Health Status and Health Behavior in Adolescents

A descriptive comparative study between immigrants from Pakistan, Somalia and Vietnam and ethnic Norwegians

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Foreword

For the topic of my thesis, I used data from a cross-sectional study about living conditions and upbringing that was conducted among youths in Oslo ("Ung i Oslo", NOVA, 2006). The study was performed by the Norwegian Social Research (NOVA) in cooperation with the city of Oslo (one of the seven national 'Drug Competence Centers'). NOVA generously provided the data on ethnicity, demographics, health status and health behavior. This study was designed and undertaken from 2006 to 2007. I received the data in February 2012.

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SUMMARY

BACKGROUND: Migration, for various reasons, continues to increase the immigrant population of Norway. Few studies compare adolescent ethnic Norwegians (EN) with adolescent immigrants for their health status and health behavior. This study describes differences in health status and health behavior between adolescent EN and immigrant groups from Pakistan, Somalia and Vietnam (PSV) seen as one group, and also between EN and each of the three immigrant groups. It also examines whether age at arrival in Norway and parental education impact health status and health behavior for each of the three immigrant groups.

METHODS: In 2006, the Norwegian Social Research (NOVA), in cooperation with the city of Oslo (Drug Competence Center), carried out a questionnaire survey in Oslo schools for 11,500 pupils aged 14-17. 10,880 individuals answered the questionnaire (response rate of 93%). Health status in terms of self-assessed health, mental health status and chronic physical illness and health behavior in terms of smoking, alcohol use, snuff use, cannabis use, eating problems and regular physical activity were analyzed for the PSV- immigrant groups. The explanatory variables were age at arrival in Norway and the educational level of their parents (parents' education).

RESULTS: No differences in mental health status were identified between the groups. However, fewer Pakistani immigrants assessed their health status as good or excellent and fewer Somali immigrants reported chronic physical illness compared to EN. The PSV-immigrant groups had less risky health behavior, such as smoking and use of snuff and alcohol, but at the same time less regular physical activities. Higher parents' education was associated with a better mental health status, less alcohol use, and less use of drugs for immigrants from Somalia and more regular physical activities for Pakistani immigrants. Age at arrival was associated with more physical activities and less use of cannabis for the Pakistani group.

CONCLUSION: In this thesis, PSV- immigrants' health status and health behavior differ from that of EN in adolescence. Interestingly, adolescent immigrants have less health-risky behavior, but at the same time less health-degrading behavior. All these differences are only partly explained by factors such as the age at arrival in Norway and the level of parents' education.

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ACRONYMS

EEC	**European Economic Community**
EN	**Ethnic Norwegian origin**
EU	**European Union**
GECIM	**Global Commission on International Migration**
IMDI	**(Integrering- og mangfoldsdirektoratet) The Norwegian Directorate for Integration and Diversity**
IMMIGRANTS	**People born abroad with two foreign-born parents and who at some point have immigrated to Norway and their descendant**
IOM	**International Organization for Migration**
NOVA	**The Norwegian Social Research**
OECD	**Organization for Economic Cooperation and Development**
SSB	**Statistics Norway**
UDI	**(Utlendingsdirektoratet) The Norwegian Directorate for Migration**
UK	**United Kingdom**
WHO	**World health organization**

1. INTRODUCTION

People have migrated voluntarily or have been forced to migrate beyond borders since the origin of mankind. Significant migrations in history include that of the Vikings, the forced transportation of slaves over the Atlantic, the labor migration from China, India and Japan after slavery was abolished, the migration due to the rise of the United States as an industrial power and Jews after the creation of Israel. By the early 1970's, international labor migration declined in Europe, but continued in the States until the early 1990's. In recent years, labor migration has grown. In addition, there is migration due to conflicts that result in asylum seekers, refugees and irregular migrants (Koser, 2007). In the last ten years the total number of international immigrants has increased from about 150 million in 2000 to 214 million in 2010. According to the International Organization of Migration (IOM), one out of every 33 persons in the world was a migrant in 2010 (IOM, 2012).

In Norway, the immigrant population,[1] specifically non-Scandinavian descendants, has increased since the end of the 1960's. After the Second World War, immigrants started to migrate to Norway - first as refugees, then as migrant workers from Europe, and thereafter as migrants from countries outside of Europe. Norway became a Schengen member in 2001. The Schengen agreement made it easier for EU members to cross borders of Schengen countries. The new immigration groups came mainly from Poland and the Baltic states (SSB, 2012). Adolescent immigrants in Norway represented approximately 26% of all immigrants in 2008 (Dybendal and Høydahl, 2008). Figure 1 illustrates the increase in the number of immigrants and their children from 1970 to 2013 for various geographical regions in Norway.

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[1] An immigrant is defined by Statistics Norway (2010) as a person with two foreign-born parents.

Figure 1 Immigrants and Norwegian-born to immigrant parents, by country background. Source: SSB, 2013
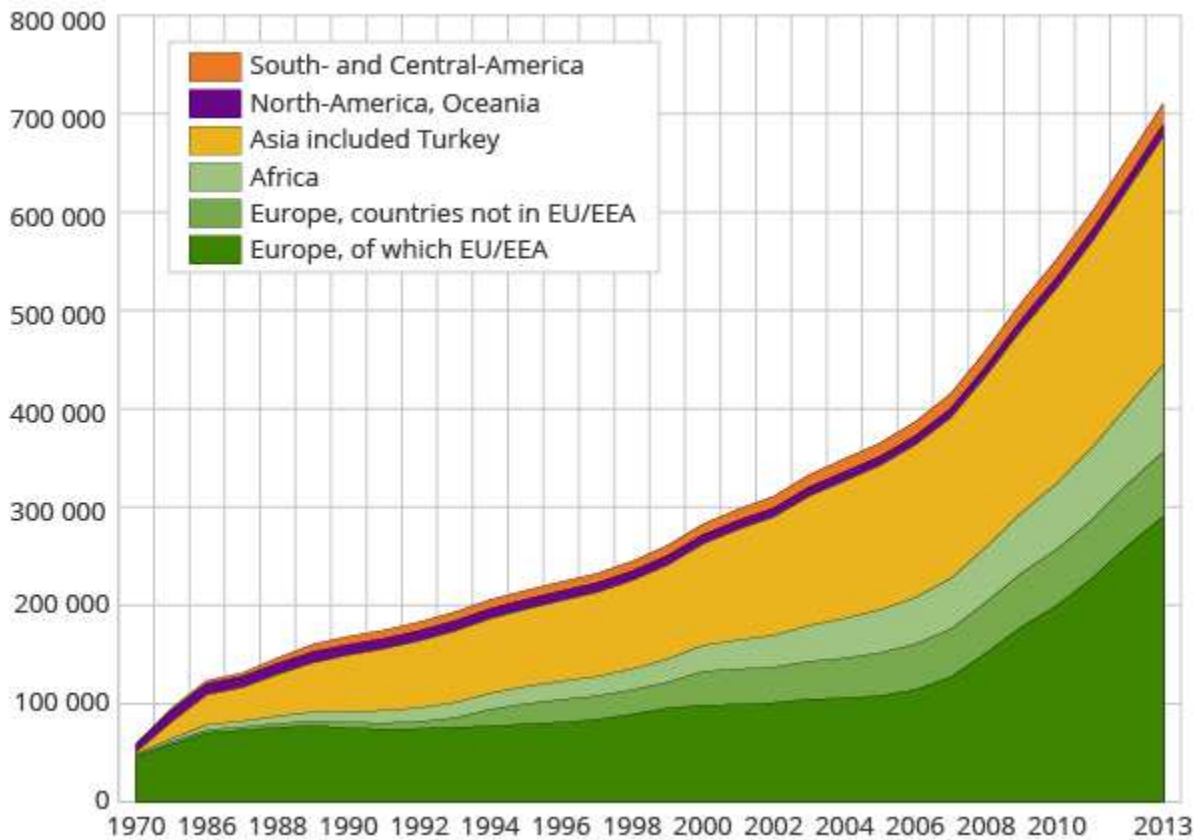
In recent decades, there has been a growing amount of research concerning the health status of immigrants in Norway (Abebe, 2010). Such studies have identified many important differences in health status and health behavior between different immigrant groups and between immigrants and ethnic Norwegians (EN) in Norway and other Scandinavian countries. However, studies that compare adolescent immigrant groups (Sam and Virta, 2003; Sam, 2010; Oppedal et al,2005; Virta et al, 2004) with EN (Vaage et al, 2009; Sam and Berry, 1995; Oppedal and Røysemb, 2004; Sam, 1994; Lien et al, 2006) are scarce, and there are even fewer studies on adolescent immigrants and their somatic health status (Zahid et al, 2005; Zahid et al, 2008 Lien et al, 2009). This thesis includes the following research questions: Are there possible differences in reported health status and health behavior in ethnic Norwegian (EN) adolescents and adolescent immigrant groups from Pakistan, Somalia and Vietnam (PSV -immigrants)? Are there possible differences in reported health status and health behavior between EN adolescents and each of the three immigrant groups (Pakistan,

Somalia and Vietnam)? Are age of arrival in Norway and parental education predictors of reported health status or health behavior in any of the PSV-immigrant groups?

The thesis is structured as follows: Chapter 2 (Background) defines and describes the phenomena of immigration and migration both in a global and a national perspective. The chapter then defines health status and health behavior, particularly in immigrants. Known health differences between ethnic Norwegian (EN) and immigrant populations are described. This chapter also sheds light on immigrant adolescents and their particular health and social challenges. Chapter 3 (Methods) presents the research question, the study design, the study sample and variables, as well as the statistical methodology. Chapter 4 (Results) presents the findings. Chapter 5 (Discussion) focuses on the main findings and discusses weaknesses, strengths and possible explanations. Finally, chapter 6 (Conclusions) provides the main conclusions with suggestions for further research.

2. BACKGROUND

This section defines and gives an overview on migration as a phenomenon. Furthermore, it presents an overview on immigrants in Europe, Norway and Oslo with a focus on health status and health behavior.

2.1. Immigrants and migration - definitions and causes

An immigrant is defined by the international organization of migration (IOM, 2012) as a person who enters and settles in a country or region to which they are not native.[2] Migration is a process whereby one moves from one place to another or one country to another searching for a better life and permanent residence or for an extended period of time (Koser, 2007). Immigrants can be categorized by these parameters: 1) voluntary and forced migrants, 2) politically or economically motivated immigrants and 3) legal or illegal immigrants (Koser, 2007). There is a distinction between voluntary and forced migration. Forced migration can be caused by war, persecution, environmental problems and/or hunger. Another distinction is often made between people who migrate for political and economic motives. Examples of the first group are refugees who flee their country due to political instability or conflicts. Furthermore, a distinction can be made between legal and illegal migrants. Illegal immigrants are people who migrate either without documents, with forged documents or those who are at first staying legally in a country and then remain after their visa, work permit or study permit has expired (Koser, 2007).

The motivation for migration displays a spectrum of variation including economics, politics, family reunification, natural disasters, poverty or the wish to change one's surroundings voluntarily (IOM, 2008). Sarah Collinson in Burnett (2007) describes three main motivators of people who migrate. Firstly, migration is related to the economic situation whereby highly skilled managerial people and business personnel expand the global economy through international and financial institutions. Secondly, there is the liberalized commercial and labor migration, which likely rests largely on the states' joint understanding of open borders for a free flow of workers and products. The third motivation factor includes the majority of regular

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[2] Native – a person born in a particular place or country from two parents born in the same place or country (dictionary.com, 2012).

and illegal labor migrants. Their movement is unlike the other groups not protected by states. Their migration is a direct response to local conditions such as political, environmental, persecution, famine, economic or individual ties to the host country (Burnett, 2007). Push and pull factors for migration are described in table 1.

Table 1 Migration factors (Castle and Miller, 2009; Kristiansen, 2008).

Motives for migration	Push factors	Pull factors
Demographic growth Lack of economic opportunities	Poverty, lack of basic health services, unemployment, education, low wages and high fertility rates	Demand for labor, availability of land, professional or personal development, Prospect of higher wages Potential for improved standard of living
Political	Human rights abuse, porous governance, insecurity, violence, conflict and corruption	Political or religious freedom, security and safety
Social and cultural	Religious, gender or ethnical discrimination	Diaspora migration, freedom from discrimination and family reunification

2.2. Migration and brain drain[3]

People with high skills who happen to have a privileged life in the country of origin may still prefer to migrate. Among this group we find scientists, engineers, doctors, teachers, and nurses whose migration may have a positive impact on even rich destination economies (Burnett, 2007). Castle and Miller (2009) report that migration contributes to the economic growth, and welfare of the host nations, as by the creation of new jobs. Moreover, such migrants contribute with taxes and cause a higher level of employment and wages for the host nations (Castle and Miller, 2009). This is observed in selective migration, as in Canada where a number of immigrant families comprise occupationally-skilled, well-educated and healthy people (Beiser et al., 2002). In such selected migration, young, healthy and well-educated people leave their country of origin in favor of more developed countries affecting the host nation positively at the expense of the country of origin (Koser, 2007: Beiser et al., 2002). This phenomenon is often referred to as "brain drain" in migration theories (Koser, 2007). On the other hand, people who are negatively affected by migration are mostly low wage workers

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[3] Brain drain, or human capital flight, is a process where individuals with high skills or knowledge such as scientists and technologists emigrate (Castle and Miller, 2009).

and low-skilled people because they are not able to compete with the more highly-skilled immigrants (Castle and Miller, 2009).

2.3.   Migration in Europe

In Europe, most countries have experienced increasing levels of net immigration since the 1990's. The immigration flow has been continuous, due to family reunion, labor migration and refugees. For established countries such as France, Austria, Switzerland, Sweden, Germany, the Benelux countries, the United Kingdom (UK) and Denmark, net immigration has been the case since the 1960's. Germany has recently experienced a decrease in immigrant flow since the 1990's because of a very high level of influx in the early 1990's (OECD, 2007; Kristiansen, 2008).

Other countries became net receiving countries in the 1980's, such as Ireland, Spain, Portugal, Finland and Greece, largely because of growing economic prosperity and strongly restrictive policies in northern Europe which redirect immigrants. Recent inflow of labor migrants to Portugal, Italy and Ireland shows that those countries have preserved a high level of migration since the 1990's (Kristiansen, 2008).

Various former socialist countries in the EU became transit countries for immigrants attempting to enter countries with better and more solid economies. Estonia, Latvia, Poland, Hungary, the Czech Republic, Lithuania and Romania are examples of countries that serve as transit countries. Countries that recently have joined the EU and experienced political stability and economic growth have also become destination countries for immigrants. Since 2001, countries like Slovenia, Hungary, Slovakia and the Czech Republic have experienced an increase in net migration (Kristiansen, 2008; GCIM, 2004).

2.4.   Migration in Norway

The number of immigrants and Norwegian-born to immigrant parents has grown rapidly during the last four decades in Norway from 1.5% of the population in 1970 to 9.8% in 2008 (SSB, 2009). Immigrants first came to Norway from low- and middle-income countries in the wake of the discovery of oil in the North Sea. During this period, the first immigrants came to Norway from Pakistan and Turkey between 1967 and 1970 as labor immigrants and met an increasing demand for industrial labor (Vassenden, 1997). By the end of 1992, the immigrant population in

Norway was 183,000 or 4.3% of the population. By 2006, immigration and the birth surplus increased the population in Norway by 17,300 people. Migration from Poland, Afghanistan, Iraq, Somalia and Lebanon was the main cause of this growth (UDI, 2006).

In 2013, the immigrant population constituted approximately 710, 465 people, making up 14,1% of the whole population. The largest group of immigrants in Norway is Polish with 77,000 people; followed by 35,600 Swedes; and the third largest group with 28,600 Lithuanians. From other parts of the world, 231, 872 people come from Asia and Turkey; 88,764 from Africa; and 21, 486 people have a Latin American background (SSB, 2013). Figure 2 shows the largest foreign groups in Norway in 2013.

Figure 2 The ten largest groups with foreign citizenship (SSB, 2013).
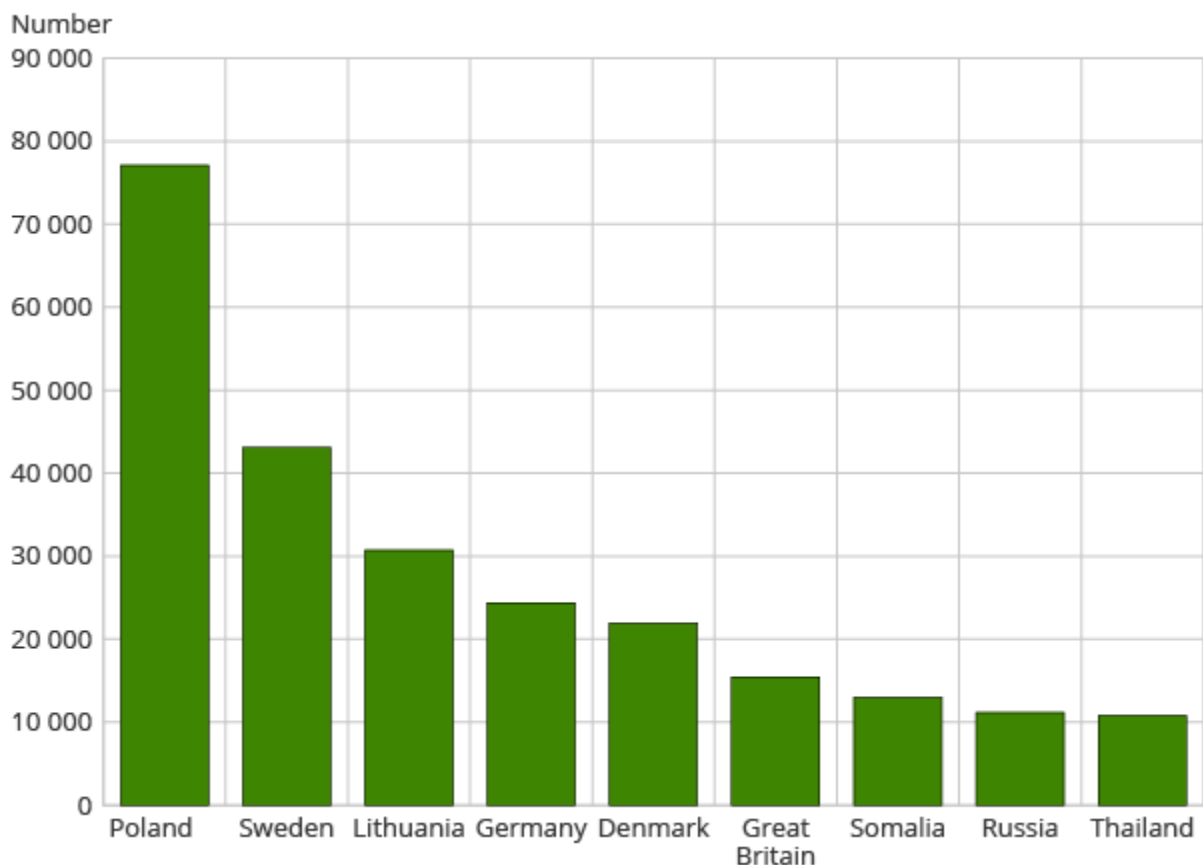
2.5.   Migration in Oslo

Oslo is the capital of Norway. It is also a county and a municipality with 624,000 inhabitants. According to Statistics Norway (SSB, 2013), 30% of the population in Oslo is immigrants, which makes Oslo the municipality with the highest concentration of immigrants in Norway. Approximately 50% of immigrants in Oslo stay in the eastern part of the city. 18% of immigrants in this area have an Asian background, and 5% are of African origin. In the western part of Oslo the concentration of immigrants is lower. Apart from ethnic Norwegians, immigrants who stay in this part of Oslo have a background mainly from Poland, Sweden, Germany and other EU/EEC countries (SSB, 2013).

Migrants are not a homogenous group (Abebe et al., 2010) but differ in age, gender and nationalities, and adapt differently to new cultures depending on their background and immigration history. (Zhou, 1997; Abebe et al., 2010; Pumariega et al., 2005). They all have individual ethnic, family and social values, health status and health behavior perceptions, beliefs in coping with life and experiences in accessing health care resources. These elements influence health status and health behavior among immigrants as well as their general situation.

Figure 3 shows the distribution of immigrants in Oslo; Outer West [3.3%, red area], Inner West [3.3%, yellow area], Inner East [17.7%, pink area], and Outer East [75.7%, blue area].

Figure 3 Distribution of immigrants in Oslo (Kumar et al, 2008).
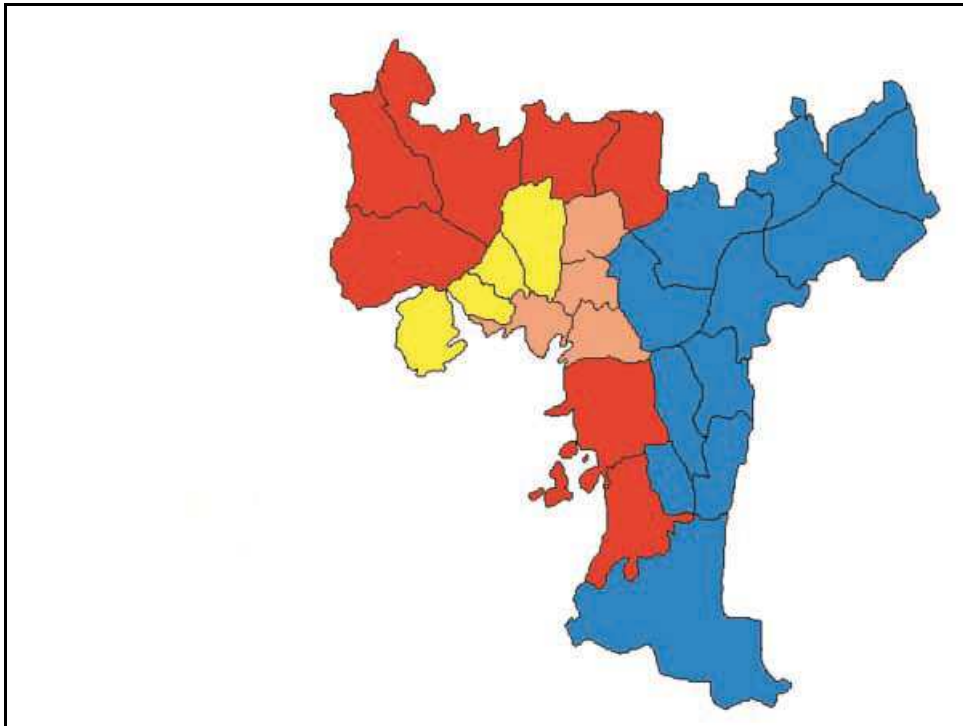
2.6.   Migration and the social environment

Migration affects people and societies in both positive and negative ways. A migrant's health status and health behavior are influenced by the new society, due to a new environment, new socio-demographic factors, uncertainty, socio-cultural and socio-economic status, acculturation, changes in nutrition, and access to needs and services (Reardon-Anderson et al., 2002, Kasl & Berkman, 1983, Holmboe-Ottessen, 2009, Friss & Persson, 1998).

Migration affects the living condition and conduct of specific parts of immigrant groups from less developed countries who emigrate to the more developed parts of the world. Fluency in the host population language can facilitate the cultural adjustment process (Holmboe-Ottesen, 2009). Bhugra (2003) mentioned that not knowing the verbal and non-verbal language fluently can have an impact on cultural adjustment and distress. Once in the host country, the situation can be improved or worsened depending on the nature of immigration and the social integration policy, such as integration or marginalization, implemented in the host country. The distance from natives and the host cultures as well as aspirations can be challenging for immigrants, especially for those who shift from a collectivistic way of living to Western

communities with a more individualistic culture (Kasl & Berkman, 1983, Virta & Sam, 2002; Markides, 2001).

The process of immigration may promote positive health effects termed as the "health immigrant effect"[4] (McDonald and Kennedy, 2004). This explains the relatively low mortality rates and good health among Mexican Americans as compared with native Americans in the USA (Lou & Beaujot, 2005; Escobar et al., 2000). Low mortality rate among Mexicans is also related to genetics, low alcohol consumption and low smoking in general (Markides & Coreil, 1986). This is also supported by Lou & Beaujot (2005), who studied the "health immigrant effect" and mental health of immigrants in Canada. Results from this survey concluded that immigrants in Canada on the whole are healthier than the native Canadian population (Escobar et al., 2000; Lou & Beaujot, 2005). Immigrants with shorter stays are healthier than ethnic Canadians, as compared with immigrants who have stayed longer (McDonald et al & Kennedy, 2004). Similarly, in the USA, the first generation Mexican immigrants report better mental health than subsequent generations, despite socio-economic disadvantages (Escobar et al., 2000).

By contrast, other studies suggest that the positive effects noticed among immigrants might be caused by fewer population samples among different immigrant groups, diverse uncontrolled factors or reporting errors (Lou & Beaujot, 2005; Lerman – Garber et al., 2004). Other studies suggest that the "healthy immigrant effect" is a result of selective immigration (Beiser et al., 2002), whereby young healthy people are more predisposed to immigrate than less healthy older people (Beiser et al., 2002). This concerns particularly labor migrants who are relatively healthy and who have a positive outlook on their lives (Markides, 1983; Beiser et al., 2002).

2.7.   Adolescent immigrants and the social environment

Even though there has been a substantial number of scientific reports on adult immigrant health, to the author's knowledge there are few reports on adolescent immigrants' health status and health behavior in Norway (Blom 2005/2006; Immigrant-HUBRO, 2000/01). Adolescents are emotionally vulnerable and are affected in a different way by migration as

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[4] The "Healthy immigrant effect" is an observed time path in which the health of immigrants just after migration is substantially better than that of comparable native-born people, but worsens after years in the new country (McDonald and Kennedy, 2004).

compared with adult immigrants. The quality of an immigrant's health varies with variables such as the level of education, acculturation, language skills, income, experienced discrimination and work environment. Those with a strong socio-economic position have better health (SSB, 2010; Næss et al., 2007).

Adolescents of immigrant background make up a big proportion of the population of Norway. In Oslo, every third person under 25 years of age has an immigrant background or is a descendant of immigrants. By the end of the year 2009, 11% of the population under 20 years of age had an immigrant background compared to 1% three decades ago (SSB,2010).

Education

There is an increasing tendency in Norway among adolescent immigrants to take a high school or college/university education. The proportion of both immigrant adolescents and ethnic Norwegians (EN) taking education is almost equal (Dzamarija, 2010). Henriksen (2010) reported that 30% of Pakistani boys took higher education in 2008 compared to 17% in 2000. The same study showed that 39% of the girls took higher education compared to 18% in 2000. The same figures are found among Turkish immigrant adolescents.

 A new report from NOVA (Norwegian Social Research) recently confirmed the same tendency. In this report, immigrants from China, Sri Lanka and India performed better in school compared with ethnic Norwegians (EN). EN shared the fourth place on the list with adolescent immigrants from Vietnam in school grades (Bakken & Elstad, 2012).

It is known that adolescents from Asia perform well in school and in a social setting (Yeh, 2003). This may be associated with their family values and structure. Vietnamese adolescents show deep respect for their family obligations. Their culture and education generally follow Buddhism and Confucianism. In this environment, children grow up in a collectivistic family setting where parents have high aspirations for the adolescents. They follow the parents' advice and respect cultural structures (Yeh, 2003). This trend is also observed among Turkish and Pakistani immigrants who follow traditional Islamic customs in a patriarchal family structure (Baken & Elstad, 2010; Virta & Sam, 2002). Mexican immigrants in the USA share the same family structure (Escobar & Randolph, 1982). The following Table (Table 2) presents the mean of grades among immigrant groups and EN.

Table 2 10th grade results from different groups in Norway (NOVA, 2012).

Country	Mean of grades from 13 courses from 10th grade 2009 – 2011
China	4.29
Sri Lanka	4.22
India	4.20
Vietnam	4.05
Norway *(Ethnic Norwegian)*	**4.05**

Scale: 1-6 (6 is the best).

Discrimination

Immigrant adolescents may face discrimination and racism in various sectors because of their foreign names. Even if they are born and raised in Norway, their names reflect an immigrant background and they may not be invited for job interviews (Jareg, 2009). Moreover, adolescents may experience bullying in schools because of being a different color, or exhibiting cultural or social behavior unlike that of EN (Jareg, 2009). According to Statistic Norway's survey (2005-2006) on "living conditions among immigrants," half of the immigrants in Norway have experienced discrimination in one or several areas in life. Most of them experience discrimination in housing and labor. Others meet discrimination in educational institutions. Seven percent report discrimination in the health sector due to their background. Adolescents also face discrimination in leisure activities. Gender differences are noticed. Women are less discriminated against than men, and men are more frequently harassed by the police. Differences between immigrant groups from different countries are noticeable (Blom & Henriksen, 2008; Spilker & Aambø, 2009). Discrimination affects adolescent immigrants negatively by increasing risk for mental health problems. Migrant adolescents may show psychiatric disorders, internalising or externalising problem behavior or report more depression and anxiety symptoms than ethnic Norwegian adolescents (Gonneke & Vollebergh, 2008).

Income

Significant differences are found within immigrant groups concerning income (Blom & Henriksen, 2008). Immigrants with a background from Western Europe, North America, Australia and New Zealand have the same income as ethnic Norwegians. The only difference is found among adolescents age 18 to 24 where the immigrants earn less money. Immigrants from Africa, Asia, Latin America and Eastern Europe have lower income on the average (Blom & Henriksen, 2008; SSB, 2010; Spilker & Aambø, 2009). The survey "children and youth with immigrant parents, demography, living conditions, income and work market" (Dzamiraja, 2010) found that 25% of adolescent immigrants under 18 years have a low income. Somalis, Iraqis and some Pakistanis and Turkish immigrants are most exposed to this phenomenon, according to this survey.

The highest income is noticed among nationals from Bosnia, Vietnam and Sri Lanka (Blom, 2005/2006; Dzamiraja, 2010). In 2006, this group had a level of income which corresponded to more than 80% of the general income of the population. The income of immigrants from Somalia and Iraq was 60% (Daugestad, 2008; Spilker & Aambø, 2009). The income difference may be associated with background, length of stay in Norway and the reason for migration as well as the labor market (Spilker & Aambø, 2009).

Employment

There are also major differences concerning the proportion of immigrants who are employed. The percentage of immigrants with employment was 57% in 2008 compared to 75% in the whole Norwegian population. 23% of immigrants have temporary work (Blom, 2005/2006). Immigrants are well represented in occupations with no formal educational requirement and are clearly under-represented in occupations with a formal demand for higher education (Blom, 2005/2006; Dzamiraja, 2010; Spilker & Aambø, 2009). Statistics Norway (2008) shows that the proportion in both groups of adolescents between 16 and 19 years who are working and those who take higher education is 90% among immigrants and 94% among EN (Dzamaria, 2010; Spilker & Aambø, 2009; Blom, 2005/2006).

2.8. Health status and health behavior

This section gives a definition of health status and health behavior and an overview of health expenditures in Norway and health problems among adolescents in Norway.

Health is a complex phenomenon that can be defined or delineated in various ways. Ingstad (1997) says that health is culturally dependent. Some national perceptions of health problems might be considered as accidental or as destiny. However, in the developed world, health has been defined as absence of disease or the general condition of a person's mind, body and spirit to be free from pain, illness and injury. The World Health Organization (WHO) defined health in 1946 as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (Grad, 2002). This definition may cover people with or without diseases or infirmities, since individuals who experience a disease or infirmity can still reckon their health as good. The Norwegian medical dictionary (1996) defines good health as physical and emotional well-being and good adaptation to society. Both definitions highlight the condition of well-being.

Health behavior is defined as an action taken by a person to maintain, attain or regain good health and to prevent illness. Health behavior reflects a person's health beliefs (The Free Dictionary, 2012).

2.9. Health expenditures and life expectancy in Norway

Anderson & Frogner (2008) rate Norway as the third best country in the world in terms of high expenditure per capita on health care. Health expenditures in Norway per capita have increased between 1990 and 2003 from NOK 13,000 to NOK 20,000 per person, which means that both public and private health expenditures constituted 17% of the government's expenditures (Svalund & Kjelvik, 2004).

Despite the fact that Norway's health expenditures are large, the health care sector deals with various problems such as the high prevalence of mental health and diabetes in immigrant groups, cancer- and coronary-related health problems and allergies in the Norwegian population (Kumar et al., 2008; Blom, 2010; SSB, 2010 Svalund & Kjevik, 2004;). The EN population has a high burden of physical chronic illnesses such as respiratory, heart and coronary illnesses and cancer (Svalund & Kjevik, 2004).

Life expectancy has increased significantly during recent decades in Norway. Life expectancy for men has increased from 71 years in 1970 to 78.2 years in 2007. Life expectancy for women has grown from 77 years to 82.7 years in the same period of time. This trend is related to a generally low infant mortality and declining prevalence of heart- and coronary-related problems through these decades. Despite the health status improvement, various health problems such as cancer, mental problems and heart problems are common in Norwegian society (SSB, 2010). But this applies primarily to specific forms of cancer and psychogenic health problems among younger generations. There are striking international and geographical differences in life expectancy, and this is also the case for Norway (Ramm, 2009).

"Pull and Push" factors for life expectancy are well described in the Dybedal & Skiri (2005) survey on life expectancy in Oslo. The study describes push factors for higher life expectancy - reduced fatalities among old people, fewer cases of heart and coronary diseases and better living conditions. Life expectancy of both men and women has increased in the same manner. This can be explained by improved living conditions, life style and occupational exposure (Dybedal & Skiri, 2005).

Pull factors for life expectancy are described in Svalund & Kjevik (2004) in their study of health. They state that a person's life condition is worsened by socio-economic factors. Health indicators such as physical chronic illness and the level of self-assessed health affect a person's life and way of living. Furthermore, work environment, housing, health and lifestyles over time create health-related differences in the population. Health is affected by health behavior.

2.10. Common health problems in adolescents

There is a high prevalence of allergy and respiratory health problems as well as mental problems both moderate and heavy, and obesity in adolescents. One survey shows that 21% of adolescents between 16 and 24 years of age have reported having respiratory problems in 2002. 10% of adolescents have experienced chronic physical illnesses which also increase as they get older (Svalund & Kjelvik, 2004). As for obesity, 12% of girls aged fifteen report being obese compared with 9% of boys of the same age (ungdata, 2010). Atopic illnesses are common in the adolescent groups and 24% to 45% have reported atopic illnesses. Asthma

prevalence has steadily increased in Norway since the first report of 0.4% in 1948 (Claussen,1948; Lauritsen et al., 2000). A study by Carlsen et al (2005) on asthma in children (N=3754) age 10 reports that every fifth child in Oslo has asthma. Other results in this study show that the lifetime prevalence of asthma was 20.2%, current asthma was 11.1% and 16% of people reported being diagnosed with asthma and those with wheezing 30.3%. The prevalence of allergies, asthma and eczema can be influenced by various factors such as environmental change, climate infections, dietary factors and pollen (Asher et al., 2006).

2.11.   Immigrant health status

In recent decades, different surveys have been conducted focusing on immigrants' mental and physical health compared to that of ethnic Norwegians (Abebe, 2010). In 2000 – 2001, a population survey was conducted. The Oslo Health Study (Ung - HUBRO) and the Oslo Immigrant Health Study (Innvandrer - HUBRO) were conducted in (2002) under the Norwegian Institute of Public Health. These studies presented information about immigrant health in terms of self- reported health. They also included physical and clinical examinations (Syed & Vangen, 2003).

 Results from the many conducted surveys report that immigrant physical and mental health in general is poorer than that of ethnic Norwegians (Abebe, 2010). As an example, the results from the Oslo Health Study (2000-2001) and the Oslo Immigrant Health study (2000) show that immigrants from Vietnam, Sri Lanka, Pakistan, Iran and Turkey report more mental health problems than are reported by ethnic Norwegians. More than 40% reporting afflictions in these studies are women. This result corresponds with Sagatun et al., (2008).

Other studies have shown no significant differences in mental or physical health between immigrants and the EN population (Lien et al., 2007; Sam, 1994; Lien, 2008, Kessler, 1994: Virta & Sam, 2002). On the other hand, some studies found no differences in health status and behavior in groups of immigrants with a culture that is similar or close to that of ethnic Norwegian culture and social life (Ung-HUBRO, 2000/2001). Also, some studies have shown that immigrants have better health status than that of EN or that they have better health despite their lower socio-economic status (Voelker,1994;Vega et al., 1993; Vaage et al., 2009).

However, differences are observed between immigrant health in the host country compared to the health of people back home in the country of origin. To illustrate this, a newly published survey called "Cardiovascular risk factors and predicted risk of cardiovascular health problems among Sri Lankans living in Norway and those living in Sri Lanka" shows that Sri Lankans living in Norway have a lower risk of cardiovascular illnesses compared to those living in Sri Lanka. This is explained by the fact that the nutrition of Sri Lankans in Norway contains healthier fat and there is a higher prevalence of physical activity compared to that found in the home country (Tennakoon, 2012).

2.11.1. Diabetes and obesity

There is a high prevalence of obesity among immigrants, particularly among those with Sri Lankan and Pakistani background as shown by Kumar et al (2008). In this study, Norwegians and the Vietnamese reported the lowest percentage of obese cases. The occurrence of diabetes among Pakistanis is higher than that found among EN. So there are major differences regarding diabetes and obesity among groups of immigrants in Norway (Larsen, 2000).

Immigrants in Norway have a high prevalence of diabetes. Results from the Immigrant-HUBRO survey conducted in 2002 show that 80% of the people with a Pakistani background who live in Norway have a BMI[5] over 25/kg/m2 which is characterized as overweight (Immigrant-HUBRO, 2002; WHO,2006). Obesity and overweight are serious risk factors for diabetes. Zahid et al. (2011) found in a comparison study among Pakistanis in Norway and in Pakistan that immigrants with a Pakistani background are significantly more overweight and obese with BMI between 25 - 30 and above 30. Gender differences are also noticeable among Pakistani immigrants in Norway. One study reported that more than 50% of the Pakistani men are obese. Syed (2003) & Næss (2007) also mentioned that the prevalence of obesity and diabetes among Pakistani women is high. Furthermore, women of Sri Lankan and Pakistani background in Norway reported the greatest proportion of central obesity. In contrast, people with Vietnamese background reported the lowest BMI and obesity (Kumar et al., 2008).

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[5] BMI (Body mass index) = Mass (kg) divided by height (m2). The BMI is considered as overweight when it is between 25- 30. BMI between 30 – 35 shows moderate obesity, BMI between 35 – 40 shows severe obesity, BMI over 40 shows very severe obesity (WHO, 2006)

Diabetes mellitus type two is more common among South Asian immigrants in Europe compared with other immigrant groups. This is also the case in Norway and in the UK as reported by Jenum et al. (2005) and Barnett et al. (2006). Women of Pakistani background reported the highest prevalence of diabetes among all immigrant groups in the study. Gender variation is also noticeable since women tend to report more diabetes than men. Nutrition and obesity are major factors that promote diabetes among this group. For example, women of Pakistani background in Norway reported that they had gained 16 kg since the age of 25 (Holmboe-Ottesen, 2009).

2.11.2. Physical self - assessed health

A person's perception of self-assessed physical illness may be related to actual clinically measured health status or might be affected by the immediate situation such as adjustment after a period of illness. Also, self-assessed health may be influenced by physical and illness symptoms or by life-satisfaction (Vilhjamson,1993). In order to understand the context of self-assessed health, social support is an important explanatory variable to understand. Social support may affect a person directly in that people with strong support evaluate their health strongly. Indirectly, social support affects physical self-assessed health by increasing positive health behavior. Social support may also influence one's mental health in some, whereas other people with less support from parents and others display poor self-assessed health (William et al., 2001:Vilhjamson,1993). Gender is also an important variable; girls tend to report inferior physical self-assessed health compared with boys (William et al.,2001). In Norway, Somalis emerge as the national group with the best physical self-assessed health compared with other immigrant groups (Blom, 2005/2006). Interestingly, the population of Oslo estimates their physical self-assessed health to be good compared with that of people in other regions of Norway. As for immigrants in general, physical self-assessed health is lower compared with that of EN (Grøtvedt & Gimmestad, 2003).

2.11.3. Asthma, allergy and eczema

Allergy is a collective term of allergic problems of the eyes, nose, trachea, skin and gut (Medical dictionary). Some types of allergy such as hay fever are characterized as health problems in the respiratory system and others such as hives are in the same groups as dermatitis skin conditions (The Norwegian Directorate of Health, 2005). Blom (2008) reported that three out of ten ethnic Norwegians experience allergic problems. The proportion

among immigrants differs. In this group, two out of ten people reported allergic problems. Further, within immigrant groups, four out of ten people from Chile and Vietnam reported allergies, while immigrants from Somalia reported the lowest prevalence of allergic problems (Blom, 2008).

Asthma is a chronic inflammation of the lower respiratory tract that causes narrowed airways and symptoms such as tightness and wheezing in lungs (Medical dictionary). Blom's (2008) survey of health among immigrants reported that there was a higher prevalence of asthma among the ethnic Norwegians compared with immigrants. The proportion who had asthma among the immigrants was 7%, compared with 10% among ethnic Norwegians. A difference between different immigrant groups existed. Immigrants from Chile reported a higher prevalence of asthma. 17% of the immigrants from Chile reported asthma versus 3 to 4% among the immigrant groups from Somalia, Iraq and Bosnia (Blom, 2008).

According to an internet health dictionary (Lommelegen.no), eczema is a collective term for various skin conditions where the skin is itchy, red, swollen and flaking. Blom (2008) conducted a survey in 2006 of immigrants' health in Norway. This study reported that among all the groups of immigrants studied, 7% reported that they had eczema, versus 10% among ethnic Norwegians. However, only 3% of the Somali immigrants reported eczema compared with 13% of the immigrants from Chile (Blom, 2008).

2.11.4. Mental health problems

Mental health problems are an increasingly common health issue in Norway (Blom, 2005/2006). In children under 12 years, more boys than girls report having mental health problems. For those between thirteen and eighteen years, two out of three with mental health problems are girls, who basically suffer from anxiety disorders and depression. In the age group 16 to 24, no differences are found between immigrants and ethnic Norwegians (EN). Differences in mental health problems occur in immigrant groups from age 55 and up (Pedersen, 2011). Common mental health problems in adolescence are depression, anxiety, behavioral disorders, psychosis, ADHD, learning disabilities and autism (Mathiesen, 2008).

There are debates on the issue of mental health among immigrants. For instance, according to Blom (2005/2006; Blom, 2008; Blom, 2010) and Sagatun et al. (2007), the prevalence of mental health problems is 27% higher in adolescent immigrants from age fifteen throughout

the teenage years than in the ethnic Norwegian population (see Figure 5). Differences are also found within immigrant groups. For example, immigrants from Iran, Chile and Iraq reported a higher prevalence of mental health problems than did the other immigrant groups. Interestingly, Somalis,Vietnamese and Sri Lankans have the lowest prevalence of mental health problems (Vaage et al., 2009; Blom, 2005/2006). Within all immigrant groups, Somalis report better mental health compared with immigrants from Iraq, Iran, Pakistan, Turkey and Sri Lanka (Blom 2005/2006). In contrast, Vaage et al. (2009) report that self – perceived mental health of second generation Vietnamese in Norway was better than that of ethnic Norwegians. The following figure (Figure 4) shows the proportion of mental symptoms such as melancholy, oppression, hopelessness, anxiety and nervousness in both the immigrant population and ethnic Norwegians.

Figure 4 : The percentage of respondents with different mental symptoms. Source: (SSB, 2005/2006; Living conditions among immigrants, 2002/2005/2006)
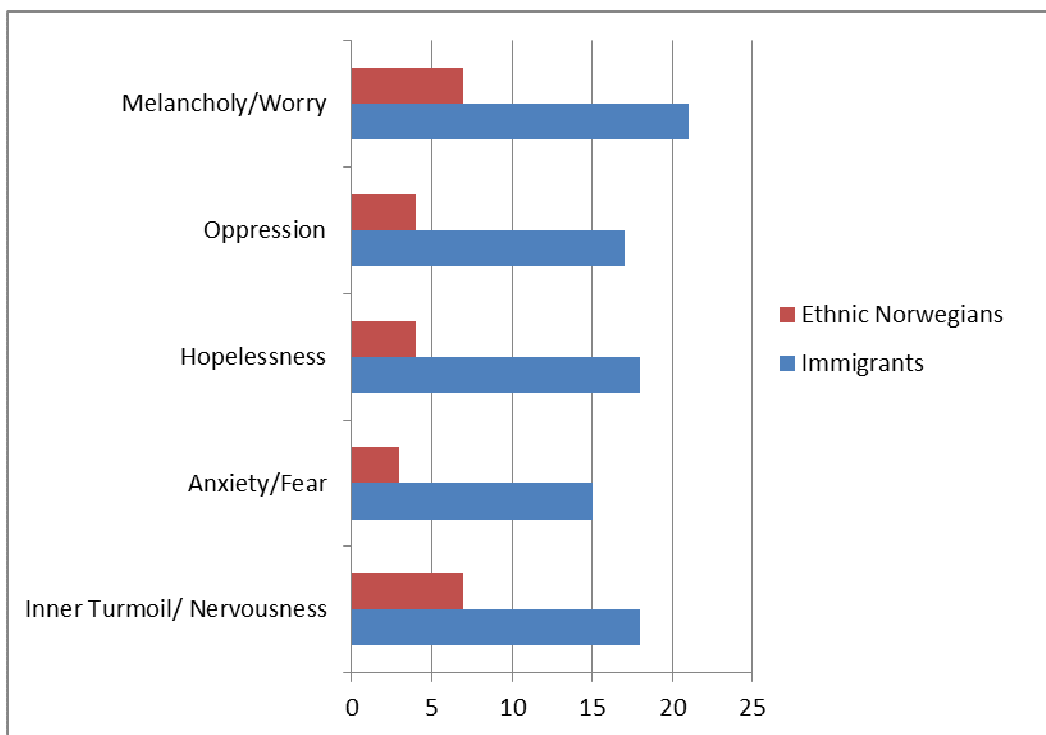

Figure 4 clearly shows that immigrants (marked with blue color) are overrepresented in the listed variables as compared with ethnic Norwegians[6] (marked with red color). However,

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[6] IMDI (2009) define ethnic Norwegians as people who are of ethnic Norwegian origin

large gender differences as well as differences among groups of immigrants are noticed both in the adult and adolescent population (Blom 2005/2006; Blom, 2008; Blom, 2010; Kumar et al., 2008).

Mental health in adolescent immigrants

Adolescents experience extra stress due to the physical and emotional changes in this period of life. Oppedal and Røysemb (2004) reported that adolescents experience stress as a result of school, parents and peers, which are the major predictors of distress and mental health problems. In that regard, the family situation plays a major role in individual adaptation (Bhugra, 2003). Individuals living alone in the host country may experience distress and lack of emotional support. Also, they may experience more pressure from family expectations and expectations in the host society of adapting to the new environment, and these in turn produce mental health problems (Bhurga, 2003; Sam & Virta, 2003; Oppedal & Røysemb, 2004). Being unable to adapt to the host culture might result in mental problems such as low self-esteem, depression, intergenerational conflicts or physical illness (Yeh, 2003). Further, moving from a collectivistic to an individualistic culture can have detrimental effects on mental health, basically caused by culture shock (Yeh, 2003, Sam & Virta, 2003; Oppedal & Røysemb, 2004).

Pumariega et al (2005) illustrate various stressors that immigrants experience as a result of the migration process. Acculturation[7] stress is specifically essential in order to understand the process of cultural adjustment. In order to adapt to a new culture, the acculturation process and strategies[8] help to determine how immigrants manage to maintain or reject their own culture, avoiding cultural conflicts while protecting their own cultural values (Yeh, 2003; Pumariega et al., 2005). Adaptation depends mainly on the character of migration policy performed in the host country. Adaptation and acculturation strategies such as

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[7] Acculturation refers to the manner in which individuals negotiate two or more cultures (Yeh, 2003).

[8] Acculturation strategies are assimilation, marginalization, integration and separation. Assimilation is understood as a total rejection of a person's cultural values in favor of embracing the foreign or the dominant cultural practice. Marginalization is understood as an adaptation strategy whereby a person embraces neither his/her own nor the majority's cultural practice. Integration implies conservation of one's own cultural identity while participating in majority cultural norms and values. Separation strategy implies valuing one's own culture and avoiding the cultural norms of the majority population. (Yeh, 2003;Berry, 1990)

marginalization, integration, separation or assimilation are important strategies that help determine migration impact on mental health (Yeh, 2003; Gonneke & Vollebergh, 2008). However, acculturation stress is related to an individual's willingness to maintain his or her own cultural identity or adopt the majority culture as well as to the length of contact with the host population (Yeh, 2003; Sam, 1994; Berry, 1990).

Sam (1994) mentioned that the acculturation strategy adopted by an individual contributes to the shaping of his or her mental health. Adolescent immigrants who adopt integration as their acculturation strategy report less depressive tendencies, fewer psychological and somatic symptoms and perceive themselves as healthier and happier than adolescent immigrants who adopted marginalization as a strategy. Virta, Sam & Westin (2004) similarly found that Turkish adolescents in Sweden reported better health when adopting integration compared to their peers in Norway who adopted marginalization and perceived discrimination (Virta et al., 2004).

2.12.   Immigrant health behavior

Health behavior or lifestyle factors such as smoking, physical inactivity, alcohol consumption, are major health behavior variables when considering immigrants' health status (Lantz et al., 1998). Good health behavior established early in life is an important basis for reducing the risk of health problems. Risk factors often remain unchanged or rise across the lifespans (Grøtvedt, 2002). Studies conducted in Norway have shown that the above-mentioned risk factors have a major impact on a person's life expectancy when they occur as an ensemble. Moreover, they are core factors for health inequalities in Norway, where surveys have shown that smoking, physical inactivity, obesity and diabetes are strongly related to social status (Grøtvedt, 2002; Jenum et al., 2005; Kumar et al. , 2008; Næss et al., 2007).

This section is about various forms of health behavior such as alcohol consumption, smoking, physical activity and nutrition.

2.12.1.   Use of snuff and drugs, smoking and alcohol consumption

In general, there is a higher prevalence of cannabis use, tobacco and alcohol use in the western part of Oslo with a majority of ethnic Norwegians than in the eastern part of Oslo with a high concentration of immigrants (Grøtvedt & Gimmestad, 2002). There is considerable variation in smoking and alcohol consumption among immigrant groups and

ethnic Norwegians (EN). In general, immigrant men smoke more than immigrant women. However, ethnic Norwegian (EN) women smoke more than men. Among immigrant groups that were studied, Turkish immigrants smoke more than EN. Men with Iranian, Vietnamese and Pakistani background smoke more than women (Kumar, 2008). The following figure (Figure 5) shows the proportion of alcohol consumers in both men and women in ethnic Norwegians and in different immigrant groups.

On the other hand, women from Sri Lanka, Pakistan and Vietnam smoke slightly less than Norwegian women. Women with Sri Lankan background have no smokers at all and both men and women have the highest proportion of nonsmokers. Among Pakistani and Vietnamese immigrants, women's percentage of smokers is low (Næss, 2007; Kumar, 2008).

Alcohol consumption is generally low among all immigrant groups compared to EN. Immigrant men consume low alcohol quantities and 90% of women with Turkish, Sri Lankan and Pakistani backgrounds report that they have never consumed alcohol or only less than once a month. The percentage is lower among men, where 50 – 60% of other immigrant groups reported low alcohol consumption (Kumar, 2008).
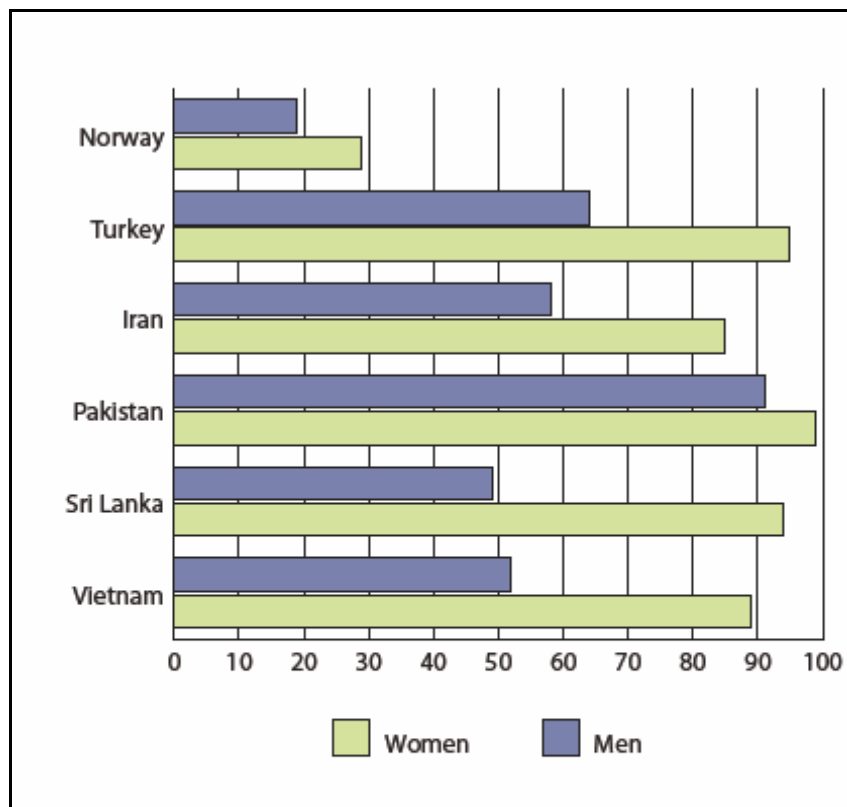
2.12.2. Nutrition and regular physical activity

Physical activity is an essential determinant in every individual's life as it reduces the risk of serious health problems. There is a remarkable gender difference between immigrants and ethnic Norwegians (EN) regarding physical activity. Gender variation is noticed in both groups; immigrant men tend to be less active than women. In contrast, EN men tend to be more sedentary than EN women. However, one out of two in all immigrant groups is inactive compared to one in five in ethnic Norwegians. The highest percentage of inactivity is reported among men with less education with Turkish, Pakistani or Vietnamese backgrounds (Næss, 2007; Kumar et al., 2008). Among adolescents, one out of six girls participates in organized sports activity compared to 41% among EN, says the minister of culture in Norway, Hadia Tajik (DB, 2013). The fact that few girls with immigrant background participate in sports depends on the parents' cultural and social expectations.

People tend to change nutrition habits after migration, as shown in the immigrant -HUBRO (2002) report. This happens because of better or worsened financial resources, taking on a host nation's nutrition habits or simply because the traditional food is missing in the host

country. In the Pakistani group in Norway, it was reported that they consume fewer warm meals per day, have a high intake of soft drinks and eat less vegetables and fruits compared to Pakistanis living in Pakistan. As nutrition among Pakistanis had changed, the prevalence of D-vitamin deficiency, obesity and diabetes is higher in this group compared to Sri Lankans, for instance (Holmboe-Ottesen, 2009).

3. DATA AND METHODOLOGY

In this section I am going to present the research questions, the study area and the sample population of this study. Furthermore, I will describe my study design, the data collection and statistical methodology.

3.1.   Research question and study objectives

The aims of this study were: 1) to study possible differences in reported health status and health behavior between adolescent ethnic Norwegians (EN) and adolescent immigrants from Pakistan, Somalia and Vietnam in Norway; 2) to study possible differences in reported health status and health behavior between EN and each of the three immigrant groups (Pakistan, Somalia and Vietnam); and 3) to study whether the age at arrival in Norway or parental education is associated with reported health status or health behavior for any of the three immigrant groups.

Health status is measured by the following three variables: (1) self-reported health, (2) depression symptom score, (3) a history of allergy, asthma, eczema or any other chronic illness. Health behavior is measured by the following five variables: 1) regular physical activity, 2) smoking, 3) alcohol consumption, 4) illicit drug use and 5) eating problems score.

3.2.   Study design and data collection

NOVA in cooperation with the city of Oslo (one of the seven national 'Drug Competence Centers') carried out a cross-sectional study about living conditions and upbringing of youths in Oslo ("Ung i Oslo", NOVA, 2006). This thesis is a study of data extracted from a subsample of that survey. The aim of the 2006 survey was to provide a general picture of health status and health behavior among adolescents; it resulted in a status report on immigrant and ethnic Norwegian adolescents and their living conditions.

The participants in the original survey were adolescents from 67 schools in Oslo: primary school pupils from the ninth and tenth grades and students from the first year of upper secondary school. The sample population of 11,500 youths was fourteen to seventeen years of age. The response rate was 93%. Living components included in the questionnaire included criminality, family relations, poverty, mental and physical health, use of various drugs, violence, bullying, coping and adaptation in school, and household composition. Students

with limited language skills were excluded from the study as the study focused on immigrants who had stayed in Norway for a certain period. After responses, the questionnaires were collected by the research assistants and 455 of the questionnaires were characterized as incomplete. The original study included 8002 ethnic Norwegians (EN) and 3043 students with an immigrant background. The immigrant groups' distribution was as follows: 396 from Europe; 2008 from the Asian continent, where the most important countries were Turkey, Sri Lanka, Pakistan, India, Iran and Vietnam; 557 from the African continent, with the important countries being Somalia, Morocco, and the central and the northern part of Africa; 79 from the USA; and 3 from New Zealand.

3.3.   Sample study groups

In this study, immigrants from three countries (Pakistan, Somalia and Vietnam) are firstly seen as one group compared with EN, then EN are compared to each of the three immigrant groups. Finally, age at arrival and parental education is studied as possible predictors of health status and health behavior. The immigrant group selection was based on the history of migration, immigrant group sizes and an attempt to represent different immigration continents.

Table 3 below shows age and gender proportions of the sample. Undertaking an ANOVA test showed significant differences between the groups (p=0.031). LSD[9] post-hoc test showed a significant difference between Norway and Vietnam (P= 0.018) and between Pakistan and Vietnam (0.014). However, there is no reason to believe that this difference in age is statistically significant for health or health behavior as it is only around 0.2 years.

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[9] LSD- Least significant difference

Table 3 Mean age and number of study groups in the sample population

Geographic background	N	Mean age and (SD)
Ethnic Norwegians	8002	15.3 (0.891)
Pakistan	862	15.3 (0.920)
Somalia	174	15.1 (0.895)
Vietnam	148	15.1 (0.878)
Total	**9186**	**15.3 (0.894)**

Gender distribution within the study groups is shown below in Figure 6. The proportion of girl respondents in the Vietnamese group is the highest (51.7%), but the gender distribution is not significantly different between the study groups (Pearson's Chi-square test; p=0.715).

Figure 6 Gender distribution of the study groups.
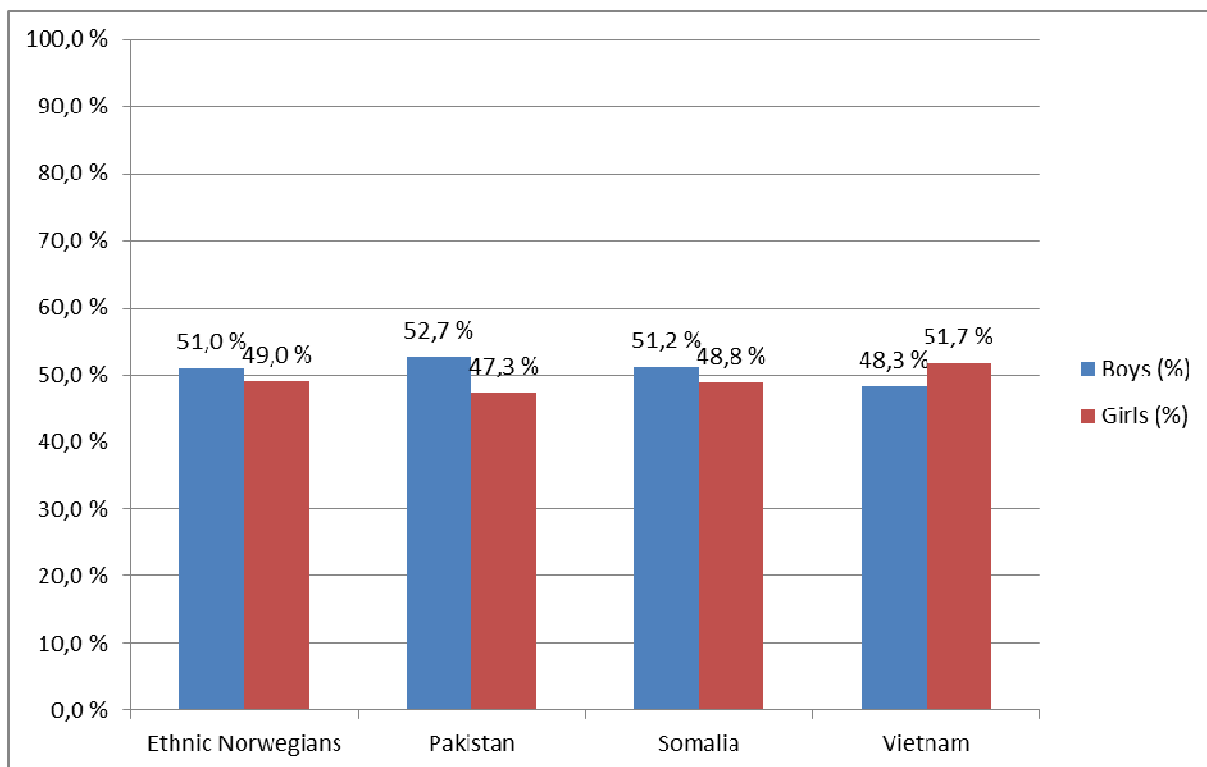
3.4. Health status variables

In the subsample, 6 variables were chosen from the survey measuring particular aspects of a person's health status (Table 4).

Table 4 The original six health status variables.

Variable name	Variable type	Possible responses
Self-assessed health	Categorical	1= good/excellent, 2= good, 3= neither or, 4= bad, 5= very bad
Depression symptom score	Continuous	Calculated from the response of the seven-item Hopkins Symptoms Checklist*
Asthma	Categorical	0= No, 1= Yes, I have/had asthma
Allergy	Categorical	0= No, 1= Yes, I have/had allergy
Eczema	Categorical	0= No, 1= Yes, I have/had eczema
Chronic illness	Categorical	0= No, 1= I have/had no chronic illness

*See appendix A.

The variable 'depression symptom score' was continuous and was not re-coded in any way. Depression symptoms were measured by seven items of the Hopkins Symptom Checklist. Using a four-point response scale ranging from 1 (corresponds very poorly) to 4 (corresponds very well), participants were asked to restrict their ratings to the preceding week. Values range from 1.0 - 4.0 and 1.0 is a sign of no depressive symptoms. High scores showed high levels of depressive symptoms.

The other variables were re-coded to facilitate the subsequent subgroup analysis used in order to detect significant differences.

The variable 'self-assessed health' was in the original questionnaire a multiple choice question about how the adolescent rates his/her health with five possible responses: 1 - good/excellent, 2 - good, 3 – neither 1 or 2, 4 - bad and 5 - very bad. The values 1 and 2 were re-coded into a dummy variable value of 0 (good or excellent health), and the values ranging from 3 to 5 were re-coded into 1 (Inferior health). Thus, the respondents were divided into two different categories: one category of persons with superior self-assessed health, and one group with inferior self-assessed health.

All the four variables for 'asthma','eczema,' 'allergy' and 'other chronic illness' were originally binary variables (yes/no). Respondents were asked if they had the illness (asthma, allergy, eczema or chronic illness). The respondents who responded with "No" to all of these question

variables were re-coded into dummy variable value 0 (and thus labeled "no chronic illness"), while the others were re-coded into 1 ("some form of chronic illness"). Thus, we divided the respondents into two categories. With this condensation of 4 variables into one variable this thesis includes a total of three health state variables.

3.5.   Health behavior variables and the predictor variables

In addition to the six health status variables, six health behavior variables were selected for analysis (Table 5). Some of these variables were also re-coded. Two other variables were selected as predictor variables.

Table 5 The six health behavior variables and the two predictor variables in the original survey.

Variable name	Variable type	Original multiple choice response design
Health behavior variables		
Smoking	Categorical	1= Have never smoked, 2= Have been smoking, but quit, 3= Smokes, but not daily, 4= Smokes daily
Alcohol use	Categorical	0= No use, 1= Use
Snuff use	Categorical	1= Have never snuffed, 2= Have snuffed before, but quit, 3= Snuffs, but not daily, 4= Snuffs daily
Cannabis use	Categorical	0= Zero times, 2= 1 or more times
Physical activity	Categorical	1= Yes, by myself, 2= Yes, in a sport organization, 3= Before, not now, 4= No, never
Eating problem score	Continuous	Calculated from the response on 7 specific questions*
Predictor variables		
Age at arrival	Continuous	0= EN, 1= Immigrants (Born in Norway), 2= 0-5 years, 3= 6+ years
Level of parents' education	Categorical	0 – 2 points per parent; no education= 0 points, high education= 1 points, college or university= 2points. The variable is the sum of both score (0 - 4)

*See Appendix A.

The variable *'smoking'* could originally attain several possible values. The respondents could choose between 1 – have never smoked; 2 – have smoked but quit; 3 – I am smoking, but not on a daily basis; 4 – I smoke daily. These values were re-coded into dummy variables: The values of 1 to 2 were coded as 0 (non-smokers) and the values of 3 to 4 were coded as 1 (smokers). Hence, the respondents were divided into two categories; non-smokers and smokers. Similar re-coding was done for the variables 'snuff use' and 'physical activity.' The variables for 'alcohol use' and 'cannabis use' were binary and not re-coded.

Alcohol use was measured by asking participants if they used alcohol or not in the preceding 12 months. The response scale ranged from 1 (never) to 8 (About every day). Drinking 5 or

more times at least once per week in the past year was used as a cut-off point for measuring the prevalence of alcohol use in the past year.

Snuff use was measured by asking the frequency of snuff use in the last 12 months. The response scale ranged from 1 (never snuffed) to 4 (snuffs daily). Snuffing at least once in the past year was a cut-off point for measuring the prevalence in the past year.

Cannabis use or hash was also assessed by asking if the person had used drugs at all or not in the last 12 months. The response scale ranged from 1 (never) to 7 (more than 50 times). Using cannabis at least once in the past year was a cut-off point for measuring the prevalence in the past year.

Physical activity similarly was measured by asking participants to indicate how often they had any form of physical activity per week during the preceding 12 months. The response scale ranged from 0 (no physical activity) to 4 (six times a week or more). Being physically active at least once per week was used as a cut-off point for measuring the prevalence of physical activity in the past year.

Eating problem score was in the original study calculated from the response of seven questions that derived from the Eating Attitude Test questionnaire, with a range from 1.0 - 4.0; 4.0 represent no eating problems.

'Age at arrival' was measured by asking the respondents if they were 0 (born in Norway), 1 (0-5 years of age at arrival in Norway), or 2 (more than six years of age at arrival in Norway).

'Parents' education score' was originally the sum score of each parent. Each parent could score 0 (no education), 1 (high school/college education), or 2 (university degree). Thus, the total score ranged from 0 to 4. Value 0 was re-coded into 0 and any other value higher than 0 was re-coded into 1. Thus, we condensed the respondents' 5 possible values into two categories in each parameter; one category with parents without any formal education and one category with one or more parent(s) with (some) formal higher education.

3.6.   Statistical methods

Data was analyzed by IBM SPSS v20. Standard functions were utilized for descriptive statistics as the mean, 95% confidence intervals and standard deviation. A number of statistical tests were performed for the different variables.

The comparison test for differences in proportions (binary variables) was done for comparisons between ethnic Norwegian (EN) and immigrant groups from Pakistan, Somalia

and Vietnam (PSV-immigrant groups), as well as for EN and each of the three immigrant groups. The test applied is Pearson's Chi-square test with a 5% level of significance (p <0.05). If many 2x2 groups were analyzed, the Bonferroni correction[10] test was applied. Differences in group means (for continuous variables depression symptom score and eating problem score) were analyzed across all groups by a one-way ANOVA test with an LSD post-hoc test for a 5% level of significance (p< 0.05). When analyzed in a 2x2 setting, a t-test was applied. If many 2x2 tests were performed, the Bonferroni correction was considered.

Associations between the categorical explanatory variables 'age at arrival' and 'parents' education' and the categorical health status and health behavior outcome variables were analyzed by either a one-way ANOVA (with an LSD post-hoc test) or by binary logistic regression analysis by the ENTER method. For the test for association between the explanatory variables and the continuous outcome variables (depression symptoms score and eating problem score), an Ordinary Least Squared (OLS) linear regression by the ENTER method was performed. Level of significance for all analysis was set to 5% (p<0.05).

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[10] Bonferroni correction is a method to counteract the problem of false positives in multiple comparisons. In short, the level of significance is adjusted by dividing the significance level by the number of comparisons (Yockey, 2011).

4. RESULTS

In this section, all the results are presented. Firstly, I present the results from the tests for differences among ethnic Norwegians (EN) and the Pakistani, Somali and Vietnamese, PSV - immigrant groups for the three health status variables (Section 4.1) and for the six health behavior variables (Section 4.2); health status and health behavior of EN are compared to immigrants from Pakistan, Somalia and Vietnam both as one group and as three separate groups. Finally, I present the results from study of associations between the explanatory variables level of parents' education and age at arrival in Norway and the outcome variables (the three health status variables [Section 4.3] and the six health behavior variables [Section 4.4]).

4.1.   Health status

Health status in terms of physical self-assessed health is significantly poorer for the PSV-immigrant group as compared to ethnic Norwegians (EN) (Pearson Chi-square test in Table 6; p-value < 0.001). When comparing ethnic Norwegians and each of the three immigrant groups we observe several differences in self-assessed health (see Table 6). The Pakistani group has a significantly higher prevalence of inferior self-assessed health (20.8%) compared with EN (15.5%) (P<0.001: Chi-square test). The lowest prevalence of inferior self-assessed health was among Somalis (13.9%). However, when compared with EN, self-assessed health in Somalis was not significantly different (p=0.579; Chi-square test). There was no significant difference in self-assessed health between ethnic Norwegians and Vietnamese (20.3%) (P=0.116) (Chi-square test).

Table 6 A comparison of adolescents' self-assessed health in EN and the three immigrant groups from Pakistan, Somalia and Vietnam. Pearson's Chi-square test between EN and the immigrant groups seen as one.

Self-assessed health	Norway N=7898 (98.7 %)	Pakistan N=833 (96.6%)	Somalia N=158 (90.8%)	Vietnam N=148 (100%)	P-value
Either good or bad, poor or very poor	1227 (15.5)	173 (20.8)	22 (13.9)	30 (20.3)	P<0.001
Good or excellent	6671 (84.5)	660 (79.2)	136 (86.1)	118 (79.7)	
Total	**7898 (100)**	**833 (100)**	**158 (100)**	**148 (100)**	

The next health status variable to consider is physical chronic illness. We observe from table 7 that there is no significant difference between EN and the Pakistani, Somali and Vietnamese (PSV-immigrant) groups seen as one (P= 0.370). When comparing each of the three immigrant groups with EN, we found that the Somali immigrants had a significantly lower prevalence of chronic physical illness (14.4%, P<0.001) than EN and that the Vietnamese had a significantly higher prevalence than the EN (33.1%, P=0.032). The Pakistanis were not significantly different from EN (24.5%, P= 0.578) (Chi-square test).

Table 7 Comparison of prevalence of chronic physical illness in adolescent groups. Pearson's chi square test between EN and the immigrant groups from Pakistan, Somalia and Vietnam seen as one.

Chronic physical illness	Norway N=7898 (98.7 %)	Pakistan N=833 (96.6%)	Somalia N=158 (90.8%)	Vietnam N=148 (100%)	P-value
Allergy, eczema, asthma and/or other chronic disease	2028 (25.3)	211 (24.5)	25 (14.4)	49 (33.1)	0.370
No disease	5974 (74.7)	651 (75.5)	149 (85.6)	99 (66.9)	
Total	**7898 (100)**	**833 (100)**	**158 (100)**	**148 (100)**	

As to the depression symptom scores, we observe from table 8 that there is no significant difference between ethnic Norwegians (EN) and the PSV immigrant groups seen as one (p=0.889). When comparing each of the three immigrant groups with EN, we found no significant differences (Pakistani, p=0.999; Somali, p=0.144; Vietnamese, p=0.053; T-test).

Table 3 Comparison of depression symptom score in EN (N:7649; 95.6%) and immigrant groups from Pakistan (N=746; 86.5%), Somalia (N=127; 73%) and Vietnam (N=138; 93.2%) seen as one. T- test.

Mental status	Norway Mean [95% C.I.]	Pakistan Mean [95% C.I.]	Somalia Mean [95% C.I.]	Vietnam Mean [95% C.I.]	p-value
Mean score of depressive symptoms*	2.00 [1.98 – 2.02]	2.00 [1.95-2.06]	1.91 [1.78-2.06]	2.12 [2.00-2.24]	0.889

*1.0-4.0; 4.0 is higher depressive symptoms.

4.2. Health behavior

We have 6 variables that measure health behavior: smoking, alcohol use, snuff use, cannabis use, regular physical activity and eating problems.

The prevalence of smokers is presented in Figure 8. We found significant differences in the prevalence of smokers across EN and the PSV immigrant groups (Chi-square test, p<0.001).

When the EN were compared with each of the three immigrant groups, Pakistanis (P=0,001), Somalis (P=0,001) and Vietnamese (P= 0,028), they were all significantly lower in the prevalence of smoking. When the Bonferroni correction is applied, the Vietnamese are not significantly different from the EN group.

Figure 7 Comparison of prevalence of smoking in adolescent groups. Chi-square test between EN (N=7896; 98.7%) and immigrants from Pakistan (N=845; 98%), Somalia (N=161; 92.5%) and Vietnam (N=145; 98%) seen as one group.
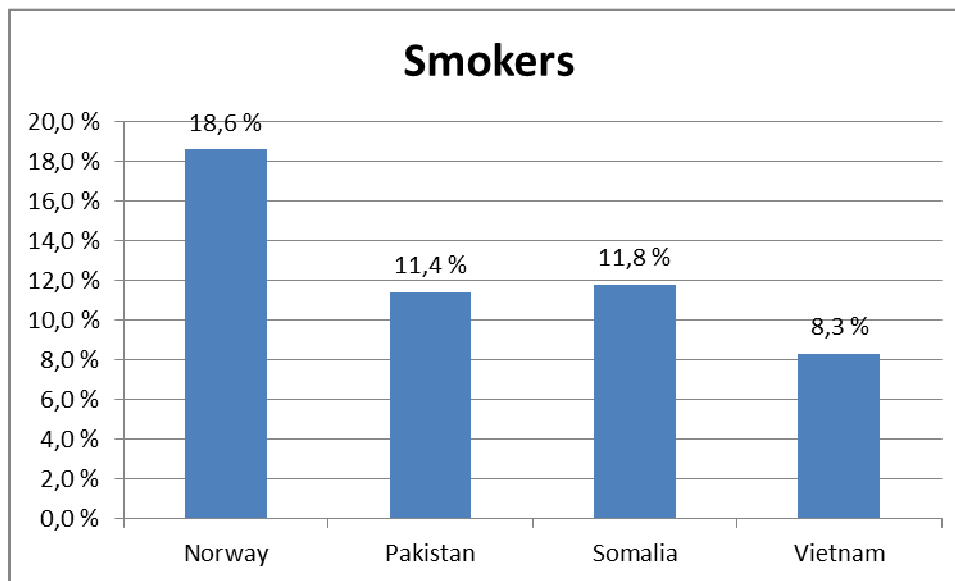
The prevalence of alcohol use is presented in figure 8. We found significant differences in the prevalence of alcohol users across EN and the PSV immigrant groups (Chi-square test, P-value of < 0,001). When the EN were compared to each of the three immigrant groups, Pakistan (P<0.001), Somalia (P<0.005) and Vietnam (P< 0.001), they were all significantly lower in prevalence of alcohol use.

Figure 8 Comparison of prevalence of alcohol use in adolescent groups. Chi-square test between EN (N=7809; 97.6%) and immigrants from Pakistan (N=794; 92.1%), Somalia (N=153; 87.9%) and Vietnam (N=148; 100%) seen as one group.
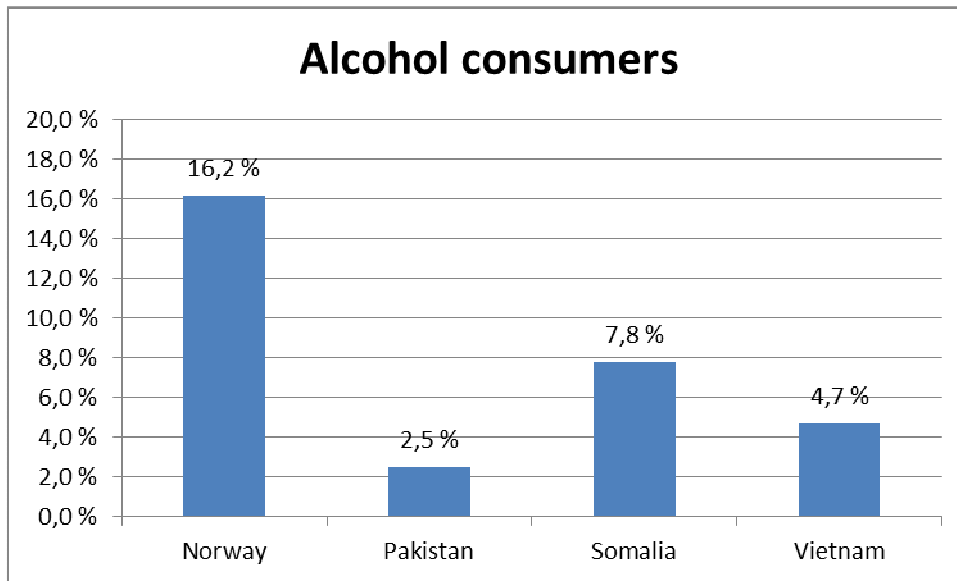
The prevalence of snuff use is presented in figure 10. Similar to alcohol use, we found significant differences in the prevalence of snuff use across EN and the PSV- immigrant group (Chi-square test, P<0.001). When EN were compared with each of the three immigrant groups, Pakistani (P<0.001), Somali (P<0.003) and Vietnam (P<0.001), they were all significantly lower in prevalence of snuff use.

Figure 9 Comparison of prevalence of snuff use in adolescent groups. Chi-square test between EN (N=7881; 98.5%) and immigrants from Pakistan (N=839; 97.3%), Somalia (N=161; 92.5%) and Vietnam (N=145; 98%) seen as one group.
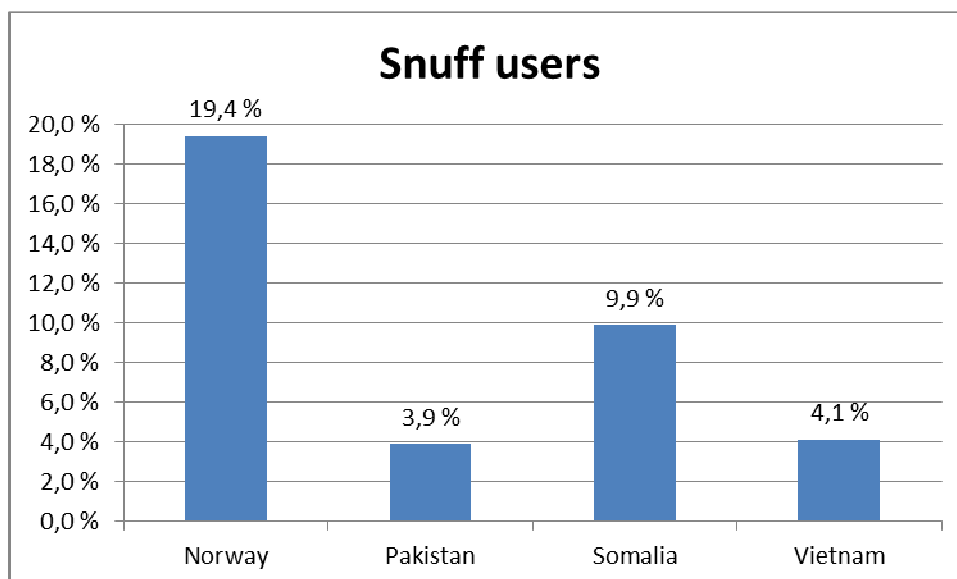
The prevalence of cannabis use is presented in Table 9. We found significant differences in the prevalence of cannabis users across ethnic Norwegians (EN) and the Pakistani, Somali and Vietnamese (PSV) immigrant groups (Chi-square test, P<0.001). When the EN were compared to each of the three immigrant groups: Pakistani (P<0.001) and Vietnamese (P<0.003), Pakistani and Vietnamese were significantly lower in prevalence than EN. No significant difference was revealed when EN were compared to Somalis.

Table 4 Comparison of prevalence of cannabis use in adolescent groups. Chi-square test between EN and immigrants from Pakistan, Somalia and Vietnam seen as one group.

Cannabis use	Norway N=7818 (97.7 %)	Pakistan N=836 (97.0%)	Somalia N=161 (92.5%)	Vietnam N= 147 (99.3%)	P-value
Cannabis use	783 (10.0)	42 (5.0)	15 (9.3)	4 (2.7)	P<0.001
No use of cannabis	7035 (90.0)	794 (95.0)	146 (90.7)	143 (97.3)	
Total	**7818 (100)**	**836 (100)**	**161 (100)**	**147 (100)**	

As to the level of regular physical inactivity, the prevalence for individuals who are not physically active on a regular basis was significantly different between all groups (see Table 10). EN had the lowest prevalence of inactive adolescents and the difference in each of the immigrant groups was highly significant, according to Pearson's Chi-square test (p<0.001) for all groups.

Table 5 Comparison of prevalence of regular physical activity in adolescent groups. Chi-square test between EN and immigrants from Pakistan , Somalia and Vietnam seen as one group.

Regular physical activity	Norway N=7634 (95.4%)	Pakistan N=735 (85.3%)	Somalia N=123 (70.7%)	Vietnam N=137 (92.6%)	P-value
Inactive	1364 (17.9)	258 (35.1)	40 (32.5)	41 (29.9)	<0.001
Active	6270 (82.1)	477 (64.9)	83 (61.8)	96 (70.1)	
Total	7634 (100)	735 (100)	137 (100)	123 (100)	

Finally, the comparison for mean scores of eating problems is presented in Table 11. There is no significant difference between EN and the PSV immigrant groups seen as one (p= 0.514).

When comparing each of the three immigrant groups with EN, we found no significant differences (Pakistani, p=0.298; Somali, p=0.347; Vietnamese, p=0.795; T-test).

Table 6 Comparison of mean score of eating problems in adolescent EN (N:7649; 95.6%) and immigrant groups from Pakistan (N:746; 86.5%), Somalia (N:127; 73.0%) and Vietnam (N: 138; 93.2%) as one group. T-test

Eating problem	Norway Mean [95% C.I.]	Pakistan Mean [95% C.I.]	Somalia Mean [95% C.I.]	Vietnam Mean [95% C.I.]	p-value
Eating problem score*	3.23 [3.21-3.24]	3.20 [3.15-3.25]	3.27 [3.16-3.39]	3.21 [3.11-3.31]	P=0.514

*1.0-4.0; 4.0 represents no eating problems.

4.3. Level of parents' education and age at arrival as predictors of health status for each of the three immigrant groups

In this subsection, I have included the level of parental education and age at arrival/length of stay in Norway as predictors for self-assessed health, chronic physical illness and health behavior. The logistic regression analysis with ENTER method results is presented in Table 12. In the Pakistani group, chronic physical illness was significantly associated with the age at arrival in Norway. Comparing Pakistani adolescents born in Norway, immigrants who arrived at the age of 0-5 had significantly lower chances of suffering from chronic physical illness (OR[11]=4.60; p=0.021) and chances were even lower for immigrants arriving at age 6 or above (OR=0.318; p=0.001). There was no significant association between parents' education and more chronic physical illness (p=0.071).

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[11] OR= odds ratio

Table 7 Association between health status (measured by chronic physical illness and self-assessed health), age at arrival in Norway and level of parents' education in adolescent immigrant groups. Logistic regression analyses within each immigrant group.

	Pakistan		*Somalia*		*Vietnam*	
	Dependent variables (outcome)		**Dependent variable (outcome)**		**Dependent variable (outcome)**	
Independent Variable	Chronic Physical illness OR (95%CI)	Self-assessed health OR (95% CI)	Chronic Physical illness OR (95%CI)	Self-assessed health OR (95% CI)	Chronic Physical illness OR (95%CI)	Self-assessed health OR (95% CI)
Age at arrival 0-5 (compared with those born in Norway)	**0.460* (0.237-0.891)**	1.262 (0.717-2.223)	0.767 (0.260-2.263)	1.724 (0.509-5.843)	0.644 (0.214-1.942)	0.988 (0.297-3.282)
Age at arrival 6-> (compared with those born in Norway)	**0.318** (0.166-0.608)**	0.701 (0.392-1.256)	0.413 (0.151-1.129)	1.634 (0.552-4.834)	0.503 (0.130-1.935)	0.629 (0.130-3.033)
Parents' education >1 (compared with parents' education =0)	1.462 (0.968-2.206)	1.072 (0.706-1.629)	1.299 (0.263-6.411)	0.407 (0.094-1.773)	1.317 (0.415-4.176)	0.471 (0.134-1.654)

* p<0.05. ** p<0.01.

Age at arrival in Norway and parents' education were also studied as predictors of mental health status in terms of depression symptoms score. The result of the linear OLS[12] regression analysis (ENTER method) is presented in Table 13. In the Somali group, there was a significant association between the level of parents' education and lower depression symptom score (lower is preferable as it indicates less depression) with a B coefficient of -0.621 and a p-value of 0.008. In other words, in the adolescents with parents' education >0 the mean depression symptom score was 0.698 lower on average compared to adolescents with uneducated parents. No significant association was found for the Pakistani and Vietnamese group.

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[12] OLS: Ordinary least squares

Table 8 Association between mental health and age at arrival in Norway and parent's education in adolescent immigrant groups. Linear regression analysis.

	Pakistan	*Somalia*	*Vietnam*
	Dependent variable (outcome)	**Dependent variable (outcome)**	**Dependent variable (outcome)**
Independent Variable	Depression symptom score B (SE[13])	Depression symptom score B (SE)	Depression symptom score B (SE)
Age at arrival	-0.012 (0.050)	-0.174 (0.094)	-0.030 (0.113)
Parents' education	-0.088 (0.073)	**-0.698 (0.258)***	0.077 (0.183)

* p=0.008.

4.4. Level of parents' education and age at arrival in Norway as predictors of health behavior for each of the three immigrant groups

The results of age at arrival in Norway and parents' education as predictors of health behavior for immigrant groups are presented in Table 14. There are few significant associations with level of significance at p<0.05. In the Pakistani group, adolescent immigrants who arrive at the age 0-5 years have increased risk for cannabis use compared to the Pakistanis born in Norway (P=0.020). Pakistani adolescents with parents' education score >0 have increased regular physical activity compared to those with no parental education (score = 0) (p=0.017).

In the Somali group, the adolescents with parents' education score > 0 (one or both parents have higher education) have less prevalence of alcohol (OR=0.146; P= 0.011) and cannabis use (OR=0.179; P= 0.018), compared to those with parents' education score= 0. There were no significant associations within the Vietnamese group between age at arrival, parents' education and health behavior.

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[13] B means B-coefficient. SE is here defined as standard error

Table 9 Association between health behavior variables (smoking, alcohol, snuff, cannabis, regular physical activity) and length of stay and parents' education in adolescent immigrant groups. Multivariate logistic regression analysis.

Independent Variable	Dependent variable (outcome)				
	Smoking OR (95%CI)	Alcohol use OR (95% CI)	Snuff use OR (95%CI)	Cannabis use OR (95% CI)	Regular physical activity OR (95%CI)
Pakistan					
Age at arrival 0-5	1.478 (0.743-2.937)	1.897 (0.535-6.728)	1.509 (0.510-4.467)	**2.653*** **(1.164-6.043)**	0.986 (0.567-1.714)
Age at arrival 6->	1.143 (0.596-2.194)	0.899 (0.202-3.998)	1.076 (0.366-3.160)	0.947 (0.326-2.757)	1.351 (0.838-2.177)
Parents' education >1	0.821 (0.494-1.365)	0.709 (0.278-1.809)	0.612 (0.283-1.323)	1.221 (0.540-2.761)	**0.627*** **(0.428-0.919)**
Somalia					
Age at arrival 0-5	1.306 (0.366-4.659)	0.0 (0.0-)	0.594 (0.109-3.245)	0.196 (0.023-1.665)	0.547 (0.194-1.544)
Age at arrival 6->	0.653 (0.188-2.271)	1.088 (0.276-4.289)	1.014 (0.292-3.525)	0.465 (0.128-1.682)	1.154 (0.484-2.753)
Parents' education >1	0.395 (0.091-1.706)	**0.146*** **(0.033-0.645)**	0.308 (0.069-1.373)	**0.179*** **(0.043-0.748)**	1.193 (0.282-5.048)
Vietnam					
Age at arrival 0-5	1.732 (0.330-9.092)	2.550 (0.456-14.275)	6.375 (0.838-48.520)	3.059 (0.263-35.610)	0.556 (0.147-2.113)
Age at arrival 6->	2.519 (0.465-13.663)	0.0 (0.0-)	0.0 (0.0-)	0.0 (0.0-)	1.391 (0.421-4.596)
Parents' education >1	0.218 (0.044-1.078)	N.A.	1.407 (0.148-13.391)	0.0 (0.0-)	0.370 (0.125-1.096)

* $p<0.05$.

Age at arrival in Norway and parents' education as predictors of eating problems is presented in Table 15. In the Somali group, there was a significant higher eating problem score in adolescents with parents with educational score >0 (higher is preferable as it in fact indicates fewer problems). However, as the B-coefficient had $p=0.044$, and one ought to consider the Bonferroni correction in multiple study group comparisons, the level of significance ought to be set to $p<0.05/4=0.0125$. After correction, the registered higher mean eating problem score in the Somali group in those with a parents education >0 is not significant.

Table 10 Association between eating problem score and parents' education in adolescent immigrant groups. Linear regression analysis within each immigrant group.

	Pakistan	*Somalia*	*Vietnam*
	Dependent variable (outcome)	**Dependent variable (outcome)**	**Dependent variable (outcome)**
Independent variables	Eating problem score B (SE)	Eating problem score B (SE)	Eating problem score B (SE)
Age at arrival	-0.053 (0.043)	0.013 (0.088)	-0.097 (0.098)
Parents' education	0.055 (0.063)	**0.469 (0.229)**	-0.106 (0.162)

*p<0.044

5. DISCUSSION

The aim of this study was threefold. Firstly, to investigate whether health status and health behavior were different between adolescent ethnic Norwegians (EN) and ethnic minority, i.e adolescents from Pakistan, Somalia and Vietnam (PSV) immigrant groups seen as one. Many significant differences were found. Secondly, to investigate whether there is any difference between adolescent EN and each of the three PSV- immigrant groups. The groups displayed some differences and some individual differences. Third, to study whether level of parental education and age at arrival in Norway are associated with health status and health behavior in each of the three immigrant groups. A few significant associations were found.

Weakness and limitations

In the data material, many respondents failed to report parents' education score. There were highly significant differences between the study groups' rate of response (ethnic Norwegians 10.6%, Pakistan 25.9%, Somalia 41.4% and Vietnam 46.6%) when tested with Pearson's chi-square test; $p < 0.001$. This generates very low figures in the small immigrant groups (Somalia and Vietnam). It also partly explains why there is a significant strong link between parents' education in the EN group, while there is a weak link between parents' education and health status and behavior in the immigrant groups. Any adolescent survey carries the limitation of reliability – did the subject understand the question? Did he or she respond truthfully?

Gender is an essential factor when studying adolescents. Depression symptoms and most health behavior have a different pattern and occurrence for girls and boys. Our study did not include gender-based analyses. Samples of two of the immigrant groups (Somalia and Vietnam) were small and may result in uncertain results and large confidence intervals. Also, research data had to be re-coded and aggregated to avoid too small study groups for statistical power. Since the Vietnamese and Somali groups were relatively small, results and conclusions for these groups are weaker than those for the Pakistani adolescents. Still, the study provided valuable conclusions in the narrow field of immigrant adolescents' health research, which can be used in both prevention programs and as a basis for further research.

Important differences in health status and health behavior

In sum, all immigrant groups are in some way different from the EN group and from each other in terms of health status. The only PSV- immigrant group difference (self-assessed health) is probably due to the Pakistani effect (a large group with lower score). Further, there are differences in chronic physical illness between EN and two immigrant groups. However, Somalis emerge as a group with lower prevalence of chronic physical illness and the Vietnamese as a group with higher prevalence of chronic physical illness, so the net difference is not significant. Interestingly, the immigrant groups have a similar pattern compared to EN when it comes to health behavior (less health-promoting and less risky health behavior). Apparently, most significant differences between EN and PSV-immigrant adolescents are found in health behavior and not in health status. This correspond to the fact that many lifestyle illnesses such as alcoholic liver problems, diabetes and coronary heart problems usually cause poor health at a later stage in life after adolescence. However, some health behavior-related illnesses may occur early, such as psychiatric illness caused by the use of illicit drugs. Table 11 illustrates 'the short version' of the significant differences in health status and health behavior between the study groups.

The lower prevalence of self-assessed health in the Pakistani group might be seen in connection with social factors or gender among respondents. As William et al. (2001) have pointed out, girls have a lower physical self-assessed health than boys, but in this study we did not take gender issues into account. On the other hand, our results may be socially related where Pakistani immigrants do not feel well-integrated and accepted in Norwegian society, which might affect their well-being. This is in accordance with Virta et al. (2004) who report that Turkish immigrants in Norway have lower mental health status than Turkish immigrants in Sweden. Turkish immigrants in Sweden reported better mental health because of better adaptation, acceptance and integration into Swedish society (Virta et al., 2004). Similarly, the acculturation strategy chosen by Pakistanis in Norway and their social conditions may play a major role in the way they assess their health.

Table 11 Overview of significant differences in health status and health behavior between ethnic Norwegians (EN) and Pakistan, Somali and Vietnam (PSV) immigrant groups seen as one group or as individual groups on health status and health behavior

Health Status	PSV-immigrants seen as one group	PSV-immigrants seen as individual groups
Self-assessed health	↓	Pakistani ↓
Depression symptoms score (mental health status)		
Chronic physical illness		Somali ↑ Vietnamese ↓
Health Behavior		
Eating problems		
Smoking	↑	Pakistani↑ Somali↑ Vietnam↑
Snuff	↑	Pakistani↑ Somali↑ Vietnam↑
Alcohol	↑	Pakistani↑ Somali↑ Vietnam↑
Cannabis	↑	Pakistani↑ Vietnam ↑
Regular physical activity	↓	Pakistani↓ Somali↓ Vietnam ↓

↓ corresponds to a significantly poorer value. ↑ corresponds to a significantly better value.

A possible explanation for the better self-assessed health among Somalis compared to the lower self-assessed health among Pakistanis who mostly are of the second generation is the healthy immigrant effect (Lou & Beaujot, 2005). However, a follow-up study among Somali second generation immigrants is needed in order to confirm this. On the other hand, better self-assessed health in the Somali group despite significant socioeconomic disadvantages can be explained by selection bias, age at arrival in Norway, protection of traditional family networks or a lower set of expectations about what constitutes "success" in Norway, as observed in first generation Mexicans in the USA (Escobar et al., 2000; McDonald & Kennedy, 2004).

As for mental health, we found no difference in depression symptom scores in all four groups. This is consistent with Virta et al., (2004) and Virta & Sam (2001), who found no difference in adolescents with ethnic Norwegian (EN) and ethnic Swedish background and immigrant adolescents. This may be explained by acculturation as an adaptation strategy adopted by

some adolescent immigrants. (Yeh, 2003). Yeh (2003) also report that youth who are less marginalized and are well-integrated or assimilated in foreign cultures tend to have better mental health. This is consistent with Sam's study (1994) where adolescent immigrants in Norway who practiced integration as an acculturation strategy reported fewer mental problem symptoms. In cases where migration process and migration reason included stress, severe exposure to violence or anxiety, the mental health of adolescent immigrants is very much affected after migration (Pumariega et al., 2005; Kirmayer et al., 2011). There may be a link between depression symptom score and the acculturation strategy adopted in our study group.

Further, strong family relations, supportive important others, networks in immigrant families, and the fact that adolescents live with both parents, as seen among Vietnamese, may explain immigrants' mental health status. Living in a non-single parents' household is associated with good mental health in adolescents (Vaage et al., 2009; Escobar, 2000; Beiser et al., 2002; Størknes et al., 2006; Gonneke & Vollebergh, 2008). Still, our findings differ from many other studies who report adolescent immigrants to have poor mental health status compared to that of EN probably because of factors used to measure mental health problems.

As for chronic physical illness, our findings are consistent with those in a study conducted by Blom (2005/2006) that Somalis have better health than ethnic Norwegians (EN) and other immigrant groups. This might be due to the socio-cultural setting; immigrants from Somalia seem to be conservatives of their collectivistic culture and have strong family values (Oppedal et al., 2005), which help and support them despite factors that can contribute to deteriorate their chronic physical health. Nutrition also plays a key role here. Holmboe-Ottesen (2009) report that a change in dietary habits after migration affects health negatively, as observed among Pakistanis in Norway. Somalis tend not to convert to a Norwegian diet. Their nutrition habits after migration remain the same, and this may contribute to their good health. It may also be related to the "healthy immigrant profile," whereby immigrants have better health on arrival, as observed among immigrants in Canada (McDonald & Kennedy, 2004). But in this case, Somalis' good health may not be explained by immigration selection in Norway as is the case for immigrants in Canada.

The differences in health behavior such as low prevalence of alcohol use, smoking, snuff and nicotine use among immigrants compared to EN is consistent with other studies (Blom, 2008; Ung-HUBRO, 2000/2001; Grøtvedt & Gimmestad, 2002; Blom, 2010). On the other hand,

there is no difference between Somalis and EN when it comes to cannabis use. This might be explained by the tradition of chewing Khat in the Somali population (Odenwald et al., 2009), which probably lowers the threshold for cannabis use. Still, our study shows that the tendency of cannabis use decreases in the Somali group with a higher level of parental education.

Predictors of health status and health behavior

Age at arrival and level of parental education do not appear as very important variables, specifically for Vietnamese. In explaining health status, only in the Somali group is higher education positively associated with depression symptom score. In explaining health behavior, level of parental education plays a role for alcohol and cannabis use among Somalis and physical activity among Pakistanis. Age at arrival plays a role for cannabis use and physical activity among Pakistanis. The following table (Table 12) illustrates ' the short version' of significant associations between the predictor variables and the study groups' health status and health behavior variables.

Table 12 Significant associations in age at arrival and level of parents' education and health status and health behavior in three immigrant groups: Pakistan, Somalia and Vietnam

Health Status and Health Behavior	Age at arrival	Level of parents' education
Physical Self-assessed health		
Depression symptoms score		Somali ↑
Physical chronic illness		
Eating problems		
Smoking		
Snuff		
Alcohol		Somali ↑
Cannabis	Pakistani ↑	Somali ↑
Physical activity		Pakistani ↑

↑ corresponds to a positive association

The low use of illicit drugs does not seem to change as the immigrants have stayed in Norway longer. The resistance to change of behavior within immigrant groups may be due to strong collectivistic family cultural values (Sam, 2000). This is consistent with Virta and Sam (2003), who report that Vietnamese culture has its base in Confucianism where the family is

patriarchally structured with no support for adolescent autonomy. Adolescents are expected to obey and follow the advice of their parents and remain at home until their marriage. Similar tendencies are observed in Pakistanis and Turks who also have a patriarchal family structure and are traditionally Muslim (Sam, 2003; Virta & Sam, 2003; Vaage et al., 2009). Therefore, behavior changing is at its minimum because of less interaction or the lack of assimilation in the immigrant groups.

Although all immigrant groups display superior health-damaging behavior, the lack of regular physical activity is a serious health risk factor which might lead to serious chronic physical illness in adult life. Our findings show that the age at arrival and the level of parents' education affects regular physical activity positively, especially among Pakistanis. This is a key finding since other adult studies of Pakistani immigrants show a high prevalence of overweight, diabetes and obesity, which could be related to physical inactivity (Holmboe-Ottesen, 2009; Zahid et al., 2011).

Pakistanis score low on depression symptom score and chronic physical illness compared to EN. One possible explanation may be poor social conditions (poor families with less income, lower education, work or lack of friends). The Somalis score similarly to EN regarding depression symptoms despite lower chronic physical illness. The reason for this seems unclear. This calls for further studies. Finally, good social conditions (e.g. family structure, high income, high educational level and good integration in society) may explain why Vietnamese score similarly to EN in self-assessed health, despite nearly significant lower depression symptom scores and significantly poor chronic physical condition (Vaage et al., 2009).

In contrast, all immigrant groups show almost identical patterns when it comes to health behavior; less health-risky behavior (drug and alcohol use), less health–promoting behavior (regular physical activity) and similar lack of eating problems.

Future research: The discrepancy between mental and chronic physical health status calls for further studies as well as gender based analysis since girls and boys react differently and are affected in a different manner. This is important in order to prevent crises from occurring in those groups before appropriate policies can be framed to deal with these problems. This will

be of great interest for health workers, policy makers and immigrant groups in order to improve and adjust immigrants' health as well as health services.

6. CONCLUSION

In this thesis, the PSV-immigrant group as one group displays few health differences compared to ethnic Norwegians (EN). However, each separate immigrant group shows differences in different health aspects, indicating that immigrants are a diverse group who deserve a careful approach with an emphasis on subgroup studies.

The most prominent differences were found between the PSV- immigrant groups (both seen as one group and as individual groups) and EN in health behavior, suggesting that health behavior is the most important parameter in health research on adolescent immigrants.

Age at arrival and the parents' level of education were poor predictors of health status and health behavior, showing significant associations only in certain variables. Other significant factors must be analysed in future studies of adolescent health status and behavior in the immigrant population.

We can certainly say that PSV- immigrant groups have less health-risk behavior and also less health-promoting behavior. Only a few health behavior parameters were associated with the parents' level of education. PSV-immigrant adolescents have health status similar to EN in some areas. However, one should explore Somalis' health status and health behavior in greater detail in order to understand factors which make them significantly different from other immigrant groups, in order to encourage health-promoting behavior in all immigrant groups.

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APPENDIX A

The questions regarding mental health based on Hopkins Symptom Checklist

Spørsmål	Svar alternativer
Følt at alt er et slit	1)Veldig mye plaget: 2) Ganske mye plaget: 3) Litt plaget: 4) Ikke plaget
Hatt søvnproblemer	1)Veldig mye plaget: 2) Ganske mye plaget: 3) Litt plaget: 4) Ikke plaget
Følt deg ulykkelig, trist eller deprimert	1)Veldig mye plaget: 2) Ganske mye plaget: 3) Litt plage: 4) Ikke plaget
Følt håpløshet med tanke på framtiden	1)Veldig mye plaget: 2) Ganske mye plaget: 3) Litt plaget: 4) Ikke plaget
Følt det stiv eller anspent	1)Veldig mye plaget: 2) Ganske mye plaget: 3) Litt plaget: 4) Ikke plaget
Bekymret deg for mye om ting	1)Veldig mye plaget: 2) Ganske mye plaget: 3) Litt plaget: 4) Ikke plaget
Tenkt å gjøre slutt på livet ditt	1)Veldig mye plaget: 2) Ganske mye plaget: 3) Litt plaget: 4) Ikke plaget

The questions regarding eating habits

Spørsmål	Svar alternativer
Jeg er opptatt av å bli tynnere	1)Alltid: 2) Ofte: 3) Sjelden: 4) Aldri
Jeg prøver å holde diett	1)Alltid: 2) Ofte: 3) Sjelden: 4) Aldri
Jeg føler ubehag etter søtsaker	1)Alltid: 2) Ofte: 3) Sjelden: 4) Aldri
Jeg trimmer for å gå ned i vekt	1)Alltid: 2) Ofte: 3) Sjelden: 4) Aldri
Jeg kaster opp etter at jeg har spist	1)Alltid: 2) Ofte: 3) Sjelden: 4) Aldri
Når jeg har begynt å spise kan det være vanskelig å stoppe	1)Alltid: 2) Ofte: 3) Sjelden: 4) Aldri
Jeg føler at maten kontrollerer livet mitt	1)Alltid: 2) Ofte: 3) Sjelden: 4) Aldri
Jeg bruker for mye tid til å tenke på maten	1)Alltid: 2) Ofte: 3) Sjelden: 4) Aldri