produced trans fatty acids in the food supply;
- Ongoing collaboration with the countries that implemented STEPS for lessons learnt and facilitation in the implementation process;
- Emphasizing on the importance of having NCD STEPwise surveillance system, repeating this survey every 5 years, if funds permit, in order to compare the prevalence of risk factors and frame interventions accordingly.

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