Prevalence of chronic diseases risk factors and specific health determinants in a transitional country - The case of Kosova

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In remembrance of my beloved mother:
Mrs. Fatishah Meka - Hoxha
(1950 – 2016)

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List of symbols and abbreviations

AIDS	Acquired Immunodeficiency Syndrome
AFR	WHO African Region
AMR	WHO Region of the Americas
AOK	General regional health funds
BMI	Body Mass Index
CAD	Coronary Artery Disease
CCM	Chronic Care Model
CDSS	Clinical Decision Support System
CHF	Congestive Heart Failure
CI	Confidence Interval
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardiovascular Diseases
DALY	Disability-Adjusted Life Year
DMP	Disease Management Programme
DNA	Deoxyribonucleic Acid
DRG	Diagnosis-Related Group
FTCT	Framework Convention on Tobacco Control
FGD	Focus Group Discussion
ELSID	Evaluation of a Large-Scale Implementation of Disease Management Programs
EMR	WHO Eastern Mediterranean Region
ESPAD	European School Survey Project on Alcohol and other Drugs
EUR	WHO European Region
GDP	Gross Domestic Product
GINA	Global Initiative for Asthma
GP	General Practitioner
GPAQ	Global Physical Activity Questionnaire
GYTS	Global Youth Tobacco Survey
HDI	Human Development Index
HED	Heavy episodic drinking

HPV	Human papilloma virus
HRQoL	Health-related quality of life
HTA	Health technology assessment
ICT	Information and communication technology
INDEPTH	An International Network of field sites for continuous Demographic Evaluation of Populations and Their Health in developing countries
MDG	Millennium Development Goals
MONICA	MONItoring of trend and determinants in CArdiovascular diseases
NCD	Non-Communicable Diseases
NIPHK	National Institute of Public Health of Kosova
OR	Odds Ratio
PPS	Probability Proportional to Size
RR	Relative Risk
SEAR	WHO South-East Asia Region
SES	Socioeconomic status
STEPS	STEPwise approach to chronic disease risk factor Surveillance
UNICEF	United Nations Children's Fund
UN	United Nations
WHA	World Health Assembly
WHO	World Health Organization
WHR	Waist Hip Ratio
WPR	WHO Western Pacific Region
YLL	Years of life lost

1. INTRODUCTION

1.1. Definition of chronic diseases

Accurate case definitions are integral to public health surveillance efforts for monitoring population health and for conducting public health and clinical investigations (1). In medicine, a persistent and lasting condition is said to be chronic (from Greek Chronos). Chronic diseases are complex and vary in nature which makes them very difficult to define. Chronic diseases vary considerably in terms of their nature, their cause, and the extent of their impact on individuals and communities. Some chronic disease may contribute to premature death, others contribute more to ill health. Some may last indefinitely, whereas others may resolve over time. However chronic diseases are generally never cured completely (2). However, definitions for chronic conditions vary widely. The Centres for Disease Control and Prevention (CDC) define chronic diseases as prolonged illnesses that do not resolve spontaneously and are rarely cured completely (3).

Here are some definitions of chronic disease and other chronic conditions by source and year:

Hwang et al, 2001 (4): "We defined a person as having a chronic condition if that person's condition had lasted or was expected to last 12 or more months and resulted in functional limitations and/or the need for ongoing medical care."

Bernstein et al, 2003 (5): "A chronic disease or condition has one or more of the following characteristics: it is permanent; it leaves residual disability; it is caused by non-reversible pathological alteration; requires special training of the patient for rehabilitation; or may be expected to require a long period of supervision, observation, or care."

Warsaw, 2006 (6): "According to a common definition, chronic illnesses are "conditions that last a year or more and require ongoing medical attention and/or limited activities of daily living". Authors used a modified version of the definition in Hwang et al (4).

Friedman et al, 2008 (7): "Chronic condition is defined as a condition that lasts 12 months or longer and meets one or both of the following tests: 1) it places limitations on self-care,

independent living, and social interactions; and 2) it results in the need for ongoing intervention with medical products, services, and special equipment."

Anderson, 2010 (8): "Chronic condition is a general term that includes chronic illnesses and impairments. It includes conditions that are expected to last a year or longer, limits what one can do, and/or may require ongoing medical care. Serious chronic conditions are a subset of chronic conditions that require ongoing medical care and limits what a person can do."

McKenna and Collins, 2010 (9): "They are generally characterized by uncertain aetiology, multiple risk factors, a long latency period, a prolonged course of illness, no contagious origin, functional impairment or disability, and impossible to cure."

World Health Organization, 2011 (10): Chronic diseases are diseases of long duration and generally slow progression.

Florida Department of Health, 2011 (11): Chronic diseases have a long course of illness. They rarely resolve spontaneously, and they are generally not cured by medication or prevented by the vaccine.

Although the literature does not support a single uniform definition for chronic disease, recurrent themes include the non–self-limited nature, the association with persistent and recurring health problems, and duration measured in months and years, not days and weeks (12).

According to WHO 2015 (13) characteristics of NCDs include: the epidemics take decades to become fully established, have their origin at young ages; require a long-term systematic approach to treatment; given their long duration and there are multiple opportunities for prevention.

1. 2. The burden of chronic diseases

Non-communicable diseases continue to dominate the overall burden of disease in the world. They are responsible for most of the deaths globally (14). A total of 56 million deaths occurred worldwide during 2012. Of these, 38 million (68%) were due to Non-

Communicable Diseases (NCDs), principally cardiovascular diseases, cancer and chronic respiratory diseases. By 2030, these figures are expected to rise to 52 million deaths. Approximately 42% of all NCD deaths are premature, occurring before the age of 70 years.

The majority of premature deaths (82%) are in low- and middle-income countries (13), especially among adults aged 30-69 years. The impact on men and women is similar (15). Their incidences in younger adults are substantially higher in the poor countries of the world than in the rich (16).

One measure of the overall burden of disease, developed by WHO is the Disability-Adjusted Life Year (DALY). It is designed to quantify the impact on a population of premature death and disability by combining them into a single measure. The DALY relies on the assumption that the most appropriate One DALY equals one year of healthy life lost (17). Non-communicable diseases now account for more than one-half of the global burden of disease (18).

The number of NCD deaths has increased worldwide and in every region since 2000, when there were 31 million NCD deaths. NCD deaths have increased the most in the WHO South-East Asia Region, from 6.7 million in 2000 to 8.5 million in 2012, and in the Western Pacific Region, from 8.6 million to 10.9 million The leading causes of NCD deaths in 2012 were: cardiovascular diseases (17.5 million deaths, or 46.2% of NCD deaths), cancers (8.2 million, or 21.7% of NCD deaths), respiratory diseases, including asthma and chronic obstructive pulmonary disease (4.0 million, or 10.7% of NCD deaths) and diabetes (1.5 million, or 4% of NCD deaths). Thus, these four major NCDs were responsible for 82% of NCD deaths (19).

The four main types of non-communicable diseases are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes. CVDs affect as many men as women. However, women lose fewer years of life due to CVDs as the disease develops about 7-10 years later in women compared to men (20). Risk factors of CVDs are similar for men and women. Every year, 3.3 million women die of heart attacks and 3.2 million dies of strokes globally.

World Health Organization data show higher chronic-disease–related death rates in low- and middle-income countries compared with Canada or the United Kingdom (21).

Although there is clear evidence, where data are available, that mortality from CHD and stroke has decreased substantially over the last 5-10 years, there are still large inequalities found between European countries, in both current rates of death and the rate at which these decreases have occurred (22).

Cardiovascular disease is the major cause of death in most European transitional countries. Mortality rates, however, varied among countries for more than two times. In 2011 the highest rate was in Hungary (98.6/100,000), then in Czech Republic (59.9) and Croatia (59.8). The lowest rate was in Austria (29.8) (23). In Croatia, cardiovascular disease is the leading cause of death and accounts for more than half of the overall mortality.

Furthermore, cardiovascular mortality has been constantly decreasing last five years. In Croatia in 2013 Age-standardized mortality rate, before age 75 among males was 216.6/100 000 and 10-year change in mortality rate was -37.0% and among females was 88.2/100 000 and 10-year change in mortality rate was -47.0% (22).

An overall trend for reduction in ischemic heart diseases (IHD) mortality is observed, most pronounced in Western Europe (greater than 60% for the Netherlands, United Kingdom, and Ireland) for both sexes 1980-2009. Most recently (2009), Lithuania had the highest mortality for males and females (318.1/100,000 and 166.1/100,000 respectively), followed by Latvia and Slovakia. France had the lowest mortality - 39.8/100,000 for males and 14.7/100,000 for females. Analysis of CVD mortality revealed that Austria had the largest reduction for both sexes (76.8% males, 76.5% females) 1980-2009. The smallest improvement over this period is seen in Lithuania, Poland and Cyprus (-5% to +20% approximately). France has the lowest present-day CVD mortality for both males and females (23.9/100,000 and 17.3/100,000 respectively), (24, 25).

Globally, there were an estimated 422.7 million prevalent cases of CVD (95% UI: 415.53 to 427.87 million cases) in 2015. The age-standardized prevalence of CVD varied significantly by country. Countries with the lowest age-standardized prevalence in 2015, all with <5,000 cases per 100,000 individuals, included Singapore, Japan, South Korea, Chile, Argentina, Uruguay, Canada, Australia, New Zealand, Ireland, Cyprus, Malta, Italy, Greece, and Israel. Countries in Western Europe, as well as the United States, the United Arab Emirates, and

Nepal, all had only slightly higher prevalence. Countries with the highest age-standardized prevalence in 2015, all >9,000 cases per 100,000 persons, included most countries in West Africa, Morocco, Iran, Oman, Zambia, Mozambique, and Madagascar (26).

There is a negative association between the burden of cerebrovascular disease and sociodemographic index. The burden and the mortality of cerebrovascular disease decrease with the increase the sociodemographic index. Regional differences in CVD are likely a result of variation in exposure to modifiable risk factors, as well as access to effective health care interventions (26).

The prevalence of chronic diseases in adolescence is constantly increasing, especially in the last two decades. It is estimated that between 10% and 20% of adolescents have a chronic disease (27). Adolescence is a period of important changes: body growth and development, sexual development, development of cognitive abilities, change in family relations and between peers, the formation of personal identity and personal system of values, making decisions on future occupation etc. Chronic disorders affect all development issues and represent an additional burden for adolescents (28).

During 2011–2025, cumulative economic losses due to NCDs under a "business as usual" scenario in low- and middle-income countries have been estimated at US$ 7 trillion. This sum far outweighs the annual US$ 11.2 billion cost of implementing a set of high-impact interventions to reduce the NCD burden (14).

There is very little empirical evidence regarding the economic impact of chronic diseases on individuals and households. The results indicate that chronic diseases are significantly associated with higher levels of household healthcare expenditure and productivity losses reflected by reduced labour supply and reduced household labour income (29).

The macroeconomic costs due to chronic diseases include direct costs (costs of medical care in relation to prevention, diagnosis and treatment of disease), indirect costs (loss of human resources caused by morbidity or premature death) and intangible costs (pain, stress, anxiety and suffering, etc.). These costs are usually estimated using accounting or cost-of-illness methods. The total cost is equal to the total time lost through premature death and illness multiplied by a wage rate, and sometimes accounting for unemployment. The sums of direct and indirect costs are then assumed to amount to a loss of GDP (30).

Medicines account for 20–60% of health spending in developing and transitional countries, (31) compared with 18% in countries of the Organization for Economic Co-operation and Development (32). Up to 90% of the population in developing countries purchase medicines through out-of-pocket payments, (33) making medicines the largest family expenditure item after food.

Achievement of a global goal for chronic disease prevention and control-an additional 2% yearly reduction in chronic disease death rates over the next 10 years-would avert 24 million deaths in these countries, and would save an estimated $8 billion, which is almost 10% of the projected loss in national income over the next 10 years (34).

1.3. Monitoring NCDs and their risk factors: a framework for surveillance

Non-communicable disease surveillance is the ongoing systematic collection and analysis of data to provide appropriate information regarding a country's NCD disease burden, the population groups at risk, estimates of NCD mortality, morbidity, risk factors and determinants, coupled with the ability to track health outcomes and risk factor trends over time. NCD surveillance systems need to be integrated into existing national health information systems. This is all the more important where resources are limited.

The objectives of surveillance of the most common NCD risk factors and NCDs are therefore to:
  • collect consistent data across and within countries;
  • develop standardized tools to enable comparisons over time and across countries;
  • prevent NCD epidemics before they occur;
  • help health services plan and determine public health priorities;
  • predict future caseloads of NCDs;
  • monitor and evaluate population-wide interventions.
Three major components of NCD surveillance are:
  • monitoring exposures (risk factors);
  • monitoring outcomes (morbidity and disease-specific mortality); and
  • assessing health system capacity and response, which also includes national capacity to

prevent NCDs (in terms of policies and plans, infrastructure, human resources and access to essential health care including medicines).

Exposures (risk factors are divided into):

    • Behavioural risk factors: tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diet.

    • Physiological and metabolic risk factors: raised blood pressure, overweight/obesity, raised blood glucose and raised cholesterol.

    • Social determinants: educational level, household income, and access to health care.

Data on behavioural and metabolic risk factors are typically obtained from national health interview or health examination surveys, either addressing a specific topic (e.g. tobacco) or multiple factors. Data on social determinants, which can then be used to further understand risk factor patterns, are also typically obtained from these sources.

In this context, the WHO STEPS approach (35) to NCD risk factor surveillance is a good example of an integrated and phased approach that has been used and tested by many countries. It allows countries to develop a comprehensive risk profile of their national populations. Information on sociodemographic factors and behavioural risk factors is collected through self-reporting. Physical measurements of height and weight for body mass index (BMI), waist circumference and blood pressure are made, and biochemical measurements are obtained for fasting blood glucose and total cholesterol levels.

The rationale for including these eight core risk factors in STEPS surveillance activities is that:

• They have the greatest impact on NCD mortality and morbidity

• The modification is possible through effective prevention

• Measurement of risk factors has been proven to be valid

• Measurements can be obtained using appropriate ethical standards (36, 37, and 38).

The principles of STEPS risk factor surveillance are repeated in cross-sectional, population-based household surveys. STEPS promotes the concept that surveillance systems require standardized data collection but with sufficient flexibility to be appropriate in a variety of country situations and settings.

Estimation of the burden of NCD in terms of prevalence, incidence, and mortality is the first step to plan control measures in every country.

Interventions and health system capacity: infrastructure, policies and plans, access to key health-care interventions and treatments, and partnerships (30). Input data for estimates of the prevalence of chronic disease come from a variety of sources, including data from population surveys and reviews of insurance claims, which typically record the reasons for which patients have sought care and/or the diagnoses associated with the care episode.

The National Health and Nutrition Examination Survey (39) and the Medical Expenditure Panel Survey (formerly, National Medical Expenditure Survey) (40) are two important surveys that provide nationally representative information about disease prevalence and costs for the entire population. Data on Medicare claims provide extensive information for persons over 65 years of age. Insurance data for younger populations are fragmented between carriers and are more difficult to access.

The Behavioural Risk Factor Surveillance System (BRFSS) is widely used by state health agencies to measure the prevalence of chronic disease risk factors. It is the nation's premier system of health-related telephone surveys that collect state data about residents regarding their health-related risk behaviours, chronic health conditions, and use of preventive services (41).

Health Information Technology (HIT) can enhance efficiency, increase patient safety, and improve patient outcomes (42). However, features of HIT intended to improve patient care can lead to rejection of HIT (43) or can produce unexpected negative consequences or unsafe workarounds if poorly aligned with workflow (44).

1.3.1. Global and regional governance processes

Governance and leadership is a central building block for health systems (45). The term governance is used widely in public administration, with little agreement on the definition. It refers collectively to institutional arrangements and management processes that include the setting of overall directions through policy development and coordination mechanisms aimed at delivering an acceptable range of outcomes.

The architecture of governance may influence the efficiency and effectiveness of a health system's activities by ensuring the best use of resources and reducing duplication and redundancy in the system. The focuses will be mainly on national-level governance mechanisms for responding to NCDs, as these are critical in providing stewardship and mobilizing the necessary political commitments, and may also define the sub-national and service delivery arrangements. The governance systems conceptualized along three key dimensions.

Governance structures: The roles and responsibilities, inter-relationships, and architecture of the institutional structures within Ministries of Health (MOH) that are involved in oversight, management, and planning for NCDs.

Policy development and planning: Policies and plans may be NCD-specific and 'sector-wide' (i.e. national health plans) covering all the programs and diseases and other sector-wide issues (e.g. human resources, health financing, information, etc.).

Multi-sectoral coordination, building coalitions and partnerships: Effective regulation of and influence over the lifestyle and other environmental determinants of NCDs require interventions across multiple sectors and stakeholders increasing the salience of multi-sectoral coordination.

The governance of health systems and disease-specific programs, especially in aid-dependent countries, are influenced by architecture of funding flows, policies, accountability and reporting requirements at global and regional level (46)

1.4. Risk factors for chronic diseases

Risk factors are described as characteristics thought to present an individual or a group of people with a higher probability of an undesirable outcome, difficulty, and/or problem (47). The leading global risks for mortality in the world are high blood pressure (responsible for 13% of deaths globally), tobacco use (9%), high blood glucose (6%), physical inactivity (6%), and overweight and obesity (5%) (49). These risks are responsible for raising the risk of chronic diseases such as heart disease, diabetes and cancers. They affect countries across all income groups: high, middle and low. Factors that can reduce the occurrence of these important diseases could contribute to important improvements in health and longevity.

To prevent disease and injury, it is necessary to identify and deal with their causes – the health risks that underlie them. Each risk has its own causes too, and many have their roots in a complex chain of events over time, consisting of socioeconomic factors, environmental and community conditions, and individual behaviour. The causal chain offers many entry points for intervention. In addition to multiple points of intervention along the causal chain, there are many ways that populations can be targeted. The two major approaches to reducing risk are:

• targeting high-risk people, who are most likely to benefit from the intervention

• targeting risk in the entire population, regardless of each individual's risk and potential benefit.

Although there are many possible definitions of "health risk", it is defined in this report as "a factor that raises the probability of adverse health outcomes" (48). A 'risk factor' refers to any attribute, characteristic or exposure of an individual which increases the likelihood of developing an NCD. The major modifiable behavioural risk factors (13, 35) are tobacco use, harmful alcohol consumption, unhealthy diet (low fruit and vegetable consumption, a diet high in salt), and insufficient physical activity.

The major biological risk factors (13, 35) are overweight and obesity raised blood pressure, raised blood glucose, abnormal blood lipids, including raised cholesterol. These eight major behavioural and biological risk factors are therefore included in STEPS NCD risk factor surveillance. The most cost-effective interventions to reduce these risk factors are population-wide programs to:

• Reduce salt in processed foods, cut dietary fat, particularly saturated fats

• Encourage more physical activity

• Encourage higher consumption of fruits and vegetables

• Cease smoking (49).

Reductions in the incidences of many NCD and their complications are, however, already possible. Up to 80% of all cases of cardiovascular disease or type-2 diabetes and 40% of all cases of cancer, for example, are probably preventable based on current knowledge (50). While deaths from non-communicable diseases mainly occur in adulthood, exposure to risk factors begins in childhood and builds up throughout life, underpinning the importance of legislative and regulatory measures, as appropriate, and health promotion interventions that engage State and non-State actors from within and outside the health sectors, to prevent

tobacco use, physical inactivity, unhealthy diet, obesity and harmful use of alcohol and to protect children from adverse impacts of marketing (35).

An international, standardized case-control study was established to assess the importance of risk factors for coronary heart disease worldwide. From 52 countries representing every inhabited continent, 15152 cases and 14820 controls were enrolled. Smoking (odds ratio 2.87 for current vs. never, population attributable risk 35.7% for current and former smoker vs. never), raised apolipoprotein B / apolipoprotein A1 ratio (3.25 for top vs. lowest quintile, population attributable risk 49.2 for top four quintiles vs. lowest quintile), history of hypertension (1.91, 17.9%), diabetes (2.37, 9.9%), abdominal obesity (1.12 for top vs. lowest tertile and 1.62 for middle vs. lowest tertile, 20.1% for top two tertiles vs. lowest tertile), psychosocial factors (2.67, 32.5), daily consumption of fruits and vegetables (0.70, 13.7% for lack of daily consumption), regular alcohol consumption (0.91, 6.7%), and regular physical activity (0.86, 12.2%) were all significantly related to acute myocardial infarction ($P < 0.01$ for all risk factors, and $P < 0.05$ for alcohol). These associations were noted in men and women, old and young and in all regions of the world. Collectively these nine risk factors accounted for 90% of the population attributable risk in men and 94% in women. This finding suggests that approaches to prevention can be based on similar principles worldwide (51).

Most guidelines for the prevention of coronary heart disease (CHD) recommend preventative measures to asymptomatic individuals at high risk. The shape of the future burden of chronic disease can be projected by data on risk factors (52). The most commonly used risk prediction equations are based on the Framingham Heart Study (53).

Continuing improvement in decreasing of incidence and mortality of NCD will depend on much more evidence and better use of existing evidence to inform policy, as well as on the creation of systems to collect data regularly on risk factors for chronic disease (54).

1.4.1. Tobacco use

Tobacco use continues to be the leading global cause of preventable death. It kills nearly 6 million people and causes hundreds of billions of dollars of economic damage worldwide each year (13). In 2015, tobacco use caused 6.9% of the global disease burden – as estimated in DALYs (55). Most of these deaths occur in low- and middle-income countries, and this

disparity is expected to widen further over the next several decades. If current trends continue, by 2030 tobacco will kill more than 8 million people worldwide each year, with 80% of these premature deaths among people living in low- and middle-income countries. Over the course of the 21st century, tobacco use could kill a billion people or more unless urgent action is taken. In 2013, WHO Member States agreed to target a 30% relative reduction in the prevalence of current tobacco use by 2025 (35).

Smoking increases the risk of heart disease, cancer, stroke, and chronic lung disease (56). Environmental tobacco smoke has been demonstrated to increase the risk of heart disease and cancer among non-smokers. Second-hand smoking was estimated to cause 1.0% of the global disease burden in 2015, and nearly a million deaths worldwide. Many of these deaths were among children (13, 55). It has also been shown that non-smokers exposed to second-hand smoke have a 25% to 35% increased risk of suffering acute coronary diseases, and increased the frequency of chronic respiratory conditions (57). Small children whose parents smoke at home have an increased risk of suffering lower tract respiratory infections, middle ear infections and asthma (58, 59). Cessations of smoking by current smokers reduce their risk of heart disease, cancer, stroke, and respiratory disease (60). In 2010, the global prevalence of current tobacco smoking was estimated at around 22%. Smoking prevalence was about five times higher among men (37%) than among women (7%). Projections for 2025 are that the prevalence will slightly decrease, to around 19% (33% for men and 5% for women). Smoking prevalence varied widely across the WHO regions in 2010, with the highest percentage of 30% of current smokers in the WHO European Region, and the lowest of 13% in the WHO African Region. However, projections for 2025 include that prevalence in the WHO African Region will increase to 18%, while prevalence in the WHO European Region will decrease to about 23% (13, 61).

Tobacco use prevalence in Europe is characterized by large disparities, with Western nations reporting smoking rates generally below 25%, while Eastern nations have smoking rates usually above 30% (62). In total, in the European region, 45% of males and 24% females over 15 years old are smokers (63). Kosova is a country with some specifics, for example, Kosova's economic performance at the last assessment was evaluated as relatively weak as compared to South-eastern Europe. Kosova's economy would need to grow 10% to 12% per annum respectively for the next ten years to reach Albania's and Montenegro's income level (64). The total population in Kosova according to the census of 2011 is 1,739,825 inhabitants

(65), Birth rate 15.7‰ and Total Mortality 3.2‰. The mean age of the population is estimated to be 30.2 years and life expectancy at birth is 76.7 years: 79.4 years for females and 74.1 for males. In the years 2012 and 2013 the number one cause of death in Kosova were circulatory system diseases and the number two cause was neoplasm's (66). Due to lack of the law on statistics and weak implementation of the health law as well as relevant existing bylaws, health information flow remains fragmented and weak. Until recently, no reliable epidemiological data were available on the prevalence of smoking in Kosova adults. A study with school children (67) and first-year medical students was available (68). In 2011 Kosova conducted the European School Survey Project on Alcohol and Other Drugs (ESPAD) on 15-16 years old school children (69) and the Netherlands (70).

The WHO Framework Convention on Tobacco Control, (71) the primary tool developed by and available to countries to control tobacco use and exposure, noted the serious burden that the production and consumption of tobacco products placed on the poor. While tobacco reduction efforts have achieved considerable success in high-income countries, (72, 73) tobacco companies have intensified marketing strategies to target vulnerable populations of LMICs, such as women and adolescents (74, 75, and 76)

1.4.2. Alcohol consumption

Alcohol contributes to more than 60 types of disease and injury, Harmful use of alcohol is associated with a risk of developing NCDs, mental and behavioural disorders, including alcohol dependence, as well as unintentional and intentional injuries, including those due to road traffic accidents and violence (13). The highest numbers of deaths from alcohol are from cardiovascular diseases, followed by injuries (especially unintentional injuries), gastrointestinal diseases (mainly liver cirrhosis) and cancers. From 4% to about 25% of the disease burden due to specific cancers are attributable to alcohol worldwide (77).

In the United States, approximately 5,000 infants are born each year with fetal alcohol syndrome, which is irreversible and the leading known cause of mental retardation (78). Although regarding 26 studies analysis by Patra et al. (79) heavy alcohol consumption increases the relative risk of any stroke while light or moderate alcohol consumption may be protective against ischemic stroke.

The level of alcohol consumption worldwide in 2010 was estimated at 6.2 litres of pure alcohol per person aged 15 years and over (equivalent to 13.5 g of pure alcohol per day) (13, 77). A quarter of this consumption (24.8%) was unrecorded, i.e., homemade alcohol, illegally produced or sold outside normal government controls. Of total recorded alcohol consumed worldwide, 50.1% was consumed in the form of spirits (77).

There is wide variation in alcohol consumption across regions. Consumption levels in some Eastern European countries are around 2.5 times higher than the global average of 6.2 litres of pure alcohol per year. With the exception of a few countries, the lowest consumption of 0.7 litres of pure alcohol in the Eastern Mediterranean region, and the highest consumption of 10.9 litres in the European region (13).

In 2014, the World Health Organization reported that alcohol contributed to more than 200 diseases and injury-related health conditions, most notably DSM–IV alcohol dependence (see sidebar), liver cirrhosis, cancers, and injuries. In 2012, 5.1 percent of the burden of disease and injury worldwide (139 million disability-adjusted life-years) was attributable to alcohol consumption (77) the global prevalence of heavy episodic drinking during the past 30 days was estimated to be 7.5% in 2010 (13).

According to the 2015 National Survey on Drug Use and Health (NSDUH), 86.4 percent of people ages 18 or older in the United States reported that they drank alcohol at some point in their lifetime; 70.1 percent reported that they drank in the past year; 56.0 percent reported that they drank in the past month (80). In 2015, 26.9 percent of people ages 18 or older in the United States reported that they engaged in binge drinking in the past month; 7.0 percent reported that they engaged in heavy alcohol use in the past month (81).

The net effect of alcohol on cardiovascular disease in older people may be protective in regions where alcohol is consumed lightly to moderately in a regular fashion without binge drinking. Ischemic stroke deaths, for example, would be 11% higher in high-income countries if no one drank alcohol. However, even in high-income countries, although the net impact on cardiovascular disease is beneficial, the overall impact of alcohol on the burden of disease is harmful. Alcohol use causes about 3.3 million deaths each year and 5.1% of the global disease burden – as estimated in DALYs – in 2015 (12). There are significant sex differences in the proportion of global deaths attributable to alcohol, for example, in 2012,

7.6% of deaths among males and 4.0% of deaths among females were attributable to alcohol (77), reflecting differences in drinking habits, both in quantity and pattern of drinking. The regions with the highest proportions of deaths attributed to alcohol were Eastern Europe (more than 1 in every 10 deaths), and Latin America (1 in every 12 deaths). In general, the greater the economic wealth of a country, the more alcohol is consumed and the smaller the number of abstainers (77). Besides the direct loss of health due to alcohol addiction, alcohol is responsible for approximately 20% of deaths due to motor vehicle accidents, 30% of deaths due to oesophageal cancer, liver cancer, epilepsy and homicide, and 50% of deaths due to liver cirrhosis (48). In 2013, WHO Member States agreed to target an at least 10% relative reduction in the harmful use of alcohol by 2025, as appropriate, within the national context (35).

Data about prevalence of alcohol consumption in Kosova adults are missing. This is the first representative population survey conducted in Kosova that include and alcohol prevalence in Kosova adults. After this study, we have only one study with adolescent presented in two publications in 2016 (82, 83).

1.4.3. Unhealthy diet – low fruit and vegetable intake

Fruit and vegetable consumption is one element of a healthy diet. They have been recommended as a key component of a healthy diet for the prevention of chronic diseases (84). Regular consumption of fruits, vegetables, whole grains, and other plant foods has been negatively correlated with the risk of the development of chronic diseases. A wide variety of fruits, vegetables, whole grains, and other plant foods provide a range of nutrients and different bioactive compounds including phytochemicals, vitamins, minerals, and fibres (85).

Fruit and vegetable intake varies considerably among countries: reflecting economic, cultural and agricultural environments. Insufficient intake of fruit and vegetables is estimated to cause around 14% of gastrointestinal cancer deaths, about 11% of ischemic heart disease deaths and about 9% of stroke deaths worldwide. Most of the benefit of consuming fruits and vegetables come from the reduction in cardiovascular disease, but fruits and vegetables also prevent cancer (49). The results, however, are not entirely consistent. While several studies found that

consumption was associated with a lower risk of mortality, (86, 87) no significant differences in risk of mortality were observed between vegetarians and non-vegetarians in a British population (88).

However, the recommendation to eat fruit and vegetables to prevent chronic diseases is mainly based on observational epidemiological studies, which leaves much uncertainty regarding the causal mechanism of this association (89).

Wang et al. (90) has performed a meta-analysis of prospective cohort studies to quantify the dose-response relation between fruit and vegetable consumption and risk of all-cause, cardiovascular, and cancer mortality and come to conclusion that higher consumption of fruit and vegetables is associated with a reduced risk of mortality from all causes and cardiovascular disease. The risk of all-cause mortality was decreased by 5% for each additional serving a day of fruit and vegetables, by 6% for fruit consumption, and by 5% for vegetable consumption. While they found a significant inverse association between cardiovascular mortality, higher consumption was not appreciably associated with risk of cancer mortality (90). According to WHO adequate consumption of fruit and vegetables reduces the risk of cardiovascular diseases, stomach cancer and colorectal cancer (20). In 2015, low intake of fruits and vegetables was estimated to cause 4.7% of the global disease burden – as estimated in DALYs (55).

In 2013, WHO Member States agreed to a diet indicator regarding monitoring of the prevalence of persons aged 18+ years consuming less than five total servings (400 grams) of fruit and vegetables per day (35). In many countries worldwide, the vast majority of the population consumes less than the recommended amount of five servings of fruit and vegetables per day (13).

In 2002 in the United States, a total of 77% of adults did not consume a daily average of >=5 servings of fruits and vegetables. Men were less likely to consume ≥5 servings than were women (78). Healthy People 2010 Objectives: 19-5: Increase the proportion of persons aged ≥2 years who consume ≥2 servings of fruit/day. 19-6: Increase the proportion of persons aged ≥2 years who consume ≥ 3 daily servings of vegetables, with at least one-third of them being dark green or orange vegetables.

In Kosova, until now we didn't have any study about of prevalence of fruit and vegetable consumption among adults. There is only one study in Switzerland where was presented fruit and vegetable consumption among migrants in Switzerland compared with Swiss nationals (91) and where the relative risk of low daily fruit and vegetable intake relative to recommended intake was higher in Kosova nationals.

1.4.4. Insufficient physical activity

Physical activity reduces the risk of cardiovascular disease, some cancers and diabetes type 2. Worldwide, Lee et al. (92) estimate that physical inactivity is responsible for between 6% and 10% of the major NCDs of CHD, type 2 diabetes, and breast and colon cancers. Additionally, physical activity is a key determinant of energy expenditure, and this is fundamental to energy balance and weight control (93). Insufficient physical activity accounts for about 3.8% of cases of dementia worldwide (94).

In the study of de Rezende et al. (95) in Brazil, physical inactivity is attributable to 3% to 5% of all major NCDs and 5.31% of all-cause mortality, ranging from 5.82% in the south-eastern region to 2.83% in the southern region. Eliminating physical inactivity would increase the life expectancy by an average of 0.31 years. This reduction would affect mainly individuals with $\geq$ 15 years of schooling, male, Asian, elderly, residing in an urban area and earning $\geq$ 2 times the national minimum wage.

In 2013, insufficient physical inactivity cost health-care systems international $ (INT$) 53.8 billion worldwide (96). Physical activity occurs across different domains, including work, transport, domestic duties and during leisure. In high-income countries, most activity occurs during leisure time, while in low-income countries most activity occurs during work, chores or transport. Globally, in 2010, 23% of adults aged 18 years and over were insufficiently physically active – i.e. they did less than 150 minutes of moderate-intensity physical activity per week, or equivalent, as recommended by WHO. Women were less active than men, with 27% of women and 20% of men not reaching the recommended level of activity (93). The WHO Eastern Mediterranean Region (31%) and the Region of the Americas (32%) had the highest prevalence of insufficient physical activity, while the prevalence was lowest in South-East Asia (15%) and African Region (21%). Insufficient physical activity in adults increased according to the level of country income in 2010, with the prevalence in high-income

countries (33%) about double that in low-income countries (17%) (13). In 2015, insufficient physical activity was estimated to cause 1.4% of the global disease burden – as estimated in DALYs (55). Physically inactive persons have a 20% to 30% increased risk of all-cause mortality as compared to those who adhere to 150 minutes of moderate intensity activity per week, or equivalent (94).

In 2004, the World Health Organization (WHO) adopted the Global Strategy on Diet, Physical Activity and Health (49). For diet, it recommended that individuals achieve energy balance and a healthy weight; limit energy intake from total fats and shift fat consumption away from saturated fats to unsaturated fats and towards the elimination of trans-fatty acids; increase consumption of fruits, vegetables, legumes, whole grains, and nuts; limit the intake of free sugars; and limit salt consumption from all sources and ensure that salt is iodized. For physical activity, it recommended at least 30 minutes of regular, moderate-intensity physical activity on most days throughout a person's life (97).

Although evidence for the benefits of physical activity for health has been available since the 1950s, promotion to improve the health of populations has lagged in relation to the available evidence and has only recently developed an identifiable infrastructure, including efforts in planning, policy, leadership and advocacy, workforce training and development, and monitoring and surveillance (98). In 2013, WHO Member States agreed to target a 10% relative reduction in the prevalence of insufficient physical activity by 2025 (35).

Before our study in Kosova wasn't any population-based study about the physical activity among adult. In 2013/14 Tishukaj et al. (99) has examined anthropometric and physical fitness parameters in 14 to 15-year-old Kosovan adolescents living in rural and urban areas.

1.4.5. Overweight and obesity

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m2). For example, an adult who weighs 70kg and whose height is 1.75m will have a BMI of 22.9 (BMI = 70 kg / (1.75 m2) = 70 / 3.06 = 22.9)

The global epidemic of overweight and obesity - "globesity" - is rapidly becoming a major public health problem in many parts of the world (100). The risks of many medical complications grow with increasing Body Mass Index (BMI) and abdominal obesity. Obesity is a risk factor for a variety of chronic conditions including diabetes, hypertension, high cholesterol, stroke, heart disease, certain cancers and arthritis (101). Overweight and obesity are clearly associated with increased risks for certain types of cancer, including kidney, endometrial, colorectal, gallbladder and postmenopausal breast cancer (102). WHO estimates that, in 2005, more than 1 billion people worldwide were overweight (BMI ≥ 25) and more than 300 million were obese (BMI ≥ 30). Mean BMI, overweight and obesity are increasing worldwide due to changes in diet and increasing physical inactivity. Rates of overweight and obesity are projected to increase in almost all countries, with 1.5 billion people overweight in 2015. Average BMI is highest in the Americas, Europe and the Eastern Mediterranean. The risk of coronary heart disease, ischemic stroke and type 2 diabetes grows steadily with increasing body mass, as do the risks of cancers of the breast, colon, prostate and other organs. Chronic overweight contributes to osteoarthritis – a major cause of disability. Globally, 44% of diabetes burden, 23% of ischemic heart disease burden and 7–41% of certain cancer burdens are attributable to overweight and obesity. In both South-East Asia and Africa, 41% of deaths caused by high body mass index occur under age 60, compared with 18% in high-income countries (48).

It is now generally accepted that obesity is strongly associated with total mortality rates. Raised BMI is an established risk factor for several causes of death, including ischemic heart disease, (103) stroke, (104) and cancers of the large intestine, kidney, endometrial, and postmenopausal breast (105,106). Obesity also leads to adverse metabolic effects on cholesterol and triglycerides (107). Overweight and obesity cause nearly 4 million deaths annually and about 4.9% of the global disease burden – as estimated in DALYs (55).

Abdominal obesity is currently considered an important risk factor for cardiovascular disease and types 2 diabetes (108). WC and WHR are the most frequently used anthropometric indicators in epidemiological studies to determine visceral obesity (109). Waist circumference is an approximate index of intra-abdominal fat mass and total body fat. Changes in waist circumference reflect changes in risk factors for cardiovascular disease and other forms of NCDs (110), Waist circumference or waist-to-hip ratio are powerful determinants of subsequent risk of type 2 diabetes (111).

Although other anthropometric measures (e.g., waist circumference, waist-to-hip ratio) could well add extra information to BMI, and BMI to them, BMI is in itself a strong predictor of overall mortality both above and below the apparent optimum of about 22·5–25 kg/m2. The progressive excess mortality above this range is due mainly to vascular disease and is probably largely causal. At 30–35 kg/m2, median survival is reduced by 2–4 years; at 40–45 kg/m2, it is reduced by 8–10 years (which is comparable with the effects of smoking). The definite excess mortality below 22·5 kg/m2 is due mainly to smoking-related diseases and is not fully explained (112).

In general, overweight and obesity is caused by lack of physical activity or inappropriate eating patterns or a combination of both. The increase in overweight and obesity in recent decades has been caused by a combination of factors – technological, social and economic – that result in reduced physical activity and increased consumption of high energy food and drinks. Although obesity has a strong genetic link, the large increase in obesity in recent years comes from non-genetic factors. Obesity is an undesirable outcome of changing lifestyle and behaviours.

Overweight and obesity is considered the third most important risk factor for the attributable burden of disease in high-income countries (113). According data of WHO globally in 2014, 39% of adults aged 18 years and older (38% of men and 40% of women) were overweight (Body Mass Index (BMI) ≥ 25), and 13% were obese (BMI ≥ 30), including 11% of men and 15% of women. The prevalence of overweight and obesity was highest in the Region of the Americas (61% overweight, 27% obese) and lowest in the South-East Asia Region (22% overweight, 5% obese). Worldwide, obesity has more than doubled since 1980. The prevalence of overweight and obesity increased with the income level of countries, with the prevalence of obesity in high- and upper-middle income countries have been more than double of that of low-income countries in 2014 (13, 114).

Physical inactivity and unhealthy eating contribute to obesity and an appropriate amount, intensity, and duration of regular physical activity and decreased caloric intake might reduce a person's BMI. In 2013, WHO Member States agreed to target to halt the rise in obesity by 2025 (35).

In the Kosova till now is only one study about anthropometric characteristics among 14 to 15-year-old Kosovan adolescents living in rural and urban areas which were performed in 2013/14 (99). Our study is first population-based study which included and prevalence of overweight and obesity.

1.4.6. Raised blood pressure

During the last 30 years, hypertension treatment has improved dramatically, contributing to a decrease in the incidence of mortality due to stroke and coronary heart disease (CHD) (115). The highest worldwide blood pressure levels have shifted from high-income to low-income countries in South Asia and sub-Saharan Africa due to opposite trends, while blood pressure has been persistently high in central and Eastern Europe (116).

Cardiovascular and other non-communicable diseases are currently responsible for two-thirds of global mortality (20, 117). Hypertension (defined as systolic and/or diastolic blood pressure $\geq$ 140/90 mmHg) is a consistent and independent risk factor for cardiovascular and kidney diseases and stroke causing human suffering and imposing severe financial and service burdens on health systems (13, 118). It is also very common, its global prevalence in 2014 in adults aged 18 years and over was around 22% (23% for men, 21% for women). Across the WHO regions, raised blood pressure was highest in Africa (30%), and lowest in the Region of the Americas (18%). In all WHO regions, men had a slightly higher prevalence of raised blood pressure than women. The prevalence of raised blood pressure in adults was higher in low-income countries compared to middle- and high-income countries in 2014 (13).

Hypertension, which plays a part in approximately 55% of the global mortality caused by cardiovascular diseases and in 7% of all disability-adjusted life years, could be managed at fairly low cost, even in resource-poor settings (119, 120, and 121).

In the developed world, more than 80% of people with hypertension are aware of their condition and receiving treatment (122, 123). However, the health systems in most developing countries fail to detect and manage hypertension effectively (124, 125). Universal health coverage may allow great improvements in the control of such diseases (126, 127), but the best way to achieve such coverage, especially in low- and middle-income countries, remains unclear (128).

In 2013, WHO Member States agreed to target a 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances by 2025 (35). A reduction in systolic blood pressure of 10 mmHg is associated with a 22% reduction in coronary heart disease, and a 41% reduction in stroke in randomized trials, and a 41-46% reduction in cardio metabolic mortality in epidemiological studies. Identifying and treating hypertension early is associated with a reduction in the risk of heart attack, heart failure, stroke, and kidney failure (129). The majority of patients BPs remain uncontrolled in all societies, and the decline in CVD, particularly stroke, has slowed in some countries (130, 131).

Until recently Kosova didn't have epidemiologic data about the prevalence of hypertension. This is the first representative population-based study which includes and prevalence of hypertension.

1.4.7. Raised blood glucose

Diabetes Mellitus is a term which refers to a heterogeneous group of metabolic disorders which all share hyperglycaemia (elevated blood sugar) as a common feature (132). The prevalence of diabetes has been rising rapidly throughout the world. Globally, an estimated 422 million adults were living with diabetes (defined as a fasting plasma glucose value ≥ 7.0 mmol/L (126 mg/dl) or being on medication for raised blood glucose) in 2014, compared to 108 million in 1980. The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population.

By gender global age-standardized diabetes prevalence increased from an estimated 4.3% in 1980 to 9.0% in 2014 in men, and from 5.0% to 7.9% in women. This reflects an increase in associated risk factors such as being overweight or obese. Over the past decade, diabetes prevalence has raised faster in low and middle-income countries than in high-income countries (133, 134). By 2030 the prevalence is estimated to rise to 9.9%. The number of people with type 2 diabetes is increasing in every country and 80% of people with diabetes live in low- and middle-income countries. Approximately 50% are undiagnosed and most people with diabetes are between 40 to 59 years of age (135). The prevalence of diabetes was highest in the WHO Eastern Mediterranean Region (14%) and lowest in the African and

European Regions (7%) in 2014 (134). Diabetes is associated with many diseases and disabilities, including ischemic heart disease, visual impairment, peripheral arterial disease, peripheral neuropathy, and cognitive impairment (136).

It is also associated with mortality (137). In 2012, diabetes was estimated to cause 1.5 million deaths worldwide, and higher-than-optimal blood glucose caused an additional 2.2 million deaths. Forty-three percent of these 3.7 million deaths occurred before the age of 70 years (134). In 2015, raised blood glucose was estimated to cause 5.8% of the global disease burden – as estimated in DALYs (35, 55).

In the United States, the proportion of deaths attributable to diabetes was estimated to be 11.5% using self-reports in the National Health Interview Survey (NHIS), 11.7% using self-reports in The National Health and Nutrition Examination Survey (NHANES) and 11.8% using HbA1c in NHANES. The proportion of deaths attributable to diabetes is much greater than the 3.3-3.7% of deaths in which diabetes is assigned as the underlying cause of death (138).

People with diabetes require at least 2-3 times the health care resources compared to people who do not have diabetes, and diabetes care may account for up to 15% of national healthcare budgets. Diabetes imposes an increasing economic burden on national health care systems worldwide. The global health expenditure on diabetes is expected to total at least USD 376 billion or ID 418 billion in 2010 and USD 490 billion or ID 561 billion in 2030. Globally, 12% of the health expenditures and USD 1330 (ID 1478) per person are anticipated to be spent on diabetes in 2010 (139).

There was little variation in prevalence rates across WHO regions. The prevalence of diabetes was highest in the Eastern Mediterranean Region (11% for both sexes) and lowest in the WHO European Region (7% for both sexes). The magnitude of diabetes and other abnormalities of glucose tolerance will be considerably higher than the above estimates if the categories of "impaired fasting" and "impaired glucose tolerance" are included (140).

The prevalence of diabetes was relatively consistent across the income groupings of countries. The high-income countries showed the lowest prevalence rate (7% for both sexes),

possibly reflecting better dietary and other nonmedical interventions. The lower middle-income countries showed the highest prevalence rate (10% for both sexes).

In 2013, WHO Member States agreed to target to halt the rise in diabetes by 2025 (35). Clinical trials have shown that type 2 diabetes can be prevented or delayed for long periods of time if lifestyle and/or medical intervention are sought. Returning to normal glucose levels from prediabetes reduces the risk of developing diabetes (141). Lower extremity amputations are at least 8 times more common in people with diabetes than in non-diabetic individuals in developed countries, and around half of all non-traumatic lower limb amputations are due to diabetes (142).

This is the first population-based study about the screening of diabetes in Kosovan Population.

1.4.8. Abnormal blood lipids

Diets high in saturated fat, physical inactivity and genetics can increase cholesterol levels. Cholesterol increases the risks of heart disease, stroke and other vascular diseases. Globally, one-third of ischemic heart disease is attributable to high blood cholesterol (143). Overall, raised cholesterol is estimated to cause 2.6 million deaths (4.5%) of total) and 29.7 million DALYS, or 2% of total DALYS globally. Globally, the prevalence of raised total cholesterol (defined as $\geq$ 5.0 mmol/l) was at nearly 40% in 2008 (13). The prevalence of raised total cholesterol was highest in the WHO European Region (54%), followed by the Region of the Americas (48%). The WHO African Region and the WHO South-East Asia Region showed the lowest percentages (23% and 30%, respectively) (13).

The prevalence of raised total cholesterol increased noticeably according to the income level of the country. Data for the year 2008, show that in low-income countries, around a quarter of adults had raised total cholesterol, in lower-middle-income countries this rose to around a third of the population for both sexes. In high-income countries, over 50% of adults had raised total cholesterol; more than double the level of the low-income countries (144).

Observational studies show that there is a continuous positive relation between coronary disease risk and blood cholesterol concentrations (145, 146, and 147), so larger reductions in

LDL cholesterol might well produce larger reductions in risk. For example, a 10% reduction in serum cholesterol in 40-year old men has been reported to result in a 50% reduction in heart disease within five years, the same serum cholesterol reduction for 70-year old men can result in an average 20% reduction in heart disease occurrence within five years (148). In 2013, WHO the Member States agreed to an indicator regarding monitoring of the prevalence of raised total cholesterol among persons aged 18+ years (defined as total cholesterol ≥ 5.0 mmol/l or 190 mg/dl); and mean total cholesterol concentration (35). A large proportion of people with raised blood lipids remain unaware of or untreated for their condition (149). This is the first population-based study about the screening of hypercholesterolemia in Kosova Population.

1.5. Prevention of chronic diseases

Most countries are experimenting with disease prevention and early detection. Prevention includes primary, secondary or tertiary approaches that differ in aims and target groups.

Primary prevention is directed at the prevention of illnesses by removing the causes. The target group for primary prevention is those that are healthy with respect to the target disease.

Secondary prevention aims at identifying the disease at an early stage so that it can be treated. This makes an early cure possible (or at least the prevention of further deterioration). The target group for secondary prevention consists of people who are already ill without being aware of it or those who have an increased risk or a genetic disposition.

Tertiary prevention is directed toward people who are already known to suffer from an illness. This is, therefore, a form of care. Tertiary prevention includes activities intended to cure, to ameliorate or to compensate. For example, the avoidance of complications of the prevention of progression of disease would be classed as tertiary prevention (150).

According to European Guidelines on cardiovascular disease prevention in clinical practice (version 2012), (151) population is advised to follow the formula 0 3 5 140 5 3 0. It suggests that crucial measures in preserving cardiovascular health are as follows: no smoking (0), walking 3 km daily or 30 minutes of any moderate activity (3), blood pressure less than 140 mm Hg systolic (140), total blood cholesterol less than 5 mmol/L (5), LDL cholesterol less than 3 mmol/L (3), avoidance of overweight and diabetes (0).

There are many studies proving the beneficial effects of statins and ACE inhibitors in improving endothelial function and endorsing primary prevention (152).

The approaches vary according to the health care system and the dominant political opinions involved. Different countries may place different emphasis on the responsibility of the community and the individual, depending on cultural views regarding the role of the state and individual autonomy (150).

Scandinavian policies, for example, attach considerable importance to environmental factors and social conditions. Other countries, such as France, Germany and the United States focus more on the individual's attitude to risk factors such as tobacco, alcohol and nutrition (150).

Some countries, such as the United Kingdom, Canada and New Zealand, emphasize integrated approaches, with clinical care systems as part of a broader approach that involves public health and health promotion efforts linked to disease management and support for self-care (150).

Heads of states and governments made commitments to the prevention and control of non-communicable diseases (NCDs) in the Political Declaration from the UN High-level Meeting on NCDs in September 2011. A key commitment in the Political Declaration calls upon WHO to develop a comprehensive global monitoring framework to assess progress in the implementation of national strategies and plans for the four main NCDs: cardiovascular diseases (CVD), diabetes, cancer, and chronic respiratory diseases (153).

2. HYPOTHESIS

The socioeconomic factors influence the prevalence of the risks for non communicable diseases and health determinants in the post war Kosova.

3. AIMS AND PURPOSE OF THE RESEARCH

GENERAL AIM:

The overall objective of the study is to describe and analyse the distribution of chronic disease risk factors and specific determinants of health in Kosova, thereby to contribute to policy and programme recommendations on public health and improvement organization of health care services.

SPECIFIC AIMS:

1. To analyse the pattern of chronic diseases risk factor distribution in population of Kosova;
2. To analyse the socioeconomic and cultural, gender and age patterning of risk factor distribution in Kosova;
3. To compare the distribution of risk factors with those in neighbouring countires;
4. To propose health measures and organization of health care as a model for implementation in a transitional country as Kosova to cope the health risks.

4. MATERIALS AND METHODOLOGY

Material, subjects and methodology

A population-based survey of non-communicable diseases risk factors started in September 2010 by adopting the World Health Organization (WHO) STEPs Instrument (154), and the data collection was completed in March 2011. The study was done in National Institute of Public Health of Kosova (NIPHK). At that time the census of population in Kosova wasn't conducted, therefore the data for households according to the settlements from Statistical Agency of Kosova for 2008 were used (155), in total seven regions, 30 municipalities and 1464 settlements. The two-stage cluster random sampling was designed. Firstly, 120 enumeration areas were selected using probability proportional to size as the primary

sampling units, followed by randomly selecting households from them as the secondary sampling units, using the proportion of households in urban and rural areas. Respondents aged 15-64 years old were selected randomly within each gender and 10-year age-group. One resident aged 15 to 64 years within each of the households was recruited for the survey using the Kish method, which provides a tool for random selection of one individual from a household (154). The total sample size consisted of 6,400 men and women. The following assumptions for this cross-sectional study were used for sample size calculation: level of confidence 95%, the margin of error 5%, baseline level of risk factors 50%, expected response rate 90% and the design effect of 1.5.

The WHO STEPs module is recommended for use on adults in the age group 25-64 years (154). The age group of 15-24 years, which is the optional age group in STEPs, were included in this study because according to the existing data, Kosova has a high percentage of young people in its population (around 19.3% of the population are in this age group) (156). We will also implement the Step 3- Biochemical measurements (only glucose and cholesterol) in the subsample of 1000 participants.

Measurements

The WHO STEP wise approach to surveillance (STEPS) is the WHO's recommended tool for surveillance of chronic diseases and their risk factors. It provides an entry point for low and middle-income countries to get started on chronic disease surveillance activities. It is also designed to help countries to get started on chronic disease surveillance activities. It is also designed to help countries build and strengthen their capacity to conduct surveillance (157). We have used three STEPS to gather information. STEP 1 measures behavioural risk factors, STEP 2 covers physical measurements, and STEP 3 measures biological risk factors.

Socio-demographic information on age and gender, education, marital and work status, as well as information on tobacco use, alcohol consumption, fruit and vegetable consumption, physical activity, and history of chronic conditions, was collected by trained interviewers in face to face interviews. We used the dry method to measure biological risk factors.

Step 1 - Behaviour
- Tobacco use. In this study, we present only data on smoking behaviour from Step 1 and answers on the core questions: Do you currently smoke any tobacco products, such as

cigarettes, cigars or pipes? Do you currently smoke tobacco products daily? How old were you when you first started smoking daily? On average, how many of the following (manufactured cigarettes; Hand-rolled cigarettes; Pipes full of tobacco; Cigars, cheroots, cigarillos) do you smoke each day? Current smokers were defined as persons who reported smoking any tobacco products, such as cigarettes, cigars, or pipes daily or non-daily irrespective of the quantity and current daily smokers if they smoked ≥ 1 cigarette per day (154).

- Alcohol Consumption. Questions were asked to determine the percentage of lifetime abstainers, Percentage who are past 12 month abstainers, Percentage who currently drink (drank alcohol in the past 30 days), Percentage who engage in heavy episodic drinking (men who had 5 or more / women who had 4 or more drinks on any day in the past 30 days) using the WHO protocol (154).

- Fruit and Vegetable Consumption - Diet. Information was recorded on the number of days that respondents consumed fruit and vegetables in a typical week, and the number of servings of fruit and vegetables consumed on average per day. Less than five servings of fruits and vegetables per day were considered insufficient fruit and vegetable intake (154).

- Physical Activity. Physical activity was assessed using the Global Physical Activity Questionnaire (GPAQ), (158). The GPAQ asks respondents about activity for transport purposes, vigorous and moderate activity at work, and vigorous and moderate activity in leisure time, and time spent sitting. Show-cards with culturally relevant examples were used to aid respondents in classifying activities. Analysis and categorization followed existing guidelines. (154, 159), and those who did not meet the criteria for vigorous and moderate intensity activities were categorized as having low physical activity. Percentage with low levels of activity (defined as < 600 MET-minutes per week), Percentage with high levels of activity (defined as ≥ 3000 MET-minutes per week), Median time spent in physical activity on average per day (minutes) (presented with inter-quartile range), Percentage not engaging in vigorous activity.

Step 2 - Physical Measurements

Using a standardized protocol (154) blood pressure was measured third in the right arm at heart level while the participant will seat. Blood pressure was measured using automated

devices (Tensovalt, Germany). Raised blood pressure was defined as having a systolic blood pressure ≥ 140 mm Hg and/or diastolic blood pressure ≥ 90 mm Hg during the study, or currently on medication for raised BP).

Weight and height were measured with participants' barefoot and wearing lightweight clothing. Weight was measured with the electronic scale (Seca Gmbh, Hamburg, Germany). Height was measured using a portable stadiometer. Body mass index was calculated as weight in kilograms divided by height in meters squared. We will use those criteria for BMI classification: Underweight (BMI<18.5); Normal weight (BMI 18.5-24.9); Overweight (BMI 25-29.9) and Obese (BMI≥30).

Step 3 - Biochemical Measurement

A mobile laboratory was used in data collection. The mobile laboratory contained logistics and human resources required including an Accutrend plus and all materials required for blood glucose testing and lipid profile measurements. Fasting samples were taken to measure blood glucose and blood lipids and measured using the dry method Participants were instructed to fast overnight for 12 hours and diabetic patients on medication were reminded to bring their medicine/insulin with them and take their medicine after providing the blood sample.

Fasting blood glucose classification: Normal (<7.0 mmol/l); Raised (≥7.0 mmol/l); currently on medication. Total blood cholesterol classification: Normal (<5.0 mmol/l); Elevated (5.0-6.1 mmol/l) and High (≥6.2 mmol/l).

Summary of combined risk factors

Current daily smokers, less than 5 servings of fruits & vegetables per day, low level of activity, overweight (BMI ≥ 25 kg/m2), raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP).

General data of questionnaire

Instrument for collecting the data in the first part have questions for socioeconomic status (health determinant) like age, gender, years spent at school, the highest level of education, ethnicity, marital status, work status, mean reported per capita annual income of respondents in local currency and an estimate of the annual household income.

Ethical Approval Received from Ethical Committee of the Medical Faculty, University of Prishtina, number 4483.

Data collection and quality control

The questionnaires were adapted and translated into the Albanian language and back-translated into English to ensure its validity. To ensure high quality of data, the group of 45 field workers (public health professionals of NIPHK) conducted three days training for field data collectors and supervisors. From them, ten (five men and five women) were recruited and trained as surveyors. In the end of training was conducted the pilot test. The field workers worked in pairs of men and women to facilitate anthropometry measurement of female respondents by female field workers. Two supervisors were responsible for the STEPS data quality control, including accuracy and completeness of data obtained. All instruments were standardized and calibrated routinely. Weekly field meetings were held to enable researchers, supervisors and surveyors to identify and discuss problems encountered during STEPS data collection processes. Completed questionnaires were sent to data entry manager.

Data management and analysis

A standardized data entry program using SPSS software was used for data entry. The further cleaning process of outliers was undertaken in the pooled data, and uniform indicators on various risk factors (for example, variables on the level of physical activity or overweight, etc.) were developed for all sites to ensure consistency and comparability. Following the WHO STEPS model, we also constructed a new variable for combined risk factors, which showed the clustering of the following risk factors: current daily smokers, less than five servings of fruits and vegetables per day, low level of physical activity, overweight, and raised blood pressure. All categorical risk factors were presented as a proportion in percentages with their 95% confidence interval (CI). The mean values of all continuous risk factors were also presented with their 95% CI.

Statistical analysis was undertaken using SPSS version 22.0. Data are presented as percentage and 95% confidence interval. Chi-square test or Fisher exact test was performed to test the differences in proportions of qualitative variables between groups, Mann Whitney U test for testing the difference between quantitative variables when distribution was not normal and Student t-test when distribution was normal. The level $P<0.05$ was considered as statistically significant.

5. RESULTS

Out of 6,400 persons planned for research, 6,117 were included which is approximately 95.6%. The response rate was slightly higher among females 96.5% compared with males 94.6%. The response rate has been higher among 15-24 years old participants with 99.2% (Table 1). Of the total respondents, 49.5 % were men (Table 1).

Table 1.Response proportions by gender

Age Group (Year)	Men			Women			Both Sexes		
	Eligible	Responded		Eligible	Responded		Eligible	Responded	
	n	n	%	N	n	%	N	n	%
15-24	640	633	98.9	640	637	99.5	1280	1270	99.2
25-34	640	603	94.2	640	607	94.8	1280	1210	94.5
35-44	640	594	92.8	640	610	95.3	1280	1204	94.1
45-54	640	624	97.5	640	607	94.8	1280	1231	96.2
55-64	640	594	92.8	640	608	95.0	1280	1202	93.9
15-64	3200	3028	94.6	3200	3089	96.5	6400	6117	95.6
25-64	2560	2415	94.3	2560	2432	95.0	5120	4847	94.7

5.1. Socio-demographic and behavioural characteristics of the study population

The socio-demographic characteristics of the sample population are presented in Table 2. About 1200 respondents of each age group, have participated in research without any significant difference according to their place of residence (P>0.05). Of the total respondents, 49.5 % were men. Residing in the village was 60.6%. Four in ten of them had primary or less education (no one to eight years of schooling). Currently married was 64.9%. The annual income of 1,500 euros or less has 10.2%. The mean number of family members more than 18 years old except responder was 4.7. None of the investigators were Underweight, 47.1% with Normal weight, Overweight were 33.7% (Rural 33.0% vs. Urban 34.7%), Obese 19.2% (Rural 20.4% vs. Urban 17.4%), with significant difference according to residence (P <0.05). Current users of tobacco were 28.4% (Rural 25.5% vs. Urban 33.0%), with the significant difference according to residence (P<0.01). Current alcohol users 8.4% (Rural 7.1% vs. Urban 10.3%), with the significant difference according to residence (P<0.01). Hypertension had 36.2% of responders (Rural 37.9% vs. Urban 33.6%), with the significant difference

according to residence (P<0.01). Low physical activity 36.1% (Rural 34.0 vs. Urban 39.2%), with the significant difference according to residence (P<0.01). Low fruit and vegetable intake 86.5% (Rural 87.2% vs. Urban 85.4%), with the significant difference according to residence (P<0.05), (Table 2).

Table 2. Socio-demographic and behavioural characteristics of the study population, STEPS survey, Kosova 2011

Characteristics	Rural N (%) N = 3709	Urban N (%) N = 2408	Total N (%) N = 6117
Age groups (years)			
15-24	757 (20.4)	513 (21.3)	1270 (20.8)
25-34	730 (19.7)	480 (19.9)	1210 (19.8)
35-44	727 (19.6)	477 (19.8)	1204 (19.7)
45-54	761 (20.5)	470 (19.5)	1231 (20.1)
55-64	734 (19.8)	468 (19.4)	1202 (19.7)
P-value	0.714		
Gender			
Male	1831 (49.4)	1197 (49.7)	3028 (49.5)
Female	1878 (50.6)	1211 (50.3)	3089 (50.5)
P-value	0.829		
Educational status			
Illiterate	141 (3.8)	57 (2.4)	198 (3.2)
Up to primary education	1603 (43.2)	636 (26.4)	2239 (36.6)
Up to secondary education	1178 (31.8)	1167 (48.5)	2345 (38.3)
Higher education	787 (21.2)	548 (22.8)	1335 (21.8)
P-value	0.000		
Marital status			
Never married	1140 (30.7)	790 (32.8)	1930 (31.6)
Currently married	2453 (66.1)	1518 (63.0)	3971 (64.9)
Separated/divorced	11 (0.3)	22 (0.9)	33 (0.5)
Widowed and cohabitating	105 (2.8)	78 (3.2)	183 (3.0)
P-value	0.018		
The annual household income			
≤ 1500 €	472 (12.7)	150 (6.2)	622 (10.2)
> 1500 €, ≤ 2500 €	753 (20.3)	373 (15.5)	1126 (18.4)
> 2500 €, ≤ 3500 €	603 (16.3)	296 (12.3)	899 (14.7)
> 3500 €, ≤ 4500 €	545 (14.7)	337 (14.0)	882 (14.4)
> 4500 €	1111 (30.0)	1056 (43.9)	2167 (35.4)
No answer	225 (6.1)	196 (8.1)	421 (6.9)
P-value	0.000		

Table 2. (Continued)

Characteristics	Rural N (%) N = 3709	Urban N (%) N = 2408	Total N (%) N = 6117
BMI			
Normal	1727 (46.6)	1153 (47.9)	2880 (47.1)
Overweight	1225 (33.0)	835 (34.7)	2060 (33.7)
Obese	757 (20.4)	420 (17.4)	1177 (19.2)
P-value	0.015		
Current smoking			
Yes	946 (25.5)	794 (33.0)	1740 (28.4)
No	2763 (74.5)	1614 (67.0)	4377 (71.6)
P-value	0.000		
Current alcohol use[a]			
Yes	264 (7.1)	248 (10.3)	512 (8.4)
No	3445 (92.9)	2160 (89.7)	5605 (91.6)
P-value	0.000		
Hypertension[b]			
Yes	1406 (37.9)	810 (33.6)	2216 (36.2)
No	2303 (62.1)	1598 (66.4)	3901 (63.8)
P-value	0.001		
Low physical activity[c]			
Yes	1261 (34.0)	945 (39.2)	2206 (36.1)
No	2448 (66.0)	1463 (60.8)	3911 (63.9)
P-value	0.000		
Low fruit and vegetable intake [d]			
Yes	3234 (87.2)	2056 (85.4)	5290 (86.5)
No	475 (12.8)	352 (14.6)	827 (13.5)
P-value	0.047		

[a] One who has drank alcohol in the past 30 days

[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication

[c] Low physical activity

[d] Less than five servings of fruits and vegetables per day

5.2. Behavioural risk factors

The major modifiable behavioural risk factors are tobacco use, harmful alcohol consumption, low fruit and vegetable consumption and insufficient physical activity. The major biological risk factors are overweight and obesity raised blood pressure, raised blood glucose, abnormal blood lipids, including raised cholesterol. In this section of results are presented results of six risk factors tobacco use, alcohol consumption, unhealthy diet-low fruit and vegetable consumption, insufficient physical activity, overweight and obesity and raised blood pressure. Those six risk factors were measured on the sample of 6117 respondents.

5.2.1. Tobacco use

In the age group 15-64 years old the prevalence of smoking was 28.4%. Prevalence of smoking was higher among male 37.4% compared with female 19.7%, with significant difference (P<0.01). Among the current smokers of ages 15 – 64, current daily smokers were 90.1%. Among the daily smokers, 93.6% smoke manufactured cigarettes. The mean age of starting smoking was 20.9 years. The mean amount of manufactured cigarettes smoked during the day was 20.9 cigarettes.The detailed results of prevalence of smoking are presented in our publication (160).

Table 3 presents the prevalence of current smoking per age groups and per residential areas. The overall prevalence of current smoking in individuals aged 15-64 years in Kosova was 28.4% (95% CI 27.3 – 29.6%), the prevalence was 33.0% (95% CI 31.1 – 34.9%) among urban residents and 25.5% (95% CI 24.1 – 26.9%) among rural residents. This difference in prevalence between urban and rural areas was statistically significant (P<0.001).

The current smoking prevalence increases along with age. The prevalence increased from 16.0% (95% CI 14.1 - 18.1%) for the 15-24 years age group to 36.9% (95% CI 34.2 - 39.6%) for the 35-44 years age group. After age 45 we have the slight decrease in prevalence. This positive correlation between current smoking and age was observed in

both rural and urban areas. In urban areas the prevalence increased from 18.1% (95% CI 15.0 - 21.7%) for the 15-24 years age group to 43.0% (95% CI 38.6 – 47.5%) for the 35-44 years age group and in rural areas the prevalence increased from 14.5% (95% CI 12.2 - 17.2%) to 32.9% (95% CI 29.6 - 36.4%) for the same age groups.

Prevalence of current smoking at both sexes was higher at respondents living in the city, compared to those living in the village with significant difference (P<0.01). The prevalence of current smoking varies according to the educational status it was higher at people Up to secondary education 36.6% (95% CI 34.7 – 38.6%), while the lowest was at Illiterate 17.7% (95% CI 13.0 - 23.6%). This positive correlation between current smoking and educational status was observed in rural and urban areas. At rural areas prevalence of current smoking was lowest at Illiterate 18.4% (95% CI 12.9 - 25.6%) and the highest in those with secondary preparation 35.9% (95% CI 33.2 - 38.7%). In urban areas prevalence of current smoking was lowest at Illiterate 15.8% (95% CI 8.5 - 27.4%) and the highest in those with secondary preparation 37.4% (95% CI 34.6 - 40.2%).We have distinguished the significant statistical difference in the prevalence of current smoking according to school preparation and residence (P< 0.01).

Prevalence of current smoking varies according to the marital status it was highest at Separated/divorced 36.4% (95%CI 22.2 – 53.4%), while lowest at Never married 22.7% (95%CI 20.9 – 24.6%), without significant difference by residence (P>0.05).

Prevalence of current smoking was highest at respondents with the annual household income > 1500 €, ≤ 2500 € with 30.0% (95% CI 27.4-32.8%). This positive correlation between current smoking and annual household income was observed in both rural and urban areas, but it was higher in urban areas with significant difference (P<0.01). The prevalence of current smoking was highest at Overweight 32.5% (95% CI 30.5 – 34.6%). At respondents in rural areas were highest at Overweight 28.8% (95% CI 26.3 - 31.4%), while at respondents in urban areas were highest at Overweight 38.0% (95% CI 34.7 - 41.3%), without significant difference (P>0.05).

Prevalence of current smoking correlate with current alcohol use; at current alcohol use the prevalence of current smoking was 57.2% (95% CI 52.9 – 61.4 %) among no smokers was 25.8% (95% CI 24.7 – 27.0 %). According to the residence, we did not distinguish significant statistical difference (P> 0.05) and those with residence in the village as well as those with residence in the city and current smoking was the highest among current alcohol use. Prevalence of current smoking was almost the same among people with hypertension 28.7% (95% CI 26.8 – 30.6%) comparing with those without hypertension 28.3% (95% CI 26.9 – 29.8%) without statistically significant difference according to residence (P>0.05). On the prevalence of current smoking according to the physical activity and residence, we didn't earn significant statistical difference (p>0.05). At respondents with low physical activity were 30.8% (95% CI 28.9 – 32.8%), compared with those with normal physical activity 27.1% (95% CI 25.7 – 28.5%).

On the prevalence of current smoking according to the fruit and vegetable intake and residence, we didn't earn significant statistical difference (p>0.05). Prevalence of current smoking among all respondents with Low fruit and vegetable intake was 29.3% (95% CI 28.1 – 30.5%), respondents with low fruit and vegetable intake in rural areas was 26.2% (95% CI 24.7 – 27.7%) while among those in urban areas was 34.1% (95% CI 32.1 – 36.2%).

On univariate analysis, the prevalence of current smoking was found to be significantly higher among those aged 35-44 years (36.9%), male (37.4%), urban (33.0%), up to secondary education (36.6%), separated/divorced (36.4%), overweight (32.5%), current alcohol users (57.2%), low physical activity (30.8%) and low fruit and vegetable intake (29.3%). No difference was found in the prevalence of the annual household income and hypertension (Table 4).

Risk factors for smoking

Age group 25-44, gender, residence, educational status, marital status, overweight, alcohol use, low physical activity and low fruit and vegetable intake were found to be the risk factors significantly associated with smoking in a multivariate regression model (Table 4).

Table 3. Socio -economic, behavioural and clinical correlates of current smoking by residence, STEPS survey, Kosova, 2011

	Rural			Urban			Total		
Characteristics	N	Current smoking N	Current smoking % (95% CI)	N	Current smoking N	Current smoking % (95% CI)	N	Current smoking N	Current smoking % (95% CI)
Total	3709	946	25.5 (24.1 - 26.9)	2408	794	33.0 (31.1 - 34.9)	6117	1740	28.4 (27.3 - 29.6)
P-value						0.000			
Age groups (years)									
15-24	757	110	14.5 (12.2 - 17.2)	513	93	18.1 (15.0 - 21.7)	1270	203	16.0 (14.1 - 18.1)
25-34	730	219	30.0 (26.8 - 33.4)	480	167	34.8 (30.7 - 39.2)	1210	386	31.9 (29.3 - 34.6)
35-44	727	239	32.9 (29.6 - 36.4)	477	205	43.0 (38.6 - 47.5)	1204	444	36.9 (34.2 - 39.6)
45-54	761	211	27.7 (24.7 - 31.0)	470	182	38.7 (34.4 - 43.2)	1231	393	31.9 (29.4 - 34.6)
55-64	734	167	22.8 (19.9 - 25.9)	468	147	31.4 (27.4 - 35.8)	1202	314	26.1 (23.7 - 28.7)
P-value						0.882			
Gender									
Male	1831	645	35.2 (33.1 - 37.4)	1197	486	40.6 (37.9 - 43.4)	3028	1131	37.4 (35.6 - 39.1)
Female	1878	301	16.0 (14.4 - 17.8)	1211	308	25.4 (23.1 - 28.0)	3089	609	19.7 (18.4 - 21.2)
P-value						0.003			
Educational status									
Illiterate	141	26	18.4 (12.9 - 25.6)	57	9	15.8 (8.5 - 27.4)	198	35	17.7 (13.0 - 23.6)
Up to primary education	1603	314	19.6 (17.7 - 21.6)	636	162	25.5 (22.2 - 29.0)	2239	476	21.3 (19.6 - 23.0)
Up to secondary education	1178	423	35.9 (33.2 - 38.7)	1167	436	37.4 (34.6 - 40.2)	2345	859	36.6 (34.7 - 38.6)
Higher education	787	183	23.3 (20.4 - 26.3)	548	187	34.1 (30.3 - 38.2)	1335	370	27.7 (25.4 - 30.2)
P-value						0.000			
Marital status									
Never married	1140	227	19.9 (17.7 - 22.3)	790	211	26.7 (23.7 - 29.9)	1930	438	22.7 (20.9 - 24.6)
Currently married	2453	690	28.1 (26.4 - 29.9)	1518	547	36.0 (33.7 - 38.5)	3971	1237	31.2 (29.7 - 32.6)
Separated/divorced	11	5	45.5 (21.3 - 72.0)	22	7	31.8 (16.4 - 52.7)	33	12	36.4 (22.2 - 53.4)
Widowed and cohabitating	105	24	22.9 (15.9 - 31.8)	78	29	37.2 (27.3 - 48.3)	183	53	29.0 (22.9 - 35.9)
P-value						0.197			
The annual household income									
≤ 1500 €	472	123	26.1 (22.3 - 30.2)	150	55	36.7 (29.4 - 44.6)	622	178	28.6 (25.2 - 32.3)
> 1500 €, ≤ 2500 €	753	209	27.8 (24.7 - 31.1)	373	129	34.6 (29.9 - 39.5)	1126	338	30.0 (27.4 - 32.8)
> 2500 €, ≤ 3500 €	603	136	22.6 (19.4 - 26.1)	296	92	31.1 (26.1 - 36.6)	899	228	25.4 (22.6 - 28.3)
> 3500 €, ≤ 4500 €	545	142	26.1 (22.5 - 29.9)	337	99	29.4 (24.8 - 34.5)	882	241	27.3 (24.5 - 30.4)
> 4500 €	1111	278	25.0 (22.6 - 27.7)	1056	346	32.8 (30.0 - 35.7)	2167	624	28.8 (26.9 - 30.7)
No answer	225	58	25.8 (20.5 - 31.9)	196	73	37.2 (30.8 - 44.2)	421	131	31.1 (26.9 - 35.7)
P-value						0.000			

Table 3. (Continued)

Characteristics	Rural			Urban			Total		
	N	Current smoking N	Current smoking % (95% CI)	N	Current smoking N	Current smoking % (95% CI)	N	Current smoking N	Current smoking % (95% CI)
BMI									
Normal	1727	424	24.6 (22.6 - 26.6)	1153	359	31.1 (28.5 - 33.9)	2880	783	27.2 (25.6 - 28.8)
Overweight	1225	353	28.8 (26.3 - 31.4)	835	317	38.0 (34.7 - 41.3)	2060	670	32.5 (30.5 - 34.6)
Obese	757	169	22.3 (19.5 - 25.4)	420	118	28.1 (24.0 - 32.6)	1177	287	24.4 (22.0 - 26.9)
P-value						0.208			
Current alcohol use[a]									
Yes	264	147	55.7 (49.7 - 61.6)	248	146	58.9 (52.7 - 64.8)	512	293	57.2 (52.9 - 61.4)
No	3445	799	23.2 (21.8 - 24.6)	2160	648	30.0 (28.1 - 32.0)	5605	1447	25.8 (24.7 - 27.0)
P-value						0.129			
Hypertension[b]									
Yes	1406	355	25.2 (23.0 - 27.6)	810	280	34.6 (31.4 - 37.9)	2215	635	28.7 (26.8 - 30.6)
No	2303	591	25.7 (23.9 - 27.5)	1598	514	32.2 (29.9 - 34.5)	3902	1105	28.3 (26.9 - 29.8)
P-value						0.354			
Low physical activity[c]									
Yes	1261	363	28.8 (26.4 - 31.3)	945	317	33.5 (30.6 - 36.6)	2206	680	30.8 (28.9 - 32.8)
No	2448	583	23.8 (22.2 - 25.5)	1463	477	32.6 (30.3 - 35.0)	3911	1060	27.1 (25.7 - 28.5)
P-value						0.541			
Low fruit and vegetable intake [d]									
Yes	3234	847	26.2 (24.7 - 27.7)	2056	702	34.1 (32.1 - 36.2)	5290	1549	29.3 (28.1 - 30.5)
No	475	99	20.8 (17.4 - 24.7)	352	92	26.1 (21.8 - 31.0)	827	191	23.1 (20.4 - 26.1)
P-value						0.504			

[a] One who has drank alcohol in the past 30 days
[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication
[c] Low physical activity
[d] Less than five servings of fruits and vegetables per day

Table 4. Socio -economic, behavioural and clinical correlates of current smoking, STEPS survey, Kosova, 2011

Characteristics	N=6117	Current smoking N (%)	P-value	Odds ratio	95% CI	P-value
Age groups (years)						
15-24	1270	203 (16.0)		Ref.	-	-
25-34	1210	386 (31.9)		2.46	2.03 - 2.98	0.000
35-44	1204	444 (36.9)	0.000	3.07	2.54 0 3.71	0.000
45-54	1231	393 (31.9)		2.46	2.03 - 2.98	0.000
55-64	1202	314 (26.1)		1.86	1.53 - 2.27	0.000
Gender						
Male	3028	1131 (37.4)	0.000	Ref.	-	-
Female	3089	609 (19.7)		0.41	0.37 - 0.46	0.000
Residence						
Rural	3709	946 (25.5)	0.000	Ref.	-	-
Urban	2408	794 (33.0)		1.44	1.28 - 1.61	0.000
Educational status						
Illiterate	198	35 (17.7)		Ref.	-	-
Up to primary education	2239	476 (21.3)	0.000	1.26	0.86 0 1.84	0.236
Up to secondary education	2345	859 (36.6)		2.69	1.85 - 3.92	0.000
Higher education	1335	370 (27.7)		1.79	1.22 - 2.62	0.003
Marital status						
Never married	1930	438 (22.7)		Ref.	-	-
Currently married	3971	1237 (31.2)	0.000	1.54	1.36 - 1.75	0.000
Separated/divorced	33	12 (36.4)		1.95	0.95 - 3.99	0.068
Widowed and cohabitating	183	53 (29.0)		1.39	0.99 - 1.95	0.055
The annual household income						
≤ 1500 €	622	178 (28.6)		Ref.	-	-
> 1500 €, ≤ 2500 €	1126	338 (30.0)		1.07	0.86 - 1.32	0.539
> 2500 €, ≤ 3500 €	899	228 (25.4)	0.187	0.85	0.67 - 1.41	0.158
> 3500 €, ≤ 4500 €	882	241 (27.3)		0.94	0.75 - 1.18	0.582
> 4500 €	2167	624 (28.8)		1.00	0.83 - 1.23	0.931
No answer	421	131 (31.1)		1.13	0.86 - 1.48	0.386

Table 4. (Continued)

Characteristics	N=6117	Current smoking N (%)	P-value	Odds ratio	95% CI	P-value
BMI						
Normal	2880	783 (27.2)		Ref.	-	-
Overweight	2060	670 (32.5)	0.000	1.29	1.14 - 1.46	0.000
Obese	1177	287 (24.4)		0.86	0.74 - 1.00	0.066
Current alcohol use[a]						
No	5605	1447 (25.8)	0.000	Ref.	-	-
Yes	512	293 (57.2)		3.84	3.20 - 4.63	0.000
Hypertension[b]						
No	3902	1105 (28.3)	0.794	Ref.	-	-
Yes	2215	635 (28.7)		1.02	0.91 - 1.14	0.771
Low physical activity[c]						
No	3911	1060 (27.1)	0.023	Ref.	-	-
Yes	2206	680 (30.8)		1.2	1.07 - 1.34	0.002
Low fruit and vegetable intake[d]						
No	827	191 (23.1)	0.000	Ref.	-	-
Yes	5290	1549 (29.3)		1.38	1.16 - 1.64	0.000

[a] One who has drank alcohol in the past 30 days
[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication
[c] Low physical activity
[d] Low fruit and vegetable intake

5.2.2. Alcohol consumption

In the age group 15-64 years old the prevalence of current drinkers was 8.4% (95% CI 7.7 – 9.1%). Prevalence of current drinkers was higher among male was 14.6% (95% CI 13.4 – 15.9%) compared with the female was 2.3% (95% CI 1.8 – 2.9%), with significant difference (P<0.001). In all age groups, the prevalence of current alcohol drinkers was higher among male compared to female. Prevalence of smoking increases with age. After the age of 54, it falls gradually, probably due to starting quitting drinking for health reasons, and this trend of prevalence is noticed only in males (Table 5).

In the age group 15-64 years old the prevalence of drank in past 12 months (not current) was 3.9 % (95% CI 3.4 – 4.4%). Prevalence of drank in past 12 months (not current) was higher among male was 5.7% (95% CI 4.9 – 6.6%) compared with the female was 2.1% (95% CI 1.6 – 2.6%), with significant difference (P<0.001). In all age groups, the prevalence of drank in past 12 months (not current) was higher among male compared to female, but no significant difference was present only in the age group 15-24 years. Prevalence of drank in past 12 months (not current) was higher in the age group 25-34 years (Table 6).

In the age group 15-64 years old the prevalence of lifetime abstainer was 84.4% (95% CI 83.5 – 85.3%). Prevalence of lifetime abstainer was higher among female 93.1% (95% CI 92.2 – 94.0%) compared with male 75.5% (95% CI 73.9 – 77.0%), with significant difference (P<0.001). In all age groups, the prevalence of lifetime abstainer drinkers was higher among female compared to male. Prevalence of lifetime abstainer is above 80.0% in all age groups (Table 7).

Table 8 presents the prevalence of current alcohol use per age groups and per residential areas. The overall prevalence of current alcohol use in individuals aged 15-64 years in Kosova was 8.4% (95% CI 7.7 – 9.1%), the prevalence was 10.3% (95% CI 9.1 – 11.6%) in urban residents and 7.1% (95% CI 6.3 – 8.0%) in rural residents. This difference in prevalence between urban and rural areas was statistically significant (P<0.01).

The current alcohol use prevalence increases along with age. The prevalence increased from 5.5% (95% CI 4.4-6.9%) for the 15-24 years age group to 10.9% (95% CI 9.3-12.7%) for the 45-54 years age group, Then at the age of 55-64 again we have fallen prevalence in 7.5% (95% CI 6.1 - 9.1%). This positive correlation between current alcohol use and age was observed in both rural and urban areas. In urban areas the prevalence increased from 7.4% (95% CI 5.6-10.2%) for the 15-24 years age group to 13.6% (95% CI 10.8–17.0%) for the 45-54 years age group and in rural areas the prevalence increased from 4.1% (95% CI 2.9-5.8%) to 9.2% (95% CI 7.3-11.5%) for the same age groups.

Prevalence of current alcohol use at both sexes was higher at respondents living in the city, compared to those living in the village but without significant difference (P>0.05). The prevalence of current alcohol use varies according to the educational status it was higher at people with Higher education 12.4% (95% CI 10.7 – 14.2%), while the lowest was at Illiterate 2.5% (95% CI 1.1-5.8%). This positive correlation between current alcohol use and educational status was observed and in urban areas. At rural areas prevalence of current alcohol use was lowest at Illiterate 2.8% (95% CI 1.1- 7.1%) and the highest in those with secondary preparation 11.1% (95% CI 9.5 - 13.0%). We have distinguished the significant statistical difference in the prevalence of current alcohol use according to school preparation and residence (P< 0.01).

Prevalence of current alcohol use varies according to the marital status it was highest at Separated/divorced 18.2% (95% CI 5.1 – 47.7%), while lowest at Widowed and cohabitating 5.5% (95% CI 3.0 - 9.8%). This positive correlation between current alcohol use and marital status was observed in both rural and urban areas.

Prevalence of current alcohol use was highest at respondents with the annual household income >4500 € with 11.1% (95% CI 9.8 - 12.5%). This positive correlation between current alcohol use and annual household income was observed in both rural and urban areas, but it was higher in urban areas with significant difference (P<0.01).

The prevalence of current alcohol use was highest at Overweight 10.5% (95% CI 9.2 – 11.9%). At respondents in rural areas were highest at Overweight 9.6% (95% CI 8.0-11.3%), while at respondents in urban areas were highest at Obese 12.4% (95% CI 9.6-15.9%), without significant difference (P>0.05).

Prevalence of current alcohol use correlates with smoking status; at current smokers prevalence of current alcohol use was 16.8% (95% CI 15.2 – 18.7 %) among no smokers was 5.0% (95% CI 4.4 – 5.7 %). According to the residence, we did not distinguish significant statistical difference (P> 0.05) and those with residence in the village as well as those with residence in the city and current alcohol use was the highest among smokers.

Prevalence of current alcohol use was slightly higher among people with hypertension 9.3% (95% CI 8.1 – 10.5%) comparing with those without hypertension 7.9% (95% CI 7.1 – 8.8%) without statistically significant difference according to residence (P>0.05).

On the prevalence of current alcohol use according to the physical activity and residence, we didn't earn significant statistical difference (P>0.05). Low physical activity was 9.6% (95% CI 8.4 – 10.9%), compared with those with normal physical activity 7.7% (95% CI 6.9 – 8.5%).

On the prevalence of current alcohol use according to the fruit and vegetable intake and residence, we didn't earn significant statistical difference (P>0.05). Prevalence of current alcohol use among all respondents with Low fruit and vegetable intake was 8.8% (95% CI 8.1 – 9.6%), respondents with low fruit and vegetable intake in rural areas was 7.6% (95% CI 6.8 – 8.6%) while among those in urban areas was 10.7% (95% CI 9.4 – 12.1%).

On univariate analysis, the prevalence of current alcohol users was found to be significantly higher among those aged 45-54 years (10.9%), male (14.6%), rural (10.3%), higher education (12.4%), separated/divorced (18.2%), the annual household income > 4500 € (11.1%), overweight (10.5%), smokers (16.8%) low physical activity (9.6%) and low fruit

and vegetable intake (8.8%). No difference was found in prevalence by the presence of hypertension (Table 9).

Risk factors for alcohol use

Age group 25-54, gender, residence, educational status, marital status, the annual household income, overweight and obesity, smoking, low physical activity and low fruit and vegetable intake were found to be the risk factors significantly associated with alcohol use in a multivariate regression model (Table 9).

Table 5. Percentage of current drinkers (past 30 days) by gender - Kosova STEPS survey 2011

Age group (years)	Male n	n	Current drinkers % (95% CI)	Female n	n	Current drinkers % (95% CI)	Total n	n	Current drinkers % (95% CI)	P-value*
15-24	613	52	8.5 (6.5 - 11.0)	657	18	2.7 (1.7 - 4.3)	1270	70	5.5 (4.4 - 6.9)	0.000
25-34	603	92	15.3 (12.6 - 18.3)	607	17	2.8 (1.8 - 4.4)	1210	109	9.0 (7.5 - 10.8)	0.000
35-44	594	98	16.5 (13.7 - 19.7)	610	11	1.8 (1.0 - 3.2)	1204	109	9.1 (7.6 - 10.8)	0.000
45-54	624	122	19.6 (16.6 - 22.8)	607	12	2.0 (1.1 - 3.4)	1231	134	10.9 (9.3 - 12.7)	0.000
55-64	594	78	13.1 (10.7 - 16.1)	608	12	2.0 (1.1 - 3.4)	1202	90	7.5 (6.1 - 9.1)	0.000
15-64	**3028**	**442**	**14.6 (13.4 - 15.9)**	**3089**	**70**	**2.3 (1.8 - 2.9)**	**6117**	**512**	**8.4 (7.7 - 9.1)**	**0.000**
25-64	2415	390	16.1 (14.7 - 17.7)	2432	52	2.1 (1.6 - 2.8)	4847	442	9.1 (8.3 - 10.0)	0.000

*Chi-square test or Fisher exact test

Table 6. Percentage of drank in past 12 months (not current), by gender - Kosova STEPS survey 2011

Age group (years)	Male			Female			Total			P-value*
		Drank 12 months			Drank 12 months			Drank 12 months		
	n	n	% (95% CI)	n	n	% (95% CI)	n	n	% (95% CI)	
15-24	613	32	5.2 (3.7 - 7.3)	657	20	3.0 (2.0 - 4.7)	1270	52	4.1 (3.1 - 5.3)	0.070
25-34	603	41	6.8 (5.1 - 9.1)	607	21	3.5 (2.3 - 5.2)	1210	62	5.1 (4.0 - 6.5)	0.012
35-44	594	44	7.4 (5.6 - 9.8)	610	11	1.8 (1.0 - 3.2)	1204	55	4.6 (3.5 - 5.9)	0.000
45-54	624	41	6.6 (4.9 - 8.8)	607	6	1.0 (0.5 - 2.1)	1231	47	3.8 (2.9 - 5.0)	0.000
55-64	594	15	2.5 (1.5 - 4.1)	608	6	1.0 (0.5 - 2.1)	1202	21	1.7 (1.1 - 2.7)	0.069
15-64	**3028**	**173**	**5.7 (4.9 - 6.6)**	**3089**	**64**	**2.1 (1.6 - 2.6)**	**6117**	**237**	**3.9 (3.4 - 4.4)**	**0.000**
25-64	2415	141	5.8 (5.0 - 6.8)	2432	44	1.8 (1.4 - 2.4)	4847	185	3.8 (3.3 -4.4)	0.000

*Chi-square test or Fisher exact test

Table 7. Percentage of lifetime abstainer by gender - Kosova STEPS survey 2011

Age group (years)	Male			Female			Total			P-value*
		Lifetime abstainer			Lifetime abstainer			Lifetime abstainer		
	n	n	% (95% CI)	n	n	% (95% CI)	n	n	% (95% CI)	
15-24	613	506	82.5 (79.3 - 85.3)	657	596	90.7 (88.3 - 92.7)	1270	1102	86.8 (84.8 - 88.5)	0.000
25-34	603	453	75.1 (71.5 - 78.4)	607	554	91.3 (88.8 - 93.3)	1210	1007	83.2 (81.0 - 85.2)	0.000
35-44	594	424	71.4 (67.6 - 74.9)	610	571	93.6 (91.4 - 95.3)	1204	995	82.6 (80.4 - 84.7)	0.000
45-54	624	435	69.7 (66.0 - 73.2)	607	576	94.9 (92.8 - 96.4)	1231	1011	82.1 (79.9 - 84.2)	0.000
55-64	594	467	78.6 (75.1 - 81.7)	608	580	95.4 (93.4 - 96.8)	1202	1047	87.1 (85.1 - 88.9)	0.000
15-64	**3028**	**2285**	**75.5 (73.9 - 77.0)**	**3089**	**2877**	**93.1 (92.2 - 94.0)**	**6117**	**5162**	**84.4 (83.5 - 85.3)**	**0.000**
25-64	2415	1779	73.7 (71.9 - 75.4)	2432	2281	93.8 (92.8 - 94.7)	4847	4060	83.8 (82.7 -84.8)	0.000

*Chi-square test or Fisher exact test

Table 8. Socio –econ., behavioural and clinical correlates of current alcohol use by residence, STEPS survey, Kosova, 2011

Characteristics	Rural			Urban			Total		
	N	Current alcohol use[a] N	Current alcohol use % (95% CI)	N	Current alcohol use N	Current alcohol use % (95% CI)	N	Current alcohol use N	Current alcohol use % (95% CI)
Total	3709	264	7.1 (6.3 - 8.0)	2408	248	10.3 (9.1 - 11.6)	6117	512	8.4 (7.7 - 9.1)
P-value						0.000			
Age groups (years)									
15-24	757	31	4.1 (2.9 - 5.8)	513	39	7.4 (5.6 - 10.2)	1270	70	5.5 (4.4 - 6.9)
25-34	730	62	8.5 (6.7 - 10.7)	480	47	9.8 (7.4 - 12.8)	1210	109	9.0 (7.5 - 10.8)
35-44	727	55	7.6 (5.9 - 9.7)	477	54	11.3 (8.8 - 14.5)	1204	109	9.1 (7.6 - 10.8)
45-54	761	70	9.2 (7.3 - 11.5)	470	64	13.6 (10.8 - 17.0)	1231	134	10.9 (9.3 - 12.7)
55-64	734	46	6.3 (4.7 - 8.3)	468	44	9.4 (7.1 - 12.4)	1202	90	7.5 (6.1 - 9.1)
P-value						0.591			
Gender									
Male	1831	233	12.7 (11.3 - 14.3)	1197	209	17.5 (15.4 - 19.7)	3028	442	14.6 (13.4 - 15.9)
Female	1878	31	1.7 (1.2 - 2.3)	1211	39	3.2 (2.4 - 4.4)	3089	70	2.3 (1.8 - 2.9)
P-value						0.237			
Educational status									
Illiterate	141	4	2.8 (1.1 - 7.1)	57	1	1.8 (0.3 - 9.3)	198	5	2.5 (1.1 - 5.8)
Up to primary education	1603	56	3.5 (2.7 - 4.5)	636	29	4.6 (3.2 - 6.5)	2239	85	3.8 (3.1 - 4.7)
Up to secondary education	1178	131	11.1 (9.5 - 13.0)	1167	126	10.8 (9.1 - 12.7)	2345	257	11.0 (9.8 - 12.3)
Higher education	787	73	9.3 (7.4 - 11.5)	548	92	16.8 (13.9 - 20.1)	1335	165	12.4 (10.7 - 14.2)
P-value						0.007			
Marital status									
Never married	1140	65	5.7 (4.5 - 7.2)	790	80	10.1 (8.2 - 12.4)	1930	145	7.5 (6.4 - 8.8)
Currently married	2453	192	7.8 (6.8 - 9.0)	1518	159	10.5 (9.0 - 12.1)	3971	351	8.8 (8.0 - 9.8)
Separated/divorced	11	2	18.2 (5.1 - 47.7)	22	4	18.2 (7.3 - 38.5)	33	6	18.2 (8.6 - 34.4)
Widowed and cohabitating	105	5	4.8 (2.1 - 10.7)	78	5	6.4 (2.8 - 14.1)	183	10	5.5 (3.0 - 9.8)
P-value						0.185			
The annual household income									
≤ 1500 €	472	25	5.3 (3.6 - 7.7)	150	10	6.7 (3.7 - 11.8)	622	35	5.6 (4.1 - 7.7)
> 1500 €, ≤ 2500 €	753	39	5.2 (3.8 - 7.0)	373	23	6.2 (4.1 - 9.1)	1126	62	5.5 (4.3 - 7.0)
> 2500 €, ≤ 3500 €	603	41	6.8 (5.1 - 9.1)	296	20	6.8 (4.4 - 10.2)	899	61	6.8 (5.3 - 8.6)
> 3500 €, ≤ 4500 €	545	42	7.7 (5.8 - 10.3)	337	40	11.9 (8.8 - 15.8)	882	82	9.3 (7.6 - 11.4)
> 4500 €	1111	103	9.3 (7.7 - 11.1)	1056	137	13.0 (11.1 - 15.1)	2167	240	11.1 (9.8 - 12.5)
No answer	225	14	6.2 (3.7 - 10.2)	196	18	9.2 (5.9 - 14.0)	421	32	7.6 (5.4 - 10.5)
P-value						0.000			

Table 8. (Continued)

Characteristics	Rural			Urban			Total		
	N	Current alcohol use N	Current alcohol use % (95% CI)	N	Current alcohol use N	Current alcohol use % (95% CI)	N	Current alcohol use N	Current alcohol use % (95% CI)
BMI									
Normal	1727	93	5.4 (4.4 - 6.6)	1153	97	8.4 (6.9 - 10.2)	2880	190	6.6 (5.7 - 7.6)
Overweight	1225	117	9.6 (8.0 - 11.3)	835	99	11.9 (9.8 - 14.2)	2060	216	10.5 (9.2 - 11.9)
Obese	757	54	7.1 (5.5 - 9.2)	420	52	12.4 (9.6 - 15.9)	1177	106	9.0 (7.5 - 10.8)
P-value					0.570				
Current smoking									
Yes	946	147	15.5 (13.4 - 18.0)	794	146	18.4 (15.8 - 21.2)	1740	293	16.8 (15.2 - 18.7)
No	2763	117	4.2 (3.5 - 5.1)	1614	102	6.3 (5.2-7.6)	4377	219	5.0 (4.4-5.7)
P-value					0.522				
Hypertension [b]									
Yes	1406	117	8.3 (7.0 - 9.9)	810	88	10.9 (8.9 - 13.2)	2215	205	9.3 (8.1 - 10.5)
No	2303	147	6.4 (5.5 - 7.5)	1598	160	10.0 (8.6 - 11.6)	3902	307	7.9 (7.1 - 8.8)
P-value					0.050				
Low physical activity [c]									
Yes	1261	111	8.8 (7.4 - 10.5)	945	101	10.7 (8.9 - 12.8)	2206	212	9.6 (8.4 - 10.9)
No	2448	153	6.3 (5.4 - 7.3)	1463	147	10.0 (8.6 - 11.7)	3911	300	7.7 (6.9 - 8.5)
P-value					0.831				
Low fruit and vegetable intake [d]									
Yes	3234	247	7.6 (6.8 - 8.6)	2056	220	10.7 (9.4 - 12.1)	5290	467	8.8 (8.1 - 9.6)
No	475	17	3.6 (2.2 - 5.7)	352	28	8.0 (5.6 - 11.3)	827	45	5.4 (4.1 - 7.2)
P-value					0.075				

[a] One who has drank alcohol in the past 30 days
[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication
[c] Low physical activity
[d] Less than five servings of fruits and vegetables per day

Table 9. Socio -economic, behavioural and clinical correlates of current alcohol use, STEPS survey, Kosova, 2011

Characteristics	N=6117	Current alcohol use N (%)	P-value	Odds ratio	95% CI	P-value
Age groups (years)						
15-24	1270	70 (5.5)		Ref.	-	-
25-34	1210	109 (9.0)		1.70	1.24 - 2.32	0.000
35-44	1204	109 (9.1)	0.000	1.71	1.25 - 2.33	0.000
45-54	1231	134 (10.9)		2.10	1.55 - 2.83	0.000
55-64	1202	90 (7.5)		1.39	1.01 - 1.92	0.047
Gender						
Male	3028	442 (14.6)	0.000	Ref.	-	-
Female	3089	70 (2.3)		7.37	5.70 -9.54	0.000
Residence						
Rural	3709	264 (7.1)	0.000	Ref.	-	-
Urban	2408	248 (10.3)		1.50	1.25-1.80	0.000
Educational status						
Illiterate	198	5 (2.5)		Ref.	-	-
Up to primary education	2239	85 (3.8)		1.52	0.61 - 3.80	0.366
Up to secondary education	2345	257 (11.0)	0.000	4.75	1.94 - 11.7	0.000
Higher education	1335	165 (12.4)		5.44	2.21 - 13.4	0.000
Marital status						
Never married	1930	145 (7.5)		Ref.	-	-
Currently married	3971	351 (8.8)		1.19	0.98 - 1.46	0.085
Separated/divorced	33	6 (18.2)	0.027	2.74	1.12 - 6.73	0.028
Widowed and cohabitating	183	10 (5.5)		0.71	0.37 - 1.37	0.312
The annual household income						
≤ 1500 €	622	35 (5.6)		Ref.	-	-
> 1500 €, ≤ 2500 €	1126	62 (5.5)		0.98	0.64-1.50	0.916
> 2500 €, ≤ 3500 €	899	61 (6.8)	0.000	1.22	0.80 - 1.87	0.362
> 3500 €, ≤ 4500 €	882	82 (9.3)		1.72	1.14 - 2.59	0.009
> 4500 €	2167	240 (11.1)		2.10	1.45 - 3.01	0.000
No answer	421	32 (7.6)		1.38	0.84 - 2.27	0.204

Table 9. (Continued)

Characteristics	N=6117	Current alcohol use N (%)	P-value	Odds ratio	95% CI	P-value
BMI						
Normal	2880	190 (6.6)		Ref.	-	-
Overweight	2060	216 (10.5)	0.000	1.66	1.35 - 2.03	0.000
Obese	1177	106 (9.0)		1.40	1.09 - 1.79	0.007
Current smoking						
No	4377	219 (5.0)	0.000	Ref.	-	-
Yes	1740	293 (16.8)		3.84	3.20 - 4.63	0.000
Hypertension[b]						
No	3902	307 (7.9)	0.068	Ref.	-	-
Yes	2215	205 (9.3)		1.19	1.00 - 1.44	0.061
Low physical activity						
No	3911	300 (7.7)	0.010	Ref.	-	-
Yes	2206	212 (9.6)		1.27	1.06 - 1.54	0.008
Low fruit and vegetable intake						
No	827	45 (5.4)	0.001	Ref.	-	-
Yes	5290	467 (8.8)		1.68	1.23 - 2.31	0.001

[a] One who has drank alcohol in the past 30 days
[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication
[c] Low physical activity
[d] Low fruit and vegetable intake

5.2.3. Unhealthy diet – low fruit and vegetable intake

In the age group 15-64 years old the prevalence of low fruit and vegetable intake was 86.5% (95% CI 85.6 – 87.3%). Prevalence of low fruit and vegetable intake was higher among female 87.0% (95% CI 85.8 – 88.1%) compared with the male was 86.0% (95% CI 84.7 – 87.2%), but without significant difference (P>0.05). In the age group 25-64 years old the prevalence of low fruit and vegetable intake was 86.7% (95% CI 85.7– 87.7%). Prevalence of low fruit and vegetable intake was higher among female 87.5% (95% CI 86.2 – 88.8%) compared with male 85.9% (95% CI 84.5 – 87.3%), but without significant difference (P>0.05). In all age groups, the prevalence of low fruit and vegetable intake was higher than 80.0% in both sexes (Table 10).

Table 11 presents the prevalence of Low fruit and vegetable intake per residential areas and socioeconomic, behavioural and clinical correlates. The overall prevalence of Low fruit and vegetable intake in individuals aged 15-64 years in Kosova were 86.5% (95% CI 85.6 – 87.3%), the prevalence was 85.4% (95% CI 83.9 – 86.7%) among urban residents and 87.2% (95% CI 86.1 – 88.2%) among rural residents. This difference in prevalence between urban and rural areas was statistically significant (P<0.05).

The Low fruit and vegetable intake prevalence is more than 85% in all age groups with very little difference and without significant differences according to age group and residence (P>0.05).

Prevalence of Low fruit and vegetable intake at both sexes was higher at respondents living in the rural areas, compared to those living in the urban areas but without significant difference (P>0.01).

The prevalence of Low fruit and vegetable intake varies according to the educational status it was higher at Illiterate 91.4% (95% CI 86.7 – 94.6%), while the lowest was at Higher educated 82.3% (95% CI 80.0 - 84.3%). This positive correlation between Low fruit and vegetable intake and educational status was observed in rural and urban areas.

We have distinguished the significant statistical difference in the prevalence of Low fruit and vegetable intake according to school preparation and residence (P< 0.01).

Prevalence of Low fruit and vegetable intake varies according to marital status it was highest at Separated/divorced 97.0% (95% CI 84.7 – 99.5%), while lowest at Never married 85.9% (95% CI 84.2 – 87.3%), with significant difference by residence and educational status (P<0.05).

Prevalence of Low fruit and vegetable intake was highest at respondents with the annual household income ≤ 1500 € with 93.6% (95% CI 91.4-95.2%). This positive correlation between Low fruit and vegetable intake and annual household income was observed in both rural and urban areas, with significant difference (P<0.01)

The prevalence of Low fruit and vegetable intake was highest at Obese 87.1% (95% CI 85.0 – 88.9%). At respondents in rural areas were highest at Obese 89.0% (95% CI 86.6-91.1%), while at respondents in urban areas were highest at Normal weight 86.1% (95% CI 84.0 - 88.8%), with significant difference (P<0.05).

At current smokers, the prevalence of Low fruit and vegetable intake was higher 89.0% (95% CI 87.5 – 90.4 %) than among no smokers 85.5% (95% CI 84.4 – 86.5 %). According to the residence, we distinguish significant statistical difference (P< 0.01) at those with residence in the village the prevalence of Low fruit and vegetable intake was higher 89.5% (95% CI 87.4 – 91.3 %) among current smokers comparing with residents in the city 88.4% (95% CI 86.0 – 90.5 %).

Prevalence of Low fruit and vegetable intake correlate with current alcohol use; at current alcohol use the prevalence of Low fruit and vegetable intake was 91.2% (95% CI 88.4 – 93.4 %) among no alcohol users were 86.0% (95% CI 85.1 – 86.9 %).

Prevalence of Low fruit and vegetable intake using was slighter higher among people with hypertension 87.2% (95% CI 85.8 – 88.5%) comparing with those without hypertension

86.1% (95% CI 84.9 – 87.1%) without statistically significant difference according to residence (P>0.05). According to the residence and hypertension, we have earned significant statistical difference (P<0.001) in the village low fruit and vegetable intake was the highest among people with hypertension and in the town prevalence were highest among people without hypertension.

On the prevalence of Low fruit and vegetable intake according to the physical activity and residence, we have earned significant statistical difference (P<0.001). At respondents with low physical activity were 85.2 (95% CI 83.6 – 86.6%), compared with those with normal physical activity 87.2% (95% CI 86.1 – 88.2%).

On univariate analysis, the prevalence of low fruit and vegetable intake was found to be significantly higher among rural (87.2%), illiterate (91.4%), separated/divorced (97.0%), the annual household income ≤ 1500 € (93.6%), smokers (89.0%), alcohol users (91.2%) and hypertension (87.2%). No difference was found in prevalence by age group, gender, BMI and low physical activity (Table 12).

Risk factors for low fruit and vegetable intake

Residence, the annual household income, smoking, alcohol use and low physical activity were found to be the risk factors significantly associated with low fruit and vegetable intake in a multivariate regression model (Table 12).

Table 10. **Percentage of Low fruit and vegetable intake by gender - Kosova STEPS survey 2011**

	Percentage of Low fruit and vegetable intake										
	Male				Female				Total		
	Low fruit and vegetable intake			n	Low fruit and vegetable intake			n	Low fruit and vegetable intake		
Age group (years)	N	N	% (95% CI)	N	N	N	% (95% CI)	N	N	N	% (95% CI)	P-value*
15-24	613	528	86.1 (83.2 - 88.6)	657	558	84.9 (82.0 - 87.5)	1270	1086	85.5 (83.5 - 87.3)	0.597
25-34	603	517	85.7 (82.7 - 88.3)	607	521	85.8 (82.8 - 88.4)	1210	1038	85.8 (83.7 - 87.6)	0.972
35-44	594	512	86.2 (83.2 - 88.7)	610	535	87.7 (84.9 - 90.1)	1204	1047	87.0 (84.9 - 88.7)	0.489
45-54	624	537	86.1 (83.1 - 88.6)	607	537	88.5 (85.7 - 90.8)	1231	1074	87.2 (85.3 - 89.0)	0.237
55-64	594	509	85.7 (82.6 - 88.3)	608	536	88.2 (85.3 - 90.5)	1202	1045	86.9 (84.9 - 88.7)	0.237
15-64	**3028**	**2603**	**86.0 (84.7 - 87.2)**	**3089**	**2687**	**87.0 (85.8 - 88.1)**	**6117**	**5290**	**86.5 (85.6 - 87.3)**	**0.258**
25-64	2415	2075	85.9 (84.5 - 87.3)	2432	2129	87.5 (86.2 - 88.8)	4847	4204	86.7 (85.7 - 87.7)	0.268

*Chi-square test or Fisher exact test

Table 11. Socio -economic, behavioural and clinical correlates of Low fruit and vegetable intake by residence, STEPS survey, Kosova, 2011

		Rural			Urban			Total	
Characteristics	N	LF and V intake N	Low fruit and vegetable intake % (95% CI)	N	LF and V intake N	Low fruit and vegetable intake % (95% CI)	N	LF and V intake N	Low fruit and vegetable intake % (95% CI)
Total	3709	3234	87.2 (86.1 - 88.2)	2408	2056	85.4 (83.9 - 86.7)	6117	5290	86.5 (85.6 - 87.3)
P-value						0.047			
Age groups (years)									
15-24	757	651	86.0 (83.3 - 88.3)	513	435	84.8 (81.4 - 87.6)	1270	1086	85.5 (83.5 - 87.3)
25-34	730	626	85.8 (83.0 - 88.1)	480	412	85.8 (82.4 - 88.7)	1210	1038	85.8 (83.7 - 87.6)
35-44	727	642	88.3 (85.8 - 90.4)	477	405	84.9 (81.4 - 87.8)	1204	1047	87.0 (84.9 - 88.7)
45-54	761	668	87.8 (85.3 - 89.9)	470	406	86.4 (83.0 - 89.2)	1231	1074	87.2 (85.3 - 89.0)
55-64	734	647	88.1 (85.6 - 90.3)	468	398	85.0 (81.5 - 88.0)	1202	1045	86.9 (84.9 - 88.7)
P-value						0.988			
Gender									
Male	1831	1592	86.9 (85.3 - 88.4)	1197	1011	84.5 (82.3 - 86.4)	3028	2603	86.0 (84.7 - 87.2)
Female	1878	1642	87.4 (85.9 - 88.9)	1211	1045	86.3 (84.2 - 88.1)	3089	2687	87.0 (85.8 - 88.1)
P-value						0.922			
Educational status									
Illiterate	141	129	91.5 (85.7 - 95.1)	57	52	91.2 (81.1 - 96.2)	198	181	91.4 (86.7 - 94.6)
Up to primary education	1603	1426	89.0 (87.3 - 90.4)	636	543	85.4 (82.4 - 87.9)	2239	1969	87.9 (86.5 - 89.2)
Up to secondary education	1178	1038	88.1 (86.1 - 89.8)	1167	1003	85.9 (83.4 - 87.8)	2345	2041	87.0 (85.6 - 88.3)
Higher education	787	641	81.4 (78.6 - 84.0)	548	458	83.6 (80.2 - 86.4)	1335	1099	82.3 (80.2 - 84.3)
P-value						0.000			
Marital status									
Never married	1140	973	85.4 (83.2 - 87.3)	790	684	86.6 (84.0 - 88.8)	1930	1657	85.9 (84.2 - 87.3)
Currently married	2453	2155	87.9 (86.5 - 89.1)	1518	1282	84.5 (82.5 - 86.2)	3971	3437	86.6 (85.5 - 87.6)
Separated/divorced	11	11	100.0 (74.1 - 100.0)	22	21	95.5 (78.2 - 99.2)	33	32	97.0 (84.7 - 99.5)
Widowed and cohabitating	105	95	90.5 (83.4 - 94.7)	78	69	88.5 (79.5 - 93.8)	183	164	89.6 (84.4 - 93.3)
P-value						0.022			
The annual household income									
≤ 1500 €	472	439	93.0 (90.3 - 95.0)	150	143	95.3 (90.7 - 97.7)	622	582	93.6 (91.4 - 95.2)
> 1500 €, ≤ 2500 €	753	678	90.0 (87.7 - 92.0)	373	314	84.2 (80.1 - 87.5)	1126	992	88.1 (86.1 - 89.9)
> 2500 €, ≤ 3500 €	603	524	86.9 (84.0 - 89.4)	296	249	84.1 (79,5 - 87.8)	899	773	86.0 (83.6 - 88.1)
> 3500 €, ≤ 4500 €	545	475	87.2 (84.1 - 89.9)	337	291	86.4 (82.3 - 89.6)	882	766	86.8 (84.5 - 88.9)
> 4500 €	1111	919	82.7 (80.4 - 84.8)	1056	879	83.2 (80.9 - 85.4)	2167	1798	83.0 (81.3 - 84.5)
No answer	225	199	88.4 (83.6 - 92.0)	196	180	91.8 (87.2 - 94.9)	421	379	90.0 (86.8 - 92.5)
P-value						0.000			

Table 11. (Continued)

	Rural			Urban			Total		
Characteristics	N	LF and V intake N	Low fruit and vegetable intake % (95% CI)	N	LF and V intake N	Low fruit and vegetable intake % (95% CI)	N	LF and V intake N	Low fruit and vegetable intake % (95% CI)
BMI									
Normal	1727	1482	85.8 (84.1 - 87.4)	1153	993	86.1 (84.0 - 88.8)	2880	2475	85.9 (84.6 - 87.2)
Overweight	1225	1078	88.0 (86.1 - 89.7)	835	712	85.3 (82.7 - 87.5)	2060	1790	86.9 (85.4 - 88.3)
Obese	757	674	89.0 (86.6 - 91.1)	420	351	83.6 (79.7 - 86.8)	1177	1025	87.1 (85.0 - 88.9)
P-value						0.003			
Current smoking									
Yes	946	847	89.5 (87.4 - 91.3)	794	702	88.4 (86.0 - 90.5)	1740	1549	89.0 (87.5 - 90.4)
No	2763	2387	86.4 (85.1 - 87.6)	1614	1354	83.9 (82.0 - 85.6)	4377	3741	85.5 (84.4 - 86.5)
P-value						0.000			
Current alcohol use[a]									
Yes	264	247	93.6 (89.9 - 95.9)	248	220	88.7 (84.2 - 92.1)	512	467	91.2 (88.4 - 93.4)
No	3445	2987	86.7 (85.5 - 87.8)	2160	1836	85.0 (83.4 - 86.4)	5605	4823	86.0 (85.1 - 86.9)
P-value						0.000			
Hypertension[b]									
Yes	1406	1250	88.9 (87.2 - 90.4)	810	682	84.2 (81.5 - 86.5)	2215	1932	87.2 (85.8 - 88.5)
No	2303	1984	86.1 (84.7 - 87.5)	1598	1374	86.0 (84.2 - 87.6)	3902	3358	86.1 (84.9 - 87.1)
P-value						0.000			
Low physical activity									
Yes	1261	1076	85.3 (83.3 - 87.2)	945	803	85.0 (82.6 - 87.1)	2206	1879	85.2 (83.6 - 86.6)
No	2448	2158	88.2 (86.8 - 89.4)	1463	1253	85.6 (83.8 - 87.3)	3911	3411	87.2 (86.1 - 88.2)
P-value						0.000			

[a] One who has drank alcohol in the past 30 days
[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication
[c] Low physical activity

Table 12. Socio -economic, behavioural and clinical correlates of low fruit and vegetable intake, STEPS survey, Kosova, 2011

Characteristics	N=6117	Low fruit and vegetable intake N (%)	P-value	Odds ratio	95% CI	P-value
Age groups (years)						
15-24	1270	1086 (85.5)		Ref.	-	-
25-34	1210	1038 (85.8)		1.02	0.82 - 1.28	0.846
35-44	1204	1047 (87.0)	0.957	1.13	0.90 - 1.42	0.296
45-54	1231	1074 (87.2)		1.16	0.92 - 1.46	0.206
55-64	1202	1045 (86.9)		1.13	0.90 - 1.42	0.304
Gender						
Male	3028	2603 (86.0)	0.258	Ref.	-	-
Female	3089	2687 (87.0)		1.09	0.94 - 1.26	0.243
Residence						
Rural	3709	3234 (87.2)	0.047	Ref.	-	-
Urban	2408	2056 (85.4)		0.86	0.74 - 1.00	0.043
Educational status						
Illiterate	198	181 (91.4)		Ref.	-	-
Up to primary education	2239	1969 (87.9)		1.05	0.62 - 1.77	0.853
Up to secondary education	2345	2041 (87.0)	0.000	0.97	0.57 - 1.63	0.901
Higher education	1335	1099 (82.3)		0.67	0.40 - 1.14	0.138
Marital status						
Never married	1930	1657 (85.9)		Ref.	-	-
Currently married	3971	3437 (86.6)		1.06	0.91 - 1.24	0.464
Separated/divorced	33	32 (97.0)	0.000	5.27	0.71 - 38.7	0.102
Widowed and cohabitating	183	164 (89.6)		1.42	0.87 - 2.33	0.160
The annual household income						
≤ 1500 €	622	582 (93.6)		Ref.	-	-
> 1500 €, ≤ 2500 €	1126	992 (88.1)		0.51	0.35 - 0.74	0.000
> 2500 €, ≤ 3500 €	899	773 (86.0)	0.000	0.42	0.29 - 0.61	0.000
> 3500 €, ≤ 4500 €	882	766 (86.8)		0.42	0.31 - 0.66	0.000
> 4500 €	2167	1798 (83.0)		0.33	0.24 - 0.47	0.000
No answer	421	379 (90.0)		0.62	0.40 - 0.97	0.038

Table 12. (Continued)

Characteristics	N=6117	Low fruit and vegetable intake N (%)	P-value	Odds ratio	95% CI	P-value
BMI						
Normal	2880	2475 (85.9)		Ref.	-	-
Overweight	2060	1790 (86.9)	0.498	1.10	0.92 - 1.28	0.335
Obese	1177	1025 (87.1)		1.10	0.90 - 1.35	0.335
Current smoking						
No	4377	3741 (85.5)	0.000	Ref.	-	-
Yes	1740	1549 (89.0)		1.38	1.16 - 1.64	0.000
Current alcohol use[a]						
No	5605	4823 (86.0)	0.000	Ref.	-	-
Yes	512	467 (91.2)		1.68	1.23 - 2.31	0.001
Hypertension[b]						
No	3902	3358 (86.1)	0.000	Ref.	-	-
Yes	2215	1932 (87.2)		1.11	0.45 - 1.29	0.200
Low physical activity[c]						
No	3911	3411 (87.2)	0.559	Ref.	-	-
Yes	2206	1879 (85.2)		0.84	0.72 - 0.98	0.025

[a] One who has drank alcohol in the past 30 days
[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication
[c] Low physical activity

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5.2.4. Insufficient physical activity

The prevalence of Low physical activity per age groups and per gender is presented in table 13. The overall prevalence of Low physical activity in individuals aged 15-64 years in Kosova was 36.1% (95% CI 34.9 – 37.3%), the prevalence was 44.3% (95% CI 42.6 – 46.1%) among males and 28.0% (95% CI 26.4 – 29.6%) among females. This difference in prevalence between genders was statistically significant (P<0.01). The difference in prevalence between genders was statistically significant for all age groups (P<0.01) and it was higher among males.

Table 14 presents the prevalence of insufficient physical activity per residential areas and socioeconomic, behavioural and clinical correlates. The overall prevalence of insufficient physical activity in individuals aged 15-64 years in Kosova was 39.2% (95% CI 37.3 – 41.2%) among urban residents and 34.0% (95% CI 32.5 – 35.5%) among rural residents. This difference in prevalence between urban and rural areas was statistically significant (P<0.001).

The insufficient physical activity prevalence is higher in age group 55-64 with 42.0% (95% CI 39.3 – 44.8%), and highest in age group 35-44 with 31.9% (95% CI 29.3 – 34.6%), with a very little differences and without significant differences according to age group and residence (P>0.05).

Prevalence of insufficient physical activity was higher at male respondents living in the rural and urban areas, but without significant difference (P>0.05).

The prevalence of insufficient physical activity varies according to the educational status it was higher at Illiterate 41.4% (95% CI 34.8 – 48.4%), while the lowest was at primary education 33.5% (95% CI 31.5-35.4%). This positive correlation between insufficient physical activity and educational status was observed in rural and urban areas. We have distinguished the significant statistical difference in the prevalence of insufficient physical activity according to school preparation and residence (P< 0.01).

Prevalence of insufficient physical activity varies according to marital status it was highest at Never married 39.0% (95% CI 36.8 – 41.2%), while lowest at Widowed and cohabitating 34.4% (95% CI 27.9 – 41.6%), but without significant difference by residence and educational status (P>0.05).

Prevalence of insufficient physical activity was lower in respondents with the annual household income > 4500 € with 33.4% (95% CI 31.5 - 35.4%). This positive correlation between insufficient physical activity and annual household income was observed in both rural and urban areas, with significant difference (P<0.01).

The prevalence of insufficient physical activity was highest at Normal weight 48.9% (95% CI 47.1 – 50.7%). At respondents in rural areas were highest at Normal weight 35.3% (95% CI 33.1 – 37.6%), while at respondents in urban areas were highest at Overweight 42.5% (95% CI 39.2 - 45.9%), but without significant difference (P>0.05).

At current smokers, the prevalence of insufficient physical activity was higher 39.1% (95% CI 36.8 – 41.4 %) than among no smokers 35.6% (95% CI 34.3 – 36.8 %). According to the residence, we distinguish significant statistical difference (P<0.05) at those with residence in the urban area the prevalence of insufficient physical activity was higher 39.9% (95% CI 36.6 – 43.4 %) among current smokers comparing with residents in the rural area 38.4% (95% CI 35.3 – 41.5 %).

At current alcohol user, the prevalence of insufficient physical activity was 41.4% (95% CI 37.2 – 45.7 %) among no alcohol users were 35.6% (95% CI 34.3 – 36.8 %). without significant difference by residence and current alcohol use (P>0.05).

Prevalence of insufficient physical activity was almost same among people with hypertension 36.0% (95% CI 34.1 – 38.0%) comparing with those without hypertension 36.1% (95% CI 34.6 – 37.6%). According to the residence and hypertension, we have earned significant statistical difference (P<0.001) in the village insufficient physical

activity was the highest among people with hypertension and in the town prevalence were highest among people without hypertension.

On the prevalence of insufficient physical activity according to the fruit and vegetable intake and residence, we haven't earned significant statistical difference (P<0.01).

On univariate analysis, the prevalence of low physical activity was found to be significantly higher among those aged 55-64 years (42.0%), male (44.3%), rural (34.0%), illiterate (41.4%), normal weight (48.9%), smokers (39.1%), alcohol users (41.4%) and enough fruit and vegetable intake (39.5%). No difference was found in prevalence by marital status, the annual household income and hypertension (Table 15).

Risk factors for low physical activity

Age group 25-54, residence, gender, educational status, marital status, BMI, smoking, alcohol use and fruit and vegetable intake were found to be the risk factors significantly associated with overweight and obesity in a multivariate regression model (Table 15).

Table 13. Percentage of Low physical activity by gender - Kosova STEPS survey 2011

Age group (years)	Male			Female			Total			P-value*
		Low physical activity			Low physical activity			Low physical activity		
	n	n	% (95% CI)	n	n	% (95% CI)	n	n	% (95% CI)	
15-24	613	297	48.5 (44.5 - 52.4)	657	207	31.5 (28.1 - 35.2)	1270	504	39.7 (37.0 - 42.4)	0.000
25-34	603	251	41.6 (37.8 - 45.6)	607	151	24.9 (21.6 - 28.5)	1210	402	33.2 (30.6 - 35.9)	0.000
35-44	594	233	39.2 (35.4 - 43.2)	610	151	24.8 (21.5 - 28.3)	1204	384	31.9 (29.3 - 34.6)	0.000
45-54	624	261	41.8 (38.0 - 45.7)	607	150	24.7 (21.4 - 28.3)	1231	411	33.4 (30.8 - 36.1)	0.000
55-64	594	300	50.5 (46.5 - 54.5)	608	205	33.7 (30.1 - 37.6)	1202	505	42.0 (39.3 - 44.8)	0.000
15-64	**3028**	**1342**	**44.3 (42.6 - 46.1)**	**3089**	**864**	**28.0 (26.4 - 29.6)**	**6117**	**2206**	**36.1 (34.9 - 37.3)**	**0.000**
25-64	2415	1045	43.3 (41.3 - 45.3)	2432	657	27.0 (25.3 - 28.8)	4847	1702	35.1 (33.8 - 36.5)	0.000

*Chi-square test or Fisher exact test

Table 14. Socio -economic, behavioural and clinical correlates of insufficient physical activity by residence, STEPS survey, Kosova, 2011

Characteristics		Rural			Urban			Total		
		N	Low phys. act. N	Low physical activity % (95% CI)	N	Low phys. act. N	Low physical activity % (95% CI)	N	Low phys. act. N	Low physical activity % (95% CI)
	Total	3709	1261	34.0 (32.5 - 35.5)	2408	945	39.2 (37.3 - 41.2)	6117	2206	36.1 (34.9 - 37.3)
	P-value						0.000			
Age groups (years)										
15-24		757	291	38.4 (35.0 - 42.0)	513	213	41.5 (37.3 - 45.8)	1270	504	39.7 (37.0 - 42.4)
25-34		730	223	30.5 (27.3 - 34.0)	480	179	37.3 (33.1 - 41.7)	1210	402	33.2 (30.6 - 35.9)
35-44		727	210	28.9 (25.7 - 32.3)	477	174	36.5 (32.3 - 40.9)	1204	384	31.9 (29.3 - 34.6)
45-54		761	233	30.6 (27.4 - 34.0)	470	178	37.9 (33.6 - 42.3)	1231	411	33.4 (30.8 - 36.1)
55-64		734	304	41.4 (37.9 - 45.0)	468	201	42.9 (38.5 - 47.5)	1202	505	42.0 (39.3 - 44.8)
	P-value						0.488			
Gender										
Male		1831	764	41.7 (39.5 - 44.0)	1197	578	48.3 (45.5 - 51.1)	3028	1342	44.3 (42.6 - 46.1)
Female		1878	497	26.5 (24.5 - 28.5)	1211	367	30.3 (27.8 - 33.0)	3089	864	28.0 (26.4 - 29.6)
	P-value						0.818			
Educational status										
Illiterate		141	61	43.3 (35.4 - 51.5)	57	21	36.8 (25.5 - 49.8)	198	82	41.4 (34.8 - 48.4)
Up to primary education		1603	505	31.5 (29.3 - 33.8)	636	244	38.4 (34.7 - 42.2)	2239	749	33.5 (31.5 - 35.4)
Up to secondary education		1178	437	37.1 (34.4 - 39.9)	1167	452	38.7 (36.0 - 41.6)	2345	889	37.9 (36.0 - 39.9)
Higher education		787	258	32.8 (29.6 - 36.1)	548	228	41.6 (37.6 - 45.8)	1335	486	36.4 (33.9 - 39.0)
	P-value						0.000			
Marital status										
Never married		1140	428	37.5 (34.8 - 40.4)	790	324	41.0 (37.6 - 44.5)	1930	752	39.0 (36.8 - 41.2)
Currently married		2453	789	32.2 (30.3 - 34.0)	1518	590	38.9 (36.4 - 41.3)	3971	1379	34.7 (33.3 - 36.2)
Separated/divorced		11	5	45.5 (21.3 - 72.0)	22	7	31.8 (16.4 - 52.7)	33	12	36.4 (22.2 - 53.4)
Widowed and cohabitating		105	39	37.1 (28.5 - 46.7)	78	24	30.8 (21.6 - 41.7)	183	63	34.4 (27.9 - 41.6)
	P-value						0.620			
The annual household income										
≤ 1500 €		472	163	34.5 (30.4 - 38.9)	150	57	38.0 (30.6 - 46.0)	622	220	35.4 (31.7 - 39.2)
> 1500 €, ≤ 2500 €		753	250	33.2 (29.9 - 36.6)	373	145	38.9 (34.1 - 43.9)	1126	395	35.1 (32.3 - 37.9)
> 2500 €, ≤ 3500 €		603	198	32.8 (29.2 - 36.7)	296	122	41.2 (35.8 - 46.9)	899	320	35.6 (32.5 - 38.8)
> 3500 €, ≤ 4500 €		545	193	35.4 (31.5 - 39.5)	337	122	36.2 (31.3 - 41.5)	882	315	35.7 (32.6 - 38.9)
> 4500 €		1111	334	30.1 (27.4 - 32.8)	1056	390	36.9 (34.1 - 39.9)	2167	724	33.4 (31.5 - 35.4)
No answer		225	123	54.7 (48.1 - 61.0)	196	109	55.6 (48.6 - 62.4)	421	232	55.1 (50.3 - 59.8)
	P-value						0.000			

Table 14. (Continued)

Characteristics	Rural			Urban			Total		
	N	Low phys. act. N	Low physical activity % (95% CI)	N	Low phys. act. N	Low physical activity % (95% CI)	N	Low phys. act. N	Low physical activity % (95% CI)
BMI									
Normal	1727	610	35.3 (33.1 - 37.6)	1153	439	38.1 (35.3 - 40.9)	2880	1409	48.9 (47.1 - 50.7)
Overweight	1225	419	34.2 (31.6 - 36.9)	835	355	42.5 (39.2 - 45.9)	2060	774	37.6 (35.5 - 39.7)
Obese	757	232	30.6 (27.5 - 34.0)	420	151	36.0 (31.5 - 40.6)	1177	383	32.5 (29.9 - 35.3)
P-value						0.077			
Current smoking									
Yes	946	363	38.4 (35.3 - 41.5)	794	317	39.9 (36.6 - 43.4)	1740	680	39.1 (36.8 - 41.4)
No	2763	898	32.5 (30.8 - 34.3)	1614	628	38.9 (36.6 - 41.3)	4377	1526	34.9 (33.5 - 36.3)
P-value						0.019			
Current alcohol use[a]									
Yes	264	111	42.0 (36.2 - 48.1)	248	101	40.7 (34.8 - 46.9)	512	212	41.4 (37.2 - 45.7)
No	3445	1150	33.4 (31.8 - 35.0)	2160	844	39.1 (37.0 - 41.1)	5605	1994	35.6 (34.3 - 36.8)
P-value						0.157			
Hypertension[b]									
Yes	1406	496	35.3 (32.8 - 37.8)	810	302	37.3 (34.0 - 40.7)	2215	798	36.0 (34.1 - 38.0)
No	2303	765	33.2 (31.3 - 35.2)	1598	643	40.2 (37.9 - 42.7)	3902	1408	36.1 (34.6 - 37.6)
P-value						0.000			
Low fruit and vegetable intake									
Yes	3234	1076	33.3 (31.7 - 34.9)	2056	803	39.1 (37.0 - 41.2)	5290	1879	35.5 (34.2 - 36.8)
No	475	185	38.9 (34.7 - 43.4)	352	142	40.3 (35.3 - 45.5)	827	327	39.5 (36.3 - 42.9)
P-value						0.863			

[a] One who has drank alcohol in the past 30 days

[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication

[d] Less than five servings of fruits and vegetables per day

Table 15. Socio -economic, behavioural and clinical correlates of insufficient physical activity, STEPS survey, Kosova, 2011

Characteristics	N=6117	Low physical activity N (%)	P-value	Odds ratio	95% CI	P-value
Age groups (years)						
15-24	1270	504 (39.7)		Ref.	-	-
25-34	1210	402 (33.2)		0.76	0.64 - 0.89	0.001
35-44	1204	384 (31.9)	0.000	0.72	0.60 - 0.84	0.000
45-54	1231	411 (33.4)		0.76	0.65 - 0.90	0.001
55-64	1202	505 (42.0)		1.10	0.94 - 1.29	0.239
Gender						
Male	3028	1342 (44.3)	0.000	Ref.	-	-
Female	3089	864 (28.0)		0.49	0.44 - 0.54	0.000
Residence						
Rural	3709	1261 (34.0)	0.000	Ref.	-	-
Urban	2408	945 (39.2)		1.25	1.23 - 1.39	0.000
Educational status						
Illiterate	198	82 (41.4)		Ref.	-	-
Up to primary education	2239	749 (33.5)	0.006	0.71	0.53 - 0.96	0.024
Up to secondary education	2345	889 (37.9)		0.86	0.64 - 1.16	0.330
Higher education	1335	486 (36.4)		0.81	0.60 - 1.10	0.174
Marital status						
Never married	1930	752 (39.0)		Ref.	-	-
Currently married	3971	1379 (34.7)	0.111	0.83	0.75 - 0.93	0.002
Separated/divorced	33	12 (36.4)		0.89	0.44 - 1.83	0.761
Widowed and cohabitating	183	63 (34.4)		0.82	0.60 - 1.13	0.228
The annual household income						
≤ 1500 €	622	220 (35.4)		Ref.	-	-
> 1500 €, ≤ 2500 €	1126	395 (35.1)		1.00	0.82 - 1.23	0.964
> 2500 €, ≤ 3500 €	899	320 (35.6)		1.00	0.82 - 1.25	0.939
> 3500 €, ≤ 4500 €	882	315 (35.7)	0.645	1.02	0.82 - 1.25	0.894
> 4500 €	2167	724 (33.4)		0.92	0.76 - 1.11	0.363
No answer	421	232 (55.1)		2.24	1.74 - 2.88	0.000

Table 15. (Continued)

Characteristics	N=6117	Low physical activity N (%)	P-value	Odds ratio	95% CI	P-value
BMI						
Normal	2880	1409 (48.9)		Ref.	-	-
Overweight	2060	774 (37.6)	0.000	0.63	0.56 - 0.71	0.000
Obese	1177	383 (32.5)		0.50	0.44 - 0.58	0.000
Current smoking						
No	4377	1526 (34.9)	0.002	Ref.	-	-
Yes	1740	680 (39.1)		1.20	1.07 - 1.34	0.002
Current alcohol use[a]						
No	5605	1994 (35.6)	0.010	Ref.	-	-
Yes	512	212 (41.4)		1.28	1.06 - 1.54	0.008
Hypertension[b]						
No	3902	1408 (36.1)	0.987	Ref.	-	-
Yes	2215	798 (36.0)		1.00	0.89 - 1.11	0.964
Low fruit and vegetable intake						
No	827	327 (39.5)	0.028	Ref.	-	-
Yes	5290	1879 (35.5)		0.84	0.72 - 0.98	0.025

[a] One who has drank alcohol in the past 30 days
[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication
[d] Low fruit and vegetable intake

5.2.5. Overweight and obesity

The prevalence of overweight per age groups and per gender is presented in table 16. The overall prevalence of overweight in individuals aged 15-64 years in Kosova was 33.7% (95% CI 32.5 – 34.9%), the prevalence was 39.8% (95% CI 38.0 – 41.5%) among males and 27.7% (95% CI 26.2 – 29.3%) among females. This difference in prevalence between genders was statistically significant (P<0.01). The difference in prevalence between genders was statistically significant for all age groups (P<0.01) and it was higher among males. In the two genders, the overweight prevalence increases along with age. After age 55 it was light decrease at both genders.

The prevalence of obesity per age groups and per gender is presented in table 17. The overall prevalence of obesity in individuals aged 15-64 years in Kosova was 19.2% (95% CI 18.3 – 20.2%), the prevalence was 14.9% (95% CI 13.7 – 16.2%) among males and 23.5% (95% CI 22.0 – 25.0%) among females. This difference in prevalence between genders was statistically significant (P<0.01). The difference in prevalence between genders was statistically significant for all age groups except for 25-34 years age group (P>0.05) and it was higher among females. On the two genders, the obesity prevalence increases along with age (Table 17).

Table 18 presents the prevalence of overweight and obesity per age groups and per residential areas. The overall prevalence of overweight and obesity in individuals aged 15-64 years in Kosova was 52.9% (95% CI 51.7 – 54.2%), the prevalence was 52.1% (95% CI 50.1 – 54.1%) among urban residents and 53.4% (95% CI 51.8 – 55.0%) in rural residents. This difference in prevalence between urban and rural areas wasn't statistically significant (P>0.05).

The overweight and obesity prevalence increases along with age. The prevalence increased from 14.5% for the 15-24 years age group to 76.7% for the 55-64 years age group. This positive correlation between overweight and obesity and age was observed in both rural and urban areas. In urban areas, the prevalence increased from 17.7% for the 15-24 years

age group to 76.7% for the 55-64 years age group and in rural areas, the prevalence increased from 12.3% to 76.7% for the same age groups.

Prevalence of overweight and obesity was higher at male respondents living in the rural and urban areas compared with female respondents living in the same areas, but without significant difference (P>0.05).

The prevalence of overweight and obesity varies according to the educational status it was higher at Illiterate 77.8% (95% CI 71.5 – 83.0 %) while the lowest was among those up to secondary education 50.0% (95% CI 48.0-52.0%). This positive correlation between overweight, obesity and educational status was observed in both rural and urban areas. We have distinguished the significant statistical difference in the prevalence of overweight and obesity according to school preparation and residence (P< 0.05).

Prevalence of overweight and obesity varies according to the marital status it was highest at Widowed and cohabitating 71.0% (95% CI 64.1 – 77.1%), while lowest at Never married 25.1% (95% CI 23.2-27.1%). This positive correlation between overweight and obesity and marital status was observed in both rural and urban areas but in rural areas prevalence of overweight and obesity was highest at sepe4rated/divorced while in urban areas among Widowed and cohabitating with the significant difference.

Prevalence of overweight and obesity was higher at respondents with the annual household income > 2500 €, ≤ 3500 € with 56.7% (95% CI 53.5-59.9%). This positive correlation between overweight and obesity and annual household income was observed in both rural and urban areas, but in rural areas 57.4% (95% CI 53.4-61.3%) in this group of people the prevalence of overweight and obesity is higher than in urban area 55.4% (95% CI 49.7-61.0%) with significant difference (P<0.01).

Prevalence of overweight and obesity has not correlated with smoking; at current smokers prevalence of overweight and obesity was 55.0% (95% CI 52.7 – 57.3 %) among no smokers was 52.1% (95% CI 50.6 – 53.6 %). But according to the residence, the

respondent in rural area prevalence of overweight and obesity among no smokers was 52.8% (95% CI 51.0 – 54.7%), among no smokers in the urban area was 51.1% (95% CI 49.0 -5 3.2%) with the significant difference.

Prevalence of overweight and obesity was higher among current alcohol user 62.9% (95% CI 58.6 – 67.0%) compared to non-alcohol users 52.0% (95% CI 50.7 – 53.3%) with the significant difference according to residence (P<0.01).

In the prevalence of overweight and obesity according to hypertension and residence, we did not distinguish with the significant statistical difference (P>0.05). Prevalence of overweight and obesity among all respondents with hypertension were 77.2% (95% CI 75.4 - 78.9%), respondents with hypertension in rural area was 76.2% (95% CI 74.0 – 78.4%) while among those living in urban area was 78.6% (95% CI 75.7 – 81.3%).

In the prevalence of overweight and obesity according to physical activity and residence, we have earned significant statistical difference (P<0.01). Prevalence of overweight and obesity among all respondents with low physical activity was 52.4% (95% CI 50.4 – 54.5%), respondents with low physical activity in rural areas was 51.6% (95% CI 48.9 – 54.4%) while among those living in urban area was 53.5% (95% CI 50.4 - 56.7%).

In the prevalence of overweight and obesity according to fruit and vegetable intake and residence we have earned significant statistical difference (P<0.01). Prevalence of overweight and obesity among all respondents with Low fruit and vegetable intake was 53.2% (95% CI 51.9 – 54.6%), respondents with low fruit and vegetable intake in rural areas was 54.2% (95% CI 52.5 – 55.9%) while among those living in urban area was 51.7% (95% CI 49.5 - 53.9%).

On univariate analysis, the prevalence of overweight and obesity was found to be significantly higher among those aged 55-64 years (76.7%), male (54.7%), illiterate (77.8%), Widowed and cohabitating (71.0%), the annual household income > 2500 €, ≤ 3500 € (56.7%), smokers (55.0%), current alcohol user (62.9%) and hypertension (77.2%). No difference was found in the prevalence of residence, physical activity, fruit and vegetable intake (Table 19).

Risk factors for overweight and obesity

Age group 25-64, gender, educational status, marital status, smoking, alcohol use and hypertension were found to be the risk factors significantly associated with overweight and obesity in a multivariate regression model (Table 19).

Table 16. Percentage of overweight by gender - Kosova STEPS survey 2011

Age group (years)	Male			Female			Total			P-value*
	N	N	Overweight % (95% CI)	N	N	Overweight % (95% CI)	N	N	Overweight % (95% CI)	
15-24	613	100	16.3 (13.6 - 19.4)	657	59	9.0 (7.0 - 11.4)	1270	159	12.5 (10.8 - 14.5)	0.000
25-34	603	232	38.5 (34.7 - 42.4)	607	151	24.9 (21.6 - 28.5)	1210	383	31.7 (29.1 - 34.3)	0.000
35-44	594	273	46.0 (42.0 - 50.0)	610	195	32.0 (28.4 - 35.8)	1204	468	38.9 (36.2 - 41.7)	0.000
45-54	624	311	49.8 (45.9 - 53.8)	607	236	38.9 (35.1 - 42.8)	1231	547	44.4 (41.7 - 47.2)	0.000
55-64	594	288	48.5 (44.5 - 52.5)	608	215	35.4 (31.7 - 39.2)	1202	503	41.8 (39.1 - 44.7)	0.000
15-64	**3028**	**1204**	39.8 (38.0 - 41.5)	**3089**	**856**	**27.7 (26.2 - 29.3)**	**6117**	**2060**	33.7 (32.5 - 34.9)	**0.000**
25-64	2415	1104	45.7 (43.7 - 47.7)	2432	797	32.8 (30.9 - 34.7)	4847	1901	39.2 (37.9 - 40.6)	0.000

*Chi-square test or Fisher exact test

Table 17. Percentage of obesity by gender - Kosova STEPS survey 2011

Age group (years)	N	Male		Female			Total			P-value*
		N	Obesity % (95% CI)	N	N	Obesity % (95% CI)	N	N	Obesity % (95% CI)	
15-24	613	19	3.1 (2.0 - 4.8)	657	6	0.9 (0.4 - 2.0)	1270	25	2.0 (1.3 - 2.9)	0.009
25-34	603	59	9.8 (7.7 - 12.4)	607	56	9.2 (7.2 - 11.8)	1210	115	9.5 (8.0 - 11.3)	0.816
35-44	594	100	16.8 (14.0 - 20.1)	610	145	23.8 (20.6 - 27.3)	1204	245	20.3 (18.2 - 22.7)	0.004
45-54	624	139	22.3 (19.2 - 25.7)	607	234	38.6 (34.8 - 42.5)	1231	373	30.3 (27.8 - 32.9)	0.000
55-64	594	135	22.7 (19.5 - 26.3)	608	284	46.7 (42.8 - 50.7)	1202	419	34.9 (32.2 - 37.6)	0.000
15-64	**3028**	**452**	14.9 (13.7 - 16.2)	**3089**	**725**	23.5 (22.0 - 25.0)	**6117**	**1177**	19.2 (18.3 - 20.2)	0.000
25-64	2415	433	17.9 (16.5 - 19.5)	2432	719	29.6 (27.8 - 31.4)	4847	1152	23.8 (22.6 - 25.0)	0.000

*Chi-square test or Fisher exact test

Table 18. Socio -economic, behavioural and clinical correlates of overweight and obesity by residence, STEPS survey, Kosova, 2011

Characteristics	Rural			Urban			Total		
	N	Overw.and obes. N	Overw and obes. % (95% CI)	N	Overw.and obes. N	Overw and obes. % (95% CI)	N	Overw.and obes. N	Overw and obes. % (95% CI)
Total	3709	1982	53.4 (51.8 - 55.0)	2408	1255	52.1 (50.1 - 54.1)	6117	3237	52.9 (51.7 - 54.2)
P-value						0.325			
Age groups (years)									
15-24	757	93	12.3 (10.1-14.8)	513	91	17.7 (14.7-21.3)	1270	184	14.5 (12.7-16.5)
25-34	730	314	43.0 (39.5-46.6)	480	184	38.3 (34.1-42.8)	1210	498	41.2 (38.4-44.0)
35-44	727	446	61.3 (57.8-64.8)	477	267	56.0 (51.5-60.4)	1204	713	59.2 (56.4-62.0)
45-54	761	566	74.4 (71.2-77.3)	470	354	75.3 (71.2-79.0)	1231	920	74.7 (72.2-77.1)
55-64	734	563	76.7 (73.5-79.6)	468	359	76.7 (72.7-80.3)	1202	922	76.7 (74.2-79.0)
P-value						0.038			
Gender									
Male	1831	1001	54.7 (52.4-56.9)	1197	655	54.7 (51.9-57.5)	3028	1656	54.7 (52.9-56.5)
Female	1878	981	52.2 (50.0-54.5)	1211	600	49.5 (46.7-52.4)	3089	1581	51.2 (49.4-52.9)
P-value						0.368			
Educational status									
Illiterate	141	107	75.9 (68.2-82.2)	57	47	82.5 (70.6-90.2)	198	154	77.8 (71.5-83.0)
Up to prim. Educ.	1603	825	51.5 (49.0-53.9)	636	322	50.6 (46.8-54.5)	2239	1147	51.2 (49.2-53.3)
Up to sec. educ.	1178	591	50.2 (47.3-53.0)	1167	581	49.8 (46.9-52.7)	2345	1172	50.0 (48.0-52.0)
Higher education	787	459	58.3 (54.8-61.7)	548	305	55.7 (51.5-59.8)	1335	764	57.2 (54.6-59.9)
P-value						0.000			
Marital status									
Never married	1140	275	24.1 (21.7-26.7)	790	210	26.6 (23.6-29.8)	1930	485	25.1 (23.2-27.1)
Currently married	2453	1622	66.1 (64.2-68.0)	1518	977	64.4 (61.9-66.7)	3971	2599	65.4 (64.0-66.9)
Separ/divorced	11	9	81.8 (52.3-94.9)	22	14	63.6 (43.0-80.3)	33	23	69.7 (52.7-82.6)
Widow, and coh.	105	76	72.4 (63.2-80.0)	78	54	69.2 (58.3-78.4)	183	130	71.0 (64.1-77.1)
P-value						0.012			
The annual household income									
≤ 1500 €	472	261	55.3 (50.8-59.7)	150	82	54.7 (46.7-62.4)	622	343	55.1 (51.2-59.0)
> 1500 €, ≤ 2500 €	753	405	53.8 (50.2-57.3)	373	188	50.4 (45.3-55.4)	1126	593	52.7 (49.7-55.6)
> 2500 €, ≤ 3500 €	603	346	57.4 (53.4 -61.3)	296	164	55.4 (49.7 -61.0)	899	510	56.7 (53.5-59.9)
> 3500 €, ≤ 4500 €	545	297	54.5 (50.3-58.6)	337	188	55.8 (50.4-61.1)	882	485	55.0 (51.7-58.2)
> 4500 €	1111	561	50.5 (47.6 - 53.4)	1056	548	51.9 (48.9-54.9)	2167	1109	51.2 (49.1 - 53.3)
No answer	225	112	49.8 (43.3 - 56.3)	196	85	43.4 (36.6-50.4)	421	197	46.8 (42.1 -51.6)
P-value						0.000			

Table 18. (Continued)

Characteristics	Rural			Urban			Total		
	N	Overweight and obesity N	Overweight and obesity % (95% CI)	N	Overweight and obesity N	Overweight and obesity % (95% CI)	N	Overweight and obesity N	Overweight and obesity % (95% CI)
Current smoking									
Yes	946	522	55.2 (52.0-58.3)	794	435	54.8 (51.3-58.2)	1740	957	55.0 (52.7-57.3)
No	2763	1460	52.8 (51.0-54.7)	1614	820	50.8 (48.4-53.2)	4377	2280	52.1 (50.6-53.6)
P-value						0.000			
Current alcohol use[a]									
Yes	264	171	64.8 (58.8-70.3)	248	151	60.9 (54.7-66.8)	512	322	62.9 (58.6-67.0)
No	3445	1811	52.6 (50.9-54.2)	2160	1104	51.1 (49.0-53.2)	5605	2915	52.0 (50.7-53.3)
P-value						0.002			
Hypertension[b]									
Yes	1406	1072	76.2 (74.0-78.4)	810	637	78.6 (75.7-81.3)	2215	1709	77.2 (75.4-78.9)
No	2303	910	39.5 (37.5-41.5)	1598	618	38.7 (36.3-41.1)	3902	1528	39.2 (37.6-40.7)
P-value						0.070			
Low physical activity [c]									
Yes	1261	651	51.6 (48.9 - 54.4)	945	506	53.5 (50.4 - 56.7)	2206	1157	52.4 (50.4 - 54.5)
No	2448	1331	54.4 (52.4 - 56.3)	1463	749	51.2 (48.6 - 53.8)	3911	2080	53.2 (51.6 - 54.7)
P-value						0.003			
Low fruit and vegetable intake [d]									
Yes	3234	1752	54.2 (52.5 - 55.9)	2056	1063	51.7 (49.5 - 53.9)	5290	2815	53.2 (51.9 - 54.6)
No	475	230	48.4 (44.0 - 52.9)	352	192	54.5 (49.3 - 59.7)	827	422	51.0 (47.6 - 54.4)
P-value						0.000			

[a] One who has drank alcohol in the past 30 days

[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication

[c] Low physical activity

[d] Less than five servings of fruits and vegetables per day

Table 19. Socio -economic, behavioural and clinical correlates of overweight and obesity, STEPS survey, Kosova, 2011

Characteristics	N = 6117	Overweight and obesity N (%)	P-value	Odds ratio	95% CI	P-value
Age groups (years)						
15-24	1270	184 (14.5)		Ref.	-	-
25-34	1210	498 (41.2)		4.13	3.40 - 14.3	0.000
35-44	1204	713 (59.2)	0.000	8.57	7.06 - 10.4	0.000
45-54	1231	920 (74.7)		17.5	14.3 - 27.7	0.000
55-64	1202	922 (76.7)		19.4	15.8 - 23.9	0.000
Gender						
Male	3028	1656 (54.7)		Ref.	-	-
Female	3089	1581 (51.2)	0.006	0.87	0.79 - 0.96	0.006
Residence						
Rural	3709	1982 (53.4)		Ref.	-	-
Urban	2408	1255 (52.1)	0.325	0.95	0.86 - 1.05	0.312
Educational status						
Illiterate	198	154 (77.8)		Ref.	-	-
Up to primary education	2239	1147 (51.2)		0.3	0.21 - 0.42	0.000
Up to secondary education	2345	1172 (50.0)	0.000	0.29	0.20 - 0.40	0.000
Higher education	1335	764 (57.2)		0.38	0.27 - 0.54	0.000
Marital status						
Never married	1930	485 (25.1)		Ref.	-	-
Currently married	3971	2599 (65.4)		5.64	5.00 - 27.8	0.000
Separated/divorced	33	23 (69.7)	0.000	6.85	3.24 - 14.5	0.000
Widowed and cohabitating	183	130 (71.0)		7.3	5.22 - 11.6	0.000
The annual household income						
≤ 1500 €	622	343 (55.1)		Ref.	-	-
> 1500 €, ≤ 2500 €	1126	593 (52.7)		0.91	0.74 - 1.11	0.319
> 2500 €, ≤ 3500 €	899	510 (56.7)	0.036	1.07	0.89 - 1.31	0.54
> 3500 €, ≤ 4500 €	882	485 (55.0)		0.99	0.81 - 1.22	0.952
> 4500 €	2167	1109 (51.2)		0.85	0.71 - 1.02	0.081
No answer	421	197 (46.8)		0.72	0.56 - 0.92	0.008

Table 19. (Continued)

Characteristics	N = 6117	Overweight and obesity N (%)	P-value	Odds ratio	95% CI	P-value
Current smoking						
No	4377	2280 (52.1)	0.043	Ref.	-	-
Yes	1740	957 (55.0)		1.12	1.00 - 1.26	0.039
Current alcohol use[a]						
No	5605	2915 (52.0)	0.000	Ref.	-	-
Yes	512	322 (62.9)		1.56	1.30 - 1.89	0.000
Hypertension[b]						
No	3902	1528 (39.2)	0.000	Ref.	-	-
Yes	2215	1709 (77.2)		5.25	4.66 - 5.90	0.000
Low physical activity						
No	3911	2080 (53.2)	0.598	Ref.	-	-
Yes	2206	1157 (52.4)		0.97	0.87 - 1.08	0.580
Low fruit and vegetable intake						
No	827	422 (51.0)	0.257	Ref.	-	-
Yes	5290	2815 (53.2)		0.91	0.79 - 1.06	0.241

[a] One who has drank alcohol in the past 30 days

[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication

[c] Low physical activity

[d] Low fruit and vegetable intake

5.2.6. Raised blood pressure

The prevalence of hypertension per age groups and per gender is presented in table 20. The overall prevalence of hypertension in individuals aged 15-64 years in Kosova was 36.2% (95% CI 35.0 – 37.4%), the prevalence was 37.1% (95% CI 35.4 – 38.8%) among males and 35.4% (95% CI 33.7 – 37.1%) among females. This difference in prevalence between genders wasn't statistically significant (P>0.05). The difference in prevalence between genders was statistically significant for 15-24 years age group (P<0.05) and for 25-34 years age group (P<0.01) and it was higher among males. On the two genders, the hypertension prevalence increases along with age.

Table 21 presents the prevalence of hypertension per age groups and per residential areas. The overall prevalence of hypertension in individuals aged 15-64 years in Kosova was 36.2% (95% CI 35.0 – 37.4%), the prevalence was 33.6% (95% CI 31.8 – 35.5%) in urban residents and 37.9% (95% CI 36.4 – 39.5%) in rural residents. This difference in prevalence between urban and rural areas was statistically significant (P<0.01).
The hypertension prevalence increases along with age. The prevalence increased from 7.5% for the 15-24 years age group to 71.1% for the 55-64 years age group. This positive correlation between hypertension and age was observed in both rural and urban areas. In urban areas, the prevalence increased from 7.2% for the 15-24 years age group to 69.7% for the 55-64 years age group and in rural areas, the prevalence increased from 7.7% to 72.1% for the same age groups.

Prevalence of hypertension was higher at both genders living in the rural area compared with those living in the urban area but without significant difference (P>0.05).

The prevalence of hypertension varies according to the educational status, it was higher at illiterates 73.7% (95% CI 67.2 – 79.4%), while the lowest was among those up to secondary education 31.6% (95% CI 29.7-33.5%). This positive correlation between hypertension and educational status was observed in both rural and urban areas. We have

distinguished the significant statistical difference in the prevalence of hypertension according to school preparation and residence (P< 0.01).

Prevalence of hypertension varies according to the marital status it was highest at Widowed and cohabitating 62.3% (95% CI 55.1 – 69.0%), while the lowest was among unmarried 14.9% (95% CI 13.4 - 16.6%). This positive correlation between hypertension and marital status was observed in both rural and urban areas, but in rural areas prevalence of hypertension was highest at separated/divorced while in urban areas among Widowed and cohabitating but without significant difference (P>0.05).

Prevalence of hypertension was higher in respondents with the annual household income ≤ 1500 € with 45.7% (95% CI 41.8 - 49.6%). This positive correlation between hypertension and annual household income was observed in both rural and urban areas, but in urban areas 50.7% (95% CI 42.7 - 58.6%) in this group of people the prevalence of hypertension is higher than in rural area 44.1% (95% CI 39.7- 48.6%) with significant difference (P<0.01).

The positive correlation between hypertension and BMI was observed in both rural and urban areas. Prevalence of hypertension was highest in Obese 66.9% (95% CI 64.2 – 69.6%). At obese respondents living in the rural area was 67.2% (95% CI 63.8 - 70.5%), while among those living in the urban area was 66.4% (95% CI 61.8 - 70.8%), without significant difference (P>0.05).

At current smokers prevalence of hypertension was 36.5% (95% CI 34.3 – 38.8 %) among no smokers was 36.1% (95% CI 34.7 – 37.6 %). According to the residence, among respondents living in the rural area prevalence of hypertension among no smokers was 38.0% (95% CI 36.2 – 39.9%), among no smokers in the urban area was 32.8% (30.6-35.2%) with significant difference (P<0.01).

Prevalence of hypertension was higher among current alcohol user 40.0% (95% CI 35.9 – 44.3%) compared with no users 35.9% (95% CI 34.6 – 37.1%) without significant difference by residence and current alcohol use (P>0.05).

In the prevalence of hypertension according to physical activity and residence, we haven't earned significant statistical difference (P>0.05). Prevalence of hypertension among all respondents with low physical activity with low physical activity was 36.2% (95% CI 34.2 - 38.2%), respondent eve with low physical activity in rural areas was 39.3% (95% CI 36.7 - 42.1%) while among those living in urban area was 32.0% (95% CI 29.1 - 35.0%).

In the prevalence of hypertension according to fruit and vegetable intake and residence we have earned significant statistical difference (P<0.01). Prevalence of hypertension among all respondents with Low fruit and vegetable intake was 36.5% (95% CI 35.2 – 37.8%), respondents with low fruit and vegetable intake in rural areas was 38.7% (95% CI 37.0 – 40.3%) while among those living in urban area was 33.2% (95% CI 31.2 - 35.2%).

On univariate analysis, the prevalence of hypertension was found to be significantly higher among those aged 55-64 years (71.1%), rural (37.9%), illiterate (73.7%), Widowed and cohabitating (62.3%), the annual household income > 1500 €, ≤ 2500 € (45.7%) and obesity (66.9%). No difference was found in prevalence by gender, residence, smoking and alcohol use, low physical activity, fruit and vegetable intake (Table 22).

Risk factors for hypertension

Age group 45-64, residence, educational status, marital status, the annual household income and overweight and obesity, were found to be the risk factors significantly associated with hypertension in a multivariate regression model (Table 22).

Table 20. Percentage of hypertension by gender - Kosova STEPS survey 2011

Age group (years)	Male			Female			Total			P-value*
	N	N	Hypertension % (95% CI)	N	N	Hypertension % (95% CI)	N	N	Hypertension % (95% CI)	
15-24	613	57	9.3 (7.2 - 11.9)	657	38	5.8 (4.2 - 7.8)	1270	95	7.5 (6.2-9.1)	0.023
25-34	603	137	22.7 (19.6 - 26.2)	607	86	14.2 (11.6 - 17.2)	1210	223	18.4 (16.3-20.7)	0.000
35-44	594	201	33.8 (30.1 - 37.7)	610	181	29.7 (26.2 - 33.4)	1204	382	31.7 (29.2-34.4)	0.136
45-54	624	322	51.6 (47.7 - 55.5)	607	339	55.8 (51.9 - 59.7)	1231	661	53.7 (50.9-56.5)	0.151
55-64	594	406	68.4 (64.5 - 72.0)	608	449	73.8 (70.2 - 77.2)	1202	855	71.1 (68.5-73.6)	0.041
15-64	**3028**	**1123**	37.1 (35.4 - 38.8)	**3089**	**1093**	35.4 (33.7 - 37.1)	**6117**	**2216**	36.2 (35.0 - 37.4)	**0.174**
25-64	2415	1066	44.1 (42.2 - 46.1)	2432	1055	43.4 (41.4 - 45.4)	4847	2121	43.8 (42.4 - 45.2)	0.614

*Chi-square test or Fisher exact test

Table 21. Socio -economic, behavioural and clinical correlates of hypertension by residence, STEPS survey, Kosova, 2011

Characteristics	Rural			Urban			Total		
	N	HBP N	HBP % (95% CI)	N	HBP N	HBP % (95% CI)	N	HBP N	HBP % (95% CI)
Total	3709	1406	37.9 (36.4 - 39.5)	2408	810	33.6 (31.8 - 35.5)	6117	2216	36.2 (35.0 - 37.4)
P-value						0.001			
Age groups (years)									
15-24	757	58	7.7 (6.0-9.8)	513	37	7.2 (5.3-9.8)	1270	95	7.5 (6.2-9.1)
25-34	730	144	19.7 (17.0-22.8)	480	79	16.5 (13.4-20.0)	1210	223	18.4 (16.3-20.7)
35-44	727	254	34.9 (31.6-38.5)	477	128	26.8 (23.1-31.0)	1204	382	31.7 (29.2-34.4)
45-54	761	421	55.3 (51.8-58.8)	470	240	51.1 (46.6-55.6)	1231	661	53.7 (50.9-56.5)
55-64	734	529	72.1 (68.7-75.2)	468	326	69.7 (65.3-73.6)	1202	855	71.1 (68.5-73.6)
P-value						0.589			
Gender									
Male	1831	719	39.3 (37.1-41.5)	1197	413	34.5 (31.9-37.2)	3028	1123	37.1 (35.4-38.8)
Female	1878	696	37.1 (34.9-39.3)	1211	397	32.8 (30.2-35.5)	3089	1093	35.4 (33.7-37.1)
P-value						0.859			
Educational status									
Illiterate	141	100	70.9 (63.0-77.8)	57	46	80.7 (68.7-88.9)	198	146	73.7 (67.2-79.4)
Up to primary education	1603	611	38.1 (35.8-40.5)	636	241	37.9 (34.2-41.7)	2239	852	38.1 (36.1-40.1)
Up to secondary education	1178	394	33.4 (30.8-36.2)	1167	347	29.7 (27.2-32.4)	2345	741	31.6 (29.7-33.5)
Higher education	787	301	38.2 (34.9-41.7)	548	176	32.1 (28.3-36.1)	1335	477	35.7 (33.2-38.3)
P-value						0.000			
Marital status									
Never married	1140	174	15.3 (13.3-17.5)	790	114	14.4 (12.2-17.1)	1930	288	14.9 (13.4-16.6)
Currently married	2453	1159	47.2 (45.3-49.2)	1518	637	42.0 (39.5-44.5)	3971	1796	45.2 (43.7-46.8)
Separated/divorced	11	8	72.7 (43.4-90.3)	22	10	45.5 (26.9-65.3)	33	18	54.5 (38.0-70.2)
Widowed and cohabitating	105	65	61.9 (52.4-70.6)	78	49	62.8 (51.7-72.7)	183	114	62.3 (55.1-69.0)
P-value						0.076			
The annual household income									
≤ 1500 €	472	208	44.1 (39.7-48.6)	150	76	50.7 (42.7-58.6)	622	284	45.7 (41.8-49.6)
> 1500 €, ≤ 2500 €	753	288	38.2 (34.8-41.8)	373	131	35.1 (30.5-40.1)	1126	419	37.2 (34.4-40.1)
> 2500 €, ≤ 3500 €	603	234	38.8 (35.0-42.8)	296	113	38.2 (32.8-43.8)	899	347	38.6 (35.5-41.8)
> 3500 €, ≤ 4500 €	545	209	38.3 (34.4-42.5)	337	119	35.3 (30.4-40.6)	882	328	37.2 (34.1-40.4)
> 4500 €	1111	365	32.9 (30.2-35.9)	1056	314	29.7 (27.1-32.6)	2167	679	31.3 (29.4- 33.3)
No answer	225	102	45.3 (39.0-51.9)	196	57	29.1 (23.2-35.8)	421	159	37.2 (33.3-42.5)
P-value						0.000			

Table 21. (Continued)

Characteristics	Rural			Urban			Total		
	N	HBP N	HBP % (95% CI)	N	HBP N	HBP % (95% CI)	N	HBP N	HBP % (95% CI)
BMI									
Normal	1727	334	19.3 (17.5-21.3)	1153	173	15.0 (13.1-17.2)	2880	507	17.6 (16.3-19.0)
Overweight	1225	563	46.0 (43.2-48.8)	835	358	42.9 (39.6-46.3)	2060	921	44.7 (42.6-46.9)
Obese	757	509	67.2 (63.8-70.5)	420	279	66.4 (61.8-70.8)	1177	788	66.9 (64.2-69.6)
P-value						0.144			
Current smoking									
Yes	946	355	37.5 (34.5-40.7)	794	280	35.3 (32.0-38.7)	1740	635	36.5 (34.3-38.8)
No	2763	1051	38.0 (36.2-39.9)	1614	530	32.8 (30.6-35.2)	4377	1581	36.1 (34.7-37.6)
P-value						0.000			
Current alcohol use[a]									
Yes	264	117	44.3 (38.4-50.3)	248	88	35.5 (29.8-41.6)	512	205	40.0 (35.9-44.3)
No	3445	1289	37.4 (35.8-39.0)	2160	722	33.4 (31.5-35.4)	5605	2011	35.9 (34.6-37.1)
P-value						0.056			
Low physical activity [c]									
Yes	1261	496	39.3 (36.7 - 42.1)	945	302	32.0 (29.1 - 35.0)	2206	798	36.2 (34.2 - 38.2)
No	2448	910	37.2 (35.3 - 39.1)	1463	508	34.7 (32.3 - 37.2)	3911	1418	36.3 (34.8 - 37.8)
P-value						0.367			
Low fruit and vegetable intake [d]									
Yes	3234	1250	38.7 (37.0 - 40.3)	2056	682	33.2 (31.2 - 35.2)	5290	1932	36.5 (35.2 - 37.8)
No	475	156	32.8 (28.8 - 37.2)	352	128	36.4 (31.5 - 41.5)	827	284	34.3 (31.2 - 37.6)
P-value						0.002			

[a] One who has drank alcohol in the past 30 days
[c] Low physical activity
[d] Less than five servings of fruits and vegetables per day

Table 22. Socio -economic, behavioural and clinical correlates of hypertension, STEPS survey, Kosova, 2011

Characteristics	N=6117	HBP N (%)	P-value	Odds ratio	95% CI	P-value
Age groups (years)						
15-24	1270	95 (7.5)		Ref.	-	-
25-34	1210	223 (18.4)		2.79	2.17 - 3.61	0.000
35-44	1204	382 (31.7)	0.000	5.75	4.51 - 7.32	0.000
45-54	1231	661 (53.7)		14.3	11.3 - 18.2	0.000
55-64	1202	855 (71.1)		30.5	23.9 - 38.9	0.000
Gender						
Male	3028	1123 (37.1)	0.174	Ref.	-	-
Female	3089	1093 (35.4)		0.93	0.84 - 1.03	0.166
Residence						
Rural	3709	1406 (37.9)	0.001	Ref.	-	-
Urban	2408	810 (33.6)		0.83	0.75 - 0.92	0.000
Educational status						
Illiterate	198	146 (73.7)		Ref.	-	-
Up to primary education	2239	852 (38.1)		0.22	0.16 - 0.30	0.000
Up to secondary education	2345	741 (31.6)	0.000	0.16	0.12 - 0.23	0.000
Higher education	1335	477 (35.7)		0.20	0.14 - 0.28	0.000
Marital status						
Never married	1930	288 (14.9)		Ref.	-	-
Currently married	3971	1796 (45.2)		4.71	4.10 - 5.42	0.000
Separated/divorced	33	18 (54.5)	0.000	6.84	3.41 - 13.7	0.000
Widowed and cohabitating	183	114 (62.3)		9.42	6.81 - 13.1	0.000
The annual household income						
≤ 1500 €	622	284 (45.7)		Ref.	-	-
> 1500 €, ≤ 2500 €	1126	419 (37.2)		0.71	0.58 - 0.86	0.000
> 2500 €, ≤ 3500 €	899	347 (38.6)	0.000	0.75	0.61 - 0.92	0.006
> 3500 €, ≤ 4500 €	882	328 (37.2)		0.71	0.57 - 0.87	0.001
> 4500 €	2167	679 (31.3)		0.54	0.45 - 0.65	0.000
No answer	421	159 (37.8)		0.72	0.56 - 0.93	0.011

Table 22. (Continued)

Characteristics	N=6117	HBP N (%)	P-value	Odds ratio	95% CI	P-value
BMI						
Normal	2880	507 (17.6)		Ref.	-	-
Overweight	2060	921 (44.7)	0.000	3.78	3.33 - 4.31	0.000
Obese	1177	788 (66.9)		9.48	8.12 - 11.1	0.000
Current smoking						
No	4377	1581 (36.1)	0.807	Ref.	-	-
Yes	1740	635 (36.5)		1.01	0.91 - 1.14	0.784
Current alcohol use[a]						
No	5605	2011 (35.9)	0.068	Ref.	-	-
Yes	512	205 (40.0)		1.19	0.99 - 1.44	0.061
Low physical activity [c]						
No	3911	1418 (36.3)	0.971	Ref.	-	-
Yes	2206	798 (36.2)		1.00	0.89 - 1.11	0.948
Low fruit and vegetable intake [d]						
No	827	284 (34.3)	0.240	Ref.	-	-
Yes	5290	1932 (36.5)		1.10	0.94 - 1.28	0.225

[a] One who has drank alcohol in the past 30 days
[c] Low physical activity
[d] Low fruit and vegetable intake

5.3. Results of biochemical measurements

In this section of results are presented results of two biological risk factors raised blood glucose and raised cholesterol. Those two risk factors were measurement on the sample of 796 which subsample of 6117 respondents.

5.3.1. Sample characteristics of biochemical measurements

Table 23 show socio-demographic and behavioural characteristics of the study population, STEPS survey step 3. Female was 50.3% of the respondents, adults in the age group 25-44 years 39.5%, rural residents 56.5%, illiterate 2.9%, up to primary education 27.9%, Currently married 68.6%, the annual household income ≤ 1500 € has 7.5%.

Table 23. Socio-demographic and behavioral characteristics of the study population, STEPS survey step 3, Kosova 2011

Characteristics	N=796 (%)
Age groups (years)	
15-24	163 (20.5)
25-34	165 (20.7)
35-44	150 (18.8)
45-54	170 (21.4)
55-64	148 (18.6)
Gender	
Male	396 (49.7)
Female	400 (50.3)
Residence	
Rural	450 (56.5)
Urban	346 (43.5)
Educational status	
Illiterate	23 (2.9)
Up to primary education	222 (27.9)
Up to secondary education	398 (50.0)
Higher education	153 (19.2)
Marital status	
Never married	224 (28.1)
Currently married	546 (68.6)
Separated/divorced	3 (0.4)
Widowed and cohabitating	23 (2.9)
The annual household income	
≤ 1500 €	60 (7.5)
> 1500 €, ≤ 2500 €	134 (16.8)
> 2500 €, ≤ 3500 €	102 (12.8)
> 3500 €, ≤ 4500 €	103 (12.9)
> 4500 €	347 (43.6)
No answer	50 (6.3)

The prevalence of hypertension among the respondents was 39.6%, current smokers 24.7%, current alcohol users 7.7%, obese 37.1%, insufficient physical activity 38.4% and low fruit and vegetable intake 90.1%.

Table 23. (Continued)

Characteristics	N=796 (%)
BMI	
Normal	363 (45.6)
Overweight	138 (17.3)
Obese	295 (37.1)
Current smoking	
Yes	197 (24.7)
No	599 (75.3)
Current alcohol use[a]	
Yes	61 (7.7)
No	735 (92.3)
Hypertension[b]	
Yes	315 (39.6)
No	481 (60.4)
Low physical activity	
Yes	306 (38.4)
No	490 (61.6)
Low fruit and vegetable intake	
Yes	717 (90.1)
No	79 (9.9)

[a] One who has drank alcohol in the past 30 days
[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication
[c] Low physical activity
[d] Low fruit and vegetable intake

5.3.2. Raised blood glucose

Overall prevalence of Diabetes mellitus among the study participants was found out to be 7.7% (95% CI 6.0 – 9.7%), which was higher in rural areas 9.1% (95% CI 6.8 – 12.1%) compared to urban 5.8% (95% CI 3.8 – 8.8%), though not significant (P>0.05). The prevalence of Diabetes mellitus was higher among females 9.0% (95% CI 6.6 – 12.2%) compared to males 6.3% (95% CI 4.3 – 9.2%), though not significant (P>0.05). The prevalence of prediabetes was 6.0% (95% CI 4.6 – 7.9%), was higher in urban areas 6.4% (95% CI 4.2 – 9.4%) compared to rural 5.8% (95% CI 4.0 – 8.3%), though not significant (P>0.05). The prevalence of prediabetes was higher among females 6.5% (95% CI 4.5 – 9.4%) compared to males 5.6% (95% CI 3.7 – 8.3%), though not significant (P>0.05). Prevalence of diabetes increased with age was 1.2% between 25-34 years (95% CI 0.3 - 4.3%) up to 21.6% aged 55-64 years (95% CI 15.8 - 28.9%) also the prevalence of pre-diabetes increased with age was 0.6% aged 15-24 years (95% CI 0.1 - 3.4%) up to 12.8% aged 55-64 years (Table 24).

On univariate analysis, the prevalence of diabetes mellitus was found to be significantly higher among those aged 55-64 years (21.6%), illiterate 26.1%), Widowed and cohabitating (17.4%), the annual household income > 1500 €, ≤ 2500 € (11.2%), overweight (14.5%), hypertensive (13.3%), low physical activity (11.8%) and hypercholesterolemia (12.0%). No difference was found in prevalence by gender, residence, smoking and alcohol use and fruit and vegetable intake (Table 25).

Risk factors for Diabetes mellitus

Age group 45-64, educational status, marital status, hypertension, overweight and obesity, low physical activity and hypercholesterolemia were found to be the risk factors significantly associated with diabetes mellitus in a multivariate regression model (Table 25).

Among all persons with Diabetes Mellitus, only 13.1% were known the case of DM or on treatment whereas the rest were newly diagnosed. Among those already on treatment or

known cases of Diabetes Mellitus only one (12.5%) had controlled blood glucose status (Table 26).

Although the percentage of diabetes mellitus in respondents aged 15-64 years is higher in females 9.0% versus males 6.3% we have not obtained significant difference (P> 0.05) as well as in age group 25-64 percent is higher in females 11.3% compared with the percentage of diabetes in males 8.0% but without significant difference (P>0.05), (Table 27).

Table 24. Prevalence of diabetes and pre-diabetes in Kosova, stratified by age group, gender and residence, 2011

Characteristics	Total N	Prevalence of pre-diabetes N (%,95% CI)	Prevalence of diabetes N (%,95% CI)
Age groups (years)			
15-24	163	1 (0.6, 0.1 - 3.4)	-
25-34	165	4 (2.4, 0.9 -6.1)	2 (1.2, 0.3 - 4.3)
35-44	150	11 (7.3, 4.1-12.7)	4 (2.7, 1.0-6.7)
45-54	170	13 (7.6, 4.5-12.6)	23 (13.5, 9.2 - 19.5)
55-64	148	19 (12.8, 8.4-19.2)	32 (21.6, 15.8 - 28.9)
Gender			
Male	396	22 (5.6, 3.7-8.3)	25 (6.3, 4.3 - 9.2)
Female	400	26 (6.5, 4.5-9.4)	36 (9.0, 6.6 -12.2)
P-value		P=0.681	P=0.196
Residence			
Rural	450	26 (5.8, 4.0-8.3)	41 (9.1, 6.8 - 12.1)
Urban	346	22 (6.4, 4.2-9.4)	20 (5.8, 3.8 - 8.8)
P-value		P=0.849	P=0.106
Total	**796**	**48 (6.0, 4.6-7.9)**	**61 (7.7,6.0 - 9.7)**

* Chi squared test

Table 25. Socio -economic, behavioural and clinical correlates of patients with diabetes, STEPS survey, Kosova, 2011

Characteristics	N=796	Diabetes	P-value	Odds ratio	95% CI	P-value
Age groups (years)						
15-24	163	-		-	-	-
25-34	165	2 (1.2)		Ref.	-	-
35-44	150	4 (2.7)	0.000	2.2	(0.4 - 12.4)	0.429
45-54	170	23 (13.5)		12.7	(3.0 - 55.0)	0.000
55-64	148	32 (21.6)		22.5	(5.3 - 95.7)	0.000
Gender						
Male	396	25 (6.3)	0.196	Ref.	-	-
Female	400	36 (9.0)		0.7	(0.4 - 1.2)	0.196
Residence						
Rural	450	41 (9.1)	0.106	Ref.	-	-
Urban	346	20 (5.8)		1.6	(0.9 - 2.8)	0.106
Educational status						
Illiterate	23	6 (26.1)		Ref.	-	-
Up to primary education	222	25 (11.3)	0.000	0.4	(0.1 - 1.0)	0.052
Up to secondary education	398	18 (4.5)		0.1	(0.05 - 0.4)	0.000
Higher education	153	12 (7.8)		0.2	(0.0 - 0.7)	0.016
Marital status						
Never married	224	3 (1.3)		Ref.	-	-
Currently married	546	54 (9.9)	0.000	8.1	(2.5 - 26.2)	0.000
Separated/divorced	3	0 (0.0)		-	-	-
Widowed and cohabitating	23	4 (17.4)		15.5	(3.2 - 74.5)	0.002
The annual household income						
≤ 1500 €	60	4 (6.7)		Ref.	-	-
> 1500 €, ≤ 2500 €	134	15 (11.2)		1.76	(0.56 - 5.56)	0.332
> 2500 €, ≤ 3500 €	102	3 (2.9)	0.033	0.42	(0.09 - 1.96)	0.272
> 3500 €, ≤ 4500 €	103	3 (2.9)		0.42	(0.09 - 1.94)	0.267
> 4500 €	347	33 (9.5)		1.47	(0.51 - 4.32)	0.482
No answer	50	3 (6.0)		0.89	(0.19 - 4.20)	0.886

Table 25. (Continued)

Characteristics	N=796	Diabetes	P-value	Odds ratio	95% CI	P-value
BMI						
Normal	363	13 (3.6)		Ref.	-	-
Overweight	138	20 (14.5)	0.000	4.6	(2.2 - 9.5)	0.000
Obese	295	28 (9.5)		2.8	(1.4 - 5.6)	0.002
Current smoking						
No	599	43 (7.2)		Ref.	-	-
Yes	197	18 (9.1)	0.458	1.3	0.73 - 2.31	0.371
Current alcohol use[a]						
No	735	57 (7.8)		Ref.	-	-
Yes	61	4 (6.6)	0.950	0.84	0.29 - 2.38	0.736
Hypertension[b]						
No	481	19 (4.0)		Ref.	-	-
Yes	315	42 (13.3)	0.000	3.74	2.13 - 6.56	0.000
Low physical activity [c]						
No	490	25 (5.1)	0.001	Ref.	-	-
Yes	306	36 (11.8)		2.48	1.46 - 4.22	0.000
Low fruit and vegetable intake[d]						
No	79	5 (6.3)	0.805	Ref.	-	-
Yes	717	56 (7.8)		1.25	0.49 - 3.22	0.639
Hypercholesterolemia						
No	513	27 (5.3)	0.001	Ref.	-	-
Yes	283	34 (12.0)		2.46	1.45 - 4.17	0.000

[a] One who has drank alcohol in the past 30 days

[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication

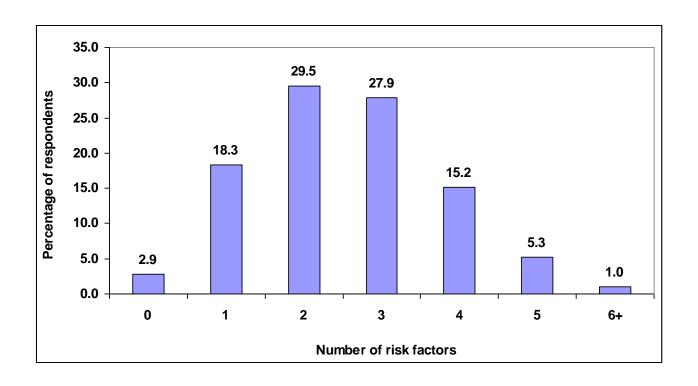[c] Low physical activity

[d] Low fruit and vegetable intake

Table 26. Treatment and control status among diabetic patients in Kosova, STEPS survey, 2011

Characteristics	Total diabetic N	On treatment N (%)	Good glycemic control N
Age groups (years)			
15-24	-	-	-
25-34	2	-	-
35-44	4	-	-
45-54	23	2 (8.7)	1
55-64	32	6 (18.8)	-
Gender			
Male	25	2 (8.0)	-
Female	36	6 (16.7)	1
Residence			
Rural	41	6 (14.6)	1
Urban	20	2 (10.0)	-
Total	**61**	**8 (13.1)**	1

Table 27. Percentage of diabetes by gender and age group, Kosova step survey 2011

Age group (years)	Percentage of diabetes								P-value*
	Male			Female			Total		
		Diabetes			Diabetes			Diabetes		
	n	% (95% CI)		n	% (95% CI)		n	% (95% CI)	
15-24	82	-		81	-		163	-	-
25-34	85	-		80	2	2.5 (0.7 - 8.7)	165	2	1.2 (0.3 - 4.3)	-
35-44	75	-		75	4	5.3 (2.1 - 12.9)	150	4	2.7 (1.0 - 6.7)	-
45-54	85	11	12.9 (7.4 - 21.7)	85	12	14.1 (8.3 - 23.1)	170	23	13.5 (9.2 - 19.5)	0.999
55-64	69	14	20.3 (12.5 - 31.2)	79	18	22.8 (14.9 - 33.2)	148	32	21.6 (15.8 - 28.9)	0.867
15-64	**396**	**25**	**6.3 (4.3 - 9.2)**	**400**	**36**	**9.0 (6.6 - 12.2)**	**796**	**61**	**7.7 (6.0 - 9.7)**	**0.196**
25-64	314	25	8.0 (5.5 - 11.5)	319	36	11.3 (8.3 - 15.2)	633	61	9.6 (7.6 - 12.2)	0.200

*Chi-square test or Fisher exact test

5.3.3. Abnormal blood lipids

The prevalence of hypercholesterolemia has increased with age. It was 9.8% (95% CI 6.1 - 15.3%) aged 15-24 years, 25.5% aged 25-34 years (95% CI 19.4 - 32.6%) and 55.4% aged 55-64 years (95% CI 47.4 - 63.2%), without significant difference by gender at any age group.

The prevalence of hypercholesterolemia in study group 15-64 years was 35.6% (95% CI 32.3% - 38.9%) without significant difference by gender (P>0.05), prevalence of hypercholesterolemia among males was 32.3% (95% CI 27.9% - 37.1%), among females 38.8% (95% CI 34.1% - 43.6%), (Table 28).

The prevalence of hypercholesterolemia in study group 25-64 years was 42.2% (95% CI 38.4% - 46.1%) without significant difference by gender (P>0.05), prevalence of hypercholesterolemia among males in this age group was 38.5% (95% CI 33.3% - 44.0%), among females 45.8% (95% CI 40.4% - 51.3%).

On univariate analysis, the prevalence of hypercholesterolemia was found to be significantly higher among those aged 55-64 years (55.4%), illiterate (47.8%), Separated/divorced (66.7%), obese (52.9%), hypertensive (48.9%), diabetes (55.7%) and no current alcohol users (35.9%). No difference was found in the prevalence of hypercholesterolemia by gender, residence, the annual household income, smoking, low physical activity and fruit and vegetable intake (Table 29).

Risk factors for hypercholesterolemia
Age group 45-64, educational status, marital status, hypertension, overweight and obesity, and diabetes were found to be the risk factors significantly associated with hypercholesterolemia in a multivariate regression model (Table 29).

Table 28. Percentage of hypercholesterolemia by gender - Kosova STEPS survey 2011

Age group (years)		Male			Female			Total		P-value*
	n	Hypercholesterol.		n	Hypercholesterol.		n	Hypercholesterol.		
		n	% (95% CI)		n	% (95% CI)		n	% (95% CI)	
15-24	82	7	8.5 (4.2 - 16.6)	81	9	11.1 (6.0 - 19.8)	163	16	9.8 (6.1 - 15.3)	0.773
25-34	85	19	22.4 (14.8 - 32.3)	80	23	28.8 (20.0 - 39.5)	165	42	25.5 (19.4 - 32.6)	0.445
35-44	75	23	30.7 (21.4 - 41.8)	75	32	42.7 (32.1 - 53.9)	150	55	36.7 (29.4 - 44.6)	0.175
45-54	85	42	49.4 (39.0 - 59.8)	85	46	54.1 (43.6 - 64.3)	170	88	51.8 (44.3 - 59.2)	0.645
55-64	69	37	53.6 (42.0 - 64.9)	79	45	57.0 (46.0 - 67.3)	148	82	55.4 (47.4 - 63.2)	0.809
15-64	396	128	32.3 (27.9 - 37.1)	400	155	38.8 (34.1 - 43.6)	796	283	35.6 (32.3 - 38.9)	**0.069**
25-64	314	121	38.5 (33.3 - 44.0)	319	146	45.8 (40.4 - 51.3)	633	267	42.2 (38.4 - 46.1)	0.078

*Chi-square test or Fisher exact test

Table 29. Socio -economic, behavioural and clinical correlates of patients with raised total cholesterol, STEPS survey, Kosova, 2011

Characteristics	N	Raised total cholesterol N (%)	P-value	Odds ratio	95% CI	P-value
Total	796	283 (35.6)				
Age groups (years)						
15-24	163	16 (9.8)		Ref.	-	-
25-34	165	42 (25.5)		3.1	(1.7 - 5.9)	0.000
35-44	150	55 (36.7)	0.000	5.3	(2.9 - 9.8)	0.000
45-54	170	88 (51.8)		9.9	(5.4 - 17.9)	0.000
55-64	148	82 (55.4)		11.4	(6.2 - 21.0)	0.000
Gender						
Male	396	128 (32.3)	0.069	Ref.	-	-
Female	400	156 (38.8)		1.3	(1.0 - 1.8)	0.058
Residence						
Rural	450	168 (37.3)	0.262	Ref.	-	-
Urban	346	115 (33.2)		0.8	(0.6 - 1.1)	0.231
Educational status						
Illiterate	23	11 (47.8)		Ref.	-	-
Up to primary education	222	95 (42.8)	0.000	0.8	(0.3 - 1.9)	0.643
Up to secondary education	398	112 (28.1)		0.4	(0.2 - 1.0)	0.049
Higher education	153	65 (42.5)		0.8	(0.3 - 1.9	0.630
Marital status						
Never married	224	29 (12.9)		Ref.	-	-
Currently married	546	239 (43.8)		5.2	3.4 - 8.0	0.000
Separated/divorced	3	2 (66.7)	0.000	13.4	1.2 - 153.1	0.036
Widowed and cohabitating	23	13 (56.5)		8.7	3.5 - 21.8	0.000
The annual household income						
≤ 1500 €	60	23 (38.3)		Ref.	-	-
> 1500 €, ≤ 2500 €	134	50 (37.3)		0.96	0.51 - 1.79	0.892
> 2500 €, ≤ 3500 €	102	36 (35.3)	0.742	0.88	0.45 - 1.70	0.697
> 3500 €, ≤ 4500 €	103	43 (41.7)		1.15	0.60 - 2.21	0.668
> 4500 €	347	120 (34.6)		0.85	0.48 - 1.49	0.574
No answer	50	11 (22.0)		0.45	0.19 - 1.06	0.067

Table 29. (Continued)

Characteristics	N	Raised total cholesterol N (%)	P-value	Odds ratio	95% CI	P-value
Total	796	283 (35.6)				
BMI						
Normal	363	88 (24.2)		Ref.	-	-
Overweight	138	122 (41.4)	0.000	2.2	1.6 - 3.1	0.000
Obese	295	73 (52.9)		3.5	2.3 - 5.3	0.000
Current smoking						
No	599	217 (36.2)		Ref.	-	-
Yes	197	66 (33.5)	0.544	0.9	0.6 - 1.3	0.488
Current alcohol use[a]						
No	735	264 (35.9)	0.000	Ref.	-	-
Yes	61	19 (31.1)		0.8	0.5 - 1.4	0.455
Hypertension[b]						
No	481	129 (26.8)	0.000	Ref.	-	-
Yes	315	154 (48.9)		2.6	1.9 - 3.5	0.000
Low physical activity [c]						
No	490	166 (33.9)	0.241	Ref.	-	-
Yes	306	117 (38.2)		1.2	0.9 - 1.6	0.212
Low fruit and vegetable intake [d]						
No	79	23 (29.1)	0.256	Ref.	-	-
Yes	717	260 (36.3)		1.4	0.8 - 2.3	0.209
Diabet						
No	735	249 (33.9)	0.001	Ref.	-	-
Yes	61	34 (55.7)		2.5	1.5 - 4.2	0.000

[a] One who has drank alcohol in the past 30 days

[b] Systolic Blood Pressure ≥140 and or Diastolic Blood Pressure ≥90 or currently on medication

[c] Low physical activity

[d] Low fruit and vegetable intake

Chart 1. Percentage of respondents by number of risk factors

Only 2.9% of the responedts was completely free from the eight established risk factors, 18.3% of respondents hat at least one risk factor, 29.5% had 2 risk factors, 27.9% had 3 risk factors and 21.5% had 4 or more risk factors (Chart 1).

Table 30. Pattern of association between non-communicable disease risk factors and socio-economic risks

	Age	Gender	Residence	Education	Marital status	The annual household income
Smoking	0,000	0,000	0,000	0,000	0,000	0,187
Alcohol	0,000	0,000	0,000	0,000	0,027	0,000
Diet	0,957	0,258	0,047	0,000	0,000	0,000
Phisical inactivity	0,000	0,000	0,000	0,006	0,111	0,645
Overweight and obesity	0,000	0,006	0,325	0,000	0,000	0,036
Hypertension	0,000	0,174	0,001	0,000	0,000	0,000
Diabetes	0,000	0,196	0,106	0,000	0,000	0,033
Raised total cholesterol	0,000	0,069	0,262	0,000	0,000	0,742

red - significant

The table 30 showed the association between non-communicable disease risk factors and socio-economic risks.

6. DISCUSSION

Non-communicable diseases, mainly cardiovascular diseases, cancers, chronic respiratory diseases and diabetes are the leading causes of death globally. More than 36 million people die annually from NCDs (63% of global deaths), including more than 14 million people who die too young between the ages of 30 and 70. Low and middle-income countries already bear 86% of the burden of these premature deaths, resulting in cumulative economic losses of US$7 trillion over the next 15 years and millions of people trapped in poverty (35). Middle-aged adults in low- and middle-income countries are especially vulnerable to NCDs: they tend to develop the disease at a younger age, suffer longer, and die earlier than those in high-income countries (161). In low-income countries, adult's ages 30 to 59 years die from NCDs at twice the rate of adults in high-income countries (162).

According to the data on the Global status report on NCD in 2014 (13), probability of premature deaths in 2012 in neighbouring country was: in Serbia 24.5%, Montenegro 22.2%, The former Yugoslav Republic of Macedonia 22.1%, other Balkan countries like Albania 18.5%, Croatia17.7%, Bosnia and Herzegovina 17.5%. The probability of premature death is higher in the low-income country like Afghanistan 30.5% and Guyana 37.2%. In China probability of premature deaths in 2012 is 19.4%, in the United States of America is 14.3 %, in Canada 10.7%, in Israel 9.5%, Australia 9.4% and in Japan 9.3%. In the high-income country in Europe, the probability of premature deaths in 2012 was lower than Balkan countries in Belgium was 12.2%, Austria 12.0%, France 11.4%, Italy 9.8%, and in Switzerland 9.1%. Kosova didn't report any data to the WHO, due to lack of the law on statistics and weak implementation of the health law as well as relevant existing bylaws, health information flow remains fragmented and weak. We have only data about causes of death. In the years 2012 and 2013 among all causes of death in Kosova the number one cause of death were circulatory system diseases and the number two cause was neoplasm's (163).

The first threats to health in Kosova started in 1989 when autonomy was withdrawn and ethnic Albanians boycotted the Yugoslavian public health system. Alternative

arrangements for primary and secondary care were established with some success, but the rise in ethnic tension in 1996 lead again to deterioration in health care. WHO data immediately before the current crisis suggested that immunization rates have fallen markedly (164). Despite this, Kosova refugees were relatively fit compared with many other refugee populations. During the Refugee crisis in Macedonia No communicable diseases, such as diabetes, cardiovascular diseases, and chronic respiratory diseases, unclassifiable complaints (fatigue, exhaustion, undefined pain, and stress-related conditions) were most common diagnoses. Two-thirds of the consultations in camps were due to the untreated or poorly controlled chronic diseases (165).

Ringdal et al. (166) have examined the relationship between war experiences and self-reported general health in representative sample surveys from Bosnia-Herzegovina (n = 3,313) and Kosova (n = 1,000). Found that war experiences may contribute to increased poorer health in the exposed populations; however, the effects 4-9 years after the war ended were modest. Hence, war experiences seemed to be more strongly related to war-related distress and posttraumatic stress disorder than to self-reported general health.

Kosova is unique in being a post-conflict situation, in a former socialist country, with an unclear political future, under temporary UN administration. Eight years after the war (2007) she declares the independence, but till now she is not a part of a lot of international agencies.

The situation in which Kosova is, in the absence of relevant and timely health statistics and limited resources available, studying risk factors is a more feasible option than disease surveillance due to its simplicity and relevance to public health interventions. Risk factor surveillance enables a better understanding of the current situation and trends over a longer period. The risk factors of interest in the WHO STEPS are all potentially modifiable. They are associated with multiple disease outcomes, thus interventions on those common risk factors can be expected to result in a reduction of multiple diseases. Future integrated risk factor management, taking into consideration the unequal distribution of risk factors in different socioeconomic groups, can be based on this knowledge (167).

Until recently, no reliable epidemiological data were available on the prevalence of chronic diseases risk factors in the Kosova population. There was no evidence base for developing policy on reducing the burden of chronic diseases in the future and recommending interventions for people with chronic diseases risk factors. This is the first representative population survey which assessed the prevalence of multiple risk factors for NCDs in Kosova.

6.1. Tobacco use

This is the first comprehensive population-based survey on risk factors of Non-communicable diseases (NCDs) among adults in Kosova. Our study shows that Kosova is among the countries with high prevalence of smoking. The current smoker is 31.7% of respondents aged 25-64 year. Findings of this survey confirmed that cigarette smoking was more prevalent among men than women in Kosova (41.6% vs. 21.9%: P<0.01). The prevalence is similar to the prevalence of smoking among school children in Kosova (67). Students aged between 13 and 15 years reported to have smoked cigarettes with 37%. In Kosova from the ESPAD survey on 15-16 years old school children in 2011, the frequency of lifetime cigarette use was reported in 35.0 % (boys 48.0% vs. girls 25.0%), (69). Another study (168) with 261 students from 4 secondary schools in Gjilan, a town in the south-east of Kosova found that 36% reported having smoked cigarettes every day. Girls consumed more cigarettes and incidence of smoking was higher among students in their last year of high school studies.

In the study with first-year medical students, University of Prishtina, Kosova, (68) the prevalence of daily smokers was 8.9% (9.1% men vs. 8.7% women) for general medicine students and 5.8% (4.8% men vs. 6.5% women) for dentistry students. This shows that the medical students in Kosova smoke less compared with the general population.

The prevalence of smoking among Kosova adults is similar to the prevalence of smoking in most of the Balkan countries (169). Compared to other studies from Balkan countries Kosova has the lower prevalence than Bosnia and Herzegovina (170, 171) and Albania

(172, 173), but higher prevalence than Croatia (174, 175) and Slovenia (176, 177). In 2010, was conducted a face-to-face survey on smoking in 18 European countries of the population aged 15 years or older. Overall, 27.2% of the participants were current smokers (30.6% of men and 24.1% of women), (62). Our results show that the prevalence of current smokers in Kosova is higher than European average but lower than the prevalence in Bulgaria and Greece (13).

Similar studies (178) with adults aged over 18 years from 48 states who have reported themselves data current daily smokers in Middle-income country group among men was 34.1% and among women 10.8%. A current daily smoker in Low-income country group was reported among men in 25.2%, and among women in 6%. In most countries, the prevalence of smoking is higher among men except Sweden where smoking prevalence is higher among women (179). The prevalence of smoking in Kosova adults is higher among men compared to women. Smoking prevalence among women increased with country income group in 2012, while prevalence among men varied less across income groups (13).

According to the age group, the highest prevalence of smoking in Kosova was among 25-34 years old (31.9%) and 35-44 years old (36.9%) and 45-54 years old (31.9%).

In the United States of America (USA) in 2014, nearly 17 of every 100 USA adults aged 18 years or older (16.8%) currently smoked cigarettes (men 18.8% vs. women 14.8%). Current cigarette smoking was higher among persons aged 25–44 years (20.0%), (180, 181).

In our study among the smokers aged 15-64 years old, 90.1% were daily smokers. Globally, over 8 of 10 smokers smoke daily (13). The average number of cigarettes smoked during the day was 20.9 cigarettes, men 23.9 cigarettes and women 14.7 cigarettes. It is higher than in Germany (182) where the average number of cigarettes smoked per day is 10 and Greece (183) where the average number of cigarettes smoked per day is 19.8. Among the daily smokers aged 15-64 years, 93.6% smoke manufactured cigarettes. Globally, manufactured cigarettes, the most common form of smoked tobacco, are used by over 90% of current smokers (13). In 2012, in a study done in 187 countries (184), there were 75

countries where the average number of cigarettes per daily smoker was greater than 20 cigarettes per day.

In our study prevalence of current smoking varies according to marital status it was highest at Separated/divorced 36.4% (95% CI 22.2 – 53.4%), while lowest at Never married 22.7% (95% CI 20.9 – 24.6%), in a survey that was conducted in Sweden in 2004 (179). In total, 27,757 individuals aged 18–80 years was found that never-married and (particularly) divorced subjects had the significantly higher prevalence of daily smoking than married/cohabitating subjects. So Separated/divorced people appear to be important target groups for tobacco prevention. Previous studies have indicated that marital status is associated with health-related behaviours including smoking (185) Interventions aimed at reducing the prevalence of daily smoking need to consider sociodemographic characteristics, including marital status.

From 2003–2008, smoking-related health care accounted for up to 11% of a country's total healthcare costs. Many studies have shown that in the poorest households in some low-income countries as much as 10% of total household expenditure is on tobacco. In addition to its direct health effects, tobacco leads to malnutrition, increased health care costs and premature death (56, 186). In our study prevalence of current smoking was highest at respondents with the annual household income > 1500 €, ≤ 2500 € with 30.0% (95% CI: 27.4 - 32.8%). This positive correlation between current smoking and annual household income was observed in both rural and urban areas, but it was higher in urban areas with significant difference (P<0.01)

The overall prevalence of current smoking in individuals aged 15-64 years in Kosova was 28.4% (95% CI 27.3 – 29.6%), the prevalence was 33.0% (95% CI 31.1 – 34.9%) among urban residents and 25.5% (95% CI 24.1 – 26.9%) among rural residents. This difference in prevalence between urban and rural areas was statistically significant (P<0.01).
The current smoking prevalence increases along with age. The prevalence increased from 16.0% (95% CI 14.1-18.1%) for the 15-24 years age group to 36.9% (95% CI 34.2-39.6%) for the 35-44 years age group, After age 45 we have the slight decrease in prevalence. This

positive correlation between current smoking and age was observed in both rural and urban areas. In urban areas the prevalence increased from 18.1% (95% CI 15.0-21.7%) for the 15-24 years age group to 43.0% (95% CI 38.6–47.5%) for the 35-44 years age group and in rural areas the prevalence increased from 14.5% (95% CI 12.2-17.2%) to 32.9% (95% CI 29.6-36.4%) for the same age groups. In Canada (187) Prevalence of Current smoking among both genders in 2005 was 18.2 % (Male19.7 % vs. Female 16.7 %). Prevalence of Smoking at aged 35–49 years was 26.6 % (Male 29.0% vs. Female 24.2%). At aged 50–64 years was 20.6 % (Male 21.7% vs. Female 19.6%).

In a survey that was conducted in Bosnia and Herzegovina in 2002 (171) and which included 2750 adults aged 25-64 years. The prevalence of daily smokers among men was 49% and among women 30%. In men 25-34 years prevalence of daily smokers 53%, 35-44 years prevalence of daily smokers 55%, 45-54 years prevalence of daily smokers 49%, 55-64 years prevalence of daily smokers 40%. In women aged 25-34 years prevalence of daily smokers 37%, aged 35-44 years prevalence of daily smokers 36%, aged 45-54 years prevalence of daily smokers 29% and 55-64 years prevalence of daily smokers 17%.

The prevalence of current smoking varies according to the educational status it was higher at people Up to secondary education 36.6% (95% CI 34.7 – 38.6%), while the lowest was at Illiterate 17.7% (95% CI 13.0-23.6%). This positive correlation between current smoking and educational status was observed in rural and urban areas. At rural areas prevalence of current smoking was lowest at Illiterate 18.4% (95% CI 12.9 - 25.6%) and the highest in those with secondary preparation 35.9% (95% CI 33.2-38.7%). In urban areas prevalence of current smoking was lowest at Illiterate 15.8% (95% CI 8.5 - 27.4%) and the highest in those with secondary preparation 37.4% (95% CI 34.6-40.2%).We have distinguished the significant statistical difference in the prevalence of current smoking according to school preparation and residence (P< 0.01).

In our study age group, 25-44, gender, residence, educational status, marital status, overweight, alcohol use, low physical activity and low fruit and vegetable intake were

found to be the risk factors significantly associated with smoking in a multivariate regression model.

The validity of items assessing smoking has been analysed previously. The results have shown that the tobacco smoking item is a valid and reliable instrument for the measurement of tobacco smoking habits in a population (188). The trust item is a self-reported item which is difficult to validate, but the item used in this study is the most commonly used.

There is the evidence that comprehensive tobacco control programs reduce smoking prevalence (189) and implementation of those policies has decreased the prevalence of smoking as examples in the USA, Canada, Ireland, Norway, Great Britain and Iceland (187, 190-194). At the time when the research was being conducted there was no legislation on tobacco control in Kosova there were only health education activities for quitting tobacco consumption and few health warnings on boxes of tobacco. Law for tobacco control in Kosova came into force in May 2013. Therefore these kinds of studies (STEPs) are needed to be repeated in order to measure the effect of such actions on smoking prevalence, especially in places where the implementation of those measures is not satisfactory.

Interventions at national and international levels stand to benefit by adopting equity-focused approaches to reduce smoking prevalence, bearing in mind that population groups may differ in their ability to participate in such initiatives and/or experience intended health benefits (195, 196). In Canada decrease in current smoking prevalence more than 20.0% (187). Lix et al. (197) found that the prevalence of risk factors for chronic disease in Canada differs from Aboriginal and No aboriginal populations, but in two of them, we have decreased in prevalence. In the study are involved persons 20 or more years. The search was conducted in two cycles 2000/2001 and 2005/2006. In 2000/01, the prevalence of Daily Smokers in the aboriginal population in Northern Canada was 50.2%, while in Southern Canada 36.2%. In 2005/06 the prevalence of Daily smoker in the no aboriginal population in Northern Canada was 23.5%, while in Southern Canada was 17.6%.

6.2. Alcohol consumption

The harmful use of alcohol is a worldwide problem resulting in millions of deaths (about 3.3 million deaths each year), (114), including hundreds of thousands of young lives lost. Alcohol use was estimated to cause 5.1% of the global disease burden – as estimated in Daly's – in 2015 (55). There are significant sex differences in the proportion of global deaths attributable to alcohol, for example, in 2012, 7.6% of deaths among males and 4.0% of deaths among females were attributable to alcohol (77). It is not only a causal factor in many diseases but also a precursor to injury and violence.

Kosova has no statistics regarding the number of deaths caused by the use of alcohol. In the publication of the causes of deaths in Kosova 2012 and 2013, there is no case of death reported due to mental and behavioural disorders due to use of alcohol (F10) according to "European shortlist" for registration of 65 causes of death (163). This publication may have a deviation from the true cause of death, as in 2012 the number of deaths was 25.4%, while in 2013 it was not coded 21.1%. Also, the cause of death is not decided by autopsy with the exception of suspicious cases (court) because it is in the tradition of Kosova's to die at home or if they die in a health institution not allowed an autopsy to be performed.

Worldwide, 61.7% of the population (15+) had not drink alcohol in the past 12 months and 13.7% had ceased alcohol consumption (i.e. they have consumed alcohol earlier in life but not in the past 12 months). Almost half of the global adult population (48.0%) has never consumed alcohol. For example, 94.6% of the population in the WHO Eastern Mediterranean Region are abstainers (i.e. past 12-month abstainers), but only 4.8% of abstainers in this region are former drinkers. In contrast, only 33.6% of the populations in the WHO European Region are past 12-month abstainers, but 38.7% of all abstainers were former drinkers (77).

The level of alcohol consumption worldwide in 2010 was estimated at 6.2 litres of pure alcohol per person aged 15 years and over (equivalent to 13.5 g of pure alcohol per day) (13, 77). Of total recorded alcohol consumed worldwide, 50.1% was consumed in the form

of spirits (79). Total alcohol consumption per capita among those aged 15 years and over varied greatly across WHO regions, with the lowest consumption of 0.7 litres of pure alcohol in the Eastern Mediterranean region, and the highest consumption of 10.9 litters in the European region (13).

Results of our study which is first representative survey among adult aged 15-64 years about the rate of alcohol use in Kosova population, shows that the prevalence of current drinkers among this age group was 8.4%. Prevalence of current drinkers was higher among male was 14.6% compared with the female was 2.3%, with significant difference (P<0.001). In all age groups, the prevalence of current alcohol drinkers was higher among male compared to female. Prevalence of current alcohol use increases with age. After the age of 54, it falls gradually, probably due to starting quitting drinking for health reasons, and this trend of prevalence is noticed only in males. The prevalence of current drinker in Kosova is lower than in the other European States and is similar to states in the Eastern Mediterranean region. In Kosova, 95.6% of the population has been declared a Muslim, 2.2% Catholic and 1.5% Orthodox in the last census of the population (156).

Drinking alcohol in most households is a stigma and this number may be underestimated because especially during the holidays the use of alcohol is higher than it is stated. According to the Living Standard Statistics of 2016 (198), alcohol and tobacco are the top five consumer groups in urban and rural households in Kosova. In urban households dominates consumption of food, housing, alcohol and tobacco, clothing and transport, whereas in rural areas dominates the consumption of food, housing, clothing, transport, alcohol and tobacco. And the results of our study show that prevalence of current alcohol use at both sexes was higher at respondents living in the city, compared to those living in the village. The prevalence of current alcohol use in urban residents was 10.3% and in rural residents 7.1%. This difference in prevalence between urban and rural areas was statistically significant (P<0.01). Also, the prevalence of current alcohol use correlates with smoking status; at current smokers prevalence of current alcohol use was 16.8% among no smokers was 5.0%. This is also seen from the results of the Living Standard Statistics 2016 (198) wherein the common group of articles consumed mostly are tobacco and alcohol. For

example, data from research in Spain, Slovakia and Canada show that rate of alcohol use is highest than in Kosova. In research of Mataix at al. (199), for risk factors for chronic disease that occurred in southern Spain and included 3421 people aged 25-60 years, current alcohol users were 61.4% of males and 36.5% of females.

Among teenagers in Slovakia (13-18 years) the prevalence of alcohol consumption in 1998 was 11.6%, in males 14.2% and in females 8.8%. The prevalence of alcohol consumption in 2006 was 15.0%, in men 17.1% and in women 13.1%. (200).

The prevalence of risk factors for chronic disease in Canada differs from Aboriginal and no aboriginal populations (199). The research involved people 20 or more years. The research was conducted in two cycles 2000/2001 and 2005/2006. In 2005/06, the prevalence of Regular Drinker among the aboriginal population in Northern Canada was 51.6%, while in Southern Canada it was 56.7%. In 2005/06, the prevalence of Regular Drinker in the non-aboriginal population in Northern Canada was 66.8%, while in southern Canada 64.3%. In 2005/06, the prevalence of Heavy Drinker in the Aboriginal population in Northern Canada was 22.9%, while in Southern Canada it was 26.9%. In 2005/06, the prevalence of heavy drinkers in the non- aboriginal population in northern Canada was 38.5%, while in southern Canada 43.0%.

According to KAS data, the structure of the population according to nationality is 92.9% Albanian (156). Due to the political situation, this research was mainly conducted in Albanian majority settlements because of the impossibility of organizing in Serb majority municipalities. The country has no official religion. The constitution establishes Kosova as a secular state that is neutral in matters of religious beliefs and where everyone is equal before the law and freedom to belief, conscience and religion is guaranteed (201). Serbs are of orthodox religion and only a small percentage of Kosova Albanians are of the Catholic religion. Therefore, this research has no national and religious differences in the presentation of data. By gender, alcohol in our study is more used by males compared to females similar to the research conducted in other countries (182, 199, 200).

Research that was conducted in Germany in 2002 (182) and which included 2187 people aged 18-65 years 42.7% of women and 23.0% of males declared that they did not consume alcohol. By age 18-30 Women 51% vs. M 31%, 31-40 years Women 44.0% vs. Men 27.8%, 41-50 years Women 38.2% vs. Males 17.1%, 51-65 years old Women 40.2% vs. Males 18.0%.

WHO research (178) which included 232,056 adult participants over the age of 18 from 48 states who reported the data themselves. Heavy episodic alcohol drinkers in Middle-income country group among males were 12.6%, while among females were 3.0%. Heavy episodic alcohol drinkers in the Low-income country group among males were 6.9%, while among females 2.7%.

In the age group 15-64 years old the prevalence of lifetime abstainer was 84.4% was higher among female 93.1% compared with male 75.5%, with significant difference (P<0.01). This prevalence is similar to the prevalence of lifetime abstainer (88.9%) with states in the Eastern Mediterranean region (77). In all age groups, the prevalence of lifetime abstainer drinkers was higher among female compared to male. Prevalence of lifetime abstainer is above 80.0% in all age groups.

The prevalence of current alcohol use varies according to the educational status it was higher at people with Higher education 12.4%, while the lowest was at Illiterate 2.5%. This is because those with higher pre-school qualifications have greater opportunities to go to different venues with society. Also in the prevalence of alcohol use has affected the marital status. Prevalence of current alcohol use varies according to the marital status it was highest at Separated/divorced 18.2%, while lowest at Widowed and cohabiting 5.5%. Excessive use can cause problems with the family or the family with problems can stimulate alcohol consumption.

Prevalence of current alcohol use was highest at respondents with the annual household income >4500 € with 11.1%, at Overweight 10.5%. In general in the world, the greater the economic wealth of a country, the more alcohol is consumed and the smaller the number of abstainers (77). In addition to the religious aspect, the low prevalence could have

influenced by the economic situation as well. General poverty in Kosova in 2011 was 29.7% while Extreme poverty 10.2% (198).

Age group 25-54, gender, residence, educational status, marital status, the annual household income, overweight and obesity, smoking, low physical activity and low fruit and vegetable intake were found to be the risk factors significantly associated with alcohol use in a multivariate regression model.

6.3. Unhealthy diet – low fruit and vegetable intake

Chronic diseases are largely preventable diseases. Although more basic research may be needed on some aspects of the mechanisms that link diet to health, the currently available scientific evidence provides a sufficiently strong and plausible basis that diet plays a key role as a risk factor for chronic diseases (84).

Nikolic at al. (202), found an inverse relation between vegetable and fruit intake and coronary heart risk. Consumption of fruits and vegetables seemed to provide significant protection against coronary heart disease. The benefit of fruit or vegetable consumption increased proportionally by the number of servings consumed (p for trend < 0.0001). Those in the upper tertile of fruit consumption (> 5 items/day) had 60% lower risk for coronary heart disease (odds ratio= 0.56, 95% CI 0.35-0.89, P < 0.05), when compared to those in the lowest tertile (<1 item/day). Consumption of vegetable >3 items/day was associated with 70% lower risk of coronary heart disease (OR = 0.25, 95% CI 0.09 - 0.66, P < 0.05), compared to subjects who did not consume vegetables.

Hung at al. (203) has studied the influence of consumption of fruits and vegetables in the incidence of cardiovascular disease and cancer in two cohort studies of males and females with follow-up periods of more than 10 years. Increased fruit and vegetable consumption was associated with a modest although a not statistically significant reduction in the development of the major chronic disease. The benefits appeared to be primarily for

cardiovascular disease and not for cancer. The median intake of total fruits and vegetables was 5.3 servings/day for women and 5.2 servings/day for men.

In European Prospective Investigation into Cancer and Nutrition (EPIC)-Heart Study Collaborators (204) which included 519 978 men and women were recruited by 23 collaborating centres in 10 European countries (Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden, and the UK) between 1992 and 2000. Has been investigated the correlation between fruit and vegetable consumption and mortality from ischemic heart disease. After an average of 8.4 years of follow-up, there were 1636 deaths from IHD among 313 074 men and women without previous myocardial infarction or stroke from eight European countries. Participants consuming at least eight portions (80 g each) of fruits and vegetables a day had a 22% lower risk of fatal IHD (RR = 0.78, 95% CI 0.65 – 0.95) compared with those consuming fewer than three portions a day. After calibration of fruit and vegetable intake to account for differences in dietary assessment between the participating centres, a one portion (80 g) increment in fruit and vegetable intake was associated with a 4% lower risk of fatal IHD (RR = 0.96, 95% CI 0.92–1.00, P for trend <0.05). Results from this large observational study suggest that a higher intake of fruits and vegetables is associated with a reduced risk of IHD mortality.

Results from randomized controlled trials have shown that increased consumption of fruits and vegetables has a negligible impact on the concentrations of plasma cholesterol fractions (205, 206) even though a higher intake of fruits and vegetables has been associated with lower concentrations of plasma low-density lipoprotein cholesterol in observational studies (207, 208) Increased consumption of fruits and vegetables does lead to a small decrease in blood pressure in large randomized controlled trials, (209) perhaps due to an increase in the intake of potassium, (210) magnesium, (211) or some other component in fruits and vegetables, (212) or alternatively a reduced intake of sodium. Nevertheless, adjusting for systolic blood pressure in the current study made very little difference to the association between fruit and vegetable intake and the risk of IHD. There is a long-standing hypothesis that various antioxidant micronutrients present in fruits and vegetables lower the risk of heart disease by reducing the degree of atherosclerosis caused by oxidative damage, (213)

but this has not been supported by results from large randomized controlled trials of several antioxidant micronutrients (214, 215).

He et al. (216) in the systematic review with twelve studies, consisting of 13 independent cohorts with 278,459 individuals (9143 CHD events) with a median follow-up of 11 years. Compared with individuals who had less than 3 servings/day of fruit and vegetables, the pooled RR of CHD was 0.93 (95% CI 0.86-1.00, P>0.05) for those with 3-5 servings/day and 0.83 (95% CI 0.77-0.89, P<0.01) for those with more than 5 servings/day. Subgroup analyses showed that both fruits and vegetables had a significant protective effect on CHD. The prospective cohort studies demonstrate that increased consumption of fruit and vegetables from less than 3 to more than 5 servings/day is related to a 17% reduction in CHD risk, whereas increased intake to 3-5 servings/day is associated with a smaller and borderline significant reduction in CHD risk. These results provide strong support for the recommendations to consume more than 5 servings/day of fruit and vegetables (216).

In 2003, the World Health Organization (WHO) concluded that there was convincing evidence that fruits and vegetables lower the risk of CHD and recommended an intake of 400–500 g/day—equivalent to five or six portions of about 80 g each (84).

In Kosova, we have no prospective research on the impact of the consumption of fruits and vegetables in health or the occurrence of various diseases since these researchers are expensive and we have not even had any research on the prevalence of fruit and vegetable consumption in the Kosova population. This is first population-based survey for the prevalence of use of fruit and vegetable intake.

In the WHO study (178) which included 232,056 adult participants over the age of 18 from 48 states who reported the data themselves. Prevalence of Low-fruit/vegetable consumers in Middle-income country group among males was 79.1%, while among females 78.6%. Low-fruit/vegetable consumers in a Low-income country group among males was 72.8%, while among females was 74.6%.

In our study in the age group 15-64 years old the prevalence of low fruit and vegetable intake was 86.5% (95% CI 85.6 – 87.3%). Prevalence of low fruit and vegetable intake was higher among female 87.0% (95% CI 85.8 – 88.1%) compared with the male was 86.0% (95% CI 84.7 – 87.2%), but without significant difference (P>0.05). In our study prevalence of low fruit and vegetable intake was higher than average in WHO studies (178).

In the age group 25-64 years old the prevalence of low fruit and vegetable intake was 86.7% (95% CI 85.7– 87.7%). Prevalence of low fruit and vegetable intake was higher among female 87.5% (95% CI 86.2 – 88.8%) compared with male 85.9% (95% CI 84.5 – 87.3%), but without significant difference (P>0.05). In all age groups, the prevalence of low fruit and vegetable intake was higher than 80.0% in both sexes.

The overall prevalence of Low fruit and vegetable intake in individuals aged 15-64 years in Kosova were 86.5% (95% CI 85.6 – 87.3%), the prevalence was 85.4% (95% CI 83.9 – 86.7%) among urban residents and 87.2% (95% CI 86.1 – 88.2%) among rural residents. This difference in prevalence between urban and rural areas was statistically significant (P<0.05). After the war in Kosova, the way of life has changed, and the population living in the village is less active in the land, less cultivates fruits and vegetables, so since the biggest opportunity of buying fruit is in the city and fruits are used more often in the city compared to the village.

Data from 196,373 adult participants from 52 countries taking part in the World Health Survey (2002 - 2003) were analysed in the summer of 2008 by Hall et al. (217). Overall, 77.6% of men and 78.4% of women from the 52 mainly low- and middle-income countries consumed less than the minimum recommended five daily servings of fruits and vegetables. Low fruit and vegetable consumption prevalence ranged from 36.6% (Ghana) to 99.2% (Pakistan) for men and from 38.0% (Ghana) to 99.3% (Pakistan) for women.

In Kosova low fruit and vegetable consumption prevalence is similar with Pakistan and other low-income countries. According to this study (217), the significant difference in the

likelihood of low fruit and vegetable intake between men and women were found in 15 countries. The prevalence of low fruit and vegetable consumption tended to increase with age and decrease with income. Although urban city was not associated overall with low fruit and vegetable consumption, urban and rural differences were significant for 11 countries.

The Low fruit and vegetable intake prevalence is more than 85% in all age groups with very little difference. Prevalence of Low fruit and vegetable intake at both sexes was higher at respondents living in the rural areas, compared to those living in the urban areas but without significant difference (P>0.01).

The prevalence of Low fruit and vegetable intake varies according to the educational status it was higher at Illiterate 91.4% (95% CI 86.7 – 94.6%), while the lowest was at Higher educated 82.3% (95% CI 80.0 - 84.3%). This positive correlation between Low fruit and vegetable intake and educational status was observed in rural and urban areas. Prevalence of Low fruit and vegetable intake was highest at respondents with the annual household income ≤ 1500 € with 93.6% (95% CI 91.4 - 95.2%). This positive correlation between Low fruit and vegetable intake and annual household income was observed in both rural and urban areas, with significant difference (P<0.01). This data are similar to data of Hall et al. study (217).

Prevalence of Low fruit and vegetable intake varies according to marital status it was highest at Separated/divorced 97.0% (95% CI 84.7 – 99.5%), while lowest at Never married 85.9% (95% CI 84.2 – 87.3%), with significant difference by residence and educational status (P<0.05).
The prevalence of Low fruit and vegetable intake was highest at Obese 87.1% (95% CI 85.0 – 88.9%) and smokers 89.0% (95% CI 87.5 – 90.4 %) than among no smokers 85.5% (95% CI 84.4 – 86.5 %).

In total 77% of Canadian adults consumed fruit and vegetables less than five times per day. Females were more likely to consume more fruit [odds ratio (OR 2.05; 95% CI 1.75-2.4),

vegetables (OR 1.95; 95% CI 1.65 - 2.29) and FV (OR 2.52; 95% CI 2.20 - 2.90) than males. Single/never married individuals, individuals with higher levels of education, never smokers, former drinkers and older people reported more consumption of fruit and vegetables than others (218). These findings are similar to findings in our study.

On univariate analysis, the prevalence of low fruit and vegetable intake was found to be significantly higher among rural (87.2%), illiterate (91.4%), separated/divorced (97.0%), the annual household income ≤ 1500 € (93.6%), smokers (89.0%), alcohol users (91.2%) and hypertension (87.2%).

In Kosova, till now we didn't have any study about of prevalence of fruit and vegetable consumption among adults. There is only one study in Switzerland where was presented fruit and vegetable consumption among migrants in Switzerland compared with Swiss nationals (91) and where the relative risk of low daily fruit and vegetable intake relative to recommended intake was higher in Kosova nationals. Compared with Swiss nationals, the relative risk of low daily fruit and vegetable intake relative to recommended intake was higher in Turkish nationals (RRR = 2.92, 95 % CI 1.91, 4.48; P = 0.0000) and Kosova nationals (RRR = 4.76, 95 % CI 3.01, 7.55; P = 0.0000). The respective relative risks of Portuguese, Serbian, German and Italian nationals were not significantly different from the Swiss reference group.

6.4. Insufficient physical activity

The overall prevalence of insufficient physical activity in individuals aged 15-64 years in Kosova was 36.1% (95% CI 34.9 – 37.3%). This prevalence is lower than in Serbia where the prevalence of insufficient physical activity (adults 18+ years), 2010 (13) was 41.4%, southern Spain (199), Germany (182), Slovak (200) and higher than in Canada (197).

In WHO research (178), which included 232,056 adults over 18 years of 48 states who reported the data themselves. Physically inactive people in the Middle-country country group were 12.3% in Males, and 14.9% in females. Physically inactive people in the low-

income country group of males were 8.4%, while in females 14.6%. In Kosova, the global prevalence of insufficient physical activity is higher. So the prevalence of insufficient physical activity varies a lot between countries. Kosova hasn't studied about the prevalence of insufficient physical activity before the war but the style of life has changed a lot after the war. Families are now with the smallest number of members, with less food preparation at home by consuming more readily available foods, the bread rarely is cooked in the villages, less land is working, and even in cases when work is changed working conditions because now the land is working with modern means and with little need for labour force.

Yasin at al. (218) in a study a cohort study with 553 students (59.5% males, 40.5% females) aged 17-26 years (median_21) from Al-Quds University 26.9% had severe physical inactivity (14.6% males, 45.1% females), and 57.7% had severe sedentary behaviour (56.5% males, 58.9% females).

In the study of Mataix at al. (199), for the chronic risk factors that occurred in Southern Spain and included 3421 people aged 25-60, Physical inactive was 56.0% of males and 74.2% of females. Physical active were 44.0% of males and 28.8% of females average of h / week of exercise 5.1 ± 5.29 in males and females 3.8 ± 3.89.

Teenagers in Slovakia (13-18 years), the prevalence of Lack of physical exercise in 1998 was 45.7%, at males 31.2% while at females 61.7%. The prevalence of Lack of physical exercise in 2006 was 26.3%, among males 20.9% while among females 31.2% (200).

The prevalence of chronic risk factors for chronic disease in Canada varies between Aboriginal and Non-Canadian populations (197). The research was conducted in two cycles 2000/2001 and 2005/2006. In 2005/06 the prevalence of Insufficient physical activity in the Aboriginal population in northern Canada was 29.2%, while in Southern Canada it was 19.0% In 2005/06 the prevalence of Insufficient Physical activity in the non-native population in northern Canada was 18.5%, while in Southern Canada it was 18.0%.

In the survey conducted in Germany in 2002 (182) and involving 2187 people aged 18-65 years from them, 38.9% (847/2,173) do not participate in any physical activity, female 40.3%, while males 37.6%. Physical activity from 0-2 hours/week 32.0% of females and 27.5% of males. From ≥ 2 - 4 hours/week 19.1% of females and 19.5% of males. More than 4 Hours/Week was physical active 8.7% of females and 15.5% of males.

The prevalence of insufficient physical activity in individuals aged 15-64 years in Kosova was 39.2% (95% CI 37.3 – 41.2%) among urban residents and 34.0% (95% CI 32.5 – 35.5%) among rural residents. This difference in prevalence between urban and rural areas was statistically significant (P<0.01). However, this difference in prevalence is not high because of the above-mentioned factors.

The insufficient physical activity prevalence is higher in the age group 55-64 with 42.0% (95% CI 39.3 – 44.8%). In the Kosova tradition, people aged 55 or 60 are considered older and especially women in rural areas are exempted from many obligations in their households.

Prevalence of insufficient physical activity was higher at male respondents which are opposed to that of many states as well Germany (182), Slovakia (200), Southern Spain (199) and 48 states of WHO region (178, 206)
The prevalence of low physical activity in Kosova was found to be significantly higher among those aged 55-64 years (42.0%), male (44.3%), rural (34.0%), illiterate (41.4%), normal weight (48.9%), smokers (39.1%), alcohol users (41.4%) and enough fruit and vegetable intake (39.5%). No difference was found in prevalence by marital status, the annual household income and hypertension.

People who are of lesser weight are dealing with physical activities such as fitness or walking because they are not endangered by overweight and this may be the reason for having a higher prevalence of insufficient physical activity. Also, Illiterate people can pay little attention to their own health. Then smokers and alcohol users may have the highest

prevalence of insufficient physical activity as smokers and alcohol users sit down by consuming these two drinks.

At current alcohol user, the prevalence of insufficient physical activity was 41.4% (95% CI 37.2 – 45.7 %) among no alcohol users were 35.6% (95% CI 34.3 – 36.8 %).without significant difference by residence and current alcohol use (P>0.05).

To estimate the prevalence of physical activity practice in adults and its association with socio-demographic and environmental factors in 2006. All the 54,369 adults interviewed lived in households with a fixed telephone line, in the Brazilian state capitals and Federal District. Proportions of active individuals were 14.8% for leisure time, 38.2% for occupation, 11.7% for transportation, and 48.5% for household chores. Indices above 60% of inactive individuals in the leisure-time domain were observed in ten capitals. Men were more active than women in all domains, except for household chores. The proportion of active individuals decreased with age. Level of education was directly associated with physical activity in leisure time. Active men in the transportation domain were more likely to be active in their leisure time, while inactive people in the occupational domain were more likely to be active in their leisure time. The existence of places to perform physical activities near the home was associated with physical activity in leisure time (220).

Before our study in Kosova wasn't any population-based study about the physical activity among adult. In 2013/14 Tishukaj et al. (99) has examined anthropometric and physical fitness parameters in 14 to 15-year-old Kosovan adolescents living in rural and urban areas.

6.5. Overweight and obesity

The worldwide prevalence of obesity nearly tripled between 1975 and 2016. In 2016, 39% of adults aged 18 years and over (39% of men and 40% of women) were overweight. Overall, about 13% of the world's adult populations (11% of men and 15% of women) were obese in 2016. Thus, nearly 2 billion adults worldwide were overweight and, of these, more than half a billion were obese. Both overweight and obesity have shown a marked increase over the past 4 decades (221).

The prevalence of obesity among males of European region aged 20 and more years was 20%, while among females of this age was 23%. The prevalence of obesity among males of Americas region aged 20 and more years was 24%, while among females of this age was 30%. The prevalence of obesity among males of Africa's region aged 20 and more years was 5%, while among females of this age was 11%. The prevalence of obesity among males of Eastern Mediterranean aged 20 and more years was 13.0%, while among females of this age was 25.0%. The prevalence of obesity among males of South East Asia aged 20 and more years was 2.0%, while among females of this age was 4.0%. The prevalence of obesity among males of Western Pacific aged 20 and more years was 5.0%, while among females of this age was 7.0% (222).

The overall prevalence of overweight in individuals aged 15-64 years in Kosova was 33.7% (95% CI 32.5 – 34.9%), the prevalence was 39.8% (95% CI 38.0 – 41.5%) among males and 27.7% (95% CI 26.2 – 29.3%) among females. This difference in prevalence between genders was statistically significant (P<0.01). The difference in prevalence between genders was statistically significant for all age groups (P<0.01) and it was higher among males. On the two genders, the overweight prevalence increases along with age. After age 55 it was light decrease at both genders.

The overall prevalence of obesity in individuals aged 15-64 years in Kosova was 19.2% (95% CI 18.3 – 20.2%), the prevalence was 14.9% (95% CI 13.7 – 16.2%) among males and 23.5% (95% CI 22.0 – 25.0%) among females. This difference in prevalence between genders was statistically significant (P<0.01). The difference in prevalence between genders was statistically significant for all age groups except for 25-34 years age group (P>0.05) and it was higher among females. On the two genders, the obesity prevalence increases along with age.

Research conducted in Argentina (223) based on the Self-reported BMI, normal weight (BMI <25) had 50.9% of the investigated, Overweight were 34.5% and Obese were 14.7%. The prevalence of obesity was higher among those with lower school backgrounds 21.4% compared to those with high school education 8.9%.

Research in Amsterdam, the Netherlands, which was conducted in 2004 among ethnic groups Dutch, Turkish and Moroccan aged 18-70 years (224) was found the various prevalence of overweight and obesity in different ethnic groups. Overweight were Dutch 48.3%, Turkish 77.6% and Moroccan 70.6%; Obese were Dutch 16.7%, Turkish 38.8% and Moroccan 33.0%; WHR Dutch 0.88, Turkish 0.92 and Moroccan 0.92.

In India (225) a research with STEPS methodology was conducted in 2005/2006 and involved 7449 people aged 15-64 for STEP 1 and 2. The prevalence of overweight was 9.4% at aged 15-24 year, 24.8% at the aged 25-34 year, 34.2% at the aged 35-44 year, 32.5% at aged 45-54 years and 30.3% at the aged 55-64 year. Among males prevalence of overweight was 18.1% and among female 31.3%. They have earned correlation between physical activity and overweight. The prevalence of overweight in inactive people was 33.8%, among those with Moderate activity 27.5% and Vigorous activity 12.3%.

Obesity was more prevalent in women than in men, whereas in men the prevalence of overweight was higher. This distribution of obesity has often been observed in western countries (226, 227). Among women, parity has been identified as a predictor of weight gain. Among men, the main factor associated with weight gain seems to be the transition from an active lifestyle during adolescence (physical exercise, sports, etc.) to a more sedentary lifestyle. Earlier studies in several other countries also reported finding gender differences in obesity rates (228, 229); however, in other developed countries neither gender appears to be associated with a higher prevalence of obesity (230).

Survey conducted in the region of Herzegovina, Bosnia and Herzegovina (170) only 16.5% of males were obese. In other study conducted in Bosnia and Herzegovina from September to December 2002 (171) and which included 2750 adults aged 25-64 years the prevalence of obesity among men was 17% and among women 25%.

The prevalence of obesity has increased with age at both genders. Among males aged 25-34 years the prevalence of obesity was 12%, aged 35-44 years 14%, aged 45-54 years 18%

and aged 55-64 years 21%. Among females aged 25-34 years the prevalence of obesity was 7%, aged 35-44 years 18%, aged 45-54 years 33% and aged 55-64 years 40%. About 75% of both men and women were overweight and 16% of men and 20% of women were obese.

The prevalence of obesity and overweight in varies among Aboriginal and non-Aboriginal populations (208). In 2005/06 the prevalence of overweight among aboriginal populations in Northern Canada was 26.2%, while in southern Canada was 30.9%. In 2005/06 the prevalence of overweight among no aboriginal populations in Northern Canada was 34.0%, while in southern Canada was 33.7%. In 2005/06 the prevalence of obesity among aboriginal populations in Northern Canada was 25.4%, while in southern Canada was 25.3%. In 2005/06 the prevalence of obesity among no aboriginal populations in Northern Canada was 21.1%, while in southern Canada was 15.6%.

Research that was conducted in Germany in 2002 (182), and which included 2187 people aged 18-65 years Overweight were 24.9% of females and 40.8% of males, Obesity Degree I were 12.2% of females and 13.9% of males, Obesity Degree II 5.0% of females and 4.4% of males. Overweight and obesity rates in both sexes were increased with increasing age.
In the study of Mataix et al (199) in southern Spain which included a random sample of 3421 subjects (1747 men, 1674 women) between 25 and 60 years of age, 18.9% were obese, Overweight was 43.6% of males and 30.7% of females. Obese was 16.9% of males and 20.9% of females.

The study of Hajian-Tilaki at al. (231) in Iran, showed that the overall prevalence rates of obesity and overweight were 18.8% and 34.8% respectively. The overall prevalence rate of central obesity was 28.3%. The rate of obesity in women was higher than men (P < 0.01). In both genders, particularly in the women, the rate of obesity was raised by increasing age.

Prevalence of Obesity among Puerto Rican participants 40.9% for men, and 51.4% for women (232). Data analysis for the 426 individuals (60 years of age and older) in Sao Paolo Brazil the overweight or obese were 57.2%. (233). The study of Gigante at al. (234)

in Brazil the prevalence of overweight was of 47% for men and 39% for women, obesity was around 11% for both sexes.

Yumuk et al. (235) presented the result of the survey in Konya, a central Anatolian city in Turkey The prevalence of diabetes (P < 0.01) and obesity (P< 0.01) increased with age. Obese men and women had a higher risk of being diabetic than their normal weight counterparts (OR, 2.05; CI 95% 1.13–3.71; P < 0.01) and (OR, 2.53; CI 95%, 1.57–4.07; P < 0.01, respectively). Overall, the overweight rate was 34.2% (33.5% of women and 36.3% of men) and the obesity rate was 23.7% (32.4% of women and 14.1% of men) (n = 12,866). Women had a significantly higher risk of being obese than men (OR, 2.84; 95% CI, 2.62 – 3.08; P < 0.01). The obesity rate was 3.4% (4.1% in women and 2.1% in men).

Ogah et al. (236) presented the result of the study which was conducted in rural and urban communities in Abia State, Nigeria with participants aged ≥15 years. Women had significantly higher BMI than the men.

The survey involving 1001 people (237) from the Croatian population who have lived in isolated islands in the Adriatic, 50.6% were overweight, 26.8% were obese.

Globally, existing trends of increasing overweight and obesity. In Canada (199) the prevalence of Obesity in both genders in 1994 was 9.5 %, while in 2005 was 11.2 % so, we had an increase in the prevalence of 18.0%. The prevalence of obesity among males in 1994 was 9.4 % while in 2005 was 12.3 % so; we had an increase in the prevalence of 31.0%. The prevalence of obesity among females in 1994 was 9.6 %, while in 2005 was 10.1 % so, we had an increase in the prevalence of 6.0%.

In Canada the prevalence of obesity in both sexes in the age group 35-49 in 2005 was 16.2%; in the age group, 50-64 years was 19.9%. In Canada, the prevalence of obesity among males aged 35-49 years in 2005 was 18.6% at the age group 50-64 years it was 21.0%.

In Canada the prevalence of obesity among women in the age group 35-49 in 2005 it was 13.7%, in the age group 50-64 years it was 18.8%.

The study in the USA (NHANES, 1999-2006) which included men aged 20 to 35 years and women aged 20 to 45 years, obesity prevalence in both sexes was 28.3% in males 23.6% whereas in females 31.3%. (238).

Data from 4,239 adult refugees and asylums who arrived in Massachusetts from January 1, 2001, through December 31, 2005 (239) in the group that came from Europe and Central Asia prevalence of Obesity was 27.3%, Overweight 31.2%, Refugees and asylum seekers from Africa Prevalence of Obesity was 13.3%, Overweight 24.2%, Lower Prevalence can be attributed Younger age of asylum seekers.

The overall prevalence of overweight and obesity in individuals aged 15-64 years in Kosova was 52.9% (95% CI 51.7 – 54.2%), the prevalence was 52.1% (95% CI 50.1 – 54.1%) among urban residents and 53.4% (95% CI 51.8 – 55.0%) in rural residents. This difference in prevalence between urban and rural areas wasn't statistically significant (P>0.05).

The overweight and obesity prevalence increases along with age. The prevalence increased from 14.5% for the 15-24 years age group to 76.7% for the 55-64 years age group. The prevalence of overweight and obesity varies according to the educational status it was higher at Illiterate 77.8% (95% CI 71.5 – 83.0%) was highest at Widowed and cohabitating 71.0% (95%CI 64.1 – 77.1%), while lowest at Never married 25.1% (95% CI 23.2-27.1%). Prevalence of overweight and obesity was higher at respondents with the annual household income > 2500 €, ≤ 3500 € with 56.7% (95% CI 53.5-59.9%). So in middle-class prevalence was higher.

Prevalence of overweight and obesity has not correlated with smoking; at current smokers prevalence of overweight and obesity was 55.0% (95% CI 52.7 – 57.3 %) among no smokers was 52.1% (95% CI 50.6 – 53.6 %). Prevalence of overweight and obesity was

higher among current alcohol user 62.9% (95% CI 58.6 – 67.0%) compared to non-alcohol users 52.0% (95% CI 50.7 – 53.3%).

Some studies have shown a relationship between obesity prevalence and socioeconomic status measured as educational level or income (223, 240, 241).

In the USA among men, obesity prevalence is generally similar at all income levels, with a tendency to be slightly higher at higher income levels. Among women, obesity prevalence increases as income decreases. Most obese adults are not low income (below 130% of the poverty level). Among men, there is no significant trend between education level and obesity prevalence. Among women, obesity prevalence increases as education decreases Between 1988–1994 and 2007–2008 the prevalence of obesity among adults increased at all income levels. Between 1988–1994 and 2007–2008 the prevalence of obesity among adults at all levels of education increased (242).

On univariate analysis, the prevalence of low physical activity was found to be significantly higher among those aged 55-64 years (42.0%), male (44.3%), rural (34.0%), illiterate (41.4%), smokers (39.1%), alcohol users (41.4%) and enough fruit and vegetable intake (39.5%). No difference was found in prevalence by marital status, the annual household income and hypertension. Age group 25-54, residence, gender, educational status, marital status, smoking, alcohol use and fruit and vegetable intake were found to be the risk factors significantly associated with overweight and obesity in a multivariate regression model.

The study of Gigante et al. (234) direct association was observed between overweight and level of schooling among men and inverse association among women. Obesity was more frequent among men living with a partner and was associated neither with the level of schooling nor skin colour. The prevalence of overweight and obesity was higher among black women and women who lived with a partner. The presence of diabetes, systemic arterial hypertension and dyslipidaemia, as well as the subject perceiving his/her health as regular or poor, were also reported by the interviewees with overweight or obesity.

In the study of Mataix et al. (199) lower educational level was associated with an increased risk of obesity. The lower percentage of obese individuals among both men and women who belonged to the university educated subgroup was the result of longer times spent exercising per week rather than differences in food intake. Logistic regression analysis supported these associations by showing that physical exercise decreased the risk of obesity and abdominal obesity. Age was also associated with the risk of hypercholesterolemia and BMI. A larger proportion of men than women were overweight, but the opposite was found for obesity. Sex, age, physical exercise and lower educational level were associated directly with the risk of obesity, and smoking was associated inversely with the risk of obesity. Sex, age, leisure-time physical exercise and educational level appear to influence obesity.

In the study of Hajian-Tilaki et al. (231) there was an inverse relation between the risk of obesity and marriage age, the high level of education (OR = 0.19, P < 0.01), severe occupational activity (OR = 0.44, P < 0.01), the level of exercise (in subjects with 3-4 h exercise per week, (OR = 0.58, P < 0.01) and leisure time activity. Marriage, history of parental obesity and parity ≥ 5 were associated with increased risk of obesity (OR = 2.2, P < 0.01 and OR = 2.43, P < 0.01 and OR = 3.73, P < 0.01 respectively). The results of this study indicate an increased rate of obesity and overweight in the northern population of Iran. Low level of activity and education, parity, family history of obesity, marriage at earlier age and ageing are responsible for both obesity and central obesity in the north of Iran.

Among rural Kazakh population, (243) risk of overweight was greatest among the population aged 45-54 years, with an OR of 5.3 (95% CI 3.1 - 9.2%). The overweight population was significantly associated with higher income (OR = 1.6, 95% CI = 1.1 - 2.4%) and knowledge of RF (OR = 1.7, 95% CI 1.2 - 2.4%), with P < 0.05.

In the cohort study with 553 students (59.5% males, 40.5% females) aged 17-26 years (median = 21) from Al-Quds University. The prevalence of overweight was 25% (31.1% males, 15.6% females) and obesity 7.2% (9.4% males, 4% females). Obesity and overweight were associated with family history of obesity in both genders (P<0.01) and

physical activity in males (r(s) =- 0.162, P<0.05). No correlation was demonstrated between participants' BMI and sedentary lifestyle or consumption of fast food (218).

In Croatia (237) there was a positive correlation between body mass index (BMI) and levels of triglycerides, glucose, diastolic blood pressure, and systolic blood pressure. Logistic regression showed that female gender, overweight, obesity, more frequent consumption of meat and beer, and less frequent consumption of potatoes were predictive for the presence of cardiovascular risk factors.

In Kosova, we didn't have data about the prevalence of overweight and obesity on the population-based survey before and after the war. So we can't compare before and after the war. Our study is first population-based study.

6.6. Raised blood pressure

Hypertension is one of the most common chronic conditions worldwide. Data in 2014 show that the states with lower prevalence of hypertension were the USA 13.4 % (males 15.9% vs. females 11.1%), Canada 13.3 % (males 15.7% vs. females 11.0%), Australia 15.4 % (males 18.4% vs. females 12.4%), Japan 16.9% (males 21.4% vs. females 12.7%) and Switzerland 17.8% (males 22.2% vs. females 13.6%). The states with higher prevalence of hypertension were Central African Republic 32.9% (males 32.9% vs. females 33.0%), Afghanistan 29.0% (males 28.5% vs. females 29.5%), Belarus 29.0% (males 34.4% vs. females 24.3%) and Serbia 29.0% (males 33.2% vs. females 24.9%). Prevalence of hypertension was higher among males compared to females except in Afghanistan, Central African Republic and Egypt (13).

Kosova is the newest state in Europe, which is struggling to establish a functional democracy after a long and devastating war with Serbia. To date, information on the prevalence and determinants of hypertension in the adult population of Kosova are scarce. Kosova hasn't population-based register for hypertension and cardiovascular diseases. Also, until this research has been conducted we have not had any studies on the prevalence

of hypertension in the Kosova population. The only source of data has been the causes of deaths in Kosova that NIPHK, together with KAS has published since 2006. According to these reports in 2013 among all causes of death in Kosova the number one cause of death was circulatory system diseases and the number two cause was neoplasm's (163). So, stroke mortality in Kosova is substantially higher than in the European Union member states, a situation which is similar to many countries in the Western Balkans and other former communist countries in Central Europe. Thus, changes in cardiovascular disease mortality account for the noticeable changes in the overall mortality patterns in transitional Kosova.

This is the first representative population-based study which includes and prevalence of hypertension among Kosova adults. The prevalence of hypertension per age groups and per gender is presented in table 25. The overall prevalence of hypertension in individuals aged 15-64 years in Kosova was 36.2% (95% CI 35.0 – 37.4%). So Kosova is part of the group of countries with high prevalence of hypertension. Similar data have also presented two studies conducted in Kosova after the war; Markoglou et al. (244) present data of 830 patients (281 - 33.86% male and 549 - 66.14% female) which were examined for different diseases at 34th Greek regimen, which was part of the NATO forces, provided medical services to the civilians of Kosova. The 30.6% of patients with hypertension, more than half of the patients (51.2%) had severe hypertension, 31.5% modest and 17.3% mild. Another cross-sectional study which was carried out in Pristina, the capital city of Kosova, in 2012-2013 (245) also with 1793 consecutive primary health care users aged ≥35 years found that the overall prevalence of hypertension was about 34% (38.9% in men vs. 28.8% in women).

For many, 1999 will be remembered for the Kosova crisis and the ensuing international humanitarian response. By the May '99, 90% 1.6 million ethnic Albanians had been displaced, mostly to overcrowded refugee camps in bordering countries. Thousands more have been transferred to other countries in Europe and North America (246) 87% of households were displaced at some time during the crisis, either within Kosova (34%) or outside Kosova (66%).

The overall prevalence of hypertension in individuals aged 15-64 years in Kosova urban residents was 33.6% (95% CI 31.8 – 35.5%) and in rural residents 37.9% (95% CI 36.4 – 39.5%). This difference in prevalence between urban and rural areas was statistically significant (P<0.01). Since we have had the displacement of the population from the village to the city both during and after the war, this distinction is not very important.

During the analysis of one-month hospital mortality in Kosova (August 22 to September 18, 1999) in 53.2% of cases Non-communicable disease were causes of death. It has been estimated that 30% of deaths occur outside the hospital (247).

The burden of disease in Kosova has the epidemiological pattern of a developed country with low mortality rates and high prevalence of non-communicable diseases which account for the majority of the morbidity and non-war related mortality.

The prevalence of hypertension was 37.1% (95% CI 35.4 – 38.8%) among males and 35.4% (95% CI 33.7 – 37.1%) among females. This difference in prevalence between genders wasn't statistically significant (P>0.05). Although the prevalence difference between genders is not significant, we have a higher prevalence among males like in a lot of other countries in the world (13, 187, 248).

The hypertension prevalence increases along with age. The prevalence increased from 7.5% for the 15-24 years age group to 71.1% for the 55-64 years age group. This positive correlation between hypertension and age was observed in both rural and urban areas. In urban areas, the prevalence increased from 7.2% for the 15-24 years age group to 69.7% for the 55-64 years age group and in rural areas, the prevalence increased from 7.7% to 72.1% for the same age groups.

Similar results were found and in other states like; in a research in Croatia with 9070 adults (18+ years old) (248) the prevalence of hypertension was (arterial blood pressure ≥140/90 mmHg) 45.5 %, 40% of them were newly diagnosed and 60% of them were previously

diagnosed. The percentage of hypertension in males 18 to 24 years was 15.5%, whereas in females of this age group was 7.6%. At age 25-34; Males 23.8% vs. Females 11.0%. At age 35-44; Males 35.0% vs. Females 24.5%. At age 45-54; Males 55.8% vs. Females 47.2%. At age 55-64; Males 64.5% vs. Females 67.0%. At age 65-74; Males 74.8% vs. Women 81.6%. At age 75+ years; Males 81.7% vs. Female 81.6%.

In Canada (187) in 2005 the prevalence of hypertension among males of the age group 35-49 was 13.2%; in the age group 50-64 years it was 32.1%. Among females of the age group 35-49 years it was 12.5%; in the age group 50-64 it was 31.8.

In India (225) the study with STEP research methodology was conducted in 2005/2006 and involved 7449 people aged 15-64 for STEP 1 and 2. The prevalence of Hypertension was 11.4% at aged 15-24 years, 19.1% at aged 25-34 years (males 12.0% vs. females 12.0%), 33.1% at aged 35-44 years (males 25.0% vs. females 29.0%), 44.0% at aged 45-54 years (males 40.0% vs. females 57.0%), and 60.7% at aged 55-64 years (males 57.0% vs. females 76.0%),. Among males the prevalence of hypertension was 30.9% compared to females 28.8%.

Even in our study as in the above-mentioned studies, the prevalence of hypertension after 45 years of age is higher in females compared to males.

The high rate of hypertension is recorded in the Bosnia and Herzegovina (250) especially among those who had family members killed in the war. The prevalence of hypertension at both time points was higher in the group with a killed family member than in the group without the loss (55.1% vs. 42.1%, P<0.01 in 1996, and 50.7% vs. 39.0%, P<0.01 in 2003, respectively). In the study of Vasilj et al. (170) 40% of men in Herzegovina region had blood pressure over 140/90 mmHg. In two studies from Bosnia and Herzegovina (170, 250) the prevalence of hypertension is higher than in Kosova.

The prevalence of hypertension varies according to the educational status it was higher at Illiterate 73.7% (95% CI 67.2 – 79.4%), while the lowest was among those up to secondary education 31.6% (95% CI 29.7 - 33.5%).

Prevalence of hypertension varies according to the marital status it was highest at Widowed and cohabitating 62.3% (95% CI 55.1 – 69.0%), while the lowest was among unmarried 14.9% (95% CI 13.4 - 16.6%). This can explain because Unmarried is younger than others. Prevalence of hypertension was higher in respondents with the annual household income ≤ 1500 € with 45.7% (95% CI 41.8 - 49.6%). This positive correlation between hypertension and annual household income was observed in both rural and urban areas.

There is strong evidence that low socioeconomic status is associated with elevated rates of blood pressure-related cardiovascular disease (251).

The positive correlation between hypertension and BMI was observed in both rural and urban areas. Prevalence of hypertension was highest in Obese 66.9% (95% CI 64.2 – 69.6%). At current smokers prevalence of hypertension was 36.5% (95% CI 34.3 – 38.8 %) among no smokers was 36.1% (95% CI 34.7 – 37.6 %).

Prevalence of hypertension was higher among current alcohol user 40.0% (95% CI 35.9 – 44.3%) compared with no users 35.9% (95% CI 34.6 – 37.1%).

On univariate analysis, the prevalence of hypertension was found to be significantly higher among those aged 55-64 years (71.1%), rural (37.9%), illiterate (73.7%), Widowed and cohabitating (62.3%), the annual household income > 1500 €, ≤ 2500 € (45.7%) and obesity (66.9%). No difference was found in prevalence by gender, residence, smoking and alcohol use, low physical activity, fruit and vegetable intake. Age group 45-64, residence, educational status, marital status, the annual household income and overweight and obesity, were found to be the risk factors significantly associated with hypertension in a multivariate regression model.

Similar data found at Hashani et al. (245) found significant positive correlates of hypertension were older age (OR=1.03, 95% CI 1.01-1.05), male gender (OR=1.41, 95% CI 1.19-1.58), a lower educational attainment (OR=1.36, 95% CI 1.08-1.67), smoking

(OR=1.53, 95% CI 1.28-2.16), physical inactivity (OR=1.98, 95% CI 1.46-2.74) and hostility (OR=1.42, 95% CI 1.17-2.08).

Another article of the same study (252), hypertension was positively related to smoking (OR=1.78, 95% CI=1.39-2.30), excessive alcohol consumption (OR=2.53, 95% CI=1.78-3.66), physical inactivity (OR=2.71, 95% CI=1.67-3.86) and excessive dietary fat intake (OR=2.21, 95% CI=1.53-3.09).

The study that examines the relationship between household income and self-reported hypertension prevalence among persons aged 65 and older in the United States and Canada found a significant inverse linear relationship between household income and the hypertension prevalence rate in the United States, but no evidence of such a relationship in Canada. In Canada, unlike the United States, the burden of hypertension is approximately equal for socioeconomically advantaged and disadvantaged older adults. It is important to consider these findings in the context of long-term and broader institutional policies. Social disparities and barriers to health care access and primary prevention among non-elderly persons in the United States may play a role in the higher hypertension prevalence rate among low-income older adults (251).

Research in Croatia with 9070 adults (18+ years old) (248) newly diagnosed hypertension was found to be positively associated with increased BMI, age and alcohol consumption in the total sample and with moderate consumption of coffee in women, as well as inversely associated with regular consumption of fruits and vegetables in the total sample and high consumption of coffee in the total sample and in men. No association with newly diagnosed hypertension was recorded for use of animal fat, consumption of whole milk, smoked meat products, for adding salt, smoking and leisure-time physical activity.

In India (225) the study with STEP research methodology was conducted in 2005/2006 and involved 7449 people aged 15-64 for STEP 1 and 2. Was earned correlation between physical activity and hypertension. Prevalence of Hypertension among inactive people was

34.0%, among them with Moderate activity 29.8% and among people with Vigorous activity 23.3%.

The study was conducted in rural and urban communities in Abia State, Nigeria participants in the study were men and women aged ≥ 15 years. Age and indices of obesity were the strongest predictors of blood pressure (236).

The study of self-reported systemic arterial hypertension and associated factors in 2006 in Brazil's capitals and Federal District the frequency of hypertension increased with age, decreased with level of schooling, was higher among blacks and widowed subjects, and lower among singles. The chance of hypertension, adjusted for confounding variables, was higher in subjects with overweight, diabetes, dyslipidaemia and cardiovascular events (249).

The study with 553 students (59.5% males, 40.5% females) aged 17-26 years (median 21) from Al-Quds University Pre-HTN was detected in 27.1% (38% males, 11.2% females) and HTN in 2.2% (3.3% males, 0.4% females). Pre-HTN and HTN were associated with obesity (r(s) =0.252, P<0.01) and smoking (P<0.05). No relationship was detected between students' BP and sedentary behaviour, family history of HTN/CAD, or consumption of fast food. The prevalence of increased BMI and BP among males was significantly higher than females (P<0.01), (218).

In the study of Markoglou et al. (244), the statistically significant relationship between the severity of hypertension and age or sex was not found out. Increased BMI, as well as the presence of protein and rheumatic diseases, were significantly related to the severity of hypertension while the coexistent heart disease, diabetes mellitus and chronic obstructive pulmonary disease (COPD) weren't. And the conclusion that the diagnosis and treatment of hypertension in the population of Kosova during the post-war period had certain particularities.

In most states we have an increase in the prevalence of hypertension but not in the developed country. In Canada (187), the prevalence of Hypertension at both sexes in 1994 was 8.2%, whereas in 2005 it was 14.6%, so we had a prevalence increase of 77.0%. The prevalence of hypertension among males in 1994 was 7.3%, whereas in 2005 it was 14.0%, so we had a prevalence increase of 92.0%. But as a result of preventive measures in 2014 the prevalence of hypertension in Canada was 13.3% (male 15.7% vs. females 11.0%). So in 2014 in Canada, we had a decrease in the prevalence of hypertension compared to 2005. The prevalence of hypertension among females in 1994 was 8.9%, whereas in 2005 it was 14.9% so there was an increase in the prevalence of 67.0%. Sociodemographic Characteristics and CHD Risk Factors for Men Aged 20 to 35 Years and Women Aged 20 to 45 Years, NHANES, 1999–2006 in the USA (238) the prevalence of hypertension at both genders was 10.9%; males 11.2% vs. females 10.6%. While in 2014 the prevalence of hypertension in the United States was 13.4% (male 15.9% vs. females 11.1%), which is also not a big increase.

In Kosova, we didn't have data about the prevalence of hypertension in the population based survey before the war. So we can't compare before and after the war. Kosova has planned during 2018 to repeat the STEP so we can compare the 2011 results with those of 2018 and look at trends in the prevalence of these eight risk factors for these two time periods.

6.7. Raised blood glucose

According to the International Diabetes Federation (IDF), more than 366 million people 20-79 years of age had diabetes in 2011, which equals a global prevalence of 8.3% (252). In 2017 more than 425 million adults aged 20-79 with diabetes worldwide including 1 in 2 remains undiagnosed. By 2030 this number is estimated to rise to 552 million and the prevalence to 9.9% (253). The number of people with type 2 diabetes is increasing in every country and 80% of people with diabetes live in low- and middle-income countries and these will experience the greatest increase in cases of diabetes over the next decades (254). Approximately 50% are undiagnosed and most people with diabetes are between 40 to 59

years of age (254). Furthermore, the International Diabetes Federation has reported a 6.4% prevalence of impaired glucose tolerance (IGT) globally, corresponding to 280 millions of people in 2011. By 2030 the number of people with IGT is expected to rise to 398 million with a prevalence of 7.1%.

In 2009 GEDA study, the German population aged 18 years and older living in private households were asked whether a physician had ever diagnosed diabetes (lifetime prevalence). A total of 8.8% of adults – 9.3% of the women and 8.2% of the men-stated a diagnosis of diabetes. In both sexes, the prevalence of diabetes is less than 5% among people aged up to 40-49 years, but strongly increases in the older age groups; diabetes was reported from one in eleven among the 50 to 59-year-olds, one in seven among the 60 to 69-year-olds, and as many as one in five people among the over 70 (255).

According to the data of WHO (13) in 2014 the states with lower prevalence of diabetes mellitus among adults were mainly African countries like Central African Republic 6.2% (males 6.1% vs. females 6.3%), Ghana 6.2% (males 6.4% vs. females 6.0%), Afghanistan 6.7 % (males 6.8% vs. females 6.6%) and Bolivia 6.5% (males 5.4% vs. females 7.3%) from the American continent. The states with higher prevalence of diabetes mellitus were Egypt 17.2 % (males 15.3% vs. females 19.0%), France 13.3 % (males 15.7% vs. females 11.0%), Georgia 16.4 % (males 16.0% vs. females 16.6%), Iraq 12.9 % (males 12.3% vs. females 13.6%), Bosnia and Herzegovina 11.8 % (males 12.2% vs. females 11.3%), mainly Muslim population.

The overall prevalence of Diabetes mellitus among the study participants (2011) was found out to be 7.7% which is lower than a global prevalence of 8.3% (252). The International Diabetes Federation (2011) has reported a 6.4% prevalence of impaired glucose tolerance (IGT) globally. And in our study, the prevalence of prediabetes was 6.0% (95% CI 4.6 – 7.9%). So, Kosova has the prevalence of diabetes similar to low-income countries.

Prevalence of diabetes mellitus in some country was higher among males compared to females and in other was higher among females compared to males (13). In Kosova the

prevalence of Diabetes mellitus was higher among females 9.0% (95% CI 6.6 – 12.2%) compared to males 6.3% (95% CI 4.3 – 9.2%), like in Central African Republic, Bolivia, Egypt, Georgia, Iraq (13), Germany (182), India, (225). In the study in Tirana city of Albania, the prevalence of diabetes mellitus was higher among males compared to females (262). Also in our study, the prevalence of prediabetes was higher among females 6.5% (95% CI 4.5 – 9.4%) compared to males 5.6% (95% CI 3.7 – 8.3%), though not significant (P>0.05).

The prevalence of risk factors for chronic disease in Canada differs from Aboriginal and no aboriginal populations (197). In 2005/06, the prevalence of Diabetes in the Aboriginal population in Northern Canada was 3.8%, while in Southern Canada it was 6.4%. In 2005/06, the prevalence of Diabetes in the non-native population in northern Canada was 3.8%, while in Southern Canada 5.5%.

Diversities in biology, culture, lifestyle, environment, and socioeconomic status impact differences between males and females in predisposition, development, and clinical presentation. Genetic effects and epigenetic mechanisms, nutritional factors and sedentary lifestyle affect risk and complications differently in both sexes. Furthermore, sex hormones have a great impact on energy metabolism, body composition, vascular function, and inflammatory responses. Thus, endocrine imbalances relate to unfavourable cardio metabolic traits, observable in women with androgen excess or men with hypogonadism. Both biological and psychosocial factors are responsible for sex and gender differences in diabetes risk and outcome. Overall, psychosocial stress appears to have the greater impact on women rather than on men (256).

Trends in diabetes and cardiovascular mortality rates are considerably different between women and men; this can be partially explained by differences in diabetes control. Women with diabetes have poorer control of main potentially modifiable cardiovascular risk factors than men. In the research at the Vuk Vrhovac University Clinic in 2008 in Croatia, women had higher levels of HbA1c (7.05 vs. 6.86%; P<0.01), despite the fact that a larger proportion of women were receiving insulin therapy than men (51.3% vs. 44%). Women

also had higher mean values of SBP (144.7 vs. 141.9 mmHg; P<0.01) and LDL (2.92 vs. 2.84 mmol/L). There were no differences in DBP (86.1 vs. 86.0 mmHg; P>0.05) and only triglyceride levels were higher in men (2.04 vs. 1.94 mmol/L; P<0.01). In multi-adjusted logistic regression model female sex was associated with a higher odds ratio of having uncontrolled values of HbA1c (OR 1.21; 95% CI 1.11-1.32), SBP (OR 1.21; 95% CI 1.07 - 1.37) and LDL (OR 1.13; 95% CI 1.04 - 1.23). This could contribute to disparities in trends in cardiovascular mortality and it demands clinicians' and public health awareness (257).

Overall prevalence of Diabetes mellitus among the study participants was found out to be 7.7% (95% CI 6.0 – 9.7%), which was higher in rural areas 9.1% (95% CI 6.8 – 12.1%) compared to urban 5.8% (95% CI 3.8 – 8.8%), though not significant (P>0.05). The prevalence of prediabetes was 6.0% (95% CI 4.6 – 7.9%), was higher in urban areas 6.4% (95% CI 4.2 – 9.4%) compared to rural 5.8% (95% CI 4.0 – 8.3%), though not significant (P>0.05). So in the future, diabetes will be increasingly concentrated in urban areas like in other countries that report data to International Diabetes Federation (253).

In China, the age-standardized prevalence's of total diabetes was 9.7% (10.6% among men and 8.8% among women (258). In Switzerland, the overall prevalence of diabetes increased from 3.9% in 2006 to 4.9% in 2011. In women 3.68% to 4.72% and in men 4.64% to 6.16% (249).

In Croatia, a nationally representative sample of 1653 subjects aged 18–65 years were analysed. The prevalence of Diabetes mellitus was 6.1% (95% CI 4.59 – 7.64%), with a significant difference by age. IFG prevalence (WHO-criteria) was 11.3%. This survey revealed a higher prevalence of diabetes than previously estimated, whereas that of IFG was as expected (260).

By the year 2025, >75% of people with diabetes will reside in developing countries, as compared with 62% in 1995. The countries with the largest number of people with diabetes are and will be in the year 2025, India, China, and the U.S. In developing countries, the majority of people with diabetes are in the age range of 45–64 years. In the developed

countries, the majority of people with diabetes are aged ≥65 years. This pattern will be accentuated by the year 2025. There are more women than men with diabetes, especially in developed countries. In the future, diabetes will be increasingly concentrated in urban areas (261).

To determine how the prevalence of Type 2 diabetes mellitus has changed in Tirana, the capital of Albania, over 20 years are selected 1540 adults 25 years of age and over in Tirana City, Albania in 2001. The overall prevalence of Type 2 diabetes mellitus in the age group 25+ was 6.3% (95% confidence interval 4.8–7.7); 6.9% (4.8–9.1%) male; 5.6% (3.8–7.5%) female. Of respondents, 3.4% were known to have diabetes, and 2.9% were newly identified through the survey. The prevalence of diabetes increased with age, although among men there was a slight decline after age 65. Impaired glucose tolerance was found in a further 2.9% of respondents, again increasing with age. The prevalence of diabetes has increased significantly since 1980, doubling in the age group 50+ (262).

Research in Amsterdam, Netherlands, which was conducted in 2004 among Dutch, Turkish and Moroccan ethnic groups aged 18-70 (224) has found various prevalence of diabetes in the different ethnic groups which is dependent on by the observed differences in lifestyle factors such as physical activity, BMI and waist-to-hip ratio (WHR). Diabetes prevalence among Dutch 3.1%, Turkish 5.6% and Moroccan 8.0%. Data are weighted for age and sex according to the age and sex distribution of Dutch, Turkish and Moroccan individuals in the Amsterdam population.

In China, the prevalence of diabetes increased with increasing age 3.2% among 20 to 39 years, 11.5% among 40-59 years and 20.4% among ≥60 years of age. The prevalence of diabetes was increased with age in 2011 was 0.68% at age group 19-39 year, 3.54% at age 40-59 years and 11.38 at age >59 years. In women the prevalence of diabetes was increased with age in 2011 was 0.79% at age group 19-39 year, 2.81% at age 40-59 years and 9.30 at age >59 years. In men the prevalence of diabetes was increased with age in 2011 was 0.57% at age group 19-39 year, 4.28% at age 40-59 years and 14.19 at age >59 years (258).

In India, (225) research with STEP methodology was conducted in 2005/2006 and involved 7449 people aged 15-64 for STEP 1 and 2 and 1,500 people aged 15-64 for STEP 3. Diabetes Mellitus prevalence was 2.9% at age-group 15-24 year, 4.1% at age group 25-34 year, 15.0% at age group 35-44 year, 31.4% at age group 45-54 year and 42.3% at age group 55-64 year. Diabetes mellitus prevalence among males was 13.4% and among females 16.0%. They have gained connectivity between physical activity and Diabetes Mellitus. Prevalence of Diabetes Mellitus in Inactive Persons was 16.9%, in persons with Moderate Activity 15.6% and Vigorous activity 11.4%.

In our study prevalence of diabetes increased with age was 1.2% between 25-34 years (95% CI 0.3 - 4.3%) up to 21.6% aged 55-64 years (95% CI 15.8 - 28.9%), the prevalence of pre-diabetes increased with age was 0.6% aged 15-24 years (95% CI 0.1 - 3.4%) up to 12.8% aged 55-64 years.

Prevalence of diabetes in Canada is lower than in European countries (187) Prevalence of diabetes among both genders in 1994 was 2.5% whereas in 2005 it was 3.6%, so we had a prevalence increase of 40.0%. But in 2014 we have increased in the prevalence of DM in 9.1%. The prevalence of Diabetes Mellitus in men in 1994 was 2.7%, whereas in 2005 it was 4.1% so we had a prevalence increase of 52.0%. The prevalence of Diabetes Mellitus among women in 1994 was 2.3%, whereas in 2005 it was 3.2% so we had an increase in the prevalence of 37.0%.

In Canada, the prevalence of Diabetes in both sexes in the age group 35-49 in 1994 was 1.6%, whereas in 2005 it was 2.6%, so we had a prevalence increase of 64.0%; in the age group 50-64 years in 1994 was 5.3%, whereas in 2005 it was 8.3% so we had a prevalence increase of 58.0%. The prevalence was increased in both genders.

In a research of Mataix et al. (199), the average glucose value in males was 99.7 mg/dL (SD ± 28.48 mg/dL) whereas in females it was 98.3 mg/dL (SD ± 17.78 mg/dL).

In the Basque Country, Spain in 2000, (263) a cross-sectional survey was conducted among 61 general practitioners (GPs) who studied 65 651 people older than 24 years. Of those, 2985 known Type 2 diabetic patients were registered. The prevalence of known Type 2 diabetes was higher in patients of lower socioeconomic status (OR 2.17, 95% CI 1.77 - 2.28), especially among women (OR 2.28, 95% CI 1.91-2.73). In Type 2 diabetes patients, obesity, sedentary lifestyle, and abnormal levels of low-density lipoprotein (LDL) cholesterol and HbA (1c) were more prevalent among those from lower socio-economic status. Macroangiopathy was inversely associated with socioeconomic status after adjustment for clinical and demographic variables. Patients of lower socioeconomic status more frequently visited primary care services than those of higher status.

To describe the prevalence of heart disease, hypertension, and stroke among Canadians with diabetes compared to those without diabetes in the Canadian general population aged 12 years and over was included 127,610 individuals who participated in the 2.1 cycles of the Canadian Community Health Survey (CCHS) in 2002–2003. The prevalence of self-reported hypertension, heart disease, and stroke among individuals with diabetes were 51.9, 21.7, and 4.8%, respectively. By comparison, prevalence among those without diabetes was 12.7, 4.2, and 0.9%. Adjusted Odds Ratios (OR) was 4.15, 5.04, and 6.75 for males', and 4.10, 5.29, and 4.56 for females' hypertension, heart disease, and stroke, respectively. Lower income (OR 1.27 – 1.94) and lower education (OR 1.23 – 1.86) were independently associated with a high prevalence of hypertension, heart disease, and stroke among diabetics. Alcohol consumption (OR 1.06 – 1.38), high BMI (OR 1.17 – 1.40), physical inactivity (OR 1.21 – 2.45), ethnicity, and immigration status were also strongly associated with hypertension, heart disease, and stroke. The adjusted prevalence of hypertension, heart disease, and stroke in the CCHS-2003 health survey in Canada was significantly higher among those with diabetes compared to those without. Other factors such as age, gender, BMI, lifestyle, family incomes, physical activity levels, and socioeconomic status also affected the strength of association between diabetes and resulting comorbidities (264).

In our study the prevalence of diabetes mellitus was found to be significantly higher among those aged 55-64 years (21.6%), illiterate 26.1%), Widowed and cohabitating (17.4%), the

annual household income > 1500 €, ≤ 2500 € (11.2%), overweight (14.5%), hypertensive (13.3%), low physical activity (11.8%) and hypercholesterolemia (12.0%).

Age group 45-64, educational status, marital status, hypertension, overweight and obesity, low physical activity and hypercholesterolemia were found to be the risk factors significantly associated with diabetes mellitus in a multivariate regression model similar to study in Spain (263) and Canada (264).

6.8. Abnormal blood lipids

This cross-sectional study of about 796 individuals from Kosova investigated the prevalence of hypercholesterolemia and its relation to the sociodemographic data of the participants. The main finding of this work was that the prevalence of hypercholesterolemia in study group 15-64 years was 35.6% (95% CI 32.3% - 38.9%) Meanwhile, the published epidemiological data regarding the current prevalence of hypercholesterolemia in Kosovan population are missing.

According to the results from the WHO MONICA Project (265) (a multinational survey), the prevalence of awareness of hypercholesterolemia was substantially higher in most populations among women. And in our study (study group 15-64 years) prevalence of hypercholesterolemia is higher among women. The prevalence among males was 32.3% (95% CI 27.9% - 37.1%), among females 38.8% (95% CI 34.1% - 43.6%). In study group 25-64 years the prevalence of hypercholesterolemia was 42.2% (95% CI 38.4% - 46.1%) among males in this age group was 38.5% (95% CI 33.3% - 44.0%), among females 45.8% (95% CI 40.4% - 51.3%).

However, the fact that the prevalence of hypercholesterolemia increases with age, which is a frequent finding of similar surveys, was also observed in the present work. It was 9.8% (95% CI 6.1 - 15.3%) aged 15-24 years, 25.5% aged 25-34 years (95% CI 19.4 - 32.6%) and 55.4% aged 55-64 years (95% CI 47.4 - 63.2%).

Age group 45-64, educational status, marital status, hypertension, overweight and obesity, and diabetes were found to be the risk factors significantly associated with hypercholesterolemia in a multivariate regression model which confirm the frequent finding from other studies (265, 266 and 267), that hypercholesterolemia usually, apart from high total cholesterol in serum, have to confront additional health problems, the coexistence of which enhances the total cardiovascular risk.

No difference was found in the prevalence of hypercholesterolemia by gender, residence, the annual household income, smoking, low physical activity and fruit and vegetable intake this finding shows a trend among hypercholesterolemia participants of avoiding this unhealthy habit in order to delay the progression of atherosclerosis.

In the research that was conducted in Germany in 2002 (182) and which included 2187 people aged 18-65 years total cholesterol level >5.2, mmol/L was at 62.0%.

In India (225) was conducted the study with STEPs methodology in year 2005/2006 with 1500 people at aged 15-64 years for STEP 3. Prevalence of Hypercholesterolemia was 29.8% at age group 15-24 year, 49.9% at age group 25-34 years, 64.4% at age group 35-44 years, 73.1% at age group 45-54 years and 71.2% at age group 55-64 years. Among male prevalence of Hypercholesterolemia was 48.1% and among female 59.6%. They earned correlation between physical activity and Hypercholesterolemia. Prevalence of Hypercholesterolemia at inactive respondents was 57.3%, at those with Moderate activity 55.4% and Vigorous activity 48.5%.

On univariate analysis, the prevalence of hypercholesterolemia was found to be significantly higher among those aged 55-64 years (55.4%), illiterate (47.8%), Separated/divorced (66.7%), obese (52.9%), hypertensive (48.9%), diabetes (55.7%) and no current alcohol users (35.9%). No difference was found in the prevalence of hypercholesterolemia by gender, residence, the annual household income, smoking, low physical activity and fruit and vegetable intake. Age group 45-64, educational status, marital status, hypertension, overweight and obesity, and diabetes were found to be the risk

factors significantly associated with hypercholesterolemia in a multivariate regression model.

In the study of Mataix et al. (199), in South Spain among 340 adults age 25-60 years mean value of total cholesterol among male was 222.5 mg/dL (SD ± 31.73 mg/dL) compared with female 224.7 mg/dL (SD ± 34.08 mg/dL).

Based on 9 prospective studies and other clinical data the author reviews the role of lipids and lipoproteins as predictors of coronary disease and analyses the determinants of cholesterol and lipoprotein concentrations in women. 1 of the studies showed that women with cholesterol concentrations of more than 295 mg/dl had rates of myocardial infarction 60% lower than men with concentrations smaller than 204 mg/dl. The rate of coronary disease in women with cholesterol concentrations exceeding 265 mg/dl was 3 times higher than in those with the lowest cholesterol concentration. In 2 American studies, an increase of 10 mg/dl in HDL was associated with a 42-50 % reduction of coronary risk in women. However, LDL did not prove to be powerful in predicting cardiovascular disease in women. In connection with the determinants of lipid levels, it was found that only 2% of hypercholesterolemia was associated with major gene effects. In women with type II hypolipoproteinaemia total serum and LDL cholesterol levels were reduced by 9% and HDL levels by 10% as a result of an isocaloric diet with low cholesterol intake. In a study, obesity was significantly and negatively correlated (P<0.01) with HDL concentrations. Drinkers had HDL cholesterol concentrations 6 to 18% greater than non-drinkers. All formulations of oral contraceptives were found to increase LDL cholesterol concentrations. (266).

In Saudi Arabia a cross-sectional national epidemiological household survey was carried out, consisting of 4539 Saudi subjects, over the age of 15 years. The prevalence of hypercholesterolemia (HC), 5.2 - 6.2 mmol/l was 9% and 11% for all male and female subjects, respectively (P > 0.05), whereas the prevalence of HC, > 6.2 mmol/l was 7% and 8% for male and female subjects, respectively (P > 0.05). The prevalence of HC 5.2-6.2 mmol/l for subjects aged 40-59 years was 14% and 10% for male and female subjects,

respectively (P > 0.05), whereas the prevalence of HC > 6.2 mmol/l was 9% and 11% for male and female subjects, respectively (P > 0.05). There was a progressive increase in the prevalence of HC with age for male and female subjects. The prevalence of HC > 5.2 mmol/l increased with increasing BMI values. The prevalence of HC of female subjects was significantly higher than for male subjects among normal weight groups. The prevalence of HC (> 6.2 mmol/l) for female subjects was higher, however, not significant than for male subjects among overweight and obese groups. The prevalence of HC, whether for male or female subjects, was higher among diabetics when compared with non-diabetic subjects. The prevalence of HC (> 6.2 mmol/l) among male subjects was higher for smokers when compared with non-smokers. It was concluded that Saudi subjects have the lower prevalence of HC than the European and American populations. This can partially be explained by the younger nature of the population (267).

This study has a few limitations. It is a cross sectional study design which limits causality of relations. However, large sample size of study makes the results conclusive. Second issue is of over-reporting, which is a well-recognized issue for self –report surveys as participants tend to report in socially desirable ways. For example, the less active may want to over-report activity to appear healthier. Use of range checks and cross matching of data with physical and biochemical parameters helped us to control this bias. Thirdly, measurement of blood glucose was done by a glucometer device instead of venous blood glucose estimation due to logistic constraints. However, regular quality control check on blood glucose measurement was done. Also, only fasting blood glucose was used to diagnose diabetes and pre-diabetes.

7. CONCLUSIONS

Prevalence of risk factors for non-communicable diseases of Kosova population was moderated by socioeconomic determinants education, marital status, residence and income:

1. Education showed statistical significance for all the risk factors (smoking, alcohol, hypertension, diabetes, abnormal cholesterol, overweight, physical incativity and diet).

2. Marital status shows similar pattern, i.e. statistical significance for all the risk factors (smoking, alcohol, hypertension, diabetes, abnormal cholesterol, overweight and diet), and not with physical inactivity.

3. Residence showed statistical significance with smoking, alcohol, hypertension, diet and physical inactivity, and not with diabetes, abnormal cholesterol and overweight and obesity.

4. Income showed statistical significance with alcohol, hypertension, diabetes, overweight and not abnormal cholesterol, smokimg and physical inactivity.

5. Age and gender showed different significance pattern with smoking, alcohol, hypertension, diabetes, abnormal cholesterol, overweight, physical inactivity, and diet. Age is statisticaly significant with all the risk factors except for diet, while gender showed significance with smoking, alcohol, overweight and physical inactivity.

6. These results point that education and marital status are leading socioeconomic factors of risk factors for non-communicable diseases.

7. The prevalence of smoking in Kosova adults (male: 37.4%; female: 19.7%) is lower than Bosnia and Herzegovina (male: 49%; female: 30 %;) and Albania (male: 58.8%; female 11.5%), but higher prevalence than Croatia (male: 25.3%; female: 22.4%).

8. Our results show that the prevalence of current smokers in Kosova is higher than the European average, higher than in Middle-income country group (male: 34.1%; female: 10.8%) and in Low-income country group (male: 25.2%; female 6%).

9. The prevalence of current drinkers in Kosova (male: 14.6%; female: 2.3%) is lower than in the other European States and is similar to states in the Eastern

Mediterranean region (male: 7.4%; female: 3.3%). Drinking alcohol in most households is a stigma, and this number may be underestimated because especially during the holidays the use of alcohol is higher than it is stated.

10. In our study prevalence of low fruit and vegetable intake higher than average in WHO studies at Middle-income country group and in Low-income country group.

11. The overall prevalence of insufficient physical activity in Kosova was 36.1% (male: 44.3%; female 28.0%) which is lower than in Serbia (41.4%), southern Spain (male: 56.0%; female 74.2%), Germany (male: 37.6%; female 40.3%), and higher than in Slovak (male: 20.9%; female 31.2%) and Canada (18.5%).

12. In Kosova prevalence of insufficient physical activity is higher than the global prevalence in the Middle-country country group (male: 12.3%; female 14.9%) and in the low-income country group (male: 8.4%; female: 14.6%).

13. The prevalence of overweight in Kosova was 33.7% (male: 39.8%; female: 27.7%) which is lower than global prevalence 39% (male: 38%; female: 40%). The prevalence of obesity in Kosova was 19.2% (male: 14.9%; female: 23.5%) which is higher than global prevalence 13% (male: 11.0%; female: 15.0%) and lower than prevalence in European region (male: 20.0%; female: 23.0%), Bosna and Herzegovina (male: 17.0%; female: 25.0%).

14. Kosova is part of the group of countries with high prevalence of hypertension 36.2% (male: 37.1%; female: 35.4%) higher than global prevalence 22% (23% for men, 21% for women), similar with prevalence in low-income countries like Herzegovina region (40.0%).

15. Overall prevalence of Diabetes mellitus in Kosova was 7.7% (male: 6.3%; female: 9.0%) which is lower than a global prevalence of 8.3% (male: 9.0%; female: 7.9%), prevalence in Bosnia and Herzegovina 11.8 % (males 12.2% vs. females 11.3%), but higher than prevalence in Albania 6.3% (male: 6.9%; female: 5.6%), Croatia (6.1%) and similar with prevalence in the WHO European Region (7%).

16. The prevalence of hypercholesterolemia in Kosova 35.6% (male: 32.3%; female 38.8%) is lower than global prevalence (40%) and lower than the prevalence in the WHO European Region (54%) similar with prevalence in the low-income country (30%).

Proposed measures

- This study provides the first, and most comprehensive, national-level evidence on the magnitude of NCD risk factors in the country of Kosova. This thesis is among the few population-based studies on chronic disease risk factors conducted in resource-poor countries. Chronic disease prevention and control is still at its initial stage in Kosova. Reliable nationwide data on chronic disease are not available. Data on chronic disease are mostly compiled from routine hospital reports and small-scale population studies.

- In our study sample, there was a relatively high prevalence of risk factors for chronic diseases, which raises serious concerns for healthcare professionals and decision-makers in the health sector in Kosova. There is an obvious need for policymakers and health promotion specialists in Kosova to implement effective programs and activities in order to control and prevent the negative health outcomes related to risk factors for chronic diseases. Health personnel need to be trained appropriately in order to help prevent and treat chronic diseases.

- We need to make clinical and policy interventions – both equally important. Solutions already exist to address the global burden of CVD, and scaling up what is already proven successful is one way to quickly and effectively turn these trends around in vulnerable areas. Following the Political Declaration on NCDs adopted by the UN General Assembly in 2011, WHO developed a global monitoring framework to enable global tracking of progress in preventing and controlling major NCDs and their key risk factors. The framework comprises nine global targets for prevention and control of NCDs to be attained by 2025 (35).

- Is a emergent need that Kosova to work in those targets. Also, Kosova need to prevent NCDs with "best buys," a core set of evidence-based interventions identified by WHO as highly cost-effective, feasible, and appropriate to implement in local health systems (268). Kosova preventing programs should employ these cost effective and proven interventions.

- A comprehensive framework to tackle CVD must encompass the impact of policy (bottom of pyramid) and healthcare environments. The Million Hearts model in the U.S. has successfully brought together community and clinical concepts to reduce the

need for treatment and improve outcomes. Community prevention (Reduce need for treatment); Tobacco control, Sodium reduction, Trans fat elimination and Clinical Prevention (Improve treatment); Focus on ABCS (aspirin for high-risk patients, blood-pressure control, cholesterol management, and smoking cessation), Health Information technology and Clinical innovations (269).

- The Global Hearts Alliance with a mission to 'unite partners to accelerate national action to prevent and control heart disease and stroke' includes three technical packages: MPOWER focuses on tobacco control, SHAKE focuses on lowering sodium consumption, and HEARTS is a technical package for CVD prevention and management in primary health care. Combined, these technical packages provide a set of high-impact, evidence-based interventions that, when used together, will have a major impact on improving global heart health. The three technical packages under the umbrella of the Global Hearts Alliance are grouped as a two pronged approach to address both policy and health systems:

  - Policy interventions: MPOWER (270) and SHAKE (271)
  - Health systems intervention: HEARTS (272)

  Moving forward, we want to expand and scale-up use of these proven strategies and tools to improve CVD prevention and treatment.

- Investing in chronic disease risk factors, morbidity and mortality surveillance is urgently needed, and it requires greater social, political and governmental support. The presence of risk factors in early and midlife predisposes people to earlier onset of chronic disease, and greater potential for life-years lost. Early-onset of chronic diseases is likely to incur greater consumption of healthcare resources, because individuals with these conditions may require treatment of greater intensity and longer duration.

- Moreover, the public health system in Kosova should also be prepared to devote greater financial and human resources to support the development of a robust chronic disease surveillance system. The focus should be on early diagnosis and opportunistic screening. There is a room for more efforts to perform systematic population-based chronic disease surveillance in Kosova. The private sector can be a useful partner in NCDs surveillance.

8. ABSTRACT IN CROATIAN

Prevalencija faktora rizika od kroničnih bolesti i specifičnih zdravstvenih odrednica u tranzicijskoj zemlji - slučaj Kosova
Sanije Gashi, 2018

Kronične bolesti i dalje predstavljaju globalni teret bolesti u svijetu. Oni su odgovorni za većinu smrti na globalnoj razini. Većina preranih smrti (82%) događa se u zemljama s niskim i srednjim dohotkom, osobito među odraslim osobama u dobi od 30-69 godina. U Kosovu donedavno nije bilo dostupnih pouzdanih epidemioloških podataka o prevalenciji čimbenika rizika za kronične bolesti u odraslih osoba. Opći cilj studije je bio opisati i analizirati raspodjelu kroničnih čimbenika rizika bolesti i specifičnih determinanti zdravlja u Kosovu, čime se doprinosi preporukama o politici i programu javnog zdravstva i poboljšanju organiziranja zdravstvene zaštite. U rujnu 2010. započeto je istraživanje o nezaraznim bolestima na populaciji usvajanjem instrumenta STEPs Svjetske zdravstvene organizacije, a prikupljanje podataka dovršeno je u ožujku 2011. godine. U to vrijeme nije proveden popis stanovništva na Kosovu, pa su korišteni podaci za kućanstva prema naseljima iz Statističke agencije Kosova za 2008. godinu, ukupno sedam regija, 30 općina i 1464 naselja. Od 6400 osoba planiranih za istraživanje, uključeno je 6117, što je oko 95,6%. Glukoza u krvi i ukupni kolesterol izmjereni su na uzorku od 796 od 6117 ispitanika. Rezultati su pokazali da je prevalencija čimbenika rizika za kronične bolesti na Kosovu visoka. Prevalencija pušenja 28,4%, konzumacija alkohola 8,4%, niski udio voća i povrća u prehrani 86,5%, fizička neaktivnost 36,1%, težina 33,7%, prekomjerna tjelesna težina 19,2%, hipertenzija 36,2%, dijabetes 7,7% i hiperkolesterolemija 35,6%. Otkrili smo da čimbenici rizika poput hipertenzije, dijabetesa i prkomjerna tjelesna težina povećavaju s dobi, ali su također prisutni i u mlađim dobnim skupinama. Obrazovanje još je uvijek snažan prediktor za zdravstveno ponašanje i ustanovili smo korelaciju između obrazovnog statusa i prevalencije svih čimbenika rizika. Također, bračni status ima značajan utjecaj na sve čimbenike rizika, osim fizičke neaktivnosti. Prema mjestu prebivališta ustanovili smo da pušenje i konzumacija alkohola više prevladava u urbanim područjima, hipertenzija i povišenje glukoze u krvi u ruralnim područjima. Prevalencija konzumacije alkohola, hipertenzije, dijabetesa i pretilosti i prekomjerne tjelesne težine moderirana je prihodima. U

prevalenciji pušenja, konzumacija alkohola, fizička neaktivnost, prekomjerna tjelesna težina i pretilost pokazuju značajne razlike s obzirom na spol. Prevalencija čimbenika rizika za kronične bolesti u Kosovu veća je u usporedbi s drugim državama, a moderirana su obrazovanjem, socio-ekonomskim odrednicama, bračnim stanjem, prebivalištem i dohotkom. Višesektorski pristup smanjenju utjecaja kronične bolesti na morbiditet i smrtnost u Kosovu imperativ je u sljedećem desetljeću.

Ključne riječi: čimbenici rizika, kronični poremećaji, Kosovo, odrasli

9. ABSTRACT IN ENGLISH

Prevalence of chronic diseases risk factors and specific health determinants in a transitional country - The case of Kosova
Sanije Gashi, 2018

Non-communicable diseases continue to dominate the overall burden of disease in the world. They are responsible for most of the deaths globally. The majority of premature deaths (82%) are in low- and middle-income countries, especially among adults aged 30-69 years. In Kosova until recently, no reliable epidemiological data were available on the prevalence of risk factors for chronic diseases in adults. The overall objective of the study is to describe and analyze the distribution of chronic disease risk factors and specific determinants of health in Kosova. In order to contribute to policy and programme recommendations on public health and improvement organization of health care services. The population-based survey of non-communicable diseases risks factors started in September 2010 by adopting the World Health Organization (WHO) STEPs Instrument. The data collection was completed in March 2011. At that time the census of population in Kosova wasn't conducted. Therefore the data for households according to the settlements from Statistical Agency of Kosova for 2008 were used. In total seven regions, 30 municipalities and 1464 settlements. Out of 6,400 persons planned for research, 6,117 were included which is approximately 95.6%. Blood glucose and total cholesterol were measured on the sample of 796 which were a subsample of 6117 respondents. The results showed that the prevalence of risk factors for chronic diseases in Kosova is high. The prevalence of current smoking 28.4%, current drinkers 8.4%, low fruit and vegetable intake 86.5%, physical inactivity 36.1%, overweight 33.7%, obesity 19.2%, hypertension 36.2% and diabetes 7.7% and hypercholesterolemia 35.6%. We found that the risk factors for hypertension, diabetes and obesity were increasing with age, but they are also prevalent and in young ages. Educational attainment is still a strong predictor of health behaviour. We found the correlation between educational status and prevalence of all risk factors. Marital status has also the significant impact of all risks factors except physical inactivity. According to the place of residence, we found that the smoking and alcohol use is more prevalent in urban areas. Hypertension and raised blood glucose in rural areas. The prevalence of alcohol consumption, hypertension, diabetes and obesity and overweight was

moderated by income. In prevalence of smoking, alcohol consumption, physical inactivity, overweight and obesity has significant impact gender. The prevalence of risk factors for chronic diseases in Kosova is higher compared to other states and was moderated by socio-economic determinants education, marital status, residence and income. Multi-sectorial approach to reducing the impact of chronic non-communicable disease on morbidity and mortality in Kosova is imperative over the next decade.

Keywords: risk factors, chronic diseases, Kosova, adults

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11. CURRICULLUM VITAE

Sanije (Lan) Hoxha - Gashi was born on December 6, 1969 in Gjakova, Republic of Kosova. She graduated in the Medical Faculty, University of Prishtina in 1988 with average grade 8.72. On the last year of the study was announced by the University of Prishtina as "Distinguished Student". Immediately after graduation she worked as a doctor at the Medical Center "Isa Grezda" in Gjakova. In 1997 she was accepted as assistant on Health Statistics and Informatics at the Medical Faculty University of Prishtina where is still working. In 2005 has finished master degree in Public Health and Epidemiology in Medical Faculty Univeristy of Prishtina. In 2011 has finished second master degree in Health Management organized by the Medical Faculty and the Economic Faculty, University of Prishtina. In 2003 has completed his specialization in Social Medicine. Since 1999 she has been working at the National Institute of Public Health of Kosova in Prishtina. From 2012 is working as Director of Department of Health Information at the National Institute of Public Health of Kosova. In 2009 has enrolled in PhD studies program in English at the School of Medicine University of Zagreb. She is the author and coauthor of several scientific and professional works. She is married and is a mother of one son. She lives in Prishtina.