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LIST OF ABBREVIATIONS

Term	Meaning
ADL	Activities Of Daily Living
AIDS	Acquired Immunodeficiency Syndrome
ANOVA	Analysis Of Variance
ANOVA	Analysis Of Variance
AUS	Alcohol Use Disorders
BMI	Body Mass Index
CHD	Chronic Heart Disease
CMS	Credit Mobile Students
CVD	Cardiovascular Diseases
DALY	Disability-Adjusted Life Years
DM	Diabetes Melitus
DMS	Degree Mobile Students
ENDS/ENNDS	Electronic Nicotine And Non-Nicotine Delivery Systems
EU	European Union
FV	Fruits And Vegetables
GDP	Gross Domestic Product
GMF	Global Monitoring Framework
HED	Heavy Episodic Drinking
HIC	High-Income Countries
HIV	Human Immunodeficiency Virus
NCD	Non-Communicable Disease
NHIS	National Health Interview Survey
QALY	Quality-Adjusted Life Years
SMS	Short Message Service
UNESCO	United Nations Educational, Scientific And Cultural Organization
USA	United States Of America
WHO	World Health Organisation

INTRODUCTION

1. The actuality of the non-communicable diseases (NCDs) global burden

Non-communicable diseases (NCDs) are the leading public health challenges globally in the twenty-first century, resulting in ill health, economic loss, life loss, diminished quality of life, and poor social development equally in both high-resource and low-resourced countries. According to the World Health Organisation Global Status Report on the non-communicable disease, from 38 million deaths due to NCDs each year, more than 40% were premature and were preventable [1]. Based on the projection of the WHO, by 2025 NCDs will account for over 70% of all deaths globally, with 85% of these occurring in developing countries. Evidence shows that if proper prevention approaches are not designed and applied, an estimated 41 million people in low-resource countries will die from NCDs by 2025, mainly due to cardiovascular diseases (CVDs) (48%), cancers (21%), chronic respiratory diseases (12%), and diabetes (3%) [2].

Globally, more than 9 million deaths occurred due to NCDs in people under the age of 60, with most being preventable. Untimely losses from NCDs range from 22% amongst men and 35% amongst women in low-resourced countries to 8% amongst men and 10% amongst women in high-resourced countries. According to current research, more than 80% of heart diseases, stroke, hypertension, and type 2 diabetes, and over a third of cancers can be prevented by eradicating the common risk factors, mainly tobacco use, unhealthy diets, physical inactivity, and the harmful use of alcohol. The effective prevention and management of common NCDs risk factors require the establishment of a strategic framework that can tackle health problems associated with the growing burden of morbidity and mortality of these diseases [3]. According to evidence by the WHO, globally, NCDs deaths will increase by 17% over the next 10 years, with the most considerable increase being in low-resource countries such as Africa (27%) and the Eastern Mediterranean region (25%). Current research indicates that cancer, diabetes, high blood pressure, cardiovascular diseases, and kidney diseases are no longer the illness of high-resourced countries, but also, non-communicable disease hampers the people and the economies of the deprived populations even more than communicable diseases, representing a public health emergency in slow motion [4].

The most common, costly, and preventable health problems are chronic diseases, principally heart disease, stroke, cancer, diabetes, and injury. About one-third of adults and one-fifth of young people are obese. Diabetes is the leading cause of blindness, kidney failure, and lower-limb amputations among adults. Lifestyle factors of physical inactivity, poor nutrition, tobacco usage, and excessive alcohol consumption are responsible for many of the effects of

chronic disease illness, and death. Medically manageable conditions are a major factor in high morbidity and mortality from NCDs; an estimated 45 % of cardiovascular deaths can be attributed to elevated blood pressure, 16 % to high cholesterol, and 13 % to high blood sugar. The challenges of addressing these issues are for each individual, family member, caregiver, insurer, school, academic institution, food producer and marketer, employer, union and professional organization, government and non-governmental organization (NGO) concerned with societal responsibility. Social policies and public health interventions can be very effective in reducing these risk factors, as seen in smoking bans and reduction.

Poverty, and education among the poor, is one of the central issues because of their pervasive effects on social skills and lifestyle issues. The eight key risk factors – alcohol use, tobacco use, high blood pressure, high body mass index (BMI), high cholesterol, high blood glucose, low fruit, and vegetable intake, and physical inactivity – account for 61 % of loss of healthy life years from CVD and 61 percent of cardiovascular deaths. These risk factors are linked to social and economic conditions in which poverty is a crucial factor. Typically, poor people smoke more and have lower quality diets because of a lack of opportunities for choice. These factors, alone or in combination, are implicated in many leading cancers. Worldwide, tobacco use causes 71 % of lung cancer deaths. Tobacco, physical inactivity, and overweight are quickly replacing the traditional risks and leading to a double burden in low- and middle-income countries.

The common NCDs account for most of the avoidable morbidity and preventable mortality, these being cardiovascular disease, coronary heart disease, high blood pressure, diabetes, and obesity. The percentage of mortality associated with the major NCDs across three regions of the world, such as high-resourced countries, low-resourced countries, and Africa varies. In high-income countries, the percentage of mortality related to NCDs such as cardiovascular disease, coronary heart disease, high blood pressure, diabetes, and obesity decreases, whilst in low-resourced countries and Africa, it continues to raise. For instance, the percentage of mortality due to cardiovascular disease is 38% in high-resourced countries and 42% in low-resource countries, from which 20% is the share of Africa [5].

In low-resource countries, the largest percentage of mortality (70%) is due to coronary heart disease with Africa's share of 10%. In high-resourced countries, coronary heart disease accounts for 20% of mortality. The share of high blood pressure is 46% in Africa, exceeding the total percentage of deaths in low-resourced countries (40%). In high-resourced countries, high blood pressure accounts for a relatively lower 35% of mortality [6]. The percentage of mortality as a result of diabetes is 8, 12, and 14% in high-resourced, low-resourced countries, and Africa,

respectively [7]. The percentage of deaths due to obesity is 29.5% in high-resourced countries and 37.5% in low-resource countries with the share of Africa 33% [8].

The high-income populations, particularly those in Europe and North America, are increasingly ethnically diverse due to migration. A themed issue called “Closing the Gap in Travel Medicine” on neglected subpopulations of travelers [9] was published in the *Journal of Travel Medicine* 2017 with a special focus on migrant health [10]. Evidence suggests that NCD rates differ between migrants and the host populations in HICs [11].

The Organization of Economic Cooperation and Development defines international students as individuals who are typically in early adulthood and travel to countries other than their own to pursue tertiary studies. In 2009, more than 2.5 million students were studying outside of their home countries; this number is expected to reach approximately 7 million by the year 2020 [12].

International students generally experience more difficulties adapting to college life abroad than they would in their home countries [13]. Problems in this regard include homesickness, unfamiliar foods, language barriers, health and financial issues, future career plans, relationships with peers, everyday life, religion, discrimination, and differences in the education systems. The stress associated with adaptation includes physical, psychological, and social aspects that are often accompanied by specific stress behaviors and physical symptoms [14].

The university or tertiary study period coincides with the late stage of youth and/or the initial stage of adulthood. At this stage, students are no longer dependent on their parents and families and therefore assume responsibility for managing their health. If they are unaware of the importance of health at this stage and continue to engage in risky behaviors such as incorrect eating habits, lack of exercise, smoking, and drinking, the foundations of their health during adulthood may be threatened.

Cardio-metabolic risks may be influenced by both genetic factors and lifestyle choices. Whilst genetic factors cannot be modified, lifestyle risk factors such as smoking, exercise, and dietary intake can be modified. Many previous studies have suggested health-promoting lifestyles as an important component of preventing and/or reducing the incidence and prevalence of cardio-metabolic diseases and associated complications [15]. Increased cardio-metabolic risks can lead to various chronic diseases (i.e. diabetes, hypertension, heart attack, and stroke); these diseases require lifetime management, constitute socioeconomic problems, and have significant impacts on an individual’s quality of life and productivity [16]. A health-promoting lifestyle in early adulthood can be sustained throughout life; therefore, it is preferable to develop a healthy lifestyle rather than reversing undesirable health behaviors at a later stage.

There is a limited amount of research regarding health-promoting lifestyles and cardio-metabolic risks among international students in Eastern European countries such as the Republic of Moldova. There is insufficient information to determine the components required to establish a university health policy aimed at improving the health care of international students in this country. Moreover, little is known about the extent to which these students engage in health-promoting lifestyles associated with cardio-metabolic risks. Therefore, this study aimed to examine health-promoting lifestyles and cardiometabolic risk factors among international students in the Republic of Moldova.

2. Purpose and objectives of the research

Purpose:

To study and evaluate the spreading of different risk factors for non-communicable diseases among international students and to develop some preventive measures.

Objectives:

1. To study and analyse bibliographical sources concerning risk factors for main NCDs, including among international students.
2. Based on bibliographical sources, to evaluate the differences in prevalence and structure of risk factors for NCDs between domestic and international students and to assess the role of individual factors and the methods of prevention of these diseases among international students.
3. Using the questionnaires to analyse and evaluate the prevalence of risk factors for NCDs among international students in the Republic of Moldova.
4. To study, analyse and evaluate the prevalence of risk factors for NCDs among domestic students.
5. To compare and evaluate the results obtained in international students with the results obtained in domestic students
6. To draw up conclusions and to develop recommendations directed to the the prophylaxis of NCDs among international students.

The practical importance of the work

The studies reveal the spread of various risk factors for NBT among international students. Because at the same time the spread of risk factors for these diseases has been studied, the difference can be clarified. Together with the results obtained directly from the questioning of international students, the analysis of data obtained from local students, comparison and

evaluation of all results, but also the analysis of bibliographic sources allow to draw objective conclusions and draw some measures to improve the situation.

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THE BIBLIOGRAPHIC ANALYSIS OF THE THEME

1. Definition and epidemiology of NCDs

Communicable diseases are those caused by specific pathogens and may be transmitted from an infected to an uninfected host, but this process is influenced by the physical, social, and economic environment. Non-communicable diseases (NCDs) are mostly due to societal conditions and lifestyle habits such as poor nutrition, smoking, excess alcohol, and lack of physical exercise. Degenerative, genetic, hereditary, and environmental conditions are also important factors. Some conditions are caused by infectious diseases, such as acquired immunodeficiency syndrome (AIDS) due to human immunodeficiency virus (HIV) infection, peptic ulcers being due to *Helicobacter pylori*, and chronic liver disease due to hepatitis B and C viruses. Chronic conditions may have a multiple-factor model of causation, as exemplified by cardiovascular diseases (CVDs) and diabetes, with the interactions of genetic tendencies and socioeconomic and behavioral factors. The World Health Organization (WHO) estimates that 150 million people suffer from catastrophic health care costs each year due to NCDs, with the problems being more frequent and severe in low- and middle-income countries.

NCDs are the major issues of public health, although sanitation, food safety, and infectious disease control are still potent issues. In lower-income countries, the additional burden of infectious diseases and child health, and nutritional challenges increase the vulnerability to all diseases and long-term effects. Other fundamentals of public health are at the same time facing the association of poverty with NCDs, which now serve as major causes of mortality.

The gradual shift in predominance from infectious diseases to NCDs is often referred to as the “epidemiological transition” which has occurred gradually over the twentieth century with sanitation, food safety, and other basic public health measures. Vaccines and antibiotics, along with improved living standards, sanitation, nutrition, and safe water, brought about a reduction in mortality rates from infectious diseases with an increase in life expectancy. Infectious diseases, while still important, are no longer the primary concerns in public health in the developed countries, and similar trends are appearing in the developing countries.

NCDs accounted for an estimated 40.5 million (71%) of the 56.9 million worldwide deaths in 2016, and for an estimated 17 million (57%) of the 29.8 million deaths in people less than 70 years of age—the age commonly used to define premature death [17]. NCDs were responsible for a substantial share of deaths in people of all ages, except very young people, accounting for at least 25% of all deaths in every age group above 10 years, and for more than half of deaths in age groups above 40 years (**figure 1**). Women in 164 countries (88% of all countries) and men in 165 (89%) countries were estimated to have a higher probability of dying

prematurely (before 70 years of age) from NCDs than from communicable, maternal, perinatal, and nutritional conditions combined (**figure 2**).

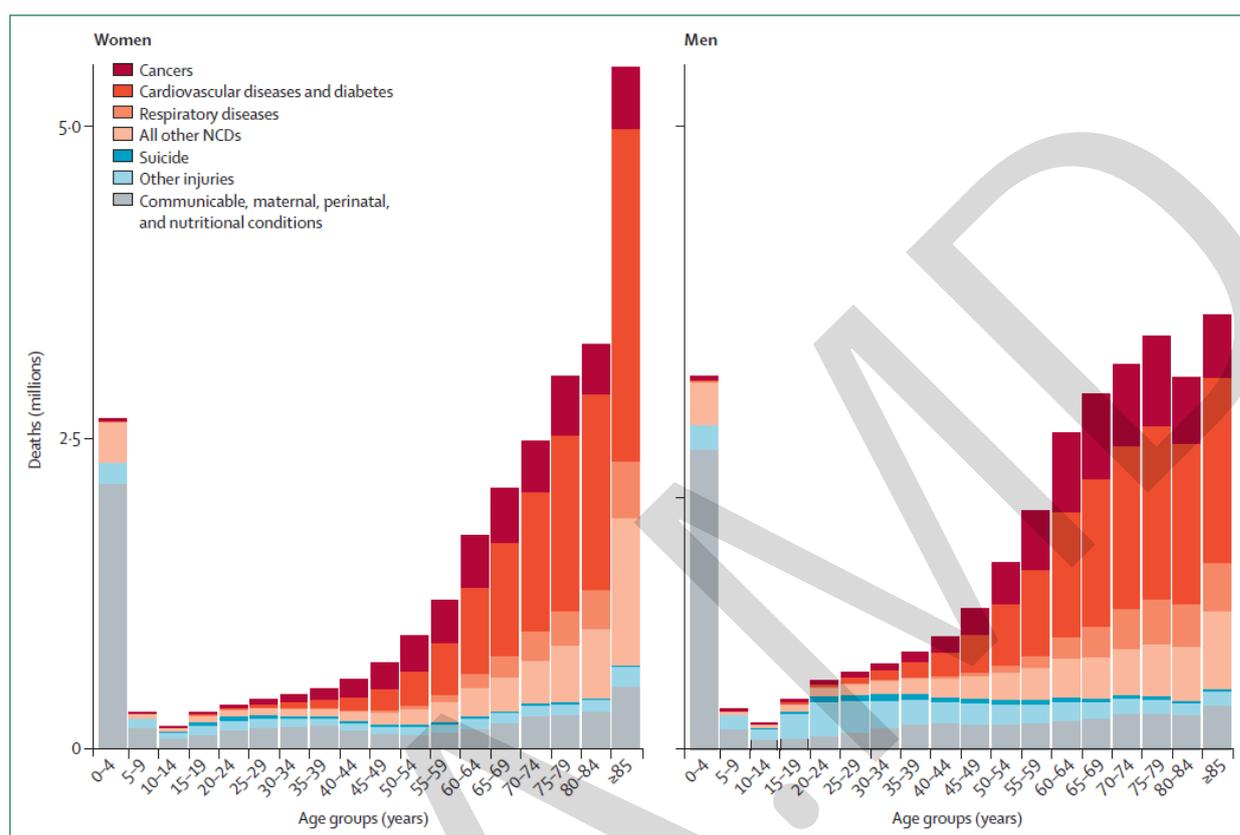


Figure 1: Number of deaths in 2016 from non-communicable diseases (NCDs), injuries, and communicable, maternal, perinatal, and nutritional conditions

CVD, diabetes, cancer, and chronic respiratory diseases are the principal NCDs. In the European Region, these four groups of diseases 86 percent of deaths and 77 percent of the disease burden. For low-income countries, lower respiratory tract infections, diarrheal disease, HIV/AIDS, malaria, tuberculosis, low birth weight, and birth trauma are among the top 10 causes of death, but ischemic heart disease and stroke rank as the fourth and sixth leading causes. But even in Africa, NCDs are projected to be the most common cause of death by 2030. In middle-income countries, ischemic heart disease, stroke, and chronic obstructive pulmonary disease (COPD) are the leading causes of death. The low-and medium-income countries suffer the double burden of high morbidity and mortality from infectious diseases as well as NCDs. In high-income countries, NCDs are the leading causes of death. Among them are ischemic heart disease, stroke, cancers, Alzheimer’s disease, COPD, colon and rectal cancer, diabetes mellitus, hypertensive heart disease, and breast cancer – all with high potential for preventive care and public health measures.

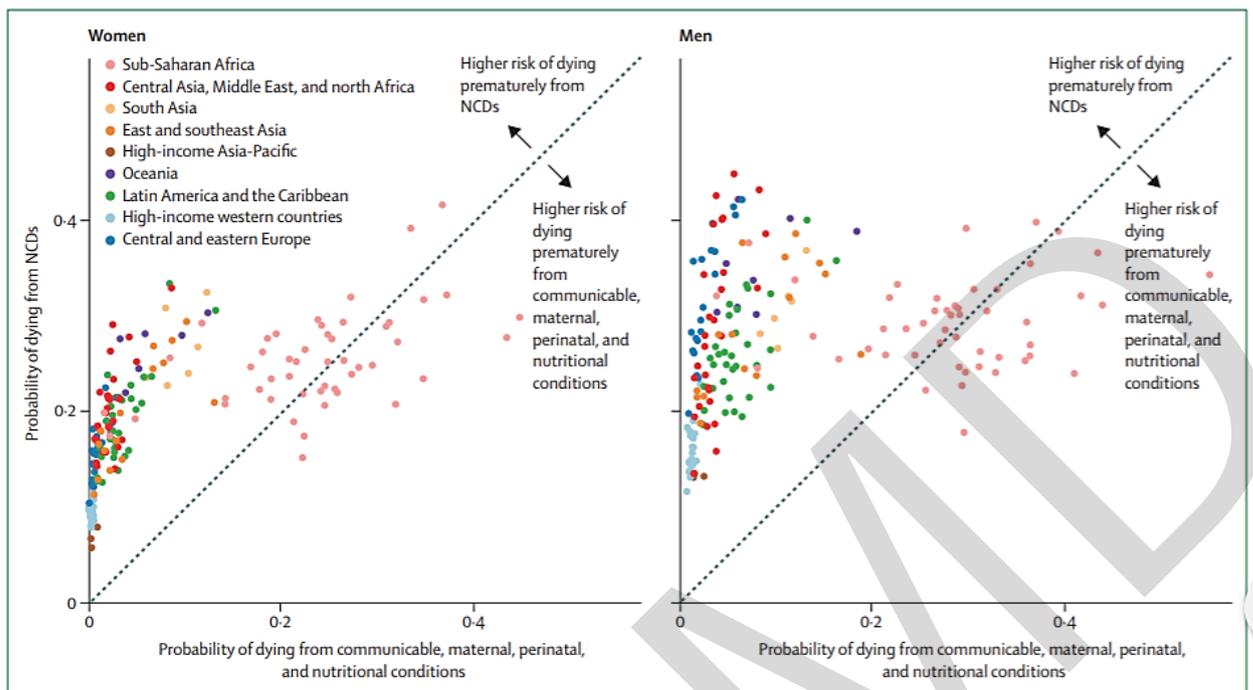


Figure 2:: Comparison of the probability of dying prematurely (ie, between birth and 70 years of age) from non-communicable diseases (NCDs) with that of dying from communicable, maternal, perinatal, and nutritional conditions

All probabilities are calculated in the absence of competing causes of death. Each point shows one country. In countries lying above then dashed line, there is a higher probability of dying prematurely from an NCD than from communicable, maternal, perinatal, and nutritional conditions, and vice versa.

CVDs, principally coronary heart disease and stroke, are the leading cause of death, with more than 13 million deaths worldwide; this figure is predicted to decrease in high-income countries whilst increasing steadily in mid-and low-income countries. More than 36 percent of deaths are caused by the principal chronic diseases such as CVD, diabetes mellitus, cancer, and chronic respiratory diseases. With 3.6 percent of world deaths, AIDS/ HIV survival time has increased to 11 years with advances and success in the management of the disease and is thus beginning to show features of chronic disease. Globally in 2002, of the 54 percent of years of life lost, 33 percent were due to NCD and a further 13 percent to injuries. Even in low-income countries, 30 percent of years of life lost were from NCD and injuries.

Chronic diseases as the leading cause of morbidity and mortality are associated with several demographic and epidemiological factors. First, the decline in infectious disease mortality has resulted in greater longevity, increasing the number of people surviving to ages when cancer and heart disease are more common. Second, changes in lifestyle such as smoking, lack of exercise, diets rich in unhealthy fats and sugars, and risk-taking behavior, have increased risk factors, thus influencing CVD and cancer to become the leading causes of disease, disability, and death. Third, trauma and chronic diseases are major contributors to rising costs of health care. Fourth, public health experience and new scientific knowledge are leading forms of prevention and medical treatment that are reducing the burden of disease and disability from

chronic conditions. Poverty and illiteracy are increasingly recognized risk factors for NCDs in an increasingly globally mobile population.

Globally, coronary heart disease, cancer, and cerebrovascular diseases are expected to continue increasing up to 2030, with respiratory disease remaining a leading cause but expected to decline. The lessons learned from the decline in coronary heart and cerebrovascular disease mortality seen in the upper-income countries since the mid-1960s offer hope to reduce the current increase being seen in middle and lower-income countries. HIV and tuberculosis mortality is also expected to decline. Road traffic accident mortality is predicted to continue to rise. NCDs as a cause of mortality is projected to remain a major cause of death in low- and middle-income countries over the next two decades.

Despite the many challenges, there is great potential for socially oriented health promotion along with individual and population primary, secondary, and tertiary prevention to reduce mortality and disability as well as the burden of disease and disability. The New Public Health stresses all aspects of prevention and care and is therefore increasingly required as a broad approach to this wide group of conditions and the needs associated with them.

2. Risk factors for the main NCDs

The four leading NCDs (cardiovascular diseases, cancer, respiratory diseases, and diabetes) share four risk factors: tobacco use, harmful use of alcohol, unhealthy diet, and physical inactivity. These in turn lead to other key metabolic/physiological changes such as raised blood pressure, overweight/obesity, raised blood glucose, and higher cholesterol levels [2]. The status of the key modifiable and biological risk factors that contribute to NCDs in the Region is presented in the following.

2.1. Harmful use of alcohol

The harmful use of alcohol contributes to over 200 health conditions, the majority of which are NCDs, including cancers, cardiovascular diseases, and liver cirrhosis. For most diseases and injuries caused by alcohol, there is a dose-response relationship: the higher the consumption, the larger the risk for a negative consequence [2].

Europe is the heaviest drinking region in the world with 10.9 liters of pure alcohol per person (15+ years). This is near twice the world average and drinking patterns vary considerably across the region. On average, adult per capita consumption decreased between 1990 and 2010 overall in the EU, Norway, and Switzerland by 12.4%. This was mainly due to a reduction in consumption in southern European countries that started before 1990. The central-western and western country groups also showed an overall decline in consumption. The largest decline in

consumption between 1964 and 2014 was observed in southern Europe, notably in France and Italy of pure alcohol per capita. In the same period, several countries have increased consumption, namely Finland, Norway, Poland, and the UK of pure alcohol per capita. Economic development, cultural changes, availability and affordability of alcohol, and the level and effectiveness of alcohol policies are all relevant factors in explaining differences and historical trends in alcohol consumption and related harm.

In the Americas, alcohol is a significant public health problem. It is the WHO Region with the second-highest levels of alcohol per capita consumption (APC) and heavy episodic drinking (HED) in the world. The average APC among those aged 15 years and older in the Americas is 8.4 L, compared to 6.2 L globally. APC among all drinkers is 18.0 L for males and 8.0 L for females, indicating that those who drink do so at high levels.

At the same time, certain patterns of consumption are particularly significant in determining many of the harmful effects of alcohol: the volume of alcohol consumed on a single occasion is linked to acute consequences such as alcohol poisoning, violence, and injuries. The prevalence of HED (60 g of pure alcohol at least once a month) is estimated to be 13.7% in the Americas and 22% among drinkers (1 in 5 drinkers); each occasion is associated with a high risk for an acute consequence, and the higher the frequency of these occasions, the higher the risk of chronic disease including cancers, liver cirrhosis, and alcohol use disorders (AUD). The prevalence of HED among the general adult population is especially high in Paraguay and Dominica [18].

The prevalence of AUD is one reflection of the negative health harms attributable to alcohol consumption. This indicator is commonly used as a proxy for alcohol-related morbidity and mortality. The prevalence of AUD among women in the Region is the highest in the world [2]. Men and women, across all age groups, show differences in the prevalence of HED. As with total consumption, men are much more likely than women to engage in HED. Youth, too, are generally much more likely than adults to engage in risky alcohol-consumption patterns, following the same gender pattern. HED prevalence among all adolescents 15–19 years of age is the second largest in the world (29.3% of males and 7.1% of females), after Europe. In the Region of the Americas, Canada and Chile have the highest prevalence. Besides, the majority of adolescents aged 13–15 years, boys and girls, report alcohol consumption starting before the age of 14 years, which places them at a higher risk of escalating their drinking as they age and of developing an alcohol use disorder later in life.

2.2. Insufficient physical activity

Worldwide industrial expansion and an increased service sector have resulted in less work-related physical exercise, whilst at the same time, modern technology has also made it increasingly convenient to remain sedentary. Many people lead a life with little or no physical exercise, and their leisure time is often spent on sedentary activities such as live online chats, playing computer games, and watching television, with 60% of the world's population being estimated to lead a sedentary life [19].

Research indicates that low-resourced countries are experiencing rapid nutritional transitions, lifestyle changes, and epidemiological transition following modernization, westernization, and increased reliance on technology. As a result, more time is available to pursue leisure activities, which leads to lifestyle diseases such as cardiovascular disease, diabetics, hypertension, overweight, and obesity [20].

Naturally, the human body is designed for movement; however, planned strenuous physical exercise is not a part of the normal lifestyle. Furthermore, an individual cannot expect his/her body to function optimally and to remain healthy for extended periods if it is abused or is not used as intended [20].

Research shows that physical inactivity is the most critical public health problem in the twenty-first century. For many years, scientists and health and fitness professionals have advocated regular physical exercise as the best defense against the development of many diseases, disorders, and illnesses [20]. Due to the recognized health benefits, it has, and the importance of maintaining a good quality of life, regular physical exercise received recognition in the first U.S. surgeon general's report on physical exercise and health. In this report, physical exercise was identified as a national health objective and recognized physical inactivity as a nationwide severe health problem; it provided clear-cut scientific evidence linking physical activity to numerous health benefits and presented demographic data describing physical exercise patterns and trends in the U.S. population. It also made physical exercise recommendations for improved health [1].

2.3. Salt/sodium intake

Hypertension and cardiovascular diseases are associated with increased consumption of dietary salt/sodium. High levels of salt/sodium consumption contribute to approximately 30% of hypertension cases (9, 10). WHO recommends reducing salt intake to less than 5 g/day (equivalent to 2 g/day of sodium) to reduce blood pressure and the risk of coronary heart disease and stroke [2,21].

Current estimates suggest that the global mean intake of salt is around 10 g of salt daily (4 g/day of sodium) [21]. The salt consumption among adults in most European countries ranges from 7 to 13 g per day according to the European Commission data. Germany, Cyprus, Bulgaria, and Latvia reported the lowest salt intake (6.3–7.3 g/day), whereas the Czech Republic, Slovenia, Hungary, and Portugal reported the highest salt intake (12.3–13.6 g/day) [22].

Among countries in the Americas where data are available, the salt intake was found to vary but be very high. In the United States and Canada, the average daily salt intakes per person are 8.7 and 8.5 g, respectively. In Latin America, Argentina's average salt intake per day per person is 12 g, Brazil's is 11 g, and Chile's is 9 g [22].

Studies have shown that in developed countries, processed foods contribute the most to salt consumption, while in some countries like Brazil, the evidence shows that salt added at the table or while cooking largely contributes to the amount of salt intake for that population [23].

2.4. Tobacco use

Tobacco use is a common risk factor for cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes. It also has a causality link to many other diseases and adverse health effects [24]. Implementing tobacco control policies will have a positive impact in lessening the burden of NCDs. In 2013, the age-standardized prevalence estimate for current tobacco smoking among persons aged 15 and older in the Americas was 17.5%⁴, with males smoking more than females [25]. Although the gender gap varies widely between countries, there are countries such as Canada, Chile, and the United States of America where this gap is narrowed with an absolute difference in the prevalence of current tobacco smoking among males and females of just 4% to 5% [25].

Among students 13–15 years old, the prevalence of current tobacco use is especially worrying. In the Americas, 13.5% of this cohort currently use tobacco (14.7% male and 12.3% female). The highest prevalence was found in Non-Latin Caribbean countries (23.2%) and in the majority of countries from the Southern Cone (21.7%) subregion.⁵ There is a characteristic in the pattern of consumption in adolescents that needs to be highlighted. In this population, the gap among males and females is limited in most of the countries in the region, with 5% or less absolute difference, but in some countries, such as Chile (male 19.8% and female 27.8%) and Uruguay (male 12.7% and female 12.5%), females are using more than males or have a similar pattern of tobacco use as males [25].

The consumption of novel smoking methods such as electronic nicotine and non-nicotine delivery systems (ENDS/ENNDS) and other tobacco products such as water-pipes and smokeless tobacco is growing in the Region, where smoking manufactured cigarettes were most

common in the past. Therefore, surveillance systems should include the monitoring of ENDS/ENNDS products, and more research is needed to understand the public health consequences of their use.

Studies have shown that a decline of 50% by 2025 in the prevalence of tobacco use as defined by the Global Monitoring Framework (GMF) targets and indicators can avert many deaths and consequently improve health outcomes at the Regional and global level [26].

3. Main NCDs

3.1 Raised blood pressure

Raised or high blood pressure, commonly known as hypertension, continues to harm mortality and the development of cardiovascular diseases and other NCDs, both globally and in the Americas. Uncontrolled raised blood pressure and/or hypertension can cause stroke, myocardial infarction, cardiac failure, dementia, renal failure, and blindness. Among all of the diseases related to hypertension, the heaviest burden is on cardiovascular diseases (CVDs). Tackling hypertension will avert many diseases, disabilities, and deaths [27].

In 2014, the age-standardized prevalence of raised blood pressure⁶ in the Americas was lower (18.7%) compared to the global prevalence of 22%. Among countries in the Americas, the prevalence of raised blood pressure varied from 13.3% in Canada to 23.3% in Brazil, in 2014. In all countries of the Region, males have a higher prevalence than females, but there are subregions⁷ such as the Central American Isthmus (Male: 23.7%, Female: 21.0%), Latin Caribbean (Male: 25.1%, Female: 22.1%), and the Non-Latin Caribbean male 23.7% and female 21.0%), Latin Caribbean (male 25.1% and female 22.1%), and Non-Latin Caribbean (male 24.7% and female 20.4%) where the gap between males and females is narrower [25].

Hypertension assessment and management is critical for the prevention and control of CVDs (22). Not addressing hypertension in a timely fashion will have significant economic and social impacts since the number of people affected by hypertension has been predicted to rise by 2025 [28].

3.2 Raised blood glucose/diabetes

Raised blood glucose is a common effect of uncontrolled diabetes and may, over time, lead to serious damage to blood vessels, eyes, kidneys, and nerves, and increase the risk of heart attack and stroke (24). It was estimated that, in 2014, around 422 million adults aged over 18 years were living with diabetes worldwide, with 62 million (15.0%) of them living in the Americas.⁸ This number has tripled in the Region since 1980 [29].

In 2014, 68% of the adult population with diabetes in the Americas lived in just three countries: the United States of America (22.4 million), Brazil (11.7 million), and Mexico (8.6 million). The largest rise in the number of people living with diabetes from 1980 to 2014 occurred in Mexico (five times higher) and Brazil (four times higher). In the United States of America, the increase was almost three times higher during the same period, but still lower compared to the increases in Brazil and Mexico. The overall prevalence of raised blood glucose in the Americas increased from 5.0% in 1980 to 8.3% in 2014 (8.6% males and 8.4% females) [30].

The increase in the prevalence of diabetes may be explained as a result of the population growth and aging, the rise in age-specific prevalence, or a combination of these two aspects. The associated risk factors of overweight and obesity, together with insufficient physical activity, are estimated to cause a large proportion of the diabetes burden [31].

3.3 Overweight and obesity

Obesity increases the likelihood of diabetes, hypertension, coronary heart disease, stroke, certain cancers, obstructive apnea, and osteoarthritis. It also negatively affects reproductive performance. The link between obesity, poor health outcomes, and all-cause mortality is well established [32].

Regarding obesity (BMI \geq 30 kg/m²), the prevalence in the Americas in 2014 was more than double the global average (26.8% versus 12.9%), with females having a higher prevalence (29.6%) than males (24.0%). Obesity poses a major health problem throughout the Region. The highest prevalence of obesity was found in the Bahamas (36.2%), the USA (33.7%), Canada and Mexico (28.0%), and Chile (27.8%) [33].

A study on pooled population-based data to determine trends from 1975 to 2014 reported the 10 countries with the largest obesity populations worldwide. Among these top 10 countries, the USA, which ranked first in 1975, ranked second in 2014, with 87.8 million obese people (41.7 million males and 46.1 million females). Brazil ranks third (29.9 million total), and Mexico is sixth (22.8 million total) globally. In both countries, the number of obese females is almost double that of males [34].

The prevalence of overweight and obesity in children has become a major problem in the Americas. The main reasons for this are changes in lifestyle and the lack of policies promoting a healthy diet and physical activity. As a result, obesity among children and adolescents has reached epidemic proportions in the Americas. The latest estimates produced for the Region (2012) show a prevalence of 7.2% for overweight in children aged less than 5 years¹⁰ (1). For school-going adolescents (13-15 years), the prevalence of obesity ranges from 21.0% in the

Bahamas to 4.1% in Guyana. The data presented for overweight and obesity show that this is a major public health problem that requires urgent action.

In the Americas in 2014, the age-standardized estimate for the adult (18 years and over) prevalence of overweight and obesity (with a body mass index [BMI] ≥ 25 kg/m²) was 61.0% (62.8% for males and 59.8% for females). The Americas ranks as the WHO Region with the highest prevalence of overweight and obesity (29, 30). In the Region, the countries with the highest prevalence of overweight and obesity are the Bahamas (69.0%), the United States of America (67.3%), Canada and Mexico (64.4%), and Chile (63.1%) [33].

4. The social and economic burden of NCDs

Chronic conditions place a heavy burden on the individual, the family, and society as a whole in terms of morbidity and mortality as well as in health costs. Measurement of the burden of disease is a fundamental responsibility of public health agencies. Health expenditures as a percentage of Gross Domestic Product (GDP) comparing high- and medium-income countries vary widely. The economic burden for health care of the population, whether funded by national responsibility, as in most industrialized countries or by a mix of public and private expenditures, is an important factor in national economies. As chronic disease and aging of the population both rise, so will the burden of the disease become increasingly important in economic as well as in health terms. The cost of individual disease groups can be enormous [35].

The American Heart Association reports the cost of CVD in the USA in 2010 at an estimated US\$444.0 billion (representing \$1 of every \$6 spent on health care). The direct costs of health services include those for physicians and other professionals, hospital and nursing home services, medications, home health care, and other medical durables, as well as lost productivity resulting from morbidity and mortality (indirect costs). With the aging of the population, the economic burden of caring for these diseases will grow rapidly, thus prevention is essential in reducing this financial burden on society and individual families.

As a comparison, in 2010 the estimated cost of all cancers was US\$263.8 billion (US\$102.8 billion in direct costs, US\$20.9 billion in indirect morbidity costs, and US\$140.1 billion in indirect costs associated with premature mortality). Between 1990 and 2007 death rates in the USA declined by 22 percent in men and 14 percent in women, equivalent to avoiding nearly 900,000 cancer deaths. Less quantitative and more difficult to calculate is the burden of disease on the individual, the family, and the community.

Traditional measures of morbidity and mortality are supplemented by quality-adjusted life-years (QALYs) and disability-adjusted life years (DALYs), but the physical and emotional burden of caring for someone is almost impossible to determine quantitatively. The burden of

chronic disease on the individual is reflected in his or her ability to function in the normal activities of daily living (ADLs). The level of function of a person with a chronic condition is measured by his or her ability to perform ADLs.

Chronic conditions often result in disabilities that impede capabilities in normal daily functions or activities. ADLs measure the degree of independent capacity the patient has about personal care, household management, and socializing. These measures help to determine the level and amount of home care required or the type of facility necessary for the patient. While ADL measures the function of a patient, it does not address the emotional, physical, and financial stress on the caregiver in a family. Self-perception of health status is important and is part of periodic surveys conducted by the US National Center for Health Statistics Summary Health Statistics for the US Population: National Health Interview Survey (NHIS), 2006 Series.

It is estimated that 75 percent of total health care costs can be attributed to patients with one or more chronic conditions that can be prevented. More than one-third of Americans have at least one type of CVD – 935,000 have CHD and 795,000 have had a stroke – with total costs of nearly US\$300 billion. Of the 68 million with high blood pressure and the 71 million with high cholesterol, more than half represent uncontrolled cases. In many health care systems, the compensation structure for services focuses more heavily on diagnosis and treatment than on other health promotion and preventive measures, which serve as key components in containing health care service costs.

5. Health promotion in prevention of NCD

Health promotion and prevention programs built around evidence-based strategies are vital to contain risk factors and reduce the toll of NCDs. Population- and community-based strategies aim at increasing healthy behaviors, reducing the disease burden, and lowering death rates. DALYs are an indicator of the impact of premature avoidable death on society. There is increasing awareness of the effectiveness and success of efforts that focus on the common, parallel risk factors associated with the leading NCDs, in contrast to a vertical method of approaching each disease individually. Leadership is required at all levels, especially national government. In the USA, the Healthy People 2020 framework provides for all stakeholders in health issues to work towards defined targets, and this has a “trickle-down” effect reaching state and local government, health insurance agencies, health care providers, and individuals [35].

In Europe, the term “Health in All Policies” has become widely accepted in trying to spread the tasks of public health among all governments (national, state, and municipal), as well as among commercial and charitable organizations and across all social agencies and activities. This approach also places stress on the role of the individual in protecting his or her health with

positive health behaviors and attention to preventive care activities such as immunization, healthful diet, and physical activity, with less risk-taking such as smoking, alcohol overuse, and unsafe driving and pedestrian behavior. The role of municipal governments in urban planning for healthy urban environments is a key component of this, as are state and federal government promotion, regulation, and supportive programs for population and individual health behaviors [35].

6. Factors influencing the quality of NCDs prevention

Different factors predict healthcare systems' capacity to prevent NCDs and their related risk factors. These predictors are determinants of NCDs prevention including the level of physical exercise, dietary choice, organized infrastructure, urbanization, and related policy, cultural norms, and accessibility of health information.

6.1. Dietary choice

Consumption of high levels of trans fats, saturated fats, processed and refined foods, sugar, salt, and sugary drinks is associated with an increased risk of CVD and diabetes, whilst adequate consumption of fruit and vegetables is associated with a reduced risk of coronary heart disease and stroke. Unhealthy diets tend to follow a socioeconomic gradient. Higher quality diets are associated with persons of greater affluence, whilst energy-dense nutrient-poor diets are associated with persons of more limited economic means [36]. Education and gender also impact diet, with unhealthy eating habits associated with lower levels of education. Moreover, low fruit intake represented a 50% greater share of the disease burden amongst men than women [37].

In low-resource countries, the wrong perceptions about body image contribute to consume unhealthy dietary sources such as high levels of trans fats, saturated fats, raw beef, goat meats, and fast foods. In some Asian and the majority of African countries, having a big, fat stomach is considered as being charismatic, powerful, healthy, and perceived as a sign of wealthy [38]. Following this perception, a more significant number (52%) of the public consumes high-fatty food substances which spontaneously results in acquiring NCDs [38]. It was shown that red meats, such as raw beef meat called "Kurt Siga", redraw ground beef with spices and yogurt called "Kitfo", and partially roasted meat respectively increased the risk of NCDs due to high-fat levels. This dietary practice is very customary amongst the diverse Ethiopian communities. Such unhealthy dietary practices are practiced mainly amongst wealthy community groups and high government officials [39]. Practicing these dietary choices frequently results in overweight, obesity, high blood pressure, kidney disease, and premature aging. Additionally,

food cooking oil known as “Hayat” and “Palm oil” which is in use amongst the majority of the Ethiopian is full of high cholesterol, and this can easily harm the health of the users [38].

Another unhealthy dietary practice frequently practiced amongst low-resourced populations, particularly in East Africa such as Ethiopia, Eritrea, Djibouti, Somalia, Kenya, Tanzania, and Sudan and Arab countries such as Saudi Arabia, United Arab Emirates, Yemen, Bahrain, Kuwait, and Oman, is “Khat chewing”. Khat is a leafy plant with natural amphetamine content and chewed by 20 million people each day in the Arabian peninsula and East African region mainly in Ethiopia. Khat chewing has incredible stimulation effects on chewers' nervous system and predominantly addictive. The practice of Khat chewing is frequent amongst university students, shop keepers, drivers, and the majority of the Muslim community, teachers, and some government officials [40]. Evidence shows that Khat chewing is associated with escalated degrees of cardiovascular complications, stroke, myocardial infarctions, cardiomyopathy, gastritis, poor oral hygiene, neurosis, poor academic performance, periodontal disease, and decreased quality of life [41].

6.2. Organized infrastructure

Within the healthcare framework, the availability of interrelated material and infrastructure are other determinants of healthcare. For NCDs, neighborhood environments broadly define the conditions in which people live and have a significant influence on the risk of NCDs [20]. A randomized control study in which mothers and families were allowed to move from a neighborhood with a high level of poverty to one with a lower level found that moving to a better-off neighborhood was associated with a reduction in NCDs. Multiple mechanisms have been proposed whereby the neighborhood environment affects the risk of NCDs, including interrelated material mechanisms [42]. These material mechanisms include the nature of the built environment, such as proximity to food outlets selling processed foods, as well as psychosocial mechanisms, such as conforming to social norms of behavior. Also, children living in unfavorable social conditions, unsafe surroundings, poor housing, and no access to sidewalks, parks, and recreation centers were 20–60% more likely to be overweight or obese compared with children not facing such conditions [42].

6.3. Urbanization and urban development policy

Urbanization is associated with an increased prevalence of NCD risk behaviors, which are increasing at a rapid rate. More than half of the global population lived in cities in 2010, a proportion expected to reach 60% in 2030 and 70% in 2050. In countries where rural-to-urban migration is commonplace, urban life may be less conducive to physical exercise than life in

rural areas. As countries develop, the sprawling nature of urban expansion and increased disposable income encourages mechanized transport and discourages walking and cycling. The nature of work available in urban areas may require less energy expenditure than subsistence farming in rural areas [42].

A study of physical activity concerning hypertension, obesity, and diabetes found that it was lower amongst rural than urban dwellers. The prevalence of obesity, diabetes, and hypertension was higher amongst the urban population, and physical inactivity amongst urban groups was associated with a higher BMI, blood pressure, and fasting blood glucose levels. NCD prevention and control may require that cities adopt models of urbanization that address the health impacts and inequities associated with city living [43].

6.4. Cultural norms

Evidence indicated that beliefs and norms amongst some social groups might include preferences for foods high in animal fat, which is socially acceptable or perceived as a sign of good health but result in overweight, obesity, hypertension, and health problems. Ethnographic studies found that amongst blacks in South Africa, Arabs in Niger, groups in rural Jamaica, Puerto Ricans in Philadelphia, and members of a Fijian village, big body size and fatness reflect wealth and prosperity, beauty, marriageability, attractiveness, fertility, and “closeness to God”, as is the case of Habesha in Ethiopia [44]. In contrast, much of the industrial West associate fatness with ugliness, undesirability, and lack of self-control, whilst associating slimness with health, beauty, intelligence, wealth, self-discipline, and “goodness”. There is some evidence that the Western slim-body ideal is becoming globalized, with thinness now being desired in many places where fatness was previously preferred. Moreover, the beliefs amongst those who idealize fatness may change when the associated health risks are explained [45].

6.5. Accessibility of health information

Health information is a tool that provides data to the healthcare system, which can be used to enhance, promote, improve, and create awareness about the health of a community. It is evidenced that health information systems are an essential tool for collecting data about the health conditions and indicators of a country to help with decision-making. It is documented that reliable health data that is collected, analyzed, and interpreted can assist policymakers, health organizations, the healthcare system, and healthcare providers in formulating appropriate disease preventive strategies. It has also been demonstrated that health data can be made available to the public through various health information channels, such as healthcare providers, counseling,

teaching, and advice; mass media, such as radio television, internet, social media; and telecommunication, such as mobile short message service (SMS) [46].

Despite the wide-ranging health benefits of health information, the attention given to addressing NCDs-related risk factors, morbidity, mortality, the health burden, and preventive mechanisms using the various sources of health information is inadequate in low-resourced countries. Similarly, the attention devoted to the accessibility of health information coverage is deficient in the healthcare system of developing countries [46].

7. Particularities of NCDs in migrant population

The HICs populations, particularly those in Europe and North America, are increasingly ethnically diverse due to migration. A themed issue called ‘Closing the Gap in Travel Medicine’ on neglected subpopulations of travelers was published in the Journal of Travel Medicine 2017 with a special focus on migrant health. Evidence suggests that NCD rates differ between migrants and the host populations in HICs.

The health of migrants can be assessed in three different ways: (1) by comparing the migrants with the host populations in the countries of settlement—ethnic inequality; (2) by comparing similar migrant populations living in different countries—the role of contexts, and (3) by comparing migrants with the population in their home countries—the role of migration [11]. By comparing migrant health to the host population, ethnic differences in disease occurrence can be studied. Comparing similar migrant populations in different countries provides information about the socio-economic, cultural, and geographic context, while by comparing migrants groups with the population in their home country the effect of migration itself on health outcomes can be studied.

Several studies have shown that the CVD incidence, prevalence, and mortality levels differ importantly between migrants and the host populations depending on migrant background, CVD type, and the destination country in which migrants live [47]. A recent systematic review by Sohail et al. described different patterns in the incidence of ischaemic heart disease (IHD) and stroke among migrants in Western Europe and North America [47]. The key findings from this systematic review were that the risk of IHD and stroke differed by country of origin, country of destination, and duration of residence. Most migrant groups in Western Europe either had a similar or higher risk of IHD and stroke compared with the host populations, particularly migrants from Eastern Europe, Middle-East and South Asia [47].

Of all NCDs for which sufficient data are available, diabetes is the only disease that is more common in virtually all migrant groups compared with the host populations [48]. A recent comprehensive systematic review and meta-analyses assessed the rates of type 2 diabetes among

ethnic minority and migrant populations including South-Asian origin, Middle Eastern and North African origin, sub-Saharan African origin, Western Pacific origin, and South and Central American origin in Europe with the host European populations [49]. The analysis shows a higher prevalence of type 2 diabetes in all migrants groups compared with the European host populations. In a pooled analysis, South-Asian origin populations had the highest odds of type 2 diabetes, followed by Middle Eastern and North African origin, sub-Saharan African origin, Western Pacific, and South and Central American in both men and women, respectively.

Numerous factors have been linked to the increased prevalence of type 2 diabetes among migrants including obesity, insulin resistance, physical inactivity and unhealthy diet, and gene-environmental interactions [50]. Obesity is a major burden among migrants, particularly in women. However, differences in obesity seem to only partially explain the higher risk of type 2 diabetes among migrant groups compared with Europeans [49]. In a meta-analysis comparing the type 2 diabetes burden among migrant groups in Europe, no clear pattern of co-occurrence of type 2 diabetes and obesity was found among migrants of South-Asian, South and Central American, and Western Pacific origin. Health-related behavior factors such as dietary intake, physical activity, and stress can increase the risk of type 2 diabetes either directly or mediate through obesity [51], but they do not seem to explain the differences in type 2 diabetes between migrants and the host population [52].

Studies on cancer show large differences in the incidence and mortality rates between migrants and the host populations in HICs. In one systematic review spanning from 1990 to 2010, the authors compiled and compared studies on cancer rates in adult migrant populations from LMICs residing in Western Europe.⁶⁷ The authors identified 37 studies conducted in seven countries including Denmark, France, Germany, Spain, Sweden, the Netherlands, and the UK [53]. About half (51%) of the identified studies compared incidence data, whereas the remaining studies compared mortality data (41%) or both incidence and mortality data (8%). The review shows that, in general, migrants have less cancer-related morbidity and mortality compared with the host populations in Europe. However, the data revealed a complex picture once the individual cancer types were evaluated separately. While almost all the studies found lower risks for cancers that are strongly related to a Western lifestyle such as colorectal cancer and cancers of the pancreas, lung, breast, ovary, and kidney, incidence and mortality from infectious disease-related cancers such as hepatic cancer, Kaposi's sarcoma, cervical cancer, and some lymphomas were higher in migrants than in the European host population. The high rates of infectious disease-related cancers are generally hypothesized to be attributed to migrants' exposure to infections in early life in their home countries before migration.

A recent study by Xu et al.[54] synthesized the current literature examining the association between migration and cognitive function among middle-aged and older adults. The study found that, overall, the evidence from current studies regarding the association between migration and cognitive function is weak and inconclusive. Some of the studies showed poorer cognitive function in migrants than non-migrants in hosting places whereas other studies found no association between migration and cognitive function. Acculturation was positively associated with better cognitive function in migrants.

The prevalence of mental health problems such as depression and anxiety disorder are higher in migrants, especially among newly arrived people [10]. This may result from traumatic experiences before migration, during the migration process, or post-migration and is addressed elsewhere in this special issue.

8. International students. Definition. Categories.

An internationally mobile student is an individual who has physically crossed an international border between two countries with the objective to participate in educational activities in a destination country, where the destination country is different from his or her country of origin” as defined by UNESCO in 2015. This definition captures the most important group of international students: those in a foreign country for education purposes. This definition also focuses on students who are enrolled for a tertiary degree (or higher), therefore the length of stay is typically more than one year, and up to 7 years. Internationally mobile students are different from two other common definitions of international students, namely “foreign students” and “credit-mobile students.”

Foreign students refer to non-citizens who are currently enrolled in higher education degree courses. This definition does not distinguish between students holding non-resident visas and those with permanent resident status. The former usually arrive and stay independently, while the latter usually migrate because their parents moved, making them 1.5-generation immigrants [55]. *Credit-mobile students* refer to “study-abroad” or exchange students, such as those in the EU’s Erasmus program. These students remain enrolled in their home countries while receiving a small number of credits from foreign institutions. Due to their fluid enrollment status, most statistics on international students do not include credit-mobile students [55].

Since students’ motivations may be related to their exposure to risk it is important to distinguish between these two populations.

9. International student enrolment statistics

In 2017, there were over 5.3 million international students, up from 2 million in 2000, as illustrated in **Figure 3**. More than half of these were enrolled in educational programs in six countries: The United States of America, the United Kingdom, Australia, France, Germany, and the Russian Federation. Prominent sending countries of international students include China, India, Germany, the Republic of Korea, Nigeria, France, Saudi Arabia, and several Central Asian countries [55].

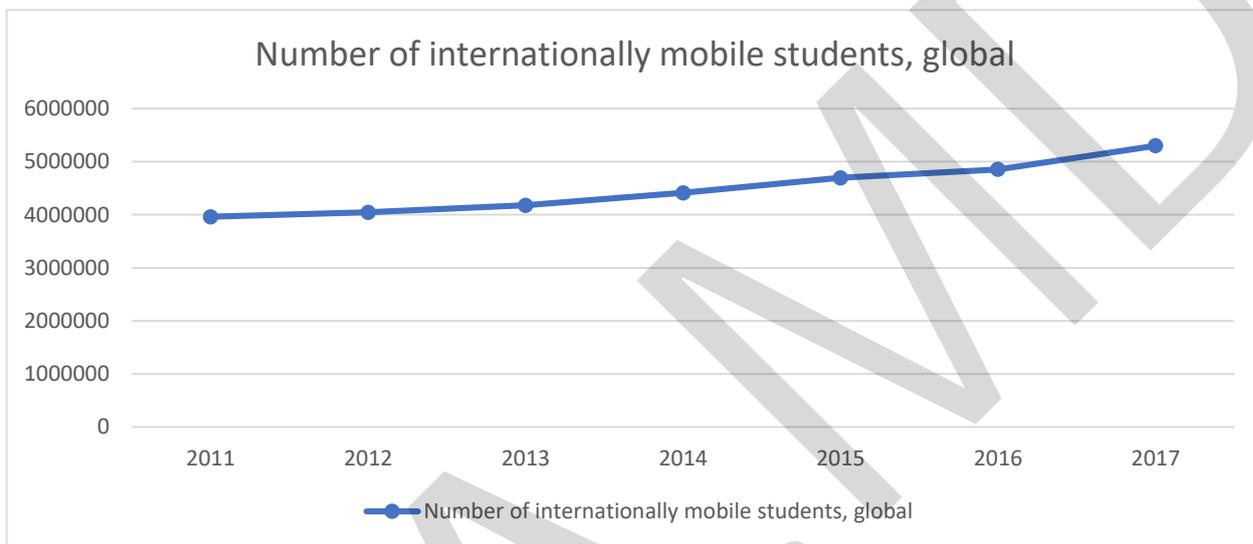


Figure 3: The estimated number of international students from 2011 to 2017.

The 2014 Open Doors Report on International Educational Exchange reported that the number of international students at colleges and universities in the United States increased by eight percent to a record high of 886,052 students in the 2013/14 academic year, confirming that the United States remains the destination of choice for higher education. The United States is the leading country that hosts more of the world’s 4.5 million globally mobile college and university students, with almost double the number hosted by the United Kingdom, the second leading host country. The report also found that a total of 289,408 American students studied abroad for academic credit from their U.S. colleges and universities [56].

There were at least 1.6 million degree mobile students from abroad who studied at the tertiary education level across the European Union (EU) in 2016. More than two-fifths (43 %) of the students from abroad studying at tertiary education level in the EU in 2016 were from Europe, 30 % were from Asia and 12 % were from Africa. In the United Kingdom, more than half (51 %) of the tertiary students from abroad were from Asia. In France, 42 % of tertiary students from abroad in 2016 were from Africa, while the share of students from the Caribbean, Central and South America were particularly high in Spain (45 %) [57].

10. Risk factors for NCDs in international students

The causal pathways linking travel with poor health outcomes are complex. Adaptation difficulties [58] as well as factors relating to students' orientation towards the host culture [59], may lead to increased alcohol and drug use. Whereas in short-term study abroad programs situational disinhibition, a motivation to socialize, and a more hedonistic and less socially restrained behavior may lead to increased alcohol and drug use [60]. In consequence, and although studying abroad provides unique personal, educational, and intercultural opportunities, students may be at greater risk from excessive alcohol and drug use and more likely to experience related consequences. Adverse consequences include injuries, blackouts, unwanted sexual contact, and violence. These consequences may be exacerbated through limited social resources and limited host country language skills.

Among younger travelers, the risk of death from injury while on elective is far higher than from infectious disease. Road traffic collisions are the commonest cause of death, followed by drowning and falls [61]. Risk factors for road traffic collisions include male gender, young age, speed, distracted driving, unfamiliarity with the environment, poor quality roads, alcohol consumption, and use of a motorbike or moped [62]. Notably, in developing countries, 90% of road deaths occur among passengers, cyclists, or pedestrians⁴⁵ and therefore, medical students are still at considerable risk, even if not driving themselves. Moreover, a study by Angelin et al. revealed that healthcare students were more likely to travel to developing regions, use motorcycles, and fail to wear seat-belts, thereby increasing their risk for road traffic collisions. Emergency and evacuation medical services are often underdeveloped or absent in developing countries and so road traffic collision casualties must rely on buses, taxis, or private vehicles for transport to the hospital. One study of Hungarian medical students showed that 30% did not have medical insurance while on an overseas elective,⁴⁶ so that students may be faced with inordinate healthcare and medical evacuation costs. In the unlikely event that death occurs while overseas, the family of the deceased must assume the significant costs and endure the emotional distress associated with repatriating the remains [63].

Drowning is another significant cause of mortality in young international travelers. Death from drowning is most likely to occur when activities such as boating, swimming, and diving may be combined with the use of alcohol or drugs [64]. To minimize risks, medical students should take appropriate care to ensure they can swim, wear a life jacket while boating, and familiarize themselves with local aquatic environments. Risky behaviors such as swimming alone, head-first diving, and alcohol consumption should be avoided. Water-based recreational activities also pose a risk for infections such as schistosomiasis.

Criminal injury, including muggings and robberies, is a risk as medical students from developed countries may be perceived by locals as wealthy and therefore, a ready target. Other criminal acts recorded in surveys of medical students and long-term volunteers abroad include shootings, stabbings, and other acts of physical violence. Sexual assault and rape may occur in travelers of any age, gender, or sexual orientation, with young female lone travelers perhaps being the most vulnerable [65]. Personal safety can also be compromised by insecure housing, unreliable telephone, and Internet access, traveling at night, use of alcohol and drugs, black market financial transactions, and poor law enforcement. To mitigate risk, students should be advised to dress in a culturally appropriate manner, avoid wearing expensive jewelry or watches, avoid traveling alone, stay in well-lit areas, inform others of their planned travel itinerary, use reputable accommodation, and keep copies of important documents and bank card numbers separately.

More recently, a large number of self-photography or 'selfie'- related injuries and deaths have been reported in the media, often in young international travelers [66]. These include falls from heights, animal attacks, electrocution, extreme weather injuries, muggings, and road traffic collisions. Elective students should be strongly discouraged from recording selfies with pediatric or adult patients and must adhere to standard ethical guidelines concerning consent for photography in clinical settings. These issues should also be discussed during the pre-travel consultation.

Embarking on a medical elective in developing countries can impact both positively and negatively on psychological wellbeing. Contributing factors include physiological stressors (heat, dehydration, ill-health), environmental stressors (unfamiliar surroundings, loss of social support network), cultural issues (language barriers, extreme poverty, culture shock), and occupational factors (exposure to severe illness and death, feelings of incompetence, poor patient outcomes and lack of clinical support or resources).

In the clinical setting, students may feel obliged to perform tasks and fulfill clinical roles beyond their training and capabilities owing to local staff shortages and peer pressure from supervisors. Students may encounter clinical and ethical challenges for which they are unprepared and unqualified to manage. Furthermore, if such scenarios have adverse outcomes or endanger patient safety, this may lead to guilt, self-doubt, and psychological harm to the student. Patients themselves can present unreasonable expectations to students, sometimes perceiving care offered by a visiting medical student to be preferable to that offered by local healthcare staff [67]. Medical students should be encouraged to respect and not oppose local health beliefs as they practice evidence-based medicine under clinical supervision. Traditional approaches to healthcare in some developing countries may include beliefs in magic or witchcraft.

11. Predictors of while-abroad and post-return behavioral risks

Studies on DMSs are cross-sectional and mostly descriptive, offering little or no information on pre-abroad behavior and other factors that are associated with future behavior. However, Sa et al. found both greater college-related life dissatisfaction and study-related stress were positively associated with binge drinking and drinking and driving [68]. Russell et al. clustered DMSs based on their style of adaptation to the host country. Most students (58.8%) were characterized by a positive sense of well-being, lower level of cultural stress, and psychological distress. A small proportion (6.7%) of students were psychologically distressed and were also involved in risk-taking behaviors that included alcohol and drug use [69].

For CMS students alcohol use and related negative consequences while abroad have been associated with several factors. These include features of the student such as demographic (e.g., ethnicity), Grade Point Average, and personality (e.g. sensation seeking). Location-specific factors are also associated. Studying in an urban setting was associated with greater alcohol use whereas living with a host family was associated with less alcohol use [70]. Significant pre-departure predictors of drinking and negative consequences while abroad included pre-departure levels of drinking, past experiences of negative consequences due to drinking [70,71], pre-departure expectations on the role alcohol would play while abroad [71], and intentions to drink while abroad [72]. Psychosocial factors measured during the study abroad program that was associated with outcomes included goals relating to socialization with other CMSs [70], the level of group cohesiveness between those who studied abroad [73], poor adjustment and cultural distress [71] as well as different acculturation orientations in the host country. In contrast, Koyama and Belli found no relationship between cultural distress and DMSs' alcohol use [74]. This study also showed that drinking motives predicted alcohol use. The only qualitative data available [75] was from open ended questions and suggest that participants considered drinking as part of the cultural experience when abroad, and heaviermore than lighter drinkerswere likely to describe it as a means to loosen behavioral constraints in social gatherings.

Studies also considered students' perceived descriptive drinking norms. Pedersen et al. found only those CMSs with a higher pre-abroad perceived norm increase their drinking while studying abroad [76]. Pedersen et al. in 2011 found that perceived native norms and perceived study abroad peer drinking norms were associated with increased drinking behavior, but analyses also revealed meaningful interactions between perceptions of drinking norms and students' acculturation orientations [77].

Alcohol use was higher in those with a higher assimilation orientation and also perceived native alcohol use was higher. Alcohol use was also higher in those with a higher separation orientation and who also perceived another study abroad students' alcohol use was higher. Little

is known on CMSs post-return patterns of behavior because only one study Pedersen, Larimer, et al., reported on post-return (one month) behavior [72]. The authors found that the number of drinks per week more than doubled during trips abroad and subsequently reduced to pre-travel levels on return to the US for most students, except for those who drank more heavily while abroad who continued to drink at significantly elevated levels once they returned home.

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MATERIALS AND METHODS

1. Study setting

The study population was international and domestic undergraduate students from several universities in the Republic of Moldova—The Medical and Pharmaceutical University “Nicolae Testemitanu”, Free International University of Moldova, and “Ion Creanga” State Pedagogical University.

2. Recruitment of participants

Data were collected using an anonymous, online survey developed for the current cross-sectional research. For the study, all currently enrolled international (n = 30) and domestic (n = 30) students were invited to participate via a bulk email. This was followed by a single reminder email. The study was also advertised on social media platforms and through the distribution of flyers and postcards at on-and-off campus locations known to be frequented by international students in particular. These methods were employed to maximize response rates from the outset. Survey completion took approximately 15 min. Participants were informed that consent was implied by completion of the survey. Students who wished to participate, but were not proficient in English or Romanian, were invited to contact the researcher for alternative arrangements to be made. There were no students who requested assistance in this regard. Ethics approval to conduct the survey was obtained from the Universities involved in the survey.

3. Measures

The questionnaire measure was used in this survey (**Table 1**). Sociodemographic variables included age, sex, residence, subjective socioeconomic background, and country. The five NCD behaviors risk factors were included in the questionnaire: fruits and vegetable consumption, BMI, physical activity, tobacco, and alcohol consumption.

- Inadequate fruit and vegetable consumption was classified as less than five or more servings in a day.
- Overweight and obesity were defined as a BMI > 25 kg/m² and 30 kg/m², respectively.
- Inadequate physical activity was defined as not daily at least 60 mins of moderate to vigorous-intensity physical activity.
- Sedentary behavior was defined as spending three or more hours per day sitting.
- Tobacco use was assessed with the question: “Do you currently use one or more of the following tobacco products (cigarettes, snuff, chewing tobacco, cigars, etc.)?”
- Heavy drinking (past-month): “How often do you have (for men) five or more and (for women) four or more drinks on one occasion?”

Each of the above NCD behavioral risk factors was summed, ranging from 0 (“none”) to 5 (“all”).

Protective variables included risk awareness, beliefs in health benefits, and social support.

- Risk awareness items included the knowledge (yes/no) whether or not each of the health behaviors (obesity, high blood pressure, smoking, sedentary behavior, alcohol consumption) contributed to health problems. Total scores ranged from 0–5 and were grouped into low = 0–2, and high-risk awareness = 3–5.
- Beliefs in health benefits. Study participants were asked to rate the importance of five health behaviors (keep body weight within the normal range, take regular exercise, non-smoking, not drinking too much alcohol, and to eat enough fruit) for health maintenance. Total scores ranged from 0–5 and were grouped into weak beliefs = 0–2, and strong beliefs in health benefits = 3–5.

Table 1: The questionnaire including sociodemographic variables, behavioral risk factors, and protective variables.

<i>Variable</i>	<i>Question</i>	<i>Response options</i>
<i>Sociodemographic variables</i>		
<i>Age</i>	How old are you?	Number
<i>Sex</i>	What is your sex?	Male/Female
<i>Residence</i>	Where do you live?	University campus/ rented apartment/ parental house
<i>Subjective socioeconomic background</i>	How do you appreciate your socioeconomic status?	Low/ medium/ high
<i>Country of origin</i>	What is your country of origin	Name of the country
<i>Behavioral risk factors</i>		
<i>Current tobacco use</i>	Do you currently use one or more of the following tobacco products (cigarettes, snuff, chewing tobacco, cigars, etc.)?	Yes/No
<i>Current alcohol use</i>	During the past 30 days, how often did you have (for men) five or more and (for women) four or more drinks on one occasion?	0 days to 30 days (coded 0=0 and 1–30=1)
<i>Fruits and vegetable consumption</i>	During the past 30 days, how many times per day did you usually eat fruits and vegetables?	0 to 5 serving per day coded 0, more than 5 serving per day coded as 1

<i>Bodyweight</i>	How much do you weigh without your shoes on?kg
<i>Height</i>	How tall are you without your shoes on?cm
<i>Physical activity</i>	How much time do you have moderate to vigorous-intensity physical activity during a usual day?	0 to 24 hours (coded 0-60 minutes=0 and > 60 minutes=1)
<i>Leisure-time sedentary behavior</i>	How much time do you spend during a typical or usual day sitting and watching television, playing computer games, talking with friends, or doing other sitting activities?	0 to 24 hours (coded 0-2 hours=0 and > 2 hours=1)
<i>Protective variables</i>		
<i>Risk awareness</i>	Do you know whether or not each of the following health behaviors (obesity, high blood pressure, smoking, sedentary behavior, alcohol consumption) contribute to health problems?	(yes/no) For each affirmative response was allocated 1 point. Total scores ranged from 0–5 and were grouped into low = 0–2, and high-risk awareness =3-5.
<i>Beliefs in health benefits</i>	Do you know whether or not each of the following health behaviors (keep body weight within the normal range, take regular exercise, non-smoking, not drinking too much alcohol, and eat enough fruit) contribute to health maintenance?	(yes/no) For each affirmative response was allocated 1 point. Total scores ranged from 0–5 and were grouped into low = 0–1, and high-risk awareness =2-5.

4. Data analysis

Statistical analyses were conducted using IBM SPSS Statistics Version 24. Standard methods, namely, independent samples t-tests, analysis of variance (ANOVA), and chi-square tests, were used for bivariate comparisons of outcome variables between international and domestic students, and between male and female international students, with posthoc analysis as appropriate to identify the source of observed differences. Regression models, i.e., multiple linear regression analysis for continuous outcome variables and binary logistic regression

analysis for dichotomous outcome variables, were used to examine the associations between student status (international vs. domestic) and each outcome variable in the total study sample while controlling for demographic characteristics and enrolment variables as outlined above. A significance (alpha) level of $p \leq 0.05$ was employed for all tests and all tests were two-tailed.

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OWN RESULTS AND DISCUSSIONS

1. General characteristics of the recruited cohort

The sample consisted of 60 students (mean age 22.7 years, Standard Deviation 1.74; **figure 4**), 55.0% females and 45.0% males. Of the total cohort, 60% of students reported university campus as the place of residence, while 31.6% and 8.3% were living in rented apartments and together with their parents, respectively. The majority of the participants appreciated their socioeconomic status as medium (71.6%), by contrast, 28.4% of subjects

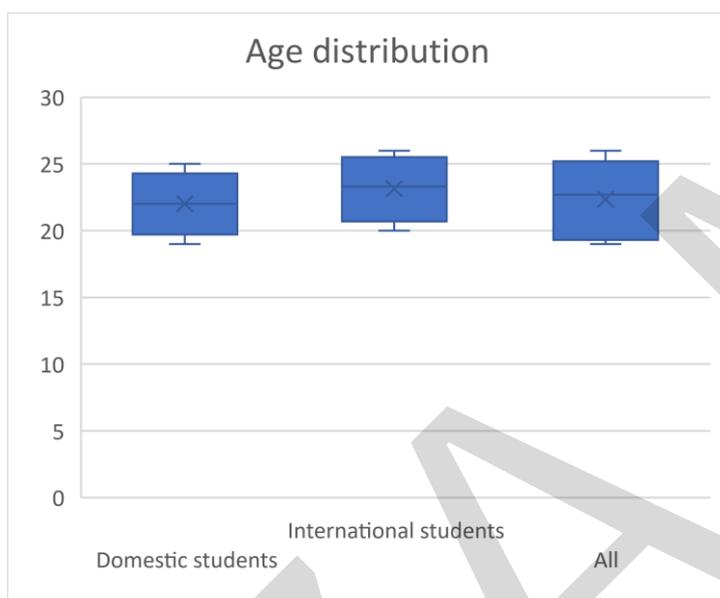


Figure 4: Boxplot with age distribution of the included participants

evaluated their socio-economic background as either low (16.6%) or high (11.6%). The country of origin for international students was Romania (8.3%), Israel (13.3%), Turkey (18.3%), Ukraine (3.3%), Syria (3.3%), and India (3.3%), see **figure 5**.

Regarding individual behavioral risk factors, 15.0 % and 10% were currently using tobacco and alcohol, respectively, 23.3% had insufficient fruits and vegetable intake, 40.0% of the students had low physical activity, 41.7% engaged in leisure-time sedentary behavior, 13.4% were overweight or obese.

The total mean of the measured six behavioral risk factors was 1.6 (SD=1.34), and the

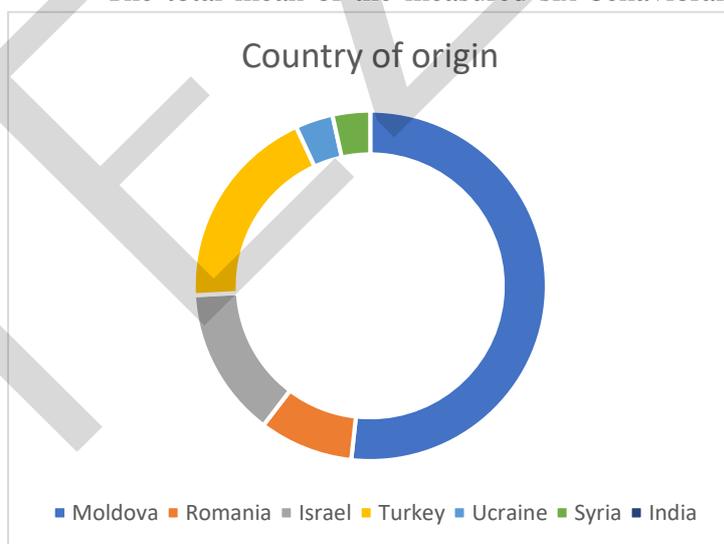


Figure 5: Diagram of the participants country of origin

Regarding individual behavioral risk factors, 15.0 % and 10% were currently using tobacco and alcohol, respectively, 23.3% had insufficient fruits and vegetable intake, 40.0% of the students had low physical activity, 41.7% engaged in leisure-time sedentary behavior, 13.4% were overweight or obese.

The total mean of the measured six behavioral risk factors was 1.6 (SD=1.34), and the

distribution of the multiple occurrence

of the behavioral risk factors was

0=1.1%, 1=13.3%, 2=8.33%,

3=10.0%, 4=6.6%, 5=0.0%, 6=0.0%

and 16.6% had at least three risk

factors.

Regarding protective variables,

23.3% of the students had a low-risk

awareness about the contribution to

health problems of behaviors, such as

obesity, high blood pressure, smoking,

sedentary behavior, and alcohol consumption,

and had weak beliefs in health benefits of keeping

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body weight within the normal range, taking regular exercise, non-smoking, not drinking too much alcohol and eating enough fruits.

Table 2: General characteristics of the included participants

Variable	All	Domestic students	International students	P-value
Sociodemographic variables				
Mean age (Standard Deviation)	22.7 (1.7)	22.0 (1.7)	23.3 (1.6)	
Female no. (%)	33 (55.0)	22 (73.3)	11 (36.6)	0.0089
Male no. (%)	27 (45.0)	8 (26.7)	19 (63.4)	
Residence				0.1983
University campus	36 (60.0)	17 (56.6)	19 (63.3)	
Rented apartment	19 (31.6)	8 (26.6)	11 (36.7)	
Parental house	5 (8.3)	5 (16.6)	0 (0.0)	
Subjective socioeconomic background				0.7534
Low	10 (16.6)	6 (20.0)	4 (13.3)	
Medium	43 (71.6)	21 (70.0)	22 (73.3)	
High	7 (11.6)	3 (10.0)	4 (13.3)	
Country of origin				
Moldova	30 (50.0)	30 (100.0)	0 (0.0)	
Romania	5 (8.3)	0 (0.0)	5 (16.7)	
Israel	8 (13.3)	0 (0.0)	8 (26.7)	
Turkey	11 (18.3)	0 (0.0)	11 (36.6)	
Ukraine	2 (3.3)	0 (0.0)	2 (6.6)	
Syria	2 (3.3)	0 (0.0)	2 (6.6)	
India	2 (3.3)	0 (0.0)	2 (6.6)	
Behavioral risk factors				
Smokers	15 (25.0)	4 (13.3)	11 (36.6)	0.0716
Non-smokers	45 (75.0)	26 (86.7)	19 (63.4)	
Alcohol consumption				0.0797
Excessive	10 (16.6)	8 (26.6)	2 (6.6)	
Normal	50 (83.4)	22 (73.4)	28 (93.4)	
Fruits and vegetable intake				1.0000
Inadequate	14 (23.3)	7 (23.3)	7 (23.3)	

Adequate	46 (76.7)	23 (76.7)	23 (76.7)	
Normal weight	52 (86.6)	26 (86.7)	26 (86.7)	1.0000
Overweight or obese	8 (13.4)	4 (13.3)	4 (13.3)	
Physical activity				0.4296
Adequate	36 (60.0)	20 (66.7)	16 (53.3)	
Inadequate	24 (40.0)	10 (33.3)	14 (46.6)	
Leisure-time sedentary behavior				0.6010
Adequate	35 (58.3)	19 (63.4)	16 (53.3)	
Inadequate	25 (41.7)	11 (36.6)	14 (46.6)	
Protective variables				
Risk awareness				1.0000
Low	14 (23.3)	7 (23.3)	7 (23.3)	
High	46 (76.7)	23 (76.7)	23 (76.7)	
Beliefs in health benefits				1.0000
Weak	9 (15.0)	5 (16.6)	4 (13.3)	
Strong	51 (85.0)	25 (83.4)	26 (86.7)	

2. Sociodemographic parameters among international and domestic students

Concerning sex distribution, the group of domestic students was dominated by female participants (73.3%), by contrast, in the group of international students, male subjects represented the majority (63.3%). The difference is statistically significant based on a P-value of 0.0089 after Fisher's exact test. In both groups, the university campus was the most used place to live; even though international students reported more often university campus as a residence (63.3% versus 56.6%, the difference is not significant (P value=0.1983). Secondly, international students (36.6%) used rented apartments more often than domestic students (26.6%), although insignificantly. The subjective socioeconomic status was appreciated approximately equal in both groups, being labeled as a medium in the majority of the participants (70.0% and 73.3%, respectively), with a P-value of 0.7534 when performed the Fisher's exact test.

3. Behavioral risk factors among international and domestic students

Concerning behavioral risk factors, students abroad seem to have a higher percentage of

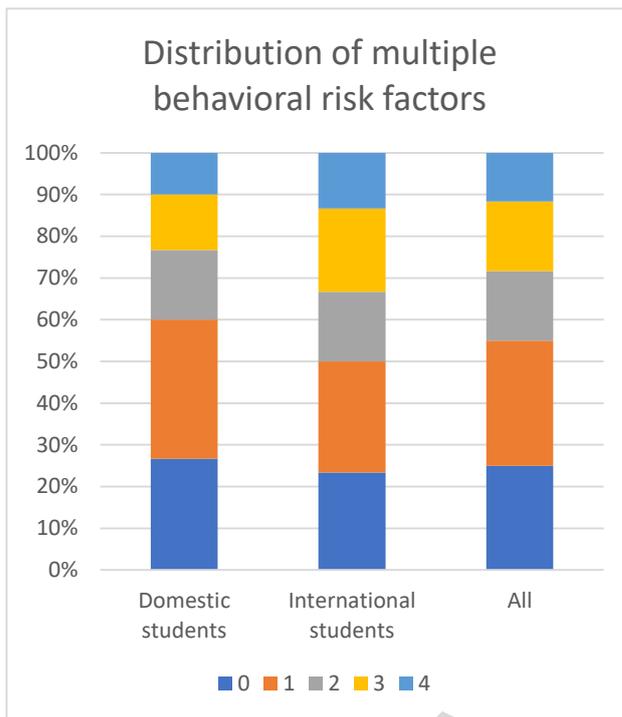


Figure 6: Diagram of the multiple behavioral risk factors distribution.

smokers compared to local participants (36.6% versus 13.3%), even if the difference is insignificant statistically (P-value 0.0716). Local students were likely to have an excessive alcohol intake more often (26.6% versus 6.6%), but nonsignificantly (P=0.0797). In both cases, 23.3% of subjects reported an inadequate consumption of fruits and vegetables, and 13.3% were overweight or obese. International students seem to have a more sedentary behavior based on a higher rate of inadequate physical activity (46.6% versus 33.3%) and leisure-time sedentary behavior (46.6% versus 36.6%), although insignificant statistically (p=0.4296,

p=0.6010, respectively). The distribution of the multiple occurrence of the behavioral risk factors in the group of international students was 0=13.3%, 1=20.0%, 2=16.6%, 3=20.0%, 4=13.3%, 5=0.0%, 6=0.0% and 33.3% had at least three risk factors, as illustrated in **figure 6**. By contrast, for domestic students distribution of the multiple occurrence of the behavioral risk factors in the group of international students was 0=26.6%, 1=33.3%, 2=16.6%, 3=13.3%, 4=10.0%, 5=0.0%, 6=0.0% and 23.3% had at least three risk factors. The difference between the mean score of behavioral risk factors between domestic (1.46, SD 1.30) and international students (1.73, SD 1.38) was statistically insignificant since p=0.4385 after performing the two-sample t-test.

Regarding protective awareness in both groups, 23.3% of cases showed a weak awareness about the NCDs risk factors, while domestic students showed a slightly higher rate of weak beliefs about health benefits (16.6% versus 13.3%).

4. Impact of sociodemographic variables on NCDs risk factors

The percentage of smoking were 37.5% and 36.8% among domestic and international male students (OR=1.028, 95% CI: 0.186-5.676, p=0.974), and 4.5% and 36.3% among domestic and international female students (OR=0.0833, 95% CI: 0.0079-0.875, p=0.038), respectively. The percentage of alcohol overconsumption was 37.5% and 10.5% among domestic and international male students (OR=5.1, 95% CI: 0.6576 to 39.5499, p=0.119) and 22.7% and

0% among domestic and international female students (OR=7.228, 95%CI: 0.3638 to 143.6284, p=0.194) , respectively. Concerning overweight distribution by gender, 18.1% of domestic female students and 15.7% of male international students had excessive body mass, while all male domestic and female international participants had a normal BMI. Inadequate fruits and vegetables intake in males was 37.5% and 21.0% among domestic and international students; conversely (OR=2.25, 95% CI: 0.3693 to 13.7077, p=0.379), 18.1% and 27.2% in female domestic and international students (OR=0.592, 95% CI: 0.1069 to 3.2864, p=0.549).

Socioeconomic status and residence did not influence significantly the behavioral risk factors in both groups.

After performing a multiple linear regression test, it was shown a weak association between age, gender, residency, and socioeconomic status and the score of risk factors for NCDs in both groups, domestic (p=0.0531, F(1,28)=4.0778) and international students (F(1,28)=1.1806, p=0.3585).

DISCUSSIONS

In sum, while the health and well-being of international students are increasingly becoming of interest worldwide, evidence in this regard remains limited. This study aimed to expand the current evidence base by examining the health and well-being of international students at several universities in the Republic of Moldova and to compare outcomes between international and domestic students. We also aimed to analyze the main risk factors for NCDs among students abroad, to evaluate the differences in prevalence and structure of risk factors for NCDs between domestic and international students, to assess the impact of socio-demographic (age, sex, socioeconomic status, etc.), geographical and cultural particularities on the prevalence and structure of NCDs. Based on the available evidence, it was hypothesized that international students would have poorer health and well-being than domestic students on at least some of the above-mentioned outcomes. Additionally, we hypothesized that international students would be less likely to seek help for mental health and related problems than domestic students.

The cohort consisted of 60 students with a mean age of 22.7 years, and equal representation of both genders. The largest part of the total cohort reported university campus as the place of residence. Three-quarters of the participants appreciated their socioeconomic status as a medium, by contrast to one quarter which evaluated their socio-economic background either low or high. The main countries of origin for international students was Romania, Israel, and Turkey.

In terms of individual behavioral risk factors, the results of the current study show that 15.0 % and 10% were currently using tobacco and alcohol, respectively, 23.3% had insufficient fruits and vegetable intake, 40.0% of the students had low physical activity, 41.7% engaged in leisure-time sedentary behavior, 13.4% were overweight or obese. The total mean of the measured six behavioral risk factors was 1.6, and 16.6% of enrolled students had at least three risk factors. Regarding protective variables, 23.3% of the students had a low-risk awareness about the contribution to health problems of behaviors, such as obesity, high blood pressure, smoking, sedentary behavior, and alcohol consumption, and had weak beliefs in health benefits of keeping body weight within the normal range, taking regular exercise, non-smoking, not drinking too much alcohol and eating enough fruits.

If comparing the sociodemographic characteristic between groups, in the domestic students' cohort female participants made up the majority, by contrast to the group of international students. International students reported slightly more often university campus as a residence. Secondly, international students used rented apartments more often than domestic students, although insignificantly. The subjective socioeconomic status was appreciated

approximately equal in both groups, being labeled as a medium in the majority of the participants. Gender was the only parameter that had a significant impact on smoking status; thus, the risk of tobacco use in international female participants was 12 times higher compared to domestic female subjects.

Concerning behavioral risk factors, students abroad seem to have a higher percentage of smokers compared to local participants, even if the difference is insignificant statistically. Local students were likely to have an excessive alcohol intake more often, but nonsignificantly. The percentage of fruits and vegetable consumption and the obesity rate was equal. International students seem to have a more sedentary behavior based on a higher rate of inadequate physical activity and leisure-time sedentary behavior, although insignificant statistically. The occurrence of multiple behavioral risk factors seemed to be higher in the group of international students compared to domestic ones. However, the difference between the mean score of behavioral risk factors between domestic and international students was statistically insignificant.

Regarding protective awareness in both groups, one-quarter of cases showed a weak awareness about the NCDs risk factors, while domestic students showed a slightly higher rate of weak beliefs about health benefits. After performing a linear regression test, it was shown a weak association between age and the score of risk factors for NCDs in both groups.

Our results are coherent with some of the previous studies, in which DMSs consumed less alcohol, less frequently, and were less likely to consume cocaine compared to British and German domestic students [78,79]. DMSs also reported a lower frequency of both experienced and witnessed alcohol-related harms compared to domestic Australian students [80]. Conversely, Seo, et.al [68] found disproportionate last 30-day rates of binge drinking and drink driving (92% of the overall sample and 67% of drivers) compared to results of representative U.S. college student population surveys. In Rosenthal et al.'s cross-sectional study no change in the pattern of drug and alcohol use was observed in the majority of DMSs once they began their overseas university study in Australia [81]. However, students from Western countries were found to have higher levels of drug and alcohol use compared to students from elsewhere in the world. The only study [74] that compared sub-populations of foreign-born students (DMS and non-F-1 visa students originally from other countries, e.g., naturalized citizen) found that the former group consumed alcohol with greater frequency (but not in greater volume) and exhibited high scores on drinking motives measures. However, comparison groups mean ages and countries of origin differed across groups potentially biasing results.

Conversely, CMSs were found to have increased their alcohol use during study abroad trips compared to pre-departure levels [70] found the proportion of students engaged in heavy episodic alcohol use and volume of alcohol consumed during single occasion peak drinking

increased during the study abroad period. However, results are not consistent across studies. One robust study revealed an increase in the frequency of drinking, but not in the volume of alcohol consumed [71]. The evidence further suggests that students experience alcohol-related consequences while abroad but at levels similar to those at pre-departure [70]. Consequences range from mild (e.g., hangover) to serious (e.g., injury, sexual assault victimization) and alcohol use was related to both general and sex-specific negative consequences. In one study [82] alcohol use was positively associated with the frequency of sexual assault victimization, but this has not been replicated in other studies [83].

Studies disagree on whether CMSs represent a self-selected population that is at greater risk compared to the general student population. Smith and Klein found no difference between CMSs and non-CMSs in terms of frequency of alcohol use before departure. Pedersen, et.al found that students with no intention to study consumed alcohol less frequently and experienced fewer alcohol-related consequences (males only) compared to participants who intended to study abroad and students who had studied abroad. The latter study involved a large random sample ($N= 3,164$) drawn from students at a North American university and may therefore be more robust [72].

Regarding tobacco use, our results showed a higher percentage of smoking in female international students compared to previous studies. In a cross-sectional survey of smoking and its cessation among 606 dental students at the Lithuanian University of Health Sciences in 2012 the percentages of occasional/current regular smokers were 41.1% and 55.7% among Lithuanian and international male students, and 22.7% and 22.9% among Lithuanian and international female students, respectively [84]. Moreover, the international dental students had a deeper knowledge of the harmfulness/addictiveness of smoking and held more positive attitudes towards smoking cessation among their patients than did the native Lithuanian dental students.

However, this study was limited by its cross-sectional nature and the convenience sample of international students from different countries. Our findings might not apply to students from other countries and immigrants with little English skills or who were working in the Republic of Moldova. We were unable to differentiate which changes were caused by migration to Moldova and which changes were caused by leaving one's hometown or parental home for other cities. Future studies among Moldovan students who left their parental home or hometown for other cities for tertiary education are worth conducting. Information on participants length of stay and religious information that might impact results were not assessed in the survey

Since most of the differences between international and domestic students that were apparent in the bivariate analysis, were no longer apparent when between-group differences in demographic and other enrolment variables were statistically controlled for; these differences

likely reflect demographic characteristics associated with being an international student, rather than student status per se. In particular, international students participating in the current study were more likely to be male than domestic students (63.4% vs. 26.7%). It is well known that young men, including those engaged in tertiary studies, are more likely to engage in certain health-compromising behaviors, including alcohol and substance use and problem gambling, and less likely to seek help for mental health and related problems, than young women. This does not detract from the implication of the current study findings suggested above, however, namely, that male international students may warrant particular attention in campus-based health promotion and early intervention programs. At the same time, it needs to be remembered that programs of this kind are more likely to be effective if they target both male students and those with whom they interact, including their female peers [30,31].

Taking into account the gathered information about the exposure of international students to behavioral and environmental risk factors to NCDs, they should be taught basic skills to protect their physical and mental wellbeing while on elective. Those with underlying psychiatric illness should carefully consider the risks and benefits of the elective experience to their mental health before traveling. For these students, psychological stress, altered sleeping habits, physical illness, or reduced medication adherence may be particularly problematic. Before departure, medical students should be instructed in basic stress management skills, how to recognize the early signs of anxiety and depression, and how to deal with the potential effects of culture shock. Another key preparatory step includes education regarding the development of cultural competence. Establishing a mentoring or buddy system with other students who have previously been on a similar elective should be encouraged. A debriefing session upon returning home may also be helpful, as this will enable a discussion of ethical challenges or psychological distress encountered while abroad.

Programs to improve the accessibility of support services to international students, through education and logistic enhancements have been somewhat effective. However, to further improve accessibility, there has been a call for such support services to be more culturally specific and reinforced frequently throughout the academic year [85]. Also, contemporary delivery methods such as internet-based student well-being services appear to provide another solution to the problem of accessibility to support. A recent prototype in an Australian university, *the desk*, appears to be well accepted by most tertiary students including international students—as long as they are instructed in its use [86]. Also, the building of enduring and meaningful social connections between international students and the host culture has been shown to improve mental health and assist with adjustment processes.

Finally, it should be mentioned, that NCDs are the leading public health challenges globally in the twenty-first century, resulting in ill health, economic loss, life loss, diminished quality of life, and poor social development equally in both high-resource and low-resourced countries. The most common, costly, and preventable health problems are chronic diseases, principally heart disease, stroke, cancer, diabetes, and injury. The eight key risk factors – alcohol use, tobacco use, high blood pressure, high body mass index, high cholesterol, high blood glucose, low fruit, and vegetable intake, and physical inactivity – account for the majority of healthy life years lost from cardiovascular diseases and deaths. These risk factors are linked to social and economic conditions in which poverty is a crucial factor.

Of note, international students generally experience more difficulties adapting to college life abroad than they would in their home countries. The causal pathways linking travel with poor health outcomes are complex. CSM and DSM seem to have a different exposure to NCDs risk factors. Other features of the student such as demographic (e.g., ethnicity), psychosocial characteristics (e.g., socialization, level of group cohesiveness between those who study abroad, poor adjustment, cultural distress), location-specific factors (e.g., urban versus rural setting, living or not with a host family), pre-departure exposure to risk factors and expectations, past experiences as well as different acculturation orientations in the host country would play an important role for students while abroad.

According to our cross-sectional study occurrence of multiple behavioral risk factors (smoking, alcohol use, sedentarism, overweight and low fruits, and vegetable intake) seemed to be higher in the group of international students compared to domestic ones. Adaptation difficulties as well as factors relating to students' orientation towards the host culture, may lead to increased occurrence of multiple risk factors in our cohort. However, the occurrence of independent risk factors is variable among different groups. This can be explained by different educational and cultural backgrounds among host and traveling populations.

Corroborating our result with those of previous studies, we can conclude that the differences between international and domestic population risk factors for NCDs are complex and sometimes controversial. They likely reflect demographic characteristics associated with being an international student, rather than student status per se. Further studies are needed to complement and validated the present results.

Facilities to improve the accessibility of support services to international students, through education and logistic enhancements would be effective and should be implemented by universities involved in study abroad programs. Also, the building of enduring and meaningful social connections between international students and the host culture has been shown to improve mental health and assist with adjustment processes.

GENERAL CONCLUSIONS

1. NCD are the leading public health challenges globally in the twenty-first century, which result in deteriorating health, economic loss, life loss, diminished quality of life, and poor social development equally in both high-resource and low-resourced countries.
2. International students generally experience more difficulties adapting to college life abroad than they would in their home countries.
3. According to our cross-sectional study occurrence of multiple behavioral risk factors (smoking, alcohol use, sedentarism, overweight and low fruits, and vegetable intake) seemed to be higher in the group of international students compared to domestic ones.
4. The differences between international and domestic population risk factors for NCDs are complex and sometimes controversial. However, the most important risk factors for NCDs in international students seem to be smoking and sedentary behaviour, while excessive alcohol consumption was more frequent among domestic ones.

RECOMMENDATIONS

For students:

- ✓ Before departure, students should have skills in basic stress management, how to recognize the early signs of anxiety and depression, and how to deal with the potential effects of culture shock.
- ✓ Those with underlying somatic or psychiatric illnesses should carefully consider the risks (psychological stress, altered sleeping habits, physical illness, or reduced medication adherence) and benefits of the elective experience to their health before traveling.
- ✓ Obtaining education regarding the development of cultural competence.

Universities-level support:

- ✓ Universities involved in study abroad programs should implement facilities to improve the accessibility of support services to international students, through education and logistic enhancement. Moreover, such support services should be more culturally specific and reinforced frequently throughout the academic year.
- ✓ Implementation of academic support and student success initiatives, such as new student orientation, advising and counseling, academic tips, workshops and webinars, academic life, tutoring, and supplemental instruction.
- ✓ Conducting of programs for teaching basic skills to protect their physical and mental wellbeing while abroad.
- ✓ A debriefing session upon returning home may also be helpful, as this will enable a discussion of ethical challenges or psychological distress encountered while abroad.
- ✓ Offering a user-friendly websites with detailed information on academic and social support services offered.

For campus support services:

- ✓ Organization of a more student-centered service structure and delivery considering the implementation of best practices based not only on their students' needs.
- ✓ Aid building enduring and meaningful social connections between international students and the host culture, thus helping to improve mental health and assist with adjustment processes.

- ✓ Establishing a mentoring or buddy system with other students who have previously been on a similar elective should be encouraged.
- ✓ Organize programs for host country language learning, designed to enhance international students' language proficiency as needed.
- ✓ Organize social and cultural activities for international students (e.g., International Education Week, global festivals, world fairs, heritage and cultural celebrations, meet-and-greet receptions, sightseeing trips, weekly coffee hours, a global siblings program, and a global student mentors program, etc.)

For future research:

- ✓ Examining the efficacy of the services offered by participant institutions, as well as how these services might relate to international students' sense of belonging on campus.
- ✓ Carrying out larger prospective studies examining international students' risk factors for NCDs compared with domestic students, taking into account the complex structure of sociodemographic, cultural, racial, psychologic, and genetic background of individual participants.

BIBLIOGRAPHY

1. Kassa, M.; Grace, J. The Global Burden and Perspectives on Non-Communicable Diseases (NCDs) and the Prevention, Data Availability and Systems Approach of NCDs in Low-Resource Countries. *Public Health in Developing Countries - Challenges and Opportunities* **2019**, doi:10.5772/intechopen.89516.
2. Mendis, S.; World Health Organization *Global Status Report on Noncommunicable Diseases 2014*; 2014; ISBN 978-92-4-156485-4.
3. Task Shifting for Non-Communicable Disease Management in Low and Middle Income Countries – A Systematic Review Available online: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0103754> (accessed on 20 January 2021).
4. Siddharthan, T.; Ramaiya, K.; Yonga, G.; Mutungi, G.N.; Rabin, T.L.; List, J.M.; Kishore, S.P.; Schwartz, J.I. Noncommunicable Diseases In East Africa: Assessing The Gaps In Care And Identifying Opportunities For Improvement. *Health Aff (Millwood)* **2015**, *34*, 1506–1513, doi:10.1377/hlthaff.2015.0382.
5. Allotey, P.; Davey, T.; Reidpath, D.D. NCDs in Low and Middle-Income Countries - Assessing the Capacity of Health Systems to Respond to Population Needs. *BMC Public Health* **2014**, *14 Suppl 2*, S1, doi:10.1186/1471-2458-14-S2-S1.
6. Mills, K.T.; Bundy, J.D.; Kelly, T.N.; Reed, J.E.; Kearney, P.M.; Reynolds, K.; Chen, J.; He, J. Global Disparities of Hypertension Prevalence and Control: A Systematic Analysis of Population-Based Studies From 90 Countries. *Circulation* **2016**, *134*, 441–450, doi:10.1161/CIRCULATIONAHA.115.018912.
7. Cho, N.H.; Shaw, J.E.; Karuranga, S.; Huang, Y.; da Rocha Fernandes, J.D.; Ohlrogge, A.W.; Malanda, B. IDF Diabetes Atlas: Global Estimates of Diabetes Prevalence for 2017 and Projections for 2045. *Diabetes Res Clin Pract* **2018**, *138*, 271–281, doi:10.1016/j.diabres.2018.02.023.
8. Ford, N.D.; Patel, S.A.; Narayan, K.M.V. Obesity in Low- and Middle-Income Countries: Burden, Drivers, and Emerging Challenges. *Annual Review of Public Health* **2017**, *38*, 145–164, doi:10.1146/annurev-publhealth-031816-044604.
9. Chen, L.H.; Leder, K.; Wilson, M.E. Closing the Gap in Travel Medicine: Reframing Research Questions for a New Era. *J Travel Med* **2017**, *24*, doi:10.1093/jtm/tax001.
10. Pavli, A.; Maltezou, H. Health Problems of Newly Arrived Migrants and Refugees in Europe. *J Travel Med* **2017**, *24*, doi:10.1093/jtm/tax016.
11. Byberg, S.; Agyemang, C.; Zwisler, A.D.; Krasnik, A.; Norredam, M. Cardiovascular Disease Incidence and Survival: Are Migrants Always Worse Off? *Eur J Epidemiol* **2016**, *31*, 667–677, doi:10.1007/s10654-015-0024-7.
12. 2009 World Conference on Higher Education: The New Dynamics of Higher Education and Research for Societal Change and Development; Communiqué - UNESCO Digital Library Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000183277> (accessed on 20 January 2021).
13. Carpenter, L.J.; Garcia, A.A. Assessing Outcomes of a Study Abroad Course for Nursing Students. *Nurs Educ Perspect* **2012**, *33*, 85–89.
14. Berry, J.W. Acculturation: Living Successfully in Two Cultures. *International Journal of Intercultural Relations* **2005**, *29*, 697–712, doi:10.1016/j.ijintrel.2005.07.013.
15. Look AHEAD Research Group; Wing, R.R. Long-Term Effects of a Lifestyle Intervention on Weight and Cardiovascular Risk Factors in Individuals with Type 2 Diabetes Mellitus: Four-Year Results of the Look AHEAD Trial. *Arch Intern Med* **2010**, *170*, 1566–1575, doi:10.1001/archinternmed.2010.334.

16. Isomaa, B.; Almgren, P.; Tuomi, T.; Forsén, B.; Lahti, K.; Nissén, M.; Taskinen, M.R.; Groop, L. Cardiovascular Morbidity and Mortality Associated with the Metabolic Syndrome. *Diabetes Care* **2001**, *24*, 683–689, doi:10.2337/diacare.24.4.683.
17. Bennett, J.E.; Stevens, G.A.; Mathers, C.D.; Bonita, R.; Rehm, J.; Kruk, M.E.; Riley, L.M.; Dain, K.; Kengne, A.P.; Chalkidou, K.; et al. NCD Countdown 2030: Worldwide Trends in Non-Communicable Disease Mortality and Progress towards Sustainable Development Goal Target 3.4. *The Lancet* **2018**, *392*, 1072–1088, doi:10.1016/S0140-6736(18)31992-5.
18. Omran, A.R. The Epidemiologic Transition: A Theory of the Epidemiology of Population Change. *Milbank Q* **2005**, *83*, 731–757, doi:10.1111/j.1468-0009.2005.00398.x.
19. Kassa, M.D.; Grace, J. Barriers to Integrate Physical Exercise Into the Ethiopian Healthcare System to Treat Non-Communicable Diseases. *Global Journal of Health Science* **2018**, *10*, p123, doi:10.5539/gjhs.v10n10p123.
20. Lear, S.A.; Hu, W.; Rangarajan, S.; Gasevic, D.; Leong, D.; Iqbal, R.; Casanova, A.; Swaminathan, S.; Anjana, R.M.; Kumar, R.; et al. The Effect of Physical Activity on Mortality and Cardiovascular Disease in 130 000 People from 17 High-Income, Middle-Income, and Low-Income Countries: The PURE Study. *Lancet* **2017**, *390*, 2643–2654, doi:10.1016/S0140-6736(17)31634-3.
21. World Health Organization(Who) *Guideline.*; World Health Organization: Place of publication not identified, 2016; ISBN 978-92-4-150483-6.
22. Anonymous Overview Available online: https://ec.europa.eu/health/alcohol/overview_en (accessed on 23 January 2021).
23. Institute of Medicine (US) Committee on Strategies to Reduce Sodium Intake *Strategies to Reduce Sodium Intake in the United States*; Henney, J.E., Taylor, C.L., Boon, C.S., Eds.; The National Academies Collection: Reports funded by National Institutes of Health; National Academies Press (US): Washington (DC), 2010; ISBN 978-0-309-14805-4.
24. Campbell, N.R.C.; Neal, B.C.; MacGregor, G.A. Interested in Developing a National Programme to Reduce Dietary Salt? *J Hum Hypertens* **2011**, *25*, 705–710, doi:10.1038/jhh.2011.25.
25. Office of the Surgeon General, A.S. for H. (ASH) Tobacco Reports And Publications Available online: <https://www.hhs.gov/surgeongeneral/reports-and-publications/tobacco/index.html> (accessed on 17 January 2021).
26. Noncommunicable Diseases.
27. Network (ENN), E.N. Contribution of Six Risk Factors to Achieving the 25x25 Non-Communicable Disease Mortality Reduction Target. *Field Exchange* **2015**, *26*.
28. *Prevention of Cardiovascular Disease: Guidelines for Assessment and Management of Cardiovascular Risk*; World Health Organization, Ed.; World Health Organization: Geneva, 2007; ISBN 978-92-4-154717-8.
29. WHO | A Global Brief on Hypertension Available online: https://www.who.int/cardiovascular_diseases/publications/global_brief_hypertension/en/ (accessed on 17 January 2021).
30. *Global Report on Diabetes*; Roglic, G., World Health Organization, Eds.; World Health Organization: Geneva, Switzerland, 2016; ISBN 978-92-4-156525-7.
31. Worldwide Trends in Diabetes since 1980: A Pooled Analysis of 751 Population-Based Studies with 4.4 Million Participants - The Lancet Available online: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(16\)00618-8/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)00618-8/fulltext) (accessed on 17 January 2021).
32. Finucane, M.M.; Stevens, G.A.; Cowan, M.J.; Danaei, G.; Lin, J.K.; Paciorek, C.J.; Singh, G.M.; Gutierrez, H.R.; Lu, Y.; Bahalim, A.N.; et al. National, Regional, and Global Trends in Body-Mass Index since 1980: Systematic Analysis of Health Examination Surveys and Epidemiological Studies with 960 Country-Years and 9.1 Million Participants. *Lancet* **2011**, *377*, 557–567, doi:10.1016/S0140-6736(10)62037-5.

33. Lim, S.S.; Vos, T.; Flaxman, A.D.; Danaei, G.; Shibuya, K.; Adair-Rohani, H.; Amann, M.; Anderson, H.R.; Andrews, K.G.; Aryee, M.; et al. A Comparative Risk Assessment of Burden of Disease and Injury Attributable to 67 Risk Factors and Risk Factor Clusters in 21 Regions, 1990-2010: A Systematic Analysis for the Global Burden of Disease Study 2010. *Lancet* **2012**, *380*, 2224–2260, doi:10.1016/S0140-6736(12)61766-8.
34. WHO | By Category | Prevalence of Obesity among Adults, BMI \geq 30, Age-Standardized - Estimates by Country Available online: <https://apps.who.int/gho/data/node.main.A900A?lang=en> (accessed on 17 January 2021).
35. NCD Risk Factor Collaboration (NCD-RisC) Trends in Adult Body-Mass Index in 200 Countries from 1975 to 2014: A Pooled Analysis of 1698 Population-Based Measurement Studies with 19.2 Million Participants. *Lancet* **2016**, *387*, 1377–1396, doi:10.1016/S0140-6736(16)30054-X.
36. Tulchinsky, T.H.; Varavikova, E.A. Non-Communicable Diseases and Conditions. In *The New Public Health*; Elsevier, 2014; pp. 237–309 ISBN 978-0-12-415766-8.
37. Itoh, H.; Kanayama, N. Nutritional Conditions in Early Life and Risk of Non-Communicable Diseases (NCDs) from the Perspective of Preemptive Medicine in Perinatal Care. *Hypertension Research in Pregnancy* **2015**, *3*, 1–12, doi:10.14390/jsshp.3.1.
38. Misra, A.; Tandon, N.; Ebrahim, S.; Sattar, N.; Alam, D.; Shrivastava, U.; Narayan, K.M.V.; Jafar, T.H. Diabetes, Cardiovascular Disease, and Chronic Kidney Disease in South Asia: Current Status and Future Directions. *BMJ* **2017**, *357*, j1420, doi:10.1136/bmj.j1420.
39. Kassa, M.D.; Grace, J. Healthcare Professionals' Perceptions of Non-Communicable Diseases Risk Factors and Its Regional Distribution in Ethiopia. *GJHS* **2017**, *10*, 88, doi:10.5539/gjhs.v10n1p88.
40. Lijalem, T.; Beyan, M.; Banerjee, S. Meat Consumption Patterns in Hawassa City, Southern Ethiopia. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)* **2013**, *3*, 56–65.
41. Teklie, H.; Gonfa, G.; Getachew, T.; Defar, A.; Bekele, A.; Bekele, A.; Gelibo, T.; Amenu, K.; Taddele, T.; Taye, G.; et al. Prevalence of Khat Chewing and Associated Factors in Ethiopia: Findings from the 2015 National Non-Communicable Diseases STEPS Survey. *Ethiopian Journal of Health Development* **2017**, *31*, 320–330, doi:10.4314/ejhd.v31i1.
42. Ayano, G.; Yohannis, K.; Abraha, M. Epidemiology of Khat (*Catha Edulis*) Consumption among University Students: A Meta-Analysis. *BMC Public Health* **2019**, *19*, 150, doi:10.1186/s12889-019-6495-9.
43. Kelly, S.; Martin, S.; Kuhn, I.; Cowan, A.; Brayne, C.; Lafortune, L. Barriers and Facilitators to the Uptake and Maintenance of Healthy Behaviours by People at Mid-Life: A Rapid Systematic Review. *PLOS ONE* **2016**, *11*, e0145074, doi:10.1371/journal.pone.0145074.
44. Oyeboode, O.; Pape, U.J.; Laverty, A.A.; Lee, J.T.; Bhan, N.; Millett, C. Rural, Urban and Migrant Differences in Non-Communicable Disease Risk-Factors in Middle Income Countries: A Cross-Sectional Study of WHO-SAGE Data. *PLOS ONE* **2015**, *10*, e0122747, doi:10.1371/journal.pone.0122747.
45. Steiner, I.; Chung, W.; Herr, K.; Mehta, K. Nyama Choma Culture: Implications of Increased Red Meat and Alcohol Consumption in East Africa. *Journal of Sustainable Development* **2016**, *9*, 96–102, doi:10.5539/jsd.v9n6p96.
46. Ajayi, I.O.; Adebamowo, C.; Adami, H.-O.; Dalal, S.; Diamond, M.B.; Bajunirwe, F.; Guwatudde, D.; Njelekela, M.; Nankya-Mutyoba, J.; Chiwanga, F.S.; et al. Urban–Rural and Geographic Differences in Overweight and Obesity in Four Sub-Saharan African Adult Populations: A Multi-Country Cross-Sectional Study. *BMC Public Health* **2016**, *16*, 1126, doi:10.1186/s12889-016-3789-z.
47. Kassa, M.D.; Grace, J.M. A Mixed-Method Study of Quality, Availability and Timeliness of Non-Communicable Disease (NCD) Related Data and Its Link to NCD Prevention:

- Perceptions of Health Care Workers in Ethiopia. *HIM J* **2019**, *48*, 135–143, doi:10.1177/1833358318786313.
48. Sohail, Q.Z.; Chu, A.; Rezai, M.R.; Donovan, L.R.; Ko, D.T.; Tu, J.V. The Risk of Ischemic Heart Disease and Stroke Among Immigrant Populations: A Systematic Review. *Can J Cardiol* **2015**, *31*, 1160–1168, doi:10.1016/j.cjca.2015.04.027.
 49. Agyemang, C.; Addo, J.; Bhopal, R.; Aikins, A. de G.; Stronks, K. Cardiovascular Disease, Diabetes and Established Risk Factors among Populations of Sub-Saharan African Descent in Europe: A Literature Review. *Global Health* **2009**, *5*, 7, doi:10.1186/1744-8603-5-7.
 50. Meeks, K.A.C.; Freitas-Da-Silva, D.; Adeyemo, A.; Beune, E.J.A.J.; Modesti, P.A.; Stronks, K.; Zafarmand, M.H.; Agyemang, C. Disparities in Type 2 Diabetes Prevalence among Ethnic Minority Groups Resident in Europe: A Systematic Review and Meta-Analysis. *Intern Emerg Med* **2016**, *11*, 327–340, doi:10.1007/s11739-015-1302-9.
 51. Galbete, C.; Nicolaou, M.; Meeks, K.; Klipstein-Grobusch, K.; de-Graft Aikins, A.; Addo, J.; Amoah, S.K.; Smeeth, L.; Owusu-Dabo, E.; Spranger, J.; et al. Dietary Patterns and Type 2 Diabetes among Ghanaian Migrants in Europe and Their Compatriots in Ghana: The RODAM Study. *Nutr Diabetes* **2018**, *8*, 25, doi:10.1038/s41387-018-0029-x.
 52. Aune, D.; Norat, T.; Leitzmann, M.; Tonstad, S.; Vatten, L.J. Physical Activity and the Risk of Type 2 Diabetes: A Systematic Review and Dose-Response Meta-Analysis. *Eur J Epidemiol* **2015**, *30*, 529–542, doi:10.1007/s10654-015-0056-z.
 53. Dekker, L.H.; van Dam, R.M.; Snijder, M.B.; Peters, R.J.G.; Dekker, J.M.; de Vries, J.H.M.; de Boer, E.J.; Schulze, M.B.; Stronks, K.; Nicolaou, M. Comparable Dietary Patterns Describe Dietary Behavior across Ethnic Groups in the Netherlands, but Different Elements in the Diet Are Associated with Glycated Hemoglobin and Fasting Glucose Concentrations. *J Nutr* **2015**, *145*, 1884–1891, doi:10.3945/jn.114.207472.
 54. Arnold, M.; Razum, O.; Coebergh, J.-W. Cancer Risk Diversity in Non-Western Migrants to Europe: An Overview of the Literature. *Eur J Cancer* **2010**, *46*, 2647–2659, doi:10.1016/j.ejca.2010.07.050.
 55. Xu, H.; Zhang, Y.; Wu, B. Association between Migration and Cognitive Status among Middle-Aged and Older Adults: A Systematic Review. *BMC Geriatr* **2017**, *17*, 184, doi:10.1186/s12877-017-0585-2.
 56. International Students Available online: <http://migrationdataportal.org/themes/international-students> (accessed on 13 January 2021).
 57. Open Doors 2014 International Students Study Abroad Available online: <https://www.iie.org/443/en/Why-IIE/Announcements/2014/11/2014-11-17-Open-Doors-Data> (accessed on 13 January 2021).
 58. Internationally Mobile Students in the EU Available online: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20181116-1> (accessed on 13 January 2021).
 59. Ehlers, C.L.; Gilder, D.A.; Criado, J.R.; Caetano, R. Acculturation Stress, Anxiety Disorders, and Alcohol Dependence in a Select Population of Young Adult Mexican Americans. *Journal of Addiction Medicine* **2009**, *3*, 227–233, doi:10.1097/ADM.0b013e3181ab6db7.
 60. Fosados, R.; McClain, A.; Ritt-Olson, A.; Sussman, S.; Soto, D.; Baezconde-Garbanati, L.; Unger, J.B. The Influence of Acculturation on Drug and Alcohol Use in a Sample of Adolescents. *Addictive Behaviors* **2007**, *32*, 2990–3004, doi:10.1016/j.addbeh.2007.06.015.
 61. Bellis, M.A.; Hughes, K.E.; Dillon, P.; Copeland, J.; Gates, P. Effects of Backpacking Holidays in Australia on Alcohol, Tobacco and Drug Use of UK Residents. *BMC Public Health* **2007**, *7*, 1, doi:10.1186/1471-2458-7-1.
 62. Tyagi, S.; Corbett, S.; Welfare, M. Safety on Elective: A Survey on Safety Advice and Adverse Events during Electives. *Clin Med (Lond)* **2006**, *6*, 154–156, doi:10.7861/clinmedicine.6-2-154.

63. Fhogartaigh, C.N.; Sanford, C.; Behrens, R.H. Preparing Young Travellers for Low Resource Destinations. *BMJ* **2012**, *345*, e7179, doi:10.1136/bmj.e7179.
64. Connolly, R.; Prendiville, R.; Cusack, D.; Flaherty, G. Repatriation of Human Remains Following Death in International Travellers. *Journal of Travel Medicine* **2017**, *24*, doi:10.1093/jtm/taw082.
65. Guse, C.E.; Cortés, L.M.; Hargarten, S.W.; Hennes, H.M. Fatal Injuries of US Citizens Abroad. *J Travel Med* **2007**, *14*, 279–287, doi:10.1111/j.1708-8305.2007.00133.x.
66. Kennedy, K.M.; Flaherty, G.T. The Risk of Sexual Assault and Rape During International Travel: Implications for the Practice of Travel Medicine. *J Travel Med* **2015**, *22*, 282–284, doi:10.1111/jtm.12201.
67. Flaherty, G.T.; Choi, J. The “selfie” Phenomenon: Reducing the Risk of Harm While Using Smartphones during International Travel. *J Travel Med* **2016**, *23*, tav026, doi:10.1093/jtm/tav026.
68. Bozinoff, N.; Dorman, K.P.; Kerr, D.; Roebelen, E.; Rogers, E.; Hunter, A.; O’Shea, T.; Kraeker, C. Toward Reciprocity: Host Supervisor Perspectives on International Medical Electives. *Med Educ* **2014**, *48*, 397–404, doi:10.1111/medu.12386.
69. Sa, J.; Seo, D.-C.; Nelson, T.; Lohrmann, D.; Ellis, N. Binge Drinking and Drinking and Driving among South Korean International College Students in the USA. *Health Education Journal* **2015**, *74*, 84–95, doi:10.1177/0017896914521599.
70. Russell, J.; Rosenthal, D.; Thomson, G. The International Student Experience: Three Styles of Adaptation. *High Educ* **2010**, *60*, 235–249, doi:10.1007/s10734-009-9297-7.
71. Pedersen, E.R.; Skidmore, J.R.; Aresi, G. Demographic and Predeparture Factors Associated with Drinking and Alcohol-Related Consequences for College Students Completing Study Abroad Experiences. *Journal of American College Health* **2014**, *62*, 244–254, doi:10.1080/07448481.2014.887573.
72. Hummer, J.F.; Pedersen, E.R.; Mirza, T.; LaBrie, J.W. Factors Associated with General and Sexual Alcohol-Related Consequences: An Examination of College Students While Studying Abroad. *Journal of Student Affairs Research and Practice* **2010**, *47*, 427–444, doi:10.2202/1949-6605.6134.
73. When in Rome: Factors Associated with Changes in Drinking Behavior among American College Students Studying Abroad. - PsycNET Available online: /doiLanding?doi=10.1037%2Fa0019863 (accessed on 13 January 2021).
74. Wielkiewicz, R.M.; Turkowski, L.W. Reentry Issues Upon Returning From Study Abroad Programs. *Journal of College Student Development* **2010**, *51*, 649–664, doi:10.1353/csd.2010.0015.
75. Koyama, C.; Belli, G. Alcohol Use, Acculturative Stress, and Drinking Motivation Among International Community College Students. *Journal of Multicultural Counseling and Development* **2011**, *39*, 229–240, doi:https://doi.org/10.1002/j.2161-1912.2011.tb00637.x.
76. PhD, G.S.; BA, S.K. Predicting Women’s Alcohol Risk-Taking While Abroad. *Women & Health* **2010**, *50*, 262–278, doi:10.1080/03630242.2010.480907.
77. Pedersen, E.R.; LaBrie, J.W.; Hummer, J.F. Perceived Behavioral Alcohol Norms Predict Drinking for College Students While Studying Abroad. *J. Stud. Alcohol Drugs* **2009**, *70*, 924–928, doi:10.15288/jsad.2009.70.924.
78. Pedersen, E.R.; Cruz, R.A.; LaBrie, J.W.; Hummer, J.F. Examining the Relationships Between Acculturation Orientations, Perceived and Actual Norms, and Drinking Behaviors of Short-Term American Sojourners in Foreign Environments. *Prev Sci* **2011**, *12*, 401–410, doi:10.1007/s11121-011-0232-7.
79. Krämer, A.; Prüfer-Krämer, L.; Stock, C.; Tshiananga, J.T. Differences in Health Determinants Between International and Domestic Students at a German University. *Journal of American College Health* **2004**, *53*, 127–32, doi:http://dx.doi.org/10.3200/JACH.53.3.127-132.

80. Vivancos, R.; Abubakar, I.; Hunter, P.R. Sexual Behaviour, Drugs and Alcohol Use of International Students at a British University: A Cross-Sectional Survey. *Int J STD AIDS* **2009**, *20*, 619–622, doi:10.1258/ijsa.2008.008421.
81. Rickwood, D.; George, A.; Parker, R.; Mikhailovich, K. Harmful Alcohol Use on Campus: Impact on Young People at University. *Youth Studies Australia* **2011**, *30*, 34.
82. Rosenthal, D.A.; Russell, J.; Thomson, G. The Health and Wellbeing of International Students at an Australian University. *High Educ* **2006**, *55*, 51, doi:10.1007/s10734-006-9037-1.
83. Flack, W.F.; Kimble, M.O.; Campbell, B.E.; Hopper, A.B.; Petercă, O.; Heller, E.J. Sexual Assault Victimization Among Female Undergraduates During Study Abroad: A Single Campus Survey Study. *J Interpers Violence* **2015**, *30*, 3453–3466, doi:10.1177/0886260514563833.
84. Marcantonio, T.; Angelone, D.J.; Sledjeski, E. Using a Pattern-Centered Approach to Assess Sexual Risk-Taking in Study Abroad Students. *Journal of American College Health* **2016**, *64*, 165–173, doi:10.1080/07448481.2015.1085058.
85. Zaborskis, A.; Volkyte, A.; Narbutaite, J.; Virtanen, J.I. Smoking and Attitudes towards Its Cessation among Native and International Dental Students in Lithuania. *BMC Oral Health* **2017**, *17*, doi:10.1186/s12903-017-0397-y.
86. Mori, S.C. Addressing the Mental Health Concerns of International Students. *Journal of Counseling & Development* **2000**, *78*, 137–144, doi:https://doi.org/10.1002/j.1556-6676.2000.tb02571.x.
87. Development of an Internet Intervention to Promote Wellbeing in College Students - Stallman - 2018 - Australian Psychologist - Wiley Online Library Available online: <https://aps.onlinelibrary.wiley.com/doi/full/10.1111/ap.12246> (accessed on 21 January 2021).