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IS SUBSTANCE USE OF ANY SUBSTANCE?

Study on Substance Use and Mental Health on Russian, Somali and Kurdish Origin Populations in Finland

Essi Salama

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University of Turku

Faculty of Medicine
Department of Clinical Medicine
Psychiatry
Doctoral Programme in Clinical Research

Supervised by

Associate Professor, Solja Niemelä
Faculty of Medicine
Psychiatry
University of Turku
Turku, Finland

Docent, Anu Castaneda
Migration and Cultural Diversity Team
Finnish Institute for Health and Welfare
Faculty of Medicine, Psychology
University of Helsinki
Helsinki, Finland

Reviewed by

Professor, Mauri Aalto
Faculty of Medicine and Health Technology
Addiction Medicine
Tampere University
Tampere, Finland

Docent, Otto Helve
New Children's Hospital
Pediatric Research Center
Helsinki University Hospital
University of Helsinki
Department of Health Security
Finnish Institute for Health and Welfare
Helsinki, Finland

Opponent

Professor, Dr, Meryam Schouler-Ocak
Psychiatric University Clinic of Charité
at St. Hedwig Hospital
Berlin, Germany

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To my family

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ESSI SALAMA: Is substance use of any substance? Study on substance use and mental health on Russian, Somali and Kurdish origin populations in Finland
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ABSTRACT

To date, our knowledge on substance use in migrated populations in their host countries is scarce. In addition, associations between discrimination and substance use have been rarely investigated in the European context.

The Finnish Migrant Health and Wellbeing Study (Maamu) collected information in 2010–2012 from Russian (n=526–688), Somali (n=338–472) and Kurdish (n=506–612) origin adults living in Finland using interviews and health examinations. For comparison, general population data were obtained from the national Health 2011 Survey (n=1,165). Alcohol use (AUDIT-C), daily tobacco smoking, lifetime cannabis use were used as outcomes. Substance use was examined in relation to contextual factors, including socio-demographic factors, migration-related factors, depressive and anxiety symptoms, potentially traumatic experiences, and perceived discrimination. Statistical analyses were performed using logistic regression and best-fitting models (Akaike's Information Criteria, AIC).

Compared with the general population, binge drinking was less prevalent among all migrant origin groups, while daily tobacco smoking was more prevalent among Russian and Kurdish origin men. Substance use associated with depressive and anxiety symptoms and suicidal ideation among the Kurdish origin population. Potentially traumatic experiences were associated with binge drinking among the Kurdish, and with lifetime cannabis use among Russian origin population. Perceived discrimination was associated with alcohol use and cannabis use only among the Kurdish origin population.

In conclusion, substance use occurred in all the studied migrant origin groups but the patterns of substance use and associations to contextual factors were unique to each group. The findings of this thesis draw attention to mental health problems and traumatic experiences associating with substance use to which particularly forced migrants might be exposed. Perceived discrimination associating with substance use highlights its importance as a determinant of wellbeing among migrant origin populations.

KEYWORDS: substance use, alcohol, tobacco smoking, cannabis, migrant, forced migration, Russian, Somali, Kurdish, depressive symptoms, anxiety, traumatic experiences, perceived discrimination

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TIIVISTELMÄ

Päihteiden käytöstä maahan muuttaneiden keskuudessa on rajoitetusti tutkimustietoa jopa Euroopan laajuudella. Erityisen vähän tiedetään päihteidenkäytön ja syrjinnän välisistä yhteyksistä maahanmuuttajataustaisen väestön keskuudessa.

Vuosina 2010–2012 toteutetussa Maahanmuuttajien terveys- ja hyvinvointi-tutkimuksessa (Maamu) kerättiin tietoa Suomessa asuvista venäläis- (n=526–688), somali- (n=338–472) ja kurditaustaisista (n=506–612) aikuisista haastattelujen ja terveystarkastusten avulla. Suomessa asuvasta yleisväestöstä koostuvan verrokki-ryhmän tiedot on poimittu Terveys 2011 tutkimuksen aineistosta (n=1,165). Alkoholin käyttö (AUDIT-C), päivittäinen tupakointi ja elinaikainen kannabiksen käyttö olivat tutkimuksen päätemuuttujia. Päihteidenkäyttöön liittyvinä selittävinä tekijöinä tarkasteltiin sosiodemografisia muuttujia, maahanmuuttotaustaan liittyviä muuttujia, masennus- ja ahdistusoireita, traumakokemuksia ja koettua syrjintää. Tilastolliset analyysit tehtiin logistista regressiota käyttäen ja malleja tarkasteltiin Akaiken informaatiokriteeriä käyttäen.

Yleisväestöön verrattuna humalahakuinen alkoholinkäyttö oli harvinaisempaa kaikissa tutkituissa maahanmuuttajataustaisissa ryhmissä. Päivittäinen tupakointi oli venäläis- ja kurditaustaisilla miehillä yleisempää kuin yleisväestössä. Päihteiden-käyttö oli yhteydessä masennus- ja ahdistuneisuusoireisiin sekä itsetuhoisiin ajatuksiin kurditaustaisten keskuudessa. Traumakokemukset olivat yhteydessä humalahakuiseen alkoholinkäyttöön kurditaustaisilla ja elinaikaiseen kannabiksen käyttöön venäläistaustaisilla. Koettu syrjintä oli yhteydessä alkoholinkäyttöön ja elinaikaiseen kannabiksen käyttöön vain kurditaustaisten keskuudessa.

Tutkimustulokset korostavat päihteidenkäytön yhteyksiä mielenterveyden ongelmiin ja traumaattisiin kokemuksiin, joita erityisesti humanitäärisistä syistä maahan muuttaneet saattavat kokea. Koetun syrjinnän ja päihteidenkäytön yhteys osoittaa, että syrjintä on merkittävä terveyteen ja hyvinvointiin vaikuttava tekijä maahan muuttaneiden väestönosien keskuudessa.

AVAINSANAT: päihteidenkäyttö, alkoholi, tupakointi, kannabis, maahanmuutto, pakolaisuus, venäläistaustainen, somalitaustainen, kurditaustainen, masennusoireet, ahdistuneisuus, itsetuhoiset ajatukset, traumaattiset kokemukset, koettu syrjintä

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Abbreviations

AIC	Akaike's Information Criterion
AUD	Alcohol Use Disorder
AUDIT	Alcohol Use Disorders Identification Test
AUDIT-C	Alcohol Use Disorders Identification Test for Consumption
CAST	Cannabis Abuse Screening Test
CI	Confidence Interval
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
DUD	Drug Use Disorder
EMR	Eastern Mediterranean Region
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
FSU	Former Soviet Union
GBD	Global Burden of Disease
HED	Heavy Episodic drinking
HPA	Hypothalamic-pituitary-adrenal
HSCL-25	Hopkins Symptoms Checklist -25
HIS	Heaviness of Smoking Index
ICD-10	International Classification of Diseases, 10th Revision
ICD-11	International Classification of Diseases, 11th Revision
IDP	Internally Displaced Person
IHME	Institute for Health Metrics and Evaluation
IOM	International Organization of Migration
Maamu	The Finnish Migrant Health and Wellbeing Study
NESARC	National Epidemiologic Survey on Alcohol and Related Conditions
OR	Odds Ratio
PD	Perceived Discrimination
PTE	Potentially traumatic experiences
PTSD	Post-traumatic Stress Disorder
SDH	Social determinants of health
SES	Socio-economic situation
SUD	Substance Use Disorder
THL	Finnish Institute for Health and Welfare

UK	United Kingdom
UNODC	United Nations Office on Drugs and Crime
US	United States of America
WHO	World Health Organization

List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

I Essi Salama, Solja Niemelä, Jaana Suvisaari, Tiina Laatikainen, Päivikki Koponen, Anu E. Castaneda. The prevalence of substance use among Russian, Somali and Kurdish migrants in Finland: a population-based study. *BMC Public Health*, 2018; 18: 13. https://doi.org/10.1186/s12889-018-5564-9

II Essi Salama, Anu E. Castaneda, Jaana Suvisaari, Shadia Rask, Tiina Laatikainen, Solja Niemelä. Substance use, affective symptoms, and suicidal ideation among Russian, Somali, and Kurdish migrants in Finland. *Transcultural Psychiatry*, 2020; 0: 1–15. https://doi.org/10.1177/1363461520906028

III Essi Salama, Anu E. Castaneda, Eero Lilja, Jaana Suvisaari, Shadia Rask, Tiina Laatikainen, Solja Niemelä. Pre-migration traumatic experiences, post-migration perceived discrimination and substance use among Russian and Kurdish migrants-a population-based study. *Addiction*, 2020; 115: 1160–1171. https://doi.org/10.1111/add.14904

 This thesis includes also substantial findings on best-fitting models of substance use that have not been included in the sub-studies or published elsewhere.

1 Introduction

The use of psychoactive substances has been a ubiquitous part of human behavior; the principal motivations for substance use have included relaxation and coping with misfortunes (Ylikangas, 2018). With time, substance use habits have been shaped by cultures and norms. The access to psychoactive substances has been regulated through legislation and via the availability of substances and local cultures. Evidently societal norms have shaped these restricting policies and furthermore these have changed over time. These factors have also impacted on the attitudes towards substance use and the attributes associated with substance users or abusers (Room, 2005; Wanigaratne & Strang, 2018; Westermeyer, Mellman, & Alarcon, 2006). Nowadays the hazards of substance use are well recognized. For example, findings of the Global Burden of Disease Study (GDB) demonstrate that alcohol use and tobacco smoking are among the leading risk factors for premature mortality and disability in both men and women (Degenhardt et al., 2018; GBD 2015 Tobacco Collaborators, 2017; GBD 2016 Alcohol Collaborators, 2018; Starodubov et al., 2018).

Migrant populations in their new host countries may use substances in different manners as the native populations. Individuals moving from one country to another may bring along with them and adhere to the substance use habits in their country of origin, but these substance use habits may also change due to a number of reasons (Room, 2005; Wanigaratne & Strang, 2018; Westermeyer, 1995b; Westermeyer et al., 2006). Recently some information about substance use among migrant populations has started to emerge, but at present the results are controversial, possibly reflecting the varying definitions and measures of substance use as well as the multitude of migration-related backgrounds. In particular, there is limited research in the European context of migration even though migration is becoming more and more common throughout the Europe.

Current evidence indicates that particularly forced migrants are exposed to a wide spectrum of adversities, that are known to be associated with increased substance use among general populations. These adversities include impaired mental health and psychological distress, traumatic experiences and post-traumatic stress disorder, and a low socio-economic situation (Bogic, Njoku, & Priebe, 2015;

Castaneda et al., 2017; Close et al., 2016; Erdem, Riva, Prins, Burdorf, & Van der Doef, 2017; Fazel, Wheeler, & Danesh, 2005; Marmot, 2016; Rask et al., 2015; Rechel, Mladovsky, Ingleby, Mackenbach, & McKee, 2013; Steel et al., 2009). Experiencing discrimination, racism and hostility in a new host country has been proposed to increase stress and decrease wellbeing of individuals with foreign-origin backgrounds (Ayonrinde & Miller, 2021; Castaneda et al., 2015; Pascoe & Smart Richman, 2009; Rask & Castaneda, 2020; Rask et al., 2018). The associations of these pre-migration and post-migration stressors with substance use have rarely been studied, even though the topic of substance use among forced migrant populations is starting to become investigated in many countries (Horyniak, Melo, Farrell, Ojeda, & Strathdee, 2016).

This thesis examines substance use among Russian, Somali, and Kurdish origin populations in Finland. Population-based information on substance use among migrant-origin populations is limited in the European settings, and substance use among foreign-origin population in Finland has not been evaluated previously. In addition, substance use is assessed in relation to possibly predisposing phenomena of the sociodemographic situation, current symptoms of depression and anxiety, traumatic experiences prior to migration, and experiences of discrimination in the host country, in this case Finland. Alcohol use, tobacco smoking and cannabis use were focused on due to their importance from the perspective of public health.

2 Review of the Literature

2.1 Concepts related to substance use

Substance use can be comprehended and classified in several ways, for example by the quantity or frequency of substance use or the substance use habits. There are different levels in substance use, some of which are illustrated in **Table 1.** For example, if the use of some substance does not damage an individual's health, including both his/her physical and mental health, or cause social consequences, the substance use can be considered to be at a *non-harmful* level. However, continuous, or frequent *risk level use* may harm the health of an individual when this turns into long term use. Different concepts such as *controlled* or *moderate* substance use, especially concerning alcohol, are sometimes utilized to describe the kind of use that is self-moderated to avoid drunkenness, or substance use that is regular but not compulsive and does not alter the individual's ability to function. The concept of *moderate drinking* is sometimes used to describe a drinking pattern where moderate quantities of alcohol are consumed and the drinking does not cause problems. *Recreational drug use* is a concept sometimes used to refer to drug use without dependence or other negative consequences to the individual (WHO, 2019). Tobacco smoking behavior, however, is rarely considered as moderate or non-harmful. Recent evidence highlights that at a population level, all alcohol use is harmful to health (GBD 2016 Alcohol Collaborators, 2018). In the light of these findings, it is complicated to make a clear distinction between non-harmful and harmful use (Burton & Sheron, 2018; GBD 2016 Alcohol Collaborators, 2018; WHO, 2018a).

Hazardous substance use can be defined as substance use habits that increase the risk of a harmful consequence. The term is not currently used in diagnostic classifications, but it will be included in the 11th edition of the International Classification of Diseases (ICD-11). This term is used in a public health context to describe substance use habits which might be of public health significance despite not fulfilling the diagnostic criteria of substance use disorders e.g. harmful use (WHO, 2019).

Diagnostic concepts related to substance use differ in the two most often applied diagnostic systems; the International Classification of Diseases (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). ICD-10 includes e.g. diagnostic concepts of *acute intoxication*, *harmful use* and *dependence*

syndromes. In the ICD-10, *harmful use* is defined as substance use that damages physical and/or mental health of an individual but does not cause social consequences. *Dependence syndromes* are defined as

> "a cluster of behavioral, cognitive, and physiological phenomena that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state" (WHO, 2019).

Dependence or addiction has both physiological and psychological aspects, where physiological addiction is caused by the sensitization and tolerance of the nervous system to the concurrent use, whereas psychological aspects include the craving and urge to use the substance and an inability to restrain from substance use independent of the consequences (Joutsa & Kiianmaa, 2018). Addictions develop in a minority of people using these substances, and they develop after long-term and large quantity of substance use (Joutsa & Kiianmaa, 2018; Kuoppasalmi, Heinälä, & Lönnqvist, 2020; Volkow, Koob, & McLellan, 2016). The current understanding is that hereditary factors play an important role when harmful use progresses to dependence syndromes or addictions but also developmental and environmental risk factors are significant (Joutsa & Kiianmaa, 2018; Kuoppasalmi et al., 2020; Volkow, Wang, Fowler, Tomasi, & Telang, 2011).

The diagnostic framework of DSM-5 does not make any distinction between abuse and dependence, and all the states fulfilling the criteria are referred to as *substance use disorders* (WHO, 2019). Having two or more of the eleven symptoms within the previous year means that the individual's behavior meets the diagnostic criteria for substance use disorder (SUD). These eleven criteria describe distorted substance use that causes a significant impairment or distress. Other diagnostic categories mentioned in the DSM-5 are intoxication, withdrawal and substance-induced mental disorders (Strain, 2017).

The substance use habits examined in this thesis are *binge drinking, daily tobacco smoking,* and *lifetime cannabis use*. From the public health perspective, binge drinking, and daily tobacco smoking may be considered as hazardous substance use habits, although from the individual's perspectives, the behavior may not fulfil the diagnostic criteria of substance use disorder, i.e. harmful use or dependence.

In this thesis, *binge drinking* is defined as consuming six or more alcohol units on one occasion at least once during the previous year. The term *heavy episodic drinking* (HED) is often used to describe binge drinking that occurs on several concurrent days or on a more regular basis. The terms binge drinking and heavy

episodic drinking are sometimes also used as synonyms. Neither of the terms have established definitions in terms of alcohol units per drinking occasion, and they are being used variably in the literature. In this study, *abstaining from alcohol use* refers to individuals who have not used alcohol during the previous 12 months, while *lifetime abstinence* refers to never having used alcohol during one's lifetime. WHO has also defined a *current drinker* as an individual aged 15 or older who has used alcohol during the previous year.

Daily tobacco smoking is defined as tobacco smoking on a daily basis and does not include occasional tobacco smoking. In some studies, the term *current smoking* has been used to describe both daily and occasional tobacco smoking.

Lifetime prevalence of cannabis or *intravenous drug use* is defined here as using cannabis or intravenous drugs during a person's lifetime. Sometimes also the term *lifetime experience with drugs* is used as a synonym (EMCDDA, 2012).

Table 1. Examples of concepts related to substance use, risk level use and problematic use (WHO, 2019).

LEVEL OF USE		DIAGNOSTIC SYSTEMS	GENERAL CONCEPTS	EXAMPLES OF SUBSTANCE SPECIFIC CONCEPTS		
				Alcohol	**Tobacco smoking**	**Drug use**
USE			Experimental, recreational use	Moderate drinking		Recreational drug use
				Current drinker		Lifetime experience
PROBLEM LEVEL USE	Risk level use, problematic use		Hazardous use	Binge drinking	Current smoking	
				Heavy episodic drinking	Daily smoking	
	Substance use disorders (SUD)	DSM-5	Mild, moderate severe SUD	Alcohol use disorder	Tobacco use disorder	Drug use disorder
		ICD-10	Harmful substance use	Harmful alcohol use	Harmful tobacco use	Harmful drug use (separate categories for several drugs)
			Substance dependence	Alcohol dependence	Nicotine dependence	Drug dependence

2.2 Substance use and stress

Most theories of mechanisms of psychoactive substance use take into account both psychological and neurobiological aspects. Motivations towards substance use include both enhancing positive emotions (e.g., sensations of pleasure) and alleviating negative emotions (e.g. anxiety, dysphoria) to cope with them. In addition, motives related to social situations and fitting-in have been described (Merrill & Thomas, 2013).

Substance use as a coping strategy may lead to substance use in situations where the adverse experience exceeds the coping abilities of the individual (Keyes, Hatzenbuehler, Grant, & Hasin, 2012). However, stressful situations exceeding the coping strategies of an individual might also result in other forms of psychopathology. Stressful situations vary from everyday hassles to catastrophic events and the stressful events can be viewed from various dimensions, e.g. severity of the experience, timing of the experience over the life course of an individual, expectedness of the event, and chronicity.

The impacts of different levels of stressors have been examined mainly in relation to alcohol use but might also be applicable to other forms of psychoactive substance use. For example, alcohol consumption or the risk of AUD (Alcohol Use Disorder) has been associated with the number of general life stressors, experiencing catastrophic events, childhood maltreatment, and chronic minority stress (Keyes et al., 2012). In addition, the lack of adaptive coping skills has been associated with increased alcohol consumption (Corbin, Farmer, & Nolen-Hoekesma, 2013; Merrill & Thomas, 2013). The self-medication theory of substance use similarly states that substances are sometimes used to diminish certain unpleasant psychological or physical sensations and symptoms (Brady, Killeen, Brewerton, & Lucerini, 2006). The shared liability hypothesis of substance use underlines the common risk factors leading to both substance use disorders and impaired mental health (Vujanovic, Lebeaut, Zegel, Smit, & Berenz, 2019).

From the neurobiological perspective, several brain structures and circuits are involved in the way in which an individual responds to psychoactive substance use and the progression from use to addiction (Koob & Volkow, 2016; Volkow et al., 2011). The current understanding of the mechanisms of substance use focuses on the neurobiological changes and adaptations occurring during psychoactive substance use and its consequences. The shared neurobiological origin between stress and psychoactive substance use as well as the complex associations between them may well involve several physiological networks and neuronal tracts such as reward networks, the mesolimbic system, and dopaminergic, glutaminergic, GABAergic-circuits in the prefrontal cortex, and the hypothalamic-pituitary axis (HPA). The adaptive neurobiological processes of the brain following stressful experiences are intended to promote coping in the short term, but if the stress and the changes persist

for a long time, these neural circuits become maladapted and this may lead to changes in mood, anxiety, decision-making and cognition (Koob et al., 2014; Koob & Volkow, 2016; McEwen, 2017; McEwen et al., 2015; Spanagel, Noori, & Heilig, 2014; Suh & Ressler, 2018). A more detailed description of neurobiology of addictions and stress systems of the brain is out of scope of this thesis.

2.3 Concepts related to migration

The International Organization of Migration (IOM) defines *migrant* as an umbrella concept covering all types of movements of people away from their place of residence, and it includes both migration within the state borders or internationally (IOM, 2019).

The term *refugee* is used to describe people who have migrated to flee from conflicts, violence, or other severe conditions in their country of origin. It is a legal status, which is defined in international law as:

> refugees are persons who are outside their country of origin for reasons of feared persecution, conflict, generalized violence, or other circumstances that have seriously disturbed public order and, as a result, require international protection (IOM, 2019).

Asylum seeker is a person seeking international protection, and if the asylum is granted, the person is granted the legal status of refugee in the host country. These terms describe the vulnerable situations in which the individuals are or their motivations for migrating from the region of origin (IOM, 2019).

The term *forced migration* can be used as an umbrella concept to describe the involuntary movement of people. It is not a legal term and therefore it includes a variety of circumstances and movements within and across boundaries where the overarching push factor is untenable circumstances in their countries of origin. The majority of the coerced displacement of people happens within developing and unstable nations and a minority of this movement reaches the global North (Foxen, 2021).

Labor mobility describes migration within or across boundaries for employment purposes, and a *migrant worker* is a person who migrates due to paid employment (IOM, 2019). The term *family migration* describes movement to reunite spouses and families, form new families and accompany migrating family members. The concept of *voluntary migration* is sometimes used as the opposite of forced migration. Employment and family relations can be considered as voluntary motivations to migrate, although for example family reunification sometimes occurs in similar circumstances as forced migration.

Importantly, some of the terms to describe migration refer to the legal statuses of individuals but most describe the situation in the country of origin or in the host country. Forced migration and voluntary migration do not represent two poles or opposites but there is a continuum of divergent push and pull factors acting as drivers to migrate (International Organization for Migration, 2017).

In public health research, migrant origin populations are usually compared to the endogenous populations in the host countries. The term *native population* normally refers to individuals born in the country or location in question. The term *general population* in part refers to everyone in a population, including also the minorities. The term does not refer to any specific racial or ethnic origin but it usually refers to a predominantly white population serving as a comparison group (Bhopal, 2014b). In this thesis, the term *general population* is applied to describe the whole population in Finland, also including minorities.

Acculturation can be defined as the process of cultural and psychological change in a group or in an individual that takes place after being in contact with other cultures. This includes adopting language, behavior, beliefs and values after moving from one country to another. Acculturation is often viewed as something that happens within the individuals who have migrated and most of the existing information is derived from migrant populations. However, all individuals living in culturally diverse settings and societies might experience some level of reciprocal acculturation. *Adaptation* can be viewed as resulting from acculturation but describing the psychological process, e.g. emotional wellbeing, or the acquisition of the socio-cultural skills needed to function in the new cultural context. It is important to note that also the host society and its policies have an effect on the way that individuals acculturate and adopt (Berry, 2021; Sam & Berry, 2010).

Healthy migrant effect is a concept that has been used to describe the better health outcomes among migrants in comparison to the population in the host country as well as in comparison to the population in the country of origin. Some findings confirm this hypothesis at least in the short term after migration, but also contradictory findings have been reported, particularly in the long term (Kennedy, Kidd, McDonald, & Biddle, 2014; McDonald & Kennedy, 2004a; Wu Z & Schimmele CM, 2005). The healthy migrant effect is considered to be a temporary phenomenon. The healthy migrant effect has been explained by the selective nature of migration, according to which the healthiest or otherwise the most privileged individuals are able to migrate (Bhopal, 2014b). This theory also presumes that the less healthy or well-off individuals return to the regions of origin. Applying the healthy migrant effect has also been criticized (Hossin, 2020). In this thesis, the healthy migrant effect will be used to describe the health of migrant origin populations in comparison to the population in the host country (Finland).

2.4 Context of the study

2.4.1 Migration in Finland

Migration of people is a perpetual and continuing phenomenon. Movement of people for various motives occurs within boundaries of states (*internal migration*) and crossing the boundaries (*international migration*). According to recent estimates, the number of international migrants is roughly 272 million people globally. The majority of international migrants are labor migrants, only a minority of approximately 26 million people consist of refugees and individuals seeking protection. The majority of forced migrants move to neighboring countries, and only a smaller proportion move further e.g., to Europe (IOM, 2020).

Migration to Finland started in the 1990s, and before that emigration from Finland was more common than immigration to Finland. Movement from Finland was mainly targeted to Sweden and North America. Finnish origin people are still a significant migrant group in Sweden. In general, migration to Finland has started later and has remained at smaller levels compared to other Nordic and European countries (Myrskylä & Pyykkönen, 2014; Tilastokeskus, 2020).

In 2018, 23 000 new immigrants were received by Finland, and 17% of migrated individuals had humanitarian reasons for migrating (OECD, 2020). The foreign-born population in Finland was slightly over 400 000 individuals corresponding to 7% of the population in 2019. The largest foreign origin population groups are the Former Soviet Union, Estonian, Iraqi, Russian, Somali, Chinese, and Thai origin populations (OECD, 2020).

2.4.2 Substance use in Finland

In Finland, alcohol use is relatively common, and alcohol intoxication is even socially accepted (Mäkelä, Härkönen, Lintonen, Tigerstedt, & Warpenius, 2018; Mäkelä, Tigerstedt, & Mustonen, 2012). The prevalence of risky drinking exceeded 20 % among women and 30% among men (Lintonen, Niemelä, & Mäkelä, 2019). Typically of high income and Nordic countries, the gender gap in drinking is small and has been decreasing during the past decades (Agardh et al., 2020; Lindeman, Österberg, & Karlsson, 2014; Mäkelä et al., 2012). The alcohol-attributed disease burden is higher in Finland in comparison to other Nordic countries, and alcohol-related harms are more prevalent among lower socio-economic groups although higher socio-economic groups report a higher prevalence rated of alcohol use (Agardh et al., 2020).

The prevalence of daily tobacco smoking in the general population aged 20–64 years old was estimated to be approximately 15% among men and 13% among

women; there has been a decreasing trend among both men and women over the past decades and although there is still a gender gap in tobacco smoking, nowadays it is rather small (Jääskeläinen & Virtanen, 2019). Despite the decreasing tobacco smoking rates, the socio-economic differences in smoking have been increasing with more smoking among the less educated people (Ruokolainen et al., 2019).

According to estimates from the United Nations Office on Drugs and Crime (UNODC), the annual prevalence of cannabis use among 15–64 year old in Finland varies between 4–6%, which is in line with nationally reported estimates among 20–44 year old adults (THL, 2020; UNODC, 2020a). Nonetheless, higher prevalence rates have been reported as the annual prevalence of cannabis use was 14% among young adults aged 15–34 years old (EMCDDA, 2019), and over 20% of the population reported a lifetime cannabis use (Karjalainen, Pekkanen, & Hakkarainen, 2020). Around five percent of the population have been estimated to have experience of using recreational drugs other than cannabis, and the prevalence of problem level use of amphetamines and opioids is estimated to be around one percent of the adult population (Rönkä et al., 2020). No estimates on the prevalence of intravenous drug use were available.

The results of the GBD Study demonstrated the negative influences of the extent of alcohol use on public health in Finland. Alcohol use disorders are listed among the most important causes of premature death, and alcohol use and tobacco are included among the most important risk factors for death and disability in Finland (Institute for Health Metrics and Evaluation (IHME), 2021).

2.5 Regional differences in substance use

Generally, substance use and intoxication are influenced by cultural, social, and religious norms, while states control the legality and availability of substances via legislation and availability. These factors shape the substance use habits of populations and may contribute to the differences in substance use between different global populations (Room, 2005; Wanigaratne & Strang, 2018; Westermeyer et al., 2006). Moreover, it is important to note that cultures and cultural norms are dynamic and may change over time, and that individuals embody and express their culture in unique and divergent ways (Westermeyer et al., 2006).

In this thesis, we examined substance use among Russian, Somali, and Kurdish origin populations in Finland. Therefore, the prevalence rates of substance use in their regions of origin (Russia, Somalia, Iraq, Iran) are presented here as background information.

2.5.1 Alcohol use

Globally the highest alcohol consumption per person and hazardous patterns of drinking have been reported in Russia and the other parts of the former Soviet Union (Leon et al., 2007). In Russia, alcohol-related mortality and morbidity remain significant public health concerns (GBD 2016 Alcohol Collaborators, 2018; WHO, 2018a). On the other hand, the prevalence of abstainers is estimated to be higher in Russia than in many West European countries. **Figure 1** (WHO, 2018b) and **Figure 2** (WHO, 2018c) demonstrate global differences in the prevalence of heavy episodic drinking and abstaining from alcohol use.

In contrast, the prohibition of alcohol and psychoactive substance use in the Muslim holy book, the Quran, is likely to influence the substance use habits in Muslim majority countries (AlMarri & Oei, 2009; Baasher, 1981; Hafeiz, 1995). These influences are likely to contribute to the high prevalence of lifetime abstainers in the Eastern Mediterranean Region (EMR) and Northern Africa as shown in **Figure 2** (WHO, 2018c). The normativity of abstinence in these areas and the restricted availability of alcohol in certain countries are likely to add to the unrecorded alcohol use in these areas (Lankarani & Afshari, 2014; Shield, Rylett, Gmel, Kehoe-Chan, & Rehm, 2013; WHO, 2018a).

In the EMR including Iraq and Iran, the prevalence of lifetime abstainers is high, according to certain estimates 92% among women and 72% among men (Lankarani & Afshari, 2014; Shield et al., 2013). Abstaining from alcohol use is common also in the East African region including Somalia where the majority reports lifetime abstinence of alcohol use (70% among women and 56% among men) (Shield et al., 2013). This implies that alcohol consumption is accounted for by a small share of the population (Lankarani & Afshari, 2014; Shield et al., 2013; WHO, 2018a). Specific information about the alcohol consumption in the Kurdistan area or among Kurds has not been reported.

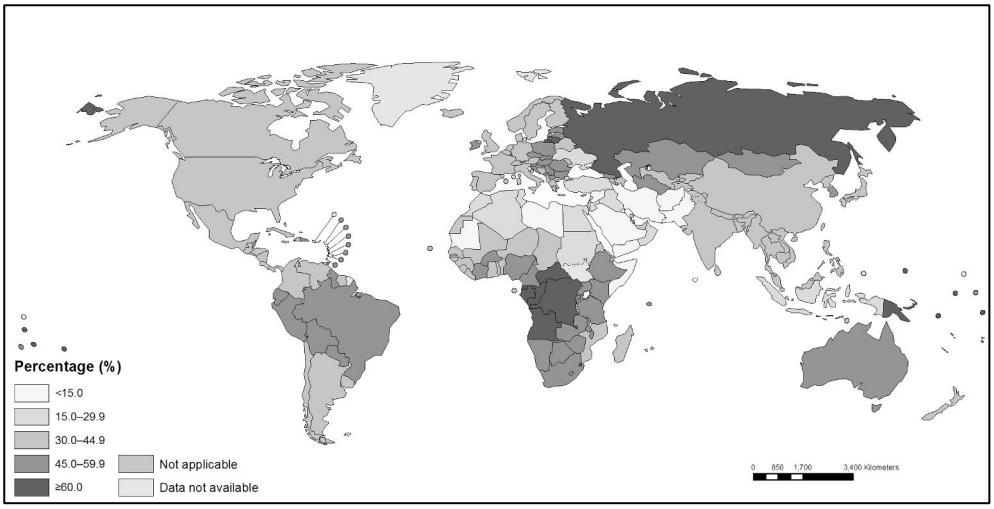

Figure 1. Prevalence of heavy episodic drinking among current drinkers aged over 15 years old in 2016 (WHO, 2018b).

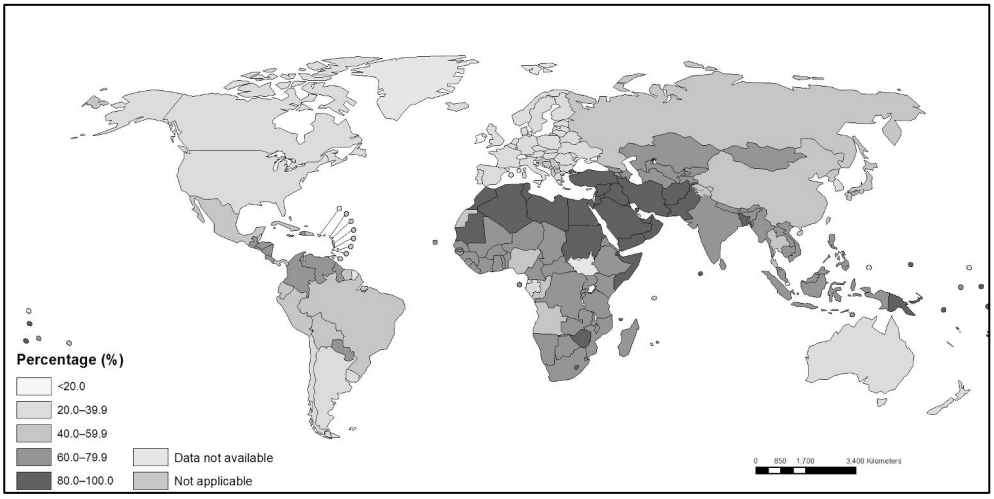

Figure 2. Prevalence of the past 12 months' abstention of alcohol use among population aged 15 years old and older (WHO, 2018c).

2.5.2 Tobacco smoking

Tobacco smoking rates across nations have been reported by the Global Burden of Disease (GBD) Study. Differences in prevalence rates of current tobacco smoking are illustrated in **Figure 3** (WHO, 2016). According to the most recent estimates from year 2015, almost two of every five Russian men and one in ten women smoke on a daily basis (GBD 2015 Tobacco Collaborators, 2017). In contrast to declining

tobacco smoking trends, the tobacco smoking rates among Russian women have increased whereas in men, they have remained on a similar level during the previous decades (GBD 2015 Tobacco Collaborators, 2017).

In Iraq, nearly one out of every four men but only three percent of women reported daily tobacco smoking, while in Iran, the tobacco smoking prevalence rates were 18% among men and two percent among women. Estimated tobacco smoking prevalence rates among Somali men were 13%, much higher than the 2% among women (GBD 2015 Tobacco Collaborators, 2017). The tobacco smoking rates of women seem to be similar in Iran, Iraq and Somalia, and there does appear to be a significant gender gap in smoking in these countries (GBD 2015 Tobacco Collaborators, 2017).

The tobacco smoking rates were lower than the global average (25% in men and 5% in women) in Iran and Somalia and larger in Iraq and Russia (GBD 2015 Tobacco Collaborators, 2017). Despite these differences, tobacco smoking was still listed among the ten most important risk factors for death and disability in Iraq, Iran and Russia (GBD 2015 Tobacco Collaborators, 2017).

Figure 3. Age-standardized prevalence of tobacco smoking among persons aged 15 years and older in 2015 (WHO, 2016).

2.5.3 Cannabis and intravenous drug use

UNODC estimates that cannabis is the most frequently used drug worldwide with a global average prevalence around 4% (UNODC, 2012). More recent data conveys

prevalence rates of approximately 0.5% in Iran and 3.5% in Russia (UNODC, 2020b, 2020d).

In other reports, the prevalence rates of cannabis use have been estimated to be similar (1–5 %) in Russia, Iran, Somalia and Finland (Hall & Degenhardt, 2009). The prevalence of opioid use (i.e. natural and synthetic) is approximately 3% in Iran, between 1–2% in Russia; for opiates, the values range between 1–2% in Iran, 0.2% in Somalia and approximately 1.5% in Russia (UNODC, 2020b, 2020c, 2020d, 2020e).

In addition, drug use disorders were listed among the ten most important causes of death and disability in Iraq and Iran, while in Russia it was one of the most important risk factors for death and disability (Institute for Health Metrics and Evaluation (IHME), 2020b, 2020a, 2020c).

2.6 Substance use among migrant origin populations

Substance use of migrants is likely to be influenced by the cultural norms, traditions and habits concerning substance use in the country or region of origin (Westermeyer, 1995b; Westermeyer et al., 2006). On the other hand, the substance use habits in the new host country are also likely to exert some effect on the substance use behavior by migrants. For example, alcohol use habits in Muslim majority countries and Nordic countries appear to be almost complete opposites. Thus, migrants originating from Muslim majority countries face contrasting circumstances in their new host countries. Adhering to the traditional norms and values of the country of origin might be an integral part of an individual's identity, reflecting also their substance use habits (Room, 2005). In contrast, acculturation and socializing in the host country might alter the substance use habits towards those of the general population (Bhugra, 2021). The contextual factors that can impact on the substance use habits are illustrated in **Figure 4** (Niemelä, 2008).

Various theoretical explanations have been proposed to explain the substance use habits among migrant populations. The healthy migrant theory suggests healthier substance use habits among migrant populations in comparison with the general population in the host country (Salas-Wright & Vaughn, 2014). Acculturation theories suggest that as more time elapses spent in the host country, migrants' substance use habits should converge towards those of the general population (Agic et al., 2016; Horyniak, Melo, et al., 2016). Theories concentrating on changes in social context due to migration and theories related to stress and traumatic experiences might well also apply to substance use habits of individuals with migration background. Coping and self-medication theories of substance use suggest that substances are used to cope with symptoms and unpleasant sensations caused by

severe stress (Kour, Lien, Kumar, Biong, & Pettersen, 2019). Individuals with severe traumatic experiences and psychological symptoms might also resort to substance use to try to diminish these sensations (Dupont, Kaplan, Verbraeck, Braam, & van de Wijngaart, 2005; Horyniak, Higgs, Cogger, Dietze, & Bofu, 2016; Kour et al., 2019).

Information about the identified studies is presented in **Table 2**. Surprisingly, there are rather few studies reporting substance use among migrants, particularly in the European context of migration. A small number of studies have examined substance use as the main outcome in comparison to native population or general population in the new host country. The majority of the studies had pooled together migrants from broad geographical areas, such as African origin migrants, or East Asian origin migrants. Several of the studies have been limited to samples of habitants of single cities or counties. In addition, a small number of studies have detailed substance use e.g. in descriptive statistics but did not examine it as the main outcome. Four of the identified studies reported substance use among Iranian or Iraqi migrants, one reported substance use among migrants from the Former Soviet Union, and four examined substance use among Somali migrants. No previous literature on substance use of Kurdish origin migrants was found.

Problematically, the majority of the previous literature have defined concepts related to substance use vaguely. For example, alcohol use or tobacco smoking might have been measured with a single question. Validated questionnaires such as Alcohol Use Disorders Identification Test (AUDIT-C) were often interpreted to describe disorder-level use with no further information. Similarly, the concept of depression was often applied in situations where depressive symptoms were enquired with a self-reporting questionnaire without clinical assessments or without considering the full diagnostic criteria of depression. These factors make comparisons between studies difficult, even unreliable.

Based on the previous literature, it seems that examining substance use among migrant populations has not been a priority in either public or mental health, substance use nor has it interested addiction researchers or those working in the field of migrants' health and wellbeing. Although this topic seems to overlap with several areas of research, unfortunately it has remained a low priority in all of them. In the Finnish context, there has been absolutely no epidemiological research conducted concerning substance use in migrant populations with larger samples.

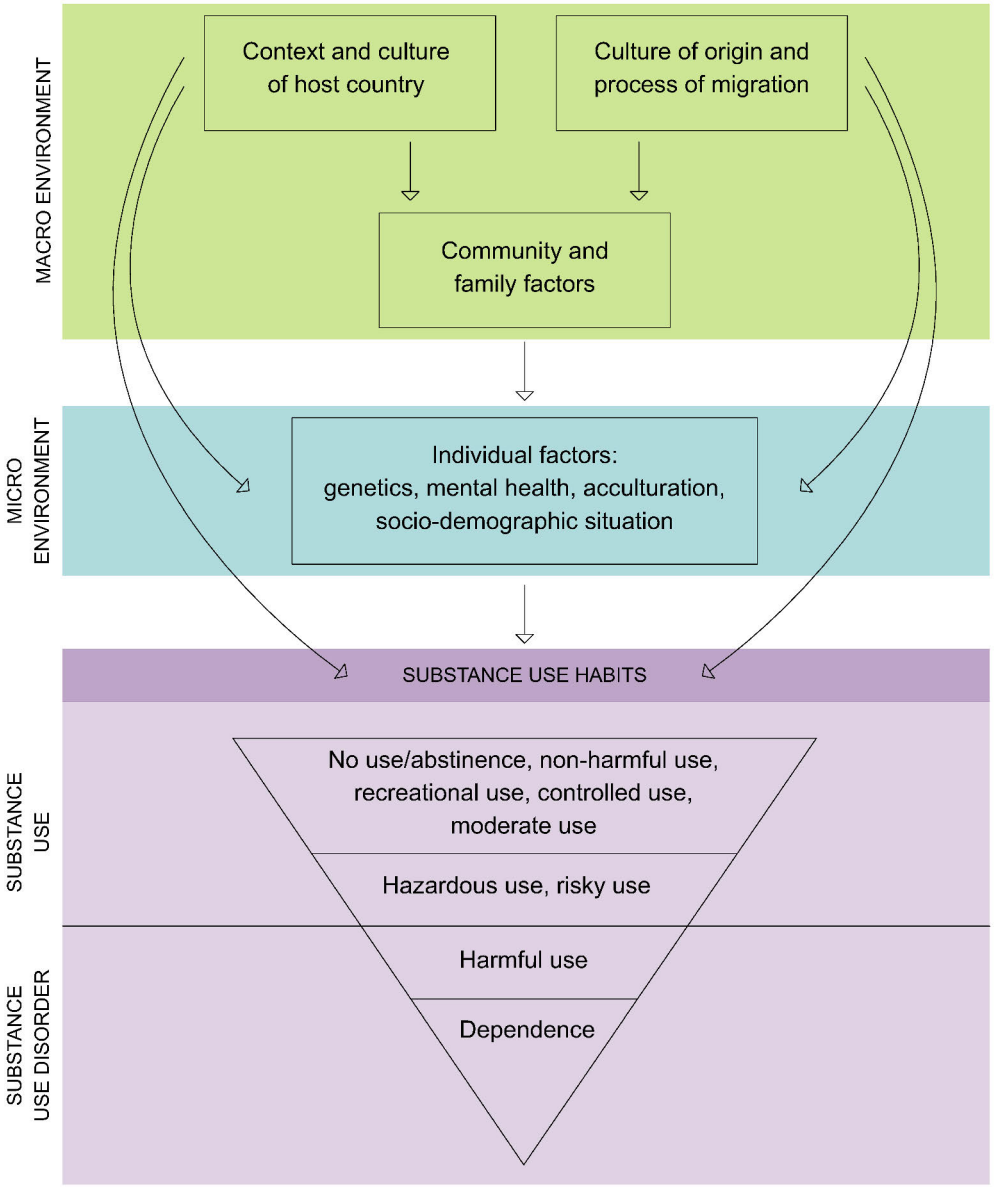

Figure 4. Substance use and contextual factors (adapted from Niemelä 2008, p. 11–12).

Table 2. Previous studies reporting substance use among migrant populations with comparison groups.

	STUDY; REFERENCE	LOCATION AND SETTING	PARTICIPANTS (MIGRANT GROUPS), AGE GROUPS	SUBSTANCE USE MEASUREMENTS	OUTCOME VARIABLE
1	Manhica, H., Gauffin, K., Almquist, Y. B., Rostila, M., Berg, L., Rodríguez García de Cortázar, A., & Hjern, A. (2017). Hospital admissions due to alcohol related disorders among young adult refugees who arrived in Sweden as teenagers – a national cohort study. *BMC Public Health*, 17(1), 644	Sweden, register-based national cohort, data collected in 2005–2012	Refugee population: permanent residency in Sweden when aged 13 to 19 years, Yugoslavian republics n=9,776, Somalia n=2,372, Middle East n=8,062 (Iraq and Iran), reference group native population n=1,009,027	Registered alcohol related medical care with a diagnosis of alcohol related psychiatric or medical disorder, alcohol-related mortality	Alcohol-related diagnosis, alcohol-related mortality
2	Selten, J.-P., Wierdsma, A., Mulder, N., & Burger, H. (2007). Treatment seeking for alcohol and drug use disorders by immigrants to the Netherlands. *Social Psychiatry and Psychiatric Epidemiology*, 42(4), 301–306	Netherlands, register-based national sample (1990-1996) and city-wide sample (Rotterdam) (1992-2001), psychiatric care registers	Surinamese n=1,570,00, Turkish n=1,410,00, German n=1,280,00, Moroccan n=1,150,00, Northern Mediterranean n=59,000, Dutch Antilles n=56,000, Belgian n=42,000, British n=36,000, Age 15–54 years, comparison group of Dutch nationals (born in the Netherlands)	AUD or DUD diagnoses in the registers (contacting the clinics)	Hospitalization due to alcohol or drug dependence or abuse
3	Visser, M. J., Ikram, U. Z., Derks, E. M., Snijder, M. B., & Kunst, A. E. (2017). Perceived ethnic discrimination in relation to smoking and alcohol consumption in ethnic minority groups in The Netherlands: the HELIUS study. *International Journal of Public Health*, 62(8), 879–887	Amsterdam/Netherlands, cross-sectional cohort study (HELIUS), collected in 2011-2015	Migrants of South-Asian Surinamese origin n=3,343, African Surinamese origin n=4,414, Ghanaian origin n=2,441, Turkish origin n=4,012, Moroccan origin n=4,290, comparison group of Dutch natives n=4,626, age 18–70 years	# of cigarettes per day, Fagerström test, alcohol use during previous 12 months, “more than four times a week” and “at least 3–4 glasses per day”, AUDIT score ≥ 8	Current smoking, heavy smoking, nicotine dependence; current drinking, excessive drinking, alcohol dependence

4	Salas-Wright, C. P., & Vaughn, M. G. (2014). A "refugee paradox" for substance use disorders? *Drug Alcohol Depend*, *142*, 345–349.	US, national sample from NESARC; data collected in 2004-2005, interview	Non-refugee immigrants n=4,955, refugees n=428, comparison group native born Americans n=29,267 aged 18 years and older	AUDADIS-IV	Substance use disorders (alcohol, cannabis, cocaine, hallucinogens, amphetamine, opioids/heroin)
5	Svensson, M., & Hagquist, C. (2010). Adolescent alcohol and illicit drug use among first- and second-generation immigrants in Sweden. *Scandinavian Journal of Public Health*, *38*(2), 184–191	Sweden, 3 counties (Västernorrland, Värnmland, Malmö), all junior high schools, cross-sectional, data collected in 2005, self-administered questionnaire	1st generation, 2nd generation, Nordic, European, Non-European migrants, total participants n=13,070, comparison group Swedish, 7th grade 13–14 years old & 9th grade 15–16 years old	Alcohol use during school year (yes/no), approx. 6 alcohol units per occasion twice a month or more often(yes/no), ever use of illicit drugs (yes/no)	Alcohol use, frequent binge drinking, drug use
6	Leão, T. S., Johansson, L. M., & Sundquist, K. (2009). Hospitalization due to Alcohol and Drug Abuse in First- and Second-Generation Immigrants: A Follow-Up Study in Sweden. *Substance Use & Misuse*, 41(3), 283–296.	Sweden, nationwide register-based study, data collected 1992–1999	Finns, labor migrants, refugees, comparison group Swedes, total of all participants n=2,243,546	ICD codes	Hospital admissions for alcohol abuse and drug abuse
7	Hjern, A., & Allebeck, P. (2004). Alcohol-related disorders in first- and second-generation immigrants in Sweden: a national cohort study. *Addiction*, *99*(2), 229–236.	Swedish Hospital Discharge Register, nationwide register-based study, data collected in 1990–1999	Migrants by geographical region n=172,890, comparison group Swedish majority population n=1,313,925	IDC-9 codes	Hospital admission related to alcohol-related disorders
8	Svensson, M. (2010). Alcohol use and social interactions among adolescents in Sweden: Do peer effects exist within and/or between the majority population and immigrants? *Soc Sci Med*, *70*(11), 1858–1864.	Sweden, 3 counties (Västernorrland, Värnmland, Malmö), all junior high schools, cross-sectional, data collected in 2005, self-administered questionnaire	1st generation, 2nd generation migrants Nordic n=673, European n=1034, Non-European migrants n=115, comparison group Swedish n=10,265, 7th grade 13–14 years old & 9th grade 15–16 years old	Alcohol use during the school year (yes/no), approx. 6 alcohol units per occasion monthly or more often	Alcohol use, frequent binge drinking

9	Vedoy, T. F. (2013). The role of education for current, former and never-smoking among non-western immigrants in Norway. Does the pattern fit the model of the cigarette epidemic? *Ethn Health*, *18*(2), 190–210.	Oslo, Norway data from two cross-sectional studies: Oslo Health Study (HUBRO) & Oslo Immigrant Health Study (Immigrant-HUBRO), data collected in 2000-2001, clinical examination and self-administered questionnaire	Turkish n=638, Iranian n=797, Pakistani n=762, Vietnamese n=707, Sri Lankan n=1156, comparison group Norwegians n=10,708; adults (certain years of birth were included)	Current smoking, previous smoking, never smoking	Smoking status
10	Hansen, A. R., Ekholm, O., & Kjoller, M. (2008). Health behaviour among non-Western immigrants with Danish citizenship. *Scandinavian Journal of Public Health*, *36*(2), 205–210.	Denmark, National health interview survey, cross-sectional, data collected in 2005, method of data collection not mentioned	Non-Western immigrants selected based on self-reported country of birth n=136, comparison group Danes n=9,901, aged 25–64	Alcohol use exceeding 14 units for women and 21 units for men, smoking	Alcohol intake, smoking
11	Rundberg, J., Lidfeldt, J., Nerbrand, C., Samsioe, G., Romelsjö, A., & Ojehagen, A. (2009). Mental symptoms, psychotropic drug use and alcohol consumption in immigrated middle-aged women. The Women's Health in Lund Area (WHILA) Study. *Nordic Journal of Psychiatry*, *60*(6), 480–485.	Lund area/Sweden, cross-sectional cohort, data collected in 1995, self-administered questionnaires & medical examination	Women, migrants born in Nordic countries n=379, born in another European country n=595, migrants born outside Europe n=167, comparison group of Swedes n=9,649, age group 50–59 years old	Quantity (units/grams) of alcohol consumption during an average week	Alcohol consumption
12	Amundsen, E. J., Rossow, I., & Skurtveit, S. (2005). Drinking pattern among adolescents with immigrant and Norwegian backgrounds: a two-way influence? *Addiction*, 100(10), 1453–1463.	Oslo, Norway, data from Oslo Health Study, cross-sectional, self-administered questionnaire, data collected 1999–2001	10th grade students in Oslo, Immigrant background n=1,213, comparison group Norwegian parents n=4,627, age group 15–16 years old	Ever drunk alcohol (yes/no), alcohol use at least twice a month during the previous year, drunkenness (twice or more during lifetime)	Drinking behavior

13	Agic, B., Mann, R. E., Tuck, A., Ialomiteanu, A., Bondy, S., Simich, L., & Ilie, G. (2016). Alcohol Use Among Immigrants In Ontario, Canada. *Drug And Alcohol Review*, *35*(2), 196–205.	Ontario/Canada, cross-sectional study, data collected in 2005–2010, computer assisted telephone interview	East Asian n=273, South East Asian n=85, South Asian n=352, Caribbean N=98, East European n=834, Central West European n=6,977, South European n=1,791, North European n=216, Comparison Group Canadian n=899, self-reported origin, aged 18 and older	Alcohol use during previous year (yes/no), weekly alcohol consumption, consuming 5 or more drinks at once, audit total score	Alcohol use, risky drinking, quantity of alcohol consumed
14	Abebe, D. S., Hafstad, G. S., Brunborg, G. S., Kumar, B. N., & Lien, L. (2015). Binge Drinking, Cannabis and Tobacco Use Among Ethnic Norwegian and Ethnic Minority Adolescents in Oslo, Norway. *Journal of Immigrant and Minority Health*, *17*(4), 1–10.	Oslo/Norway, cross-sectional data from school survey Young in Oslo, data collected in 2006, self-administered questionnaires	Migrant adolescents n=2,932, comparison group Norwegians n=8,002, age group 14–17 years old	5 or more alcohol units per one occasion weekly over the past year, cannabis use during the previous year, smoking daily	Binge drinking, cannabis use, tobacco use
15	Carrasco-Garrido, P., De Miguel, A. G., Barrera, V. H., & Jimenez-Garcia, R. (2007). Health profiles, lifestyles and use of health resources by the immigrant population resident in Spain. *European Journal of Public Health*, *17*(5), 503–507	Spain, cross-sectional data from Spanish National Health Survey, collected in 2003, face-to-face interviews	Migrants n=502, comparison group of general population n=1,004, aged 16 years and older	Smoking (yes/no) during previous 2 weeks, alcohol consumption (yes/no) during previous 2 weeks	Smoking, alcohol consumption
16	Lindstrom, M., & Sundquist, J. (2002). Ethnic differences in daily smoking in Malmo, Sweden. Varying influence of psychosocial and economic factors. *European Journal of Public Health*, *12*(4), 287–294.	Malmö/Sweden, cross-sectional study, data collected in 1994 by postal questionnaire	Categories by self-reported country of birth Denmark/Norway n=67, other Western n=88, Yugoslavia n=79, Poland n=53, Arabic-speaking n=57, other countries n=170, comparison group born in Sweden n=1,367, age group 20–80	Never smoked, stopped smoking, daily smoker, intermittent smoker	Smoking

17	Hosper, K., Nierkens, V., Nicolaou, M., & Stronks, K. (2007). Behavioural risk factors in two generations of non-Western migrants: do trends converge towards the host population? *Eur J Epidemiol*, *22*(3), 163–172	Amsterdam/the Netherlands, cross-sectional, data collected 2003–2004, face-to-face interviews	1st and 2nd generation migrants, Turkish n=505, Moroccan n=291, comparison group of native Dutch, aged 15–30 years	Smokers (incl. occasional smokers) vs. Never smokers, even occasional alcohol use vs. abstainers	Smoking, alcohol consumption
18	Sordo, L., Indave, B. I., Vallejo, F., Belza, M. J., Sanz-Barbero, B., Rosales-Statkus, M., et al. (2015). Effect of country-of-origin contextual factors and length of stay on immigrants' substance use in Spain. *European Journal of Public Health*, *25*(6), 930–936	Spain, nationwide cross-sectional study, data collected 2005–2007, self-administered questionnaire and interview	Migrants n=2,562 divided by geographical region of origin, comparison group of natives n=45,618, aged 15–64 years old	Over 5 drinks in one occasion over the last month, daily alcohol consumption exceeding limits, daily smoking during previous month, cannabis use during the last year, illicit drug use during last year	Binge drinking, excessive drinking, tobacco use, cannabis use, illegal drug use
19	Reiss, K., Schunck, R., & Razum, O. (2015). Effect of length of stay on smoking among Turkish and eastern European immigrants in Germany – interpretation in the light of the smoking epidemic model and the acculturation theory. *Int J Environ Res Public Health*, 12(12), 15925–15936	Germany, longitudinal study, data collection years 1998–2012	Turkish immigrants n=828, Eastern European immigrants n=2,009, comparison group of non-immigrants n=34,011, aged 17 years and older	Current smoking (yes/no)	Smoking
20	Brathwaite, R., Smeeth, L., Addo, J., Kunst, A. E., Peters, R. J. G., Snijder, M. B., et al. (2017). Ethnic differences in current smoking and former smoking in the Netherlands and the contribution of socioeconomic factors: a cross-sectional analysis of the HELIUS study, *BMJ Open* 2017;7(7), e01604	Amsterdam/the Netherlands, cross-sectional study, data collected 2011–2015, questionnaire & physical examination	Moroccan n=4,262, Turkish n=3,985, African Surinamese n=4,369, South-Asian Surinamese n=320, Ghanaian n=2,395, Dutch comparison group n=4,598, aged 18–70	Current smokers, former smokers, never smokers	Smoking

21	Brathwaite, R., Addo, J., Kunst, A. E., Agyemang, C., Owusu-Dabo, E., de-Graft Aikins, A., et al. (2017). Smoking prevalence differs by location of residence among Ghanaians in Africa and Europe: The RODAM study. *PloS One*, *12*(5), e0177291	London/UK, Amsterdam/the Netherlands, Berlin/Germany, Ghana, cross-sectional study, data collected 2012–2015, structured questionnaire	Ghanaians in London n=949, Amsterdam n=1,400, Berlin n=543; comparison group in rural Ghana n=973, urban Ghana n=1,400, aged 25–70	Current smokers, former smokers, never smokers	Smoking
22	Aspinall, P. J., & Mitton, L. (2014). Smoking prevalence and the changing risk profiles in the UK ethnic and migrant minority populations: implications for stop smoking services. *Public Health*, *128*(3), 297–306	UK, data from 2 cross-sectional survey, data collected 2009–2012 and in 2012, interview face-to-face or by telephone & by questionnaire	Participants classified according to self-reported ethnic group, comparison group white British, age groups not mentioned	Never smoker, current smoker, ex-smoker	Smoking
23	Bosdriesz, J. R., Lichthart, N., Witvliet, M. I., Busschers, W. B., Stronks, K., & Kunst, A. E. (2013). Smoking prevalence among migrants in the US compared to the US-born and the population in countries of origin. *PloS One*, *8*(3), e58654	US data from nationwide survey, global data from WHO (World Health Survey), cross-sectional, US-data collected in 2006–2007, US-data collected by telephone interview & face-to-face interview, global data collected in household face-to-face surveys, computer assisted telephone interview or computer assisted personal interview	Migrants, 2nd generation migrants, US-born comparison group n=247,159, comparison group from country of origin, no information on the # of participants in the global data	Current smoker (including occasional smoking), non-smoker (including ex-smokers)	Smoking
24	Markkula, N., Lehti, V., Gissler, M., & Suvisaari, J. (2017). Incidence and prevalence of mental disorders among immigrants and native Finns: a register-based study. *Social Psychiatry and Psychiatric Epidemiology*, *52*(12), 1523–1540	Finland, register-based cohort, data from 2011–2014, (Hospital Discharge Register & Primary Care Register	Migrants n=185,605, classified by region, Finnish-born comparison group n=185,605, aged 15 years old and above	ICD-10 diagnosis	Alcohol use disorders, other substance use disorders

25	Erdem, Ö., Riva, E., Prins, R. G., Burdorf, A., & Van der Doef, M. (2017). Health-related behaviours mediate the relation between ethnicity and (mental) health in the Netherlands. *Ethn Health*, 4(1), 1–14.	4 cities in the Netherlands, cross-sectional, data collected in 2012, self-administered questionnaire or interview via phone or face-to-face	Surinamese n=1,297, Turks n=850, Moroccan n=779, comparison group Dutch nationals n=15,633, aged 19 and older	Cigarettes/day, glasses of any kind of alcohol in a week	Health-related behavior
27	Siddiqui, F., Lindblad, U., & Bennet, L. (2014). Physical inactivity is strongly associated with anxiety and depression in Iraqi immigrants to Sweden: a cross-sectional study. *BMC Public Health*, *14*(1), 502	Malmö/Sweden, cross-sectional, data collected in 2010–2012	Iraqi born n=1,255, comparison group Swedish born n=634, aged 30-75 years	Smoking (yes/no), alcohol use (yes/no)	Anxiety, depression
28	Mehta, N. K., & Elo, I. T. (2012). Migrant selection and the health of U.S. immigrants from the former Soviet Union. *Demography*, *49*(2), 425–447	US, nationwide, cross-sectional data from 2 surveys, data collected in 2000 and 2000–2007; data collection method not mentioned	Former Soviet Union born migrants n=9,531, aged 50–84 years, comparison group US-born non-Hispanic whites n=2,657,185	Smoking (never, former, current smoker), alcohol use (lifetime abstainer, former drinker, current drinker, current moderate or heavy drinker)	Health, physical limitations
29	Méjean, C., Traissac, P., Eymard-Duvernay, S., Ati, El, J., Delpeuch, F., & Maire, B. (2007). Influence of socio-economic and lifestyle factors on overweight and nutrition-related diseases among Tunisian migrants versus non-migrant Tunisians and French. *BMC Public Health*, *7*(1), 265	Languedoc-Roussillon/France; cross-sectional, data collected 2004–2005, interview, health examination	Tunisian migrant men n=147, comparison groups French born men n=147, Tunisian men n=147, no age group specified	Daily smoking (yes/no), any alcohol use during previous 12 months (yes/no)	Overweight, diabetes, cardiovascular diseases
30	Kennedy, S., Kidd, M. P., McDonald, J. T., & Biddle, N. (2014). The Healthy Immigrant Effect: Patterns and Evidence from Four Countries. *Journal of International Migration and Integration*, *16*(2), 317–332	Pooled national datasets from US, Canada, Australia, UK, collected in 1996–2005, various methods of data collection	Migrants and native-born comparison groups with total n=129,727 in US, n=227,136 Canada, n=57,176 in UK, n=33,303 in Australia	Smoking (ever daily smoking yes/no)	Health (healthy migrant effect hypothesis), health behavior

2.6.1 Alcohol use

Generally, the alcohol use by migrants seems to vary depending on their country and culture of origin. Lower rates of binge drinking and less risky drinking among non-European origin migrants than the native populations seem to be the major trend noted in previous studies (Abebe, Hafstad, Brunborg, Kumar, & Lien, 2015; Agic et al., 2016; Amundsen, Rossow, & Skurtveit, 2005; Carrasco-Garrido, De Miguel, Barrera, & Jimenez-Garcia, 2007; Clarke, Colantonio, Rhodes, & Escobar, 2008; Hansen, Ekholm, & Kjoller, 2008; Hosper, Nierkens, Nicolaou, & Stronks, 2007; Mehta & Elo, 2012; Méjean et al., 2007; Rundberg et al., 2006; Salas-Wright & Vaughn, 2014; Siddiqui, Lindblad, & Bennet, 2014; Skogberg et al., 2017; Sordo et al., 2015; Svensson, 2010; Svensson & Hagquist, 2010; Visser, Ikram, Derks, Snijder, & Kunst, 2017).

Overall, lower alcohol consumption has been reported among migrant adolescents from non-European countries in comparison to the general population (Amundsen et al., 2005; Svensson, 2010; Svensson & Hagquist, 2010), and a lower risk of binge drinking among migrant adolescents of Middle Eastern, Asian and African origin than among Norwegian origin adolescents (Abebe et al., 2015).

Similarly, studies from Spain and France have reported that abstaining from alcohol use was more common among migrants than in the native population (Carrasco-Garrido et al., 2007; Méjean et al., 2007; Sordo et al., 2015). A Dutch population-based study found that current drinking and excessive drinking were less prevalent among all the migrant groups than the Dutch comparison group. The prevalence of alcohol dependence was less among South-Asian Surinamese, African Surinamese, Ghanaian and Turkish origin migrants but among Moroccan origin migrants there was no significant difference compared with the general population (Visser et al., 2017). In a Swedish study limited to a single city, Iraqi origin migrants reported a lower prevalence of alcohol use than the native population (Siddiqui et al., 2014).

Outside Europe, two Canadian studies reported lower rates of alcohol among all foreign origin populations compared with the native population (Agic et al., 2016), and lower prevalence rates of alcohol abuse among foreign born populations and visible minorities compared with the general population (Clarke et al., 2008). In the United States (US), persons with a refugee background were found to be less likely to have substance use disorders than the native-born Americans (Vaughn, Salas-Wright, DeLisi, & Maynard, 2014), and migrants from the Former Soviet Union (FSU) reported less frequently alcohol consumption than a US-born white comparison group (Mehta & Elo, 2012).

In addition, register-based studies have found lower rates of alcohol use disorders among all migrant groups when compared with the native population in Finland (Markkula, Lehti, Gissler, & Suvisaari, 2017) and with non-Nordic migrant

groups in Sweden (Hjern & Allebeck, 2004). A smaller risk of hospitalization or treatment due to alcohol-related disorders compared with the native population has been reported among refugees from the regions of the Former Yugoslavia and the Middle East (Manhica et al., 2017) and first-generation non-Nordic migrants (Leao, Johansson, & Sundquist, 2009) in Sweden, and non-European origin migrants in the Netherlands (Selten, Wierdsma, Mulder, & Burger, 2007).

The published literature highlights the differences in prevalence of alcohol use among migrant populations. However, varying definitions of migrant origin, alcohol use and comparison groups complicate comparing the previous research findings.

2.6.2 Tobacco smoking

The findings concerning prevalence rates of tobacco smoking among migrants are inconsistent, as some studies have reported higher, some similar and some lower smoking rates among migrants when compared with the mainly native populations. In addition, the studies have applied varying definitions of tobacco smoking. No previous research examining tobacco smoking among Kurdish origin population was found.

Higher tobacco smoking rates among migrants in comparison to the general population have been reported in the Netherlands, Norway, Sweden and the United Kingdom (UK). Three Dutch studies investigated current smoking rates and found that current smoking was more prevalent among South Asian Surinamese, African Surinamese and Turkish participants (Brathwaite et al., 2017; Visser et al., 2017), particularly Turkish origin men (Hosper et al., 2007), and less prevalent among Ghanaian and Moroccan participants, particularly women of Moroccan origin, as compared with the native population (Hosper et al., 2007; Visser et al., 2017). Similarly, a Norwegian city-wide study found that current smoking was more prevalent among Turkish, Pakistani, Iranian and Vietnamese origin migrant men but less prevalent among Iranian, Pakistani, Vietnamese and Sri Lankan origin migrant women than in the native population (Vedoy, 2013). A city-wide study from Sweden found the smoking prevalences to be higher among migrant men (Scandinavian, Western, Polish, Arabic-speaking) than in the native population (Lindstrom & Sundquist, 2002). In the UK, the smoking prevalence was higher among migrants from the Eastern Europe, Turkey and Greece when compared with the UK native population (Aspinall & Mitton, 2014). Several studies have also reported no differences in tobacco smoking between migrants and the host country's native population. A Norwegian study of migrated adolescents found no differences in daily tobacco smoking when compared with native-born counterparts (Abebe et al., 2015). Similarly, no differences in smoking rates between migrants and the native population have been reported in Denmark (Hansen et al., 2008) and France (Méjean

et al., 2007). Another city-wide study found no differences in smoking rates between Iraqi origin men and the native population (Siddiqui et al., 2014). Lower smoking rates among migrants compared with the native populations have been reported in Spain and the US (Bosdriesz et al., 2013; Carrasco-Garrido et al., 2007). In addition, a study from the US reported a lower prevalence of current smoking among migrants from the Former Soviet Union (FSU) than in the native population (Mehta & Elo, 2012).

Gender differences in tobacco smoking among migrant populations have been examined and detected in Norway (Vedoy, 2013) and the Netherlands (Brathwaite et al., 2017; Hosper et al., 2007).

Thus, the differences in tobacco smoking rates among migrants in comparison to the native populations seem to vary largely depending on migrant populations and the native populations. The varying findings of the previous studies highlight that migrants cannot be considered a single population group in which any findings could be generalized.

2.6.3 Cannabis and other drug use

Drug use among migrant populations is rather rarely reported, and no previous results concerning Kurdish origin migrants were found.

A Spanish study found that migrants with a shorter duration of residence in the host country reported lower rates of cannabis, sedative hypnotics and other illicit drug use than the native population but migrants with a longer duration of residence reported similar prevalence rates as the native population (Sordo et al., 2015). Two Nordic studies on migrant adolescents reported contradicting results. A Swedish study revealed a higher prevalence of lifetime use of drugs among migrant adolescents in comparison to the general population (Svensson & Hagquist, 2010), while similar or lower prevalence rates of past year cannabis use were reported among migrant adolescents in Norway in comparison with the native population (Abebe et al., 2015).

Register-based evidence from Finland demonstrated that hazard ratios for substance use disorders (other than alcohol) (SUDs) were smaller among Asian origin men and similar in other migrant groups (Nordic, Russian, Western, North African and Middle Eastern, Sub-Saharan African) in comparison with the native population (Markkula et al., 2017). Among women, the prevalence of SUDs was similar among Asian origin migrants and smaller in other groups. Results of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) from the US have shown that migrants with a refugee background were less likely to be diagnosed with any drug use disorder (cannabis, cocaine, hallucinogens,

amphetamines, opioids) as compared with the native population (Salas-Wright & Vaughn, 2014).

The published literature hints that cannabis and other illicit drug use might be less common among adult migrants in comparison with the general population, but possibly the results concerning adults are not applicable to migrant origin adolescents.

2.7 Contextual factors related to substance use among migrant origin populations

2.7.1 Sociodemographic factors

The association between substance use and sociodemographic factors among the general population is well established. However, the patterns of associations might not be universal concerning different substances, in this case alcohol, tobacco and cannabis. Generally, the prevalence rates of problem-level alcohol use and alcohol use disorder (AUD) are highest among young adults (under 30 years of age) (Connor, Haber, & Hall, 2016). Typically, alcohol use is more common among men than among women (Schuckit, 2009; Wilsnack, Wilsnack, Kristjanson, Vogeltanz-Holm, & Gmel, 2009) but the gender differences have shown a converging trend with women's changing drinking habits (Connor et al., 2016; Mäkelä et al., 2018). Education as a proxy of socio-economic status (SES) has also been analyzed in relation to alcohol use but with contrasting findings: it seems that generally among men who have a lower education tend to display higher rates of hazardous drinking but the situation is reversed in women (WHO, 2018a). In the Finnish context, observations have been made about problem level drinking being more prevalent among women with both low and high educational attainments (Mäkelä et al., 2018). In addition, higher SES has been associated with higher drinking rates but conversely lower SES was associated with heavy drinking and problematic drinking (Bloomfield, Grittner, Kramer, & Gmel, 2006; WHO, 2018a).

Among the general population, the associations between tobacco smoking and sociodemographic factors are well established (Casetta et al., 2017; Giskes et al., 2005; Huisman, Kunst, & Mackenbach, 2005; Laaksonen, Rahkonen, Karvonen, & Lahelma, 2005; Moodie et al., 2013). Tobacco smoking is typically more prevalent among more disadvantaged individuals, and their success in smoking cessation is lower compared with individuals with higher SES (Hiscock, Bauld, Amos, Fidler, & Munafò, 2012; Laaksonen et al., 2005). Disadvantaged situations which are linked to lower SES and higher tobacco smoking rates include e.g., long-term unemployment, homelessness, and impaired mental health (Hiscock et al., 2012).

Socio-economic conditions are not equally distributed between general populations and migrant populations, and lower socio-economic situations are often precipitated particularly among forced migrants arriving from outside the EU (Marmot, 2016; Rechel et al., 2013). This accumulation of risk factors together with other simultaneous stressors might predispose young migrants to developing risky behaviors (Acarturk et al., 2011; Dupont et al., 2005; Horyniak, Higgs, et al., 2016). According to previous findings in Finland, a larger share of Russian origin migrants (80%) has completed high school level education in comparison to the general population (68%), while the proportions are smaller among Somali (26%) and Kurdish origin (41%) populations. In addition, a higher prevalence of unemployment was reported among Russian (24%), Somali (27%) and Kurdish (29%) origin populations than in the general population (4%). A similar proportion of the Russian origin population reported living alone (43%) as the general population (42%) while the proportion was smaller among Somali (33%) and Kurdish (32%) origin populations (Rask et al., 2015).

Previous research among migrants in the European context has pointed to associations between lower SES and alcohol use. Two studies from the Nordic countries reported associations between lower SES and alcohol use. A Swedish register-based study found that hospital admissions due to alcohol related disorders among migrants were associated with lower SES and having received social welfare benefits (Hjern & Allebeck, 2004). The level of parental education was associated with higher odds for binge drinking among migrant adolescents in Norway (Abebe et al., 2015).

A few studies have indicated that there is an association between lower SES and tobacco smoking among migrants in the Netherlands, Germany, Norway, and Sweden. Two Dutch studies found that among migrants, smoking was associated with lower educational attainment and being unemployed (Brathwaite et al., 2017; van Oort et al., 2006). In addition, male gender and living with a partner were associated with smoking (van Oort et al., 2006). In Sweden, economic stress was associated with smoking among migrants from Arab-speaking countries (Lindstrom & Sundquist, 2002). The effects of educational attainment were opposite between genders among Turkish and East European origin migrants in Germany; a higher prevalence of smoking was reported among men with a lower educational attainment while among women a higher prevalence of smoking was reported among women with a higher educational attainment (Reiss, Schunck, & Razum, 2015). A Norwegian study found that parental education was associated with a lower odds for daily smoking among migrant adolescents (Abebe et al., 2015). No previous studies were identified which would have examined the association between sociodemographic factors and illicit drug use among migrants in the European context.

Thus, based on the published literature, it seems that the individual's sociodemographic situation is associated with alcohol use or tobacco smoking in a similar fashion among migrants as it is in the native populations. However, the available literature is scanty, although the available information does imply that differences between migrant populations are significant and findings concerning a certain migrant group may not be generalizable to other groups or to all migrants as a single population.

2.7.2 Migration-related factors

Migration-related factors might influence substance use habits of migrants through mechanisms of increased stress or through mechanisms of acculturation and socio-cultural adaptation. The process of migration itself might predispose certain individuals to stress, particularly if it involves unsafe migration pathways. This increased stress may lead to substance use acting through various mechanisms (Vujanovic et al., 2019). Another theoretical explanation involves the process of acculturation and adaptation, and their effects on the substance use habits of an individual (Room, 2005; Westermeyer, 1995a, 1995b, 1999; Westermeyer et al., 2006).

Migration-related factors and acculturation have been conceptualized in previous research for example via the duration of residence in the host country, age of migration and proficiency in the host country's languages. However, it is important to note that acculturation is a complex phenomenon, that involves many psychological and behavioral characteristics (Berry, 2021).

The results of the previous research indicate that length of residence and other measures of acculturation might be associated with substance use, although the substances under study varied, and participating populations were diverse. Migration by an individual to Canada younger than 19 years increased the odds for risky drinking as compared to migration by older people (Agic et al., 2016). A US study found that among men, migration while still in adolescence increased the odds for current smoking in adulthood, and migration during childhood increased the odds for binge drinking in adulthood, while no such findings were found among women (Li & Wen, 2015). Similarly, an older age at migration to the US was associated with a lower risk for SUDs compared to younger age at migration (Salas-Wright & Vaughn, 2014). It was also noticed that a longer duration of residence in the host country was associated with the drinking frequency among Iranian origin migrants but not in Pakistani or Turkish origin migrants in Norway (Amundsen, 2012). A Spanish study found that the length of residence correlated with the risk of substance use among migrants (Sordo et al., 2015). Another study found that smoking attitudes of Chinese and Russian origin migrants in the US turned more negative with a longer

duration of residence in the host country (Sussman & Truong, 2011). A Dutch study used local language proficiency as a marker for acculturation, and found that linguistic acculturation was associated with a higher likelihood of cannabis use among migrant adolescents and young adults with migrant backgrounds (Delforterie, Creemers, & Huizink, 2014).

These previous findings indicate that age at migration, duration of residence and some aspects of acculturation might be associated with substance use among migrants. However, the differences between populations and genders were very marked. The previous results imply that substance use might converge towards that of the native population with a longer duration of residence in the host country.

2.7.3 Impaired mental health

Among general populations, the comorbidity of substance use and psychological distress or impaired mental health is well established (Connor et al., 2016; Lai, Cleary, Sitharthan, & Hunt, 2015; Swendsen et al., 2010). There is an impressive literature about the associations of both alcohol use and tobacco smoking with depressive symptoms, anxiety and suicidal behavior (Hiscock et al., 2012; Poorolajal & Darvishi, 2016; Rancans, Vrublevska, Snikere, Koroleva, & Trapencieris, 2014; Schuckit, 2006, 2009; Swendsen et al., 2010). In addition, there is broad-based evidence revealing the associations between cannabis use and impaired mental health (Metrik et al., 2016).

Culture has an impact on the way how distress is experienced and expressed (Kirmayer, 2006). This variation might also influence the comorbidity of substance use and mental health across different populations (Wanigaratne & Strang, 2018). In particular, forced migrants are found to be at a higher risk of impaired mental health, although the risk of mental health issues is not limited only to individuals with refugee backgrounds (Close et al., 2016; Erdem et al., 2017). High rates of depressive symptoms and anxiety have been reported among Iranian, Iraqi, Kurdish and Somali population in various European countries, and also outside Europe (Ahmad et al., 2016; Bhui et al., 2006; Gerritsen et al., 2006; Rask et al., 2015; Siddiqui et al., 2014; Taloyan, Johansson, Sundquist, Koctürk, & Johansson, 2008; Taloyan, Sundquist, & Al-Windi, 2009). High prevalence rates of depressive and anxiety symptoms have been reported in Russian (18%) and Kurdish (35%) origin migrants in Finland, while Somali origin migrants (9%) reported similar prevalence rates of depressive and anxiety symptoms as the general population (9%) (Rask et al., 2015). Register-based evidence from Finland also indicates that depressive disorders are more common than among the general population, particularly among migrants originating from the Middle East and North Africa, (Markkula et al., 2017).

Despite the high prevalence rates of psychological symptoms among migrants in the host countries, the concurrence of substance use and mental health has rarely been examined, and the findings have been inconsistent. The comorbidity between AUD and depressive symptoms was detected among Latino migrants in Spain and the US (Ramos et al., 2017). A Norwegian study also reported an association between binge drinking and depressive symptoms among migrant adolescents (Abebe et al., 2015). On the contrary, depressive symptoms were not associated with alcohol use among Somali refugees residing in Ethiopia (Feyera, Mihretie, Bedaso, Gedle, & Kumera, 2015). Associations between tobacco smoking and depressive symptoms were detected among Iraqi migrants in Sweden (Siddiqui et al., 2014), and depressive symptoms were more prevalent among smokers than in non-smokers among Turkish origin migrants in the Netherlands (Acarturk et al., 2011). The frequency of symptoms of depression also correlated with a greater risk of smoking among migrant adolescents in Norway (Abebe et al., 2015). Among Somali refugees in Ethiopia, smoking was not associated with depression (Feyera et al., 2015). Cannabis use was found to be associated with depressive symptoms among migrant adolescents in Norway (Abebe et al., 2015), and substance use disorders (SUDs) were associated with depression and anxiety (Ramos et al., 2017) among Latino immigrants. Two studies examining Somali origin migrants in Ethiopia (Feyera et al., 2015) and London, UK (Bhui & Warfa, 2010) reported that khat use was not associated with depressive symptoms.

Previous research indicates that substance use among migrant populations has been a rarely and unsystematically examined topic. High prevalence rates of traumatic experiences, perceived discrimination, and symptoms of depression and anxiety have been reported among several migrant groups, but their role in influencing substance use in migrant populations has remained a mystery. In addition, substance use among migrant origin persons in Finland has not been studied before.

2.7.4 Traumatic experiences

Traumatic experiences are defined as experiences that are extremely threatening or horrifying in nature and likely to case distress to almost anyone (Posttraumatic Stress Disorder: Current care guidelines, 2020). However, it is difficult to estimate the impact of specific potentially traumatic events on an individual or his/her suffering, as distress or psychiatric symptoms following exposure to traumatic events also depend on the individual's protective factors and social support. The literature confirms that only some individuals develop acute stress syndrome or severe post-traumatic stress disorder (PTSD) following traumatic events (Bonanno, Westphal, & Mancini, 2011; Posttraumatic Stress Disorder: Current care guidelines, 2020;

Henriksson & Lönnqvist, 2020). Among the individuals who develop symptoms as a result of traumatic experiences about one in three will develop a long-term disorder with chronic symptoms accompanied by a severe decrease in their functional capacity (Bonanno et al., 2011; Henriksson & Lönnqvist, 2020).

Epidemiological studies have shown that traumatic experiences are particularly common among forced migrants who have lived in conflict zones and/or in unstable circumstances in refugee resettlements and the high prevalence rates of PTSD have been reported among migrants (Bogic et al., 2015; Fazel et al., 2005; Steel et al., 2009). Previous studies demonstrate that potentially traumatic experiences (PTEs) prior to migration were particularly prevalent among Somali (58%) and Kurdish (77%) origin populations in Finland (Castaneda et al., 2017). Other forms of psychological distress or psychiatric symptoms might also follow on from these kinds of traumatic events, for example depressive symptoms and a major depressive disorder or substance abuse (Brady et al., 2006; de Jong, Komproe, & van Ommeren, 2003; Starck et al., 2020).

Associations between traumatic experiences or PTSD and substance use, including AUD, tobacco smoking and nicotine dependence and cannabis use, have been documented in the US and Australia among the general population or among veterans (Bonn-Miller, Vujanovic, Boden, & Gross, 2011; Bonn-Miller, Vujanovic, Feldner, Bernstein, & Zvolensky, 2007; Brady et al., 2006; Breslau, Davis, & Schultz, 2003; Fetzner, McMillan, Sareen, & Asmundson, 2011; Garey et al., 2016; Kearns et al., 2018; Metrik et al., 2016; Mills, Teesson, Ross, & Peters, 2006; Seal et al., 2011). However, also contradictory findings have been reported (Breslau et al., 2003). The associations have been studied mainly among general populations and veterans. Considering the wide prevalence of PTEs among forced migrants and refugees, and the different nature of traumatic events faced by individuals fleeing conflicts or persecution, the findings on consequent substance use might not be applicable to migrant populations as such. Traumatic experiences in part might predispose forced migrants towards substance use (Horyniak, Melo, et al., 2016; Lo, Patel, Shultz, Ezard, & Roberts, 2017).

There is scant information available on substance use and traumatization among migrants in the new host countries. Previous results concerning internally displaced persons (IDPs) and conflict-affected general populations are partly contradictory. Findings among IDPs in Georgia and Uganda indicated that hazardous alcohol use and AUD would be associated with traumatic experiences, but no associations between heavy episodic drinking or AUD and PTSD were detected (Roberts et al., 2014; Roberts, Ocaka, Browne, Oyok, & Sondorp, 2011). Contradictory results were reported from Croatia, where an association between alcohol dependence and current PTSD was reported among internally displaced men (Kozaric-Kovacic, Ljubin, & Grappe, 2000). In contrast, with respect to a conflict-affected general population in

South Sudan, traumatic experiences were not associated with alcohol misuse (Lien et al., 2016). Finally, among Latino immigrants in Spain and the US, a high comorbidity of PTSD and AUD was reported (Ramos et al., 2017).

Qualitative studies have shown that coping with trauma was a motivation for alcohol use among African origin refugees in Australia and one of the motivations for alcohol and drug use by asylum seekers living in the Netherlands (Dupont et al., 2005; Horyniak, Higgs, et al., 2016).

The only previously found research on tobacco smoking and traumatization among migrants reported that PTSD was associated with smoking status among Bosnian origin refugees living in in the US (Weaver, Čajdrić, & Jackson, 2007). Research conducted in the Balkans, however, indicated no association between SUDs and traumatic experiences (Priebe et al., 2010).

Cannabis or other illicit drug use in relation to traumatization among migrants has been rarely examined. A study examining Somali combatants in Somalia did detect an association between khat use and traumatic experiences (Odenwald et al., 2009). Contradictory findings were reported among Somali origin migrants living in London, where no association between traumatic experiences and khat use was found (Bhui & Warfa, 2010).

It seems that associations between traumatic experiences or traumatization and substance use have been studied rarely among migrant origin populations in their new host countries. The literature suggests that in conjunction with traumatic experiences, also the post-migration circumstances are likely to influence the wellbeing of forced migrants in their new host countries (Bogic et al., 2015). Therefore, the previous results concerning IDPs or war-exposed general populations might not be applicable to migrant populations.

2.7.5 Discrimination

Discrimination can be defined as differential or unequal treatment of individuals based on various factors, e.g. ethnicity, race, gender, age, sexuality, disability or religion, and based on ideas of superiority that are expressed in thoughts or actions (Ayonrinde & Miller, 2021; Krieger, 2001; Pager & Shepherd, 2008; Rask, 2018). Prejudice has been defined through learnt negative attitudes and emotions towards an individual or group based on cultural or social characteristics (WHO, 1997).

Experiencing discrimination and racism is rather common among migrant origin individuals. In Finland, over a third of Russian, Somali and Kurdish origin persons reported that they had encountered discrimination, and over one in five reported overt discrimination (having been called names, insulted, harassed, or threatened) (Rask et al., 2018). Even higher levels (56%) of perceived discrimination have been

reported particularly among African origin individuals (Rask & Castaneda, 2020). Perceived discrimination was associated with unsafe feelings and a decline in trust towards societal institutions as well as deteriorations in mental and physical health (Castaneda et al., 2015; Rask & Castaneda, 2020; Rask et al., 2018). In addition, discrimination might occur towards individuals with impaired mental health and individuals with problematic substance use. Mental health and substance use problems are still viewed as being stigmatizing in many communities (Kour et al., 2019; Kour, Lien, Kumar, Biong, & Pettersen, 2020; McCann, Mugavin, Renzaho, & Lubman, 2016). This might leave certain individuals in an intersecting minority, they may become a minority within a minority.

The impacts of discrimination on health have been investigated mainly in the United States (US), whereas in the European context, understanding of the health effects of discrimination and racism are more limited, although the understanding has been increasing during the previous decades and evidence concerning migrant populations in Europe has started to emerge. One plausible explanation for association between discrimination and health, including mental health, is the minority stress model. According to this theory, belonging to a minority is stressful due to accumulated hardship, marginalization and experienced discrimination in its various levels and forms (Ayonrinde & Miller, 2021; Walsh, Sagis-Krebs, & Gross, 2018). This stress is then embodied and internalized causing physical and psychological symptoms (Pascoe & Smart Richman, 2009). Perceiving discrimination in everyday life might be an exhausting experience, and this might lead to an individual having less energy to make healthy lifestyle choices, which might be reflected in increased substance use (Pascoe & Smart Richman, 2009). At the same time, substance use might be accentuated as a means of coping with high levels of stress and discrimination (Horyniak, Higgs, et al., 2016; Kour et al., 2019; Pascoe & Smart Richman, 2009). Despite these theories, general information is still limited in the literature on the role of discrimination on the link between health, and substance use (Galea, Nandi, & Vlahov, 2004).

Studies among minorities and different racial groups in the North America indicate that perceived discrimination is associated with substance use. Several investigators have reported associations between perceived discrimination and alcohol dependence or AUD as well as associations with tobacco smoking and cannabis use among several minority and racial groups (Bennett, Wolin, Robinson, Fowler, & Edwards, 2005; L N Borrell et al., 2007; Luisa N Borrell et al., 2010; Choi, Harachi, Gillmore, & Catalano, 2006; Gee, Delva, & Takeuchi, 2007; Guthrie, Young, Williams, Boyd, & Kintner, 2002; Martin, Tuch, & Roman, 2003; Otiniano Verissimo, Gee, Ford, & Iguchi, 2014; Tran, Lee, & Burgess, 2010; Yen, Ragland, Greiner, & Fisher, 1999; Zemore, Karriker-Jaffe, Keithly, & Mulia, 2011). There is also some evidence about these associations among migrant populations (Siddiqi,

Shahidi, Ramraj, & Williams, 2017; Tran et al., 2010; Tse & Wong, 2015). The results concerning minorities or racial groups might be applicable to migrant populations partly, but the situations of migrant populations might also differ from native minorities. Most of these previous studies have been conducted in the context of Northern America, which differs from the European context. In the European context, only one study was found and in that publication, discrimination was associated with alcohol consumption among African Surinamese and with alcohol dependence among Ghanaians living in the Netherlands (Visser et al., 2017).

The existing literature consists of studies where definitions and measurements of substance use and discrimination vary extensively. None of the previous studies have reported these associations among Russian, Somali, or Kurdish origin populations nor among forced migrant populations. The associations between substance use and perceived discrimination have not been studied before in Finland or in the Nordic context of substance use. High prevalence rates of affective symptoms, traumatic experiences, perceived discrimination have been reported among several migrant groups, but their role in substance use in migrant populations is not known. Thus, the previous research indicates that substance use among migrant populations has been a rarely and unsystematically examined topic.

3 Aims

The aim of this study was to examine substance use and associated contextual factors among populations of Russian, Somali, and Kurdish origins in Finland.

The specific aims were:

1. To evaluate the prevalence of substance use and background factors, i.e. sociodemographic and migration-related factors associated with substance use (alcohol use, tobacco smoking, and cannabis use) among populations of Russian, Somali, and Kurdish origins.
2. To assess whether substance use is associated with depressive and anxiety symptoms, and suicidal ideation among populations of Russian, Somali, and Kurdish origins and the general population.
3. To assess whether substance use is associated with pre-migration traumatic experiences and post-migration perceived discrimination among populations of Russian, Somali, and Kurdish origins in Finland.

4 Materials and Methods

4.1 Participants

4.1.1 The Finnish Migrant Health and Wellbeing Study (Maamu) and its participants

The Finnish Migrant Health and Wellbeing Study (Maamu) is a comprehensive cross-sectional survey conducted by the Finnish Institute for Health and Welfare (THL) between 2010–2012 (Castaneda et al., 2019; Castaneda, Rask, Koponen, Mölsä, & Koskinen, 2012). In this survey, a stratified random sample of 3,000 migrants of Russian, Somali, and Kurdish origin (1,000 per group), living in six major cities in Finland (Helsinki, Espoo, Vantaa, Turku, Tampere, Vaasa), was drawn from the National Population Register.

Russian, Somali and Kurdish origin populations were selected due to their divergent ethnocultural backgrounds, distinct geographical origins and diverse reasons of migration. These population groups were among the largest migrant groups in Finland, and also significant in other Scandinavian and European countries. In the present study, Russian origin was defined by the native language being Russian or Finnish, and the country of birth as Russia or Former Soviet Union. Somali origin was defined by the country of birth being Somalia, and Kurdish origin was defined by the native language being Kurdish and the country of birth being Iraq or Iran. A person ought to have had a residence permit in Finland for a minimum of a year to be included in the sample, thus for example asylum seekers or people residing in reception centers were not included. The inclusion criteria for age was 18–64.

The Maamu Study consisted of a broad, structured interview on health and wellbeing and a standardized health examination. In addition, a short interview, including the most important items from the Maamu Study interview and the health examination, was generated to diminish the loss of participants, and offered for those not able to participate in the interview. The interview was carried out face-to-face by field personnel, who were fluent in the participant's native language and Finnish. Therefore, the interviews were conducted in the participant's native language or in Finnish according to the wishes of the participant, and interpreters were not used.

The short interview was conducted face-to-face, over a phone call or self-administered by mail. The health examinations were carried out by licensed healthcare field personnel who were also fluent in both the native language of the participant and Finnish. The data collection and participation rates are visualized in **Figure 5**.

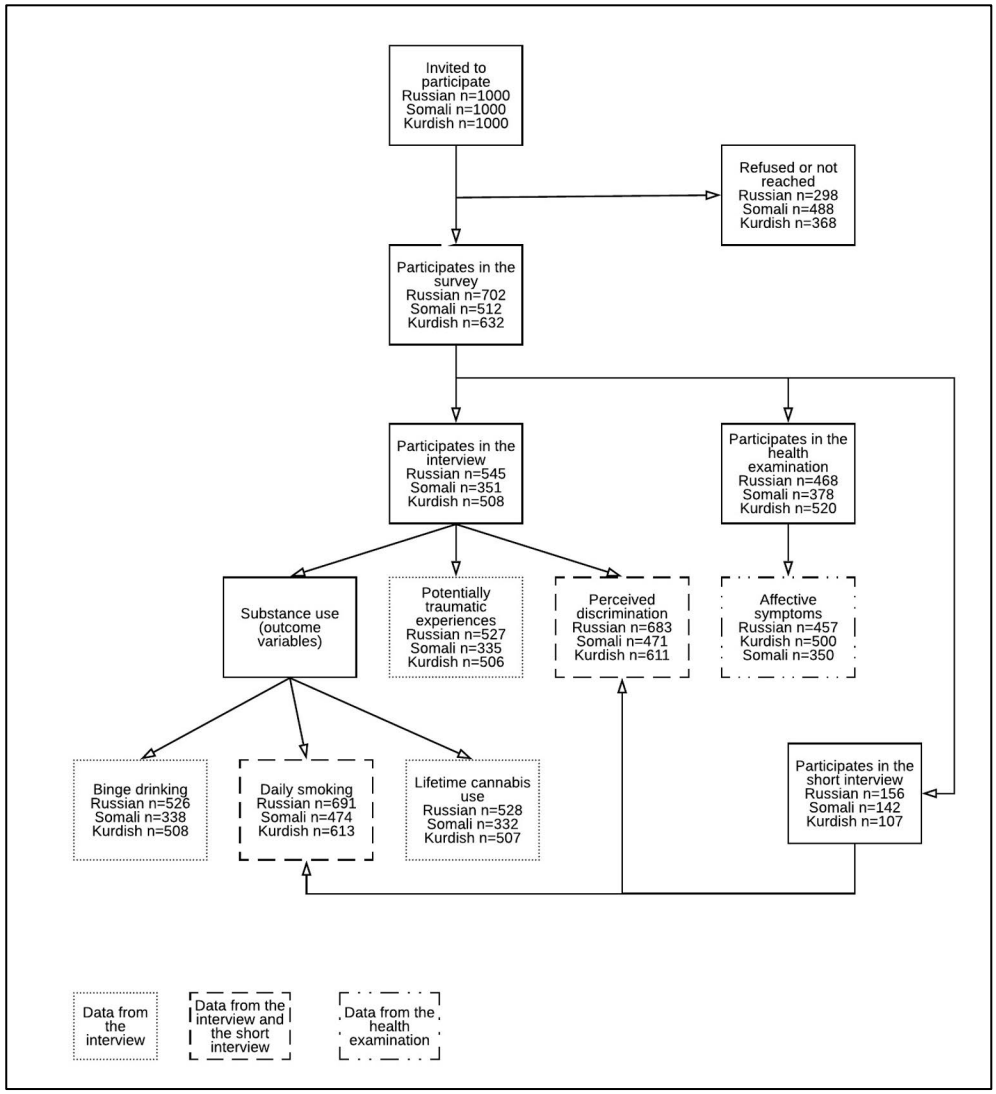

Figure 5. The data collection flow and participation rates of the outcome variables and the main explanatory variables.

4.1.2 Health 2011 comparison group

Health 2011 Survey, conducted by the Finnish Institute for Health and Welfare (THL) during 2011–2012, is a nationwide health examination survey of the adult population in Finland and forms the comparison group for the Maamu Study (Lundqvist & Mäki-Opas, 2016). The comparison group data were restricted to those of the same age group and living in the same six cities as the inclusion criteria of the Maamu Study sample. The participation rate of this selected comparison group was 51% (n=1,165).

Health 2011 Survey included similar methods and mostly the same questions and measures as enquired in the Maamu Study for many investigated areas of health and wellbeing (e.g. alcohol use, tobacco smoking, depressive and anxiety symptoms), but some of the measures were used only in the Maamu Study (e.g. drug use, perceived discrimination, potentially traumatic experiences). Therefore, all the measures used in the present study do not have comparison group data.

4.2 Measures

4.2.1 Alcohol use

Alcohol use was measured with four items asked in the interview (two of which were asked in the short interview). First, the participants were asked in the interview and short interview if they had used alcohol during the previous 12 months. Following a positive response, AUDIT-C (Alcohol Use Disorder Identification Test for Consumption) was enquired in the interview. AUDIT-C is a validated shortened version of the 10-item AUDIT (Alcohol Use Disorder Identification Test) that includes three items. Hazardous drinking can be identified using AUDIT-C (Aalto, Alho, Halme, & Seppä, 2009; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998; Dawson, Grant, Stinson, & Zhou, 2005; Frank et al., 2008; Reinert & Allen, 2007). AUDIT C was included the interview in its original form but the response categories of the items were modified for the statistical analyses. Only the first question of the AUDIT-C was included in the short interview.

The first question of the AUDIT-C ("*How often do you have a drink containing alcohol?*") measures the frequency of alcohol use with response categories "*never*", "*monthly or less*", "*2–4 times a month*", "*2–3 times a week*" and "*4 or more times a week*". In the statistical analyses of the present study, the categories were simplified to "*never*", "*occasionally*" including responses "*monthly or less*" and "*2–4 times a* month", and "*frequently*" including response in the categories "*2–3 times a week*" and "*4 or more times a week*". This item was included in the interview and short interview.

The second question ("*How many standard drinks containing alcohol do you have on a typical day when you have used alcohol?*") measures the number of standard drinks typically consumed. The original response categories were "*1–2*", "*3–4*", "5–6", "*7–9*", "*10 or more*", and in the analyses the categories were simplified to "*no alcohol use*" based on the response of the previous item; "*1–2*"; "*3–6*"; and "*7 or more*". This item was included in the interview.

The third question ("*How often do you have six drinks or more on one occasion?*") measures the frequency of binge drinking i.e., having six or more alcohol units on one occasion. In the analyses, the original five response categories ("*never*", "*less than monthly*", "*monthly*", "*weekly*", "*daily or almost daily*") were simplified to three categories "*no binge drinking*" including the response "*never*" and previous response "*no alcohol use*"; "*occasionally*" including "*less than monthly*" and "*monthly*"; and "*frequently*" including "*weekly*" and "*daily or almost daily*". This variable was also dichotomized to "*no binge drinking*" referring to the responses "*never*" [no binge drinking] and "*no alcohol use*" vs. "*binge drinking*" including the other response categories. Each of the items was analyzed separately and the prevalence rates were reported in sub-study I.

Response category "*binge drinking*" was interpreted as a risky drinking occasion and it was used as an outcome variable to indicate a hazardous pattern of alcohol use in all of the sub-studies I–III (Gmel, Kuntsche, & Rehm, 2011; Gual, 2011; Herring, Berridge, & Thom, 2008). This item was included in the interview.

A sum variable of all the AUDIT-C items was also formed. Cut-off points of 4 for women and 6 for men were applied to describe risky drinking (Aalto et al., 2009; Kaarne, Aalto, Kuokkanen, & Seppä, 2010; Reinert & Allen, 2007). Sum scores were reported in sub-study I and used as a continuous variable in sub-study III.

Data of the general population comparison group were available on the three-item AUDIT-C.

4.2.2 Tobacco smoking

Information on tobacco smoking was collected with eight items and four of those were used in the present study.

Lifetime tobacco smoking was measured with the question "*Have you ever smoked during your lifetime?*" and lifetime regular tobacco smoking with "*Have you ever smoked regularly (every day for at least a year)*?" with dichotomous response categories (*yes* vs. *no*). These items were included in the interview

Current tobacco smoking was measured with the question "*Do you smoke currently (cigarettes, cigars, pipe)?*" with three response categories "*not at all*" including also the negative responses to the previous question of lifetime tobacco smoking, "*yes, occasionally*" and "*daily*". This item was included both in the full

Maamu interview and the short interview. The words "*occasionally*" or "*daily*" were not defined in more detail in the interview, and detailed information on the frequency or quantity of occasional tobacco smoking was not available. A dichotomous variable of daily tobacco smoking was formed, where "*yes, occasionally*" was pooled with "*not at all*". This dichotomous variable was selected as an outcome variable in all the sub-studies (I–III) to indicate a frequent and more hazardous tobacco smoking pattern.

The fourth question measuring the quantity of cigarette products consumed per day was "*How many cigarette products do you use or did you use before smoking cessation on an average day?*". The continuous answer variable was converted to categorical variable with categories "*no smoking*" according to the previous responses, "*1–10 manufactured or roll-your-own cigarettes per day*" and "*11 or more manufactured or roll-your-own cigarettes per day*". This item was included in the interview, and it was not included in the Health 2011 Survey, and therefore no data on the general population were available.

4.2.3 Cannabis and intravenous drug use

In the interview, the participants were also asked about their use of cannabis and intravenous drugs with three questions. Lifetime use of cannabis was enquired with the item "*Have you ever used cannabis (hashish, marijuana)?*" with response categories "*yes*" vs. "*no*". This item was selected as an outcome variable in the sub-studies I–III. Following a positive response, the participants were asked if they had used cannabis during the previous 12 months, again with response categories "*yes*" vs. "*no*".

Intravenous drug use was enquired with the question "*Have you ever used drugs by injection/intravenously?*" with response categories "*yes*" vs. "*no*".

No data on the general population were available for cannabis and intravenous drug use.

4.2.4 Sociodemographic and migration-related variables

Socio-demographic and migration-related explanatory variables are presented in **Table 3** with the original response categories and the categorization used in the sub-studies I–III. No general population comparison group data were available on religion, economic situation, or migration-related variables.

Table 3. Variables describing the socio-demographic and migration-related backgrounds of the participants.

VARIABLE	ORIGINAL RESPONSE CATEGORIES	CATEGORIZATIONS IN SUBSTUDIES
Age[1]	Continuous	Sub-studies I–II 18–29 years / 30–44 years / 45–64 years Sub-study III Continuous
Gender[1]	Male / Female	Sub-studies I–III Male / Female
Marital status[2]	Married / Cohabiting / Single / Divorced or separated / Widow	Sub-studies I–III Married or cohabitating / Other (single, divorced or separated, widow)
Educational attainment[2]	No education / Elementary school or part of elementary school / Secondary school or part of secondary school / High school or part of high school	Sub-studies I–III High school (high school or part of high school corresponding to over 9 years of education) / Lower (all other options)
Employment status[2]	Employed fulltime / Employed part-time / Student / Retired / Unemployed or furloughed / At home / Other	Sub-studies I–II Employed (employed fulltime and part-time) / Unemployed (unemployed or furloughed) / Economically inactive (student, retired, at home, other) Sub-study III Employed (employed fulltime or part-time) / Other (all others)
Subjective economic situation (coping with the current household income)[2]	Very easy / Easy / Fairly easy / Very hard / Hard / Fairly hard	Sub-studies I–III Satisfactory (very easy, easy, fairly easy) / Unsatisfactory (very hard, hard, fairly hard)
Religion[3]	None / Orthodox Christian / Lutheran Christian / Muslim / Jewish / Other	Sub-study I Christian (Orthodox or Lutheran) / Muslim / Other (Jewish, other) / None
Age at migration[2]	Continuous	Sub-studies I–III Underage (<18 years) / Adult Sub-study III Continuous
Duration of residence in Finland[2]	Continuous	Sub-studies I–III 5 years or less / > 5 years
Grounds of residence permit[3]	Asylum seeker / Refugee / Ingrian or returnee / Spouse or child of Finnish citizen / Family reunification / Labor immigrant / Spouse or child of labor immigrant / Citizen of other EU country / Student / Other	Sub-study I–III Refugee background (asylum seeker, refugee) / other (all other options)
Proficiency in Finnish or Swedish language	Speaking Finnish or Swedish[2]: Not at all / Poorly / Moderately / Well Managing to express oneself to strangers in Finnish or Swedish[3]: Without difficulties / With some difficulties / It it is really difficult / I do not manage	Sub-study I–III Fair (speaking Finnish/Swedish well or managing to express oneself to strangers in Finnish or Swedish without difficulties) / poor (any other answers)

[1]Information from the National Population Register

[2]Item included in the interview and the short interview

[3]Item included on in the interview

4.2.5 Symptoms of depression, anxiety and suicidal ideation

Depressive and anxiety symptoms are conceptualized here as mixed symptoms of depression and anxiety, measured in the health examination with the self-administered Hopkin's Symptom Checklist -25 (HSCL-25). HSCL-25 is a validated instrument for measuring clinically significant symptoms of depression and anxiety also outside the Western context (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974; Haroz et al., 2016; Hollifield et al., 2002; Sandanger et al., 1998; Tinghög & Carstensen, 2010). It consists of 25 items, of which 15 measure symptoms of depression (depression subscale) and 10 measure symptoms of anxiety (anxiety subscale) during the previous seven days. The subscales are sometimes used separately to differentiate between symptoms of depression and anxiety, but validation of the subscales was not possible with this dataset (Kuittinen et al., 2017) and therefore only the total score is used in the present study. A previously translated version of the HSCL-25 was used (Derluyn, Broekaert, & Schuyten, 2008).

Every symptom item is answered on a scale from 1 "*not at all bothered*" to 4 "*extremely bothered*". For each participant, the sum score was calculated and the cut-off point of 1.75 was applied to dichotomize the variable into "clinically significant symptoms" vs. "no clinically significant symptoms" (Gerritsen et al., 2006; Hollifield et al., 2002; Rask et al., 2015; Tinghög, Al-Saffar, Carstensen, & Nordenfelt, 2010; Tinghög & Carstensen, 2010). This dichotomized variable and continuous sum score variable were used as explanatory variables in sub-studies II–III.

A single item from the HSCL-25 concerning suicidal ideation ("*Having thoughts about ending one's life*") during the past seven days was used also separately due to the clinical significance of the topic. The variable was dichotomized into "*no*" including the answer "*not at all bothered*" vs. "*yes*" including answers *"a little bothered"*, *"quite a bit bothered*" and "*extremely bothered*". This dichotomized variable was used in the analyses. This item was used as an explanatory variable in sub-study II.

4.2.6 Potentially traumatic experiences (PTEs)

Potentially traumatic experiences (PTEs) in the country of origin were measured in the interview with eight questions selected from the Harvard Trauma Questionnaire (HTQ) (Castaneda et al., 2017), which is a validated instrument for measuring exposure to severe traumatic events (Shoeb, Weinstein, & Mollica, 2007). The questions were "*Have you experienced the following unpleasant events in your former home country*: *1) Experienced a combat situation in a war? 2) Been the victim of a natural disaster such as an earthquake, a flood or a fire? 3) Witnessed violent death or serious injury? 4) Experienced sexual violence? 5) Been a target of a*

serious physical attack or harm? 6) Been detained or kidnapped? 7) Been tortured? 8) Experienced some other form of horrible violence?", all with response categories "*yes*" vs. "*no*" (Castaneda et al., 2017).

A combination-variable was formed and dichotomized to indicate exposure to any of the PTEs: "*yes*" referred to a positive answer to any of the questions vs. "*no*" including negative answers to all the questions. This item was selected as an explanatory variable in sub-study III. Information on PTEs was not available for the general population comparison group.

4.2.7 Perceived discrimination (PD)

Perceived discrimination (PD) was measured with four statements selected from the Everyday Discrimination Scale (EDS) (Castaneda et al., 2015; Rask et al., 2018; Williams & Mohammed, 2008), asked in the interview and the short interview. The statements were 1) "*You are not treated as politely as other people*", 2) "*You are not treated as respectfully as other people*", 3) "*You have been called names or insulted verbally*", 4) "*You have been threatened or harassed*". The participants answered "*yes*" or "*no*" to each of these statements, and a combination variable was formed and dichotomized to indicate exposure to any type of perceived discrimination (Castaneda et al., 2015; Rask et al., 2018). This combination variable was used as an explanatory variable in sub-study III. Information on PD was not available for the general population comparison group.

4.3 Statistical analyses

Stratified random sampling of the data was considered in all analyses. Inverse probability weighting was used to account for the effects of missing data (Robins, Andrea, & Ping, 1994). The inverse probability weights were determined by the main predictive factors of non-response, which were age, gender, city of residence and marital status (Castaneda et al., 2019). Due to the relatively small population sizes and the inclusion of a significant proportion of the total population, finite population correction was used (Lehtonen & Pahkinen, 2003).

The prevalence rates and associations between the variables were analyzed separately for each population group. The migrant population groups were compared with the general population concerning the prevalence rates of substance use and the descriptive statistics. Logistic regression was used in all analyses to determine the adjusted prevalence rates (adjusted for age and gender), and the adjusted prevalence rates and descriptive statistics were calculated with predictive margins (Graubard & Korn, 1999). In the sub-study I, the prevalence rates were reported by gender and adjusted for age.

Binge drinking, daily tobacco smoking and lifetime cannabis use were defined as outcome variables. The associations between the outcome and explanatory variables were determined with logistic regression and multivariate analyses. In multivariate analyses, the explanatory and confounding variables were added to the models stepwise in blocks. The confounding variables were selected based on their association with substance use in cross-tabulation with *p*-value <0.1 or selected from the literature. In the analyses, odds ratios (OR), beta-factors (B) and 95% confidence intervals (CI) are reported. *P*-value <0.05 was considered statistically significant.

Akaike's information criterion (AIC) was used to determine the best models predicting the substance use outcomes (binge drinking, daily tobacco smoking and lifetime cannabis use) separately among the different populations of Russian, Somali and Kurdish origins (Akaike, 1973). All possible combinations of the explanatory and confounding variables were considered with the models with the lowest AIC statistics being reported. The models were run using either the weighting coefficients for the interview or the health examination. The final models were assessed with the coefficient of determination (R^2), and ORs, beta-coefficients and 95% CI were calculated for the variables selected to the final models.

The analyses were conducted with statistical software: Stata 13 IC, Stata 15 IC, SAS 9.3 and Sudaan 11.0.1.

4.4 Ethical approval

Ethical approvals for the Maamu Study and the Health 2011 Survey were granted by the Coordinating Ethics Committee of the Hospital District of Helsinki and Uusimaa. Each participant gave their written informed consent prior to participation in the health examination and interview. The individuals, who only participated in the short interview, gave their oral consent to participation during a face-to-face interview, or over a phone interview. Returning the self-administered questionnaire by mail was interpreted as a consent among those who answered by mail.

5 Results

5.1 Characteristics of the study population

The characteristics of the study population are reported in **Table 4**. The study populations differed from each other in almost all examined characteristics. The majority of the Russian (64%) and Somali (54%) origin participants were women, while among the Kurdish origin population, the majority were men (57%). The majority of the Russian origin participants had graduated from high school corresponding to over 9 years of schooling (80%), which was a significantly higher proportion than among the general population (66%). A smaller proportion of Somali (29%) and Kurdish (42%) origin participants had received a high school level education compared with the general population. The proportion of persons in working life was lower among all the migrant populations (Russian origin 52%, Kurdish origin 39%, Somali origin 21%) compared with the general population (68%). Most of the participants had resided in Finland for over five years. Russian origin participants had mainly reported that there were other than humanitarian reasons for migration (99%), while 72% of the Somali and 75% of the Kurdish origin participants reported having a refugee background (had migrated with granted refugee status or to seek asylum). Russian origin participants reported being mainly Christian by religion (68%) or belonging to no religion (31%), while 75% of the Kurdish and 99% of the Somali origin population reported being Muslim by religion. One fifth of the Kurdish origin participants stated that they were non-believers.

Current symptoms of depression and anxiety were significantly more frequently reported by Kurdish (35%) and Russian (19%) origin participants than by the general population (8%). Almost every fifth (17%) of the Kurdish origin participants also reported suicidal ideation during the past week, which was significantly higher than among the general population (4%).

Experiencing potentially traumatic experiences (PTEs) in the country of origin was extremely common among the Kurdish origin population (77%) whereas a significantly smaller proportion of Russian (24%) and Somali origin (55%) population reported PTEs. The prevalence of perceived discrimination (PD) was similar among Russian (45%) and Kurdish origin populations (44%) but lower among Somali origin participants (30%).

Table 4. Descriptive statistics of the contextual factors of the participants.

	RUSSIAN ORIGIN POPULATION	SOMALI ORIGIN POPULATION	KURDISH ORIGIN POPULATION	GENERAL POPULATION
	% (n) p-value[1]	% (n) p-value[1]	% (n) p-value[1]	% (n)
Gender: men	36 (688) <0.001	46 (475) 0.64	57 (613) <0.001	48 (1165)
Mean age[3]	39 (688) 0.281	34 (475) <0.001	35 (613) <0.001	39 (1165)
Marital status: married or cohabiting	57 (687) 0.30	66 (471) 0.12	65 (612) 0.058	61 (1151)
Educational attainment: high school graduate	80 (671) <0.001	29 (460) <0.001	42 (605) <0.001	66 (1151)
Employment status: employed	52 (687) <0.001	21 (461) <0.001	39 (610) <0.001	68 (1150)
Economic situation: unsatisfactory	48 (676)	62 (445)	66 (604) <0.001[2]	na
Language proficiency: fair or less	41 (604)	22 (390)	51 (534) <0.001[2]	na
Religion	(525)	(337)	(506) <0.001[2]	na
Christian	68	0	2	
Muslim	0.1	99	75	
Other	1	0	3	
None	31	1	20	
Mean age at migration[3]	27 (688)	22 (475)	24 (613) <0.001[2]	na
Residence in Finland: > 5 years	79 (687)	78 (471)	79 (611) 0.84[2]	na
Migration background: refugee	1 (517)	72 (334)	75 (507) <0.001[2]	na
Potentially traumatic experiences (PTEs)	24 (527)	22 (335)	77 (506) <0.001[2]	na
Perceived discrimination (PD)	45 (683)	30 (471)	44 (611) <0.001[2]	na
Depressive and anxiety symptoms	19 (457) <0.001	9 (350) 0.61	35 (500) <0.001	8 (860)
Suicidal ideation	3 (456) 0.64	1 (349) 0.045	17 (498) <0.001	4 (858)

na not available

[1] Comparison to the general population

[2] Comparison across all groups

[3] Age presented as mean, not percentage

5.2 Prevalence rates of substance use and associations with background factors (sub-study I)

The prevalence rates of substance use are reported in **Table 5**. Age-adjusted prevalence rates of the outcome variables (binge drinking during past 12 months, current daily tobacco smoking and lifetime cannabis use) are illustrated in **Figure 6**, **Figure 7**, and **Figure 8**.

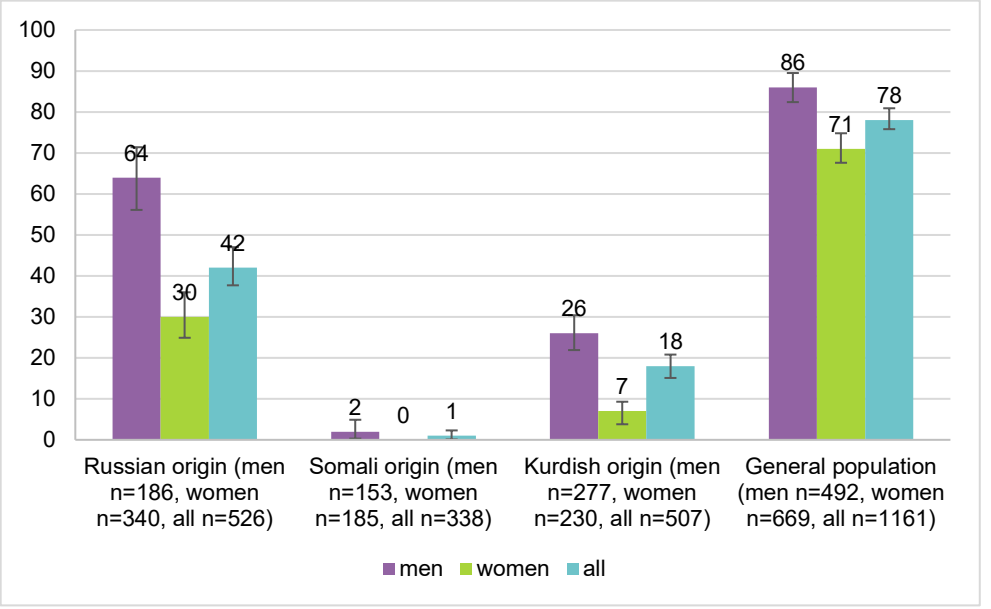

Figure 6. Age adjusted prevalence rates of binge drinking during past 12 months.

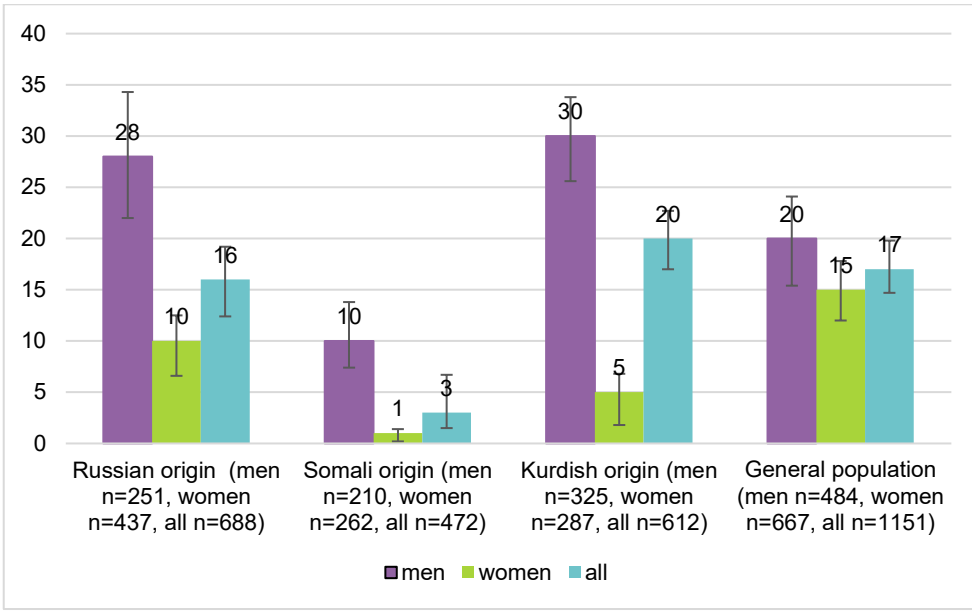

Figure 7. Age adjusted prevalence rates of daily tobacco smoking.

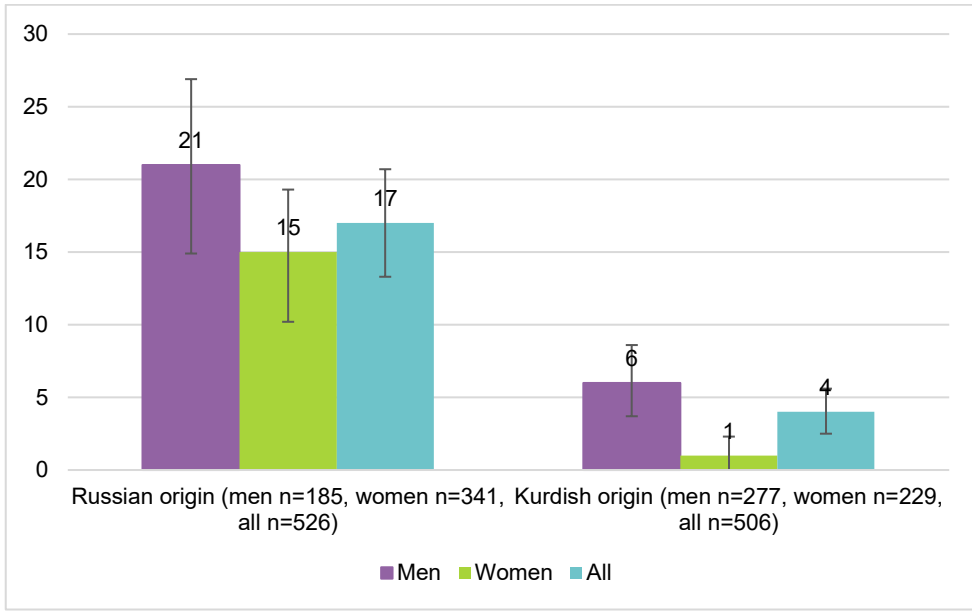

Figure 8. Age adjusted prevalence rates of lifetime cannabis use.

Table 5. Age adjusted prevalence rates of substance use.

	RUSSIAN ORIGIN MEN		RUSSIAN ORIGIN WOMEN		SOMALI ORIGIN MEN		SOMALI ORIGIN WOMEN		KURDISH ORIGIN MEN		KURDISH ORIGIN WOMEN		GEN. POP. MEN[1]	GEN. POP. WOMEN[1]
	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	% (n)
Frequency of alcohol use[5]														
None	11 (32)	<0.01	16 (71)	<0.01	98 (208)	<0.01	100 (263)	<0.01	51 (172)	<0.01	85 (244)	<0.01	7 (39)	8 (53)
Occasional	73 (186)		70 (310)		2 (3)		0 (1)		45 (143)		15 (44)		53 (233)	66 (439)
Frequent	16 (33)		14 (56)		0 (0)		0		3 (10)				39 (221)	25 (180)
p[3]				0.26				0.07				<0.01		<0.01
Usual number of alcohol units consumed[5]														
No alcohol use	11 (24)	<0.01	11 (43)	<0.01	98 (151)	<0.01	100[4] (185)	<0.01	47 (134)	<0.01	85 (193)	<0.01	8 (39)	9 (53)
1–2	41 (79)		66 (234)		1 (1)		(0)		18 (50)		9 (20)		31 (166)	46 (328)
3–6	40 (65)		22 (62)		1 (1)		(0)		30 (79)		6 (15)		37 (190)	37 (238)
> 7	9 (9)		0 (2)		(0)		(0)		5 (14)		0 (1)		23 (97)	8 (47)
p[3]				<0.01				0.28				<0.01		<0.01
Frequency of binge drinking[5]														
No alcohol use	11 (23)	<0.01	11 (42)	<0.01	98 (151)	<0.01	100[4] (185)	<0.01	47 (134)	<0.01	84 (193)	<0.01	8 (39)	9 (53)
Never	25 (45)		59 (215)		(0)		(0)		27 (74)		9 (23)		6 (29)	20 (143)
Occasionally	56 (98)		28 (79)		2 (2)		(0)		24 (62)		6 (14)		65 (322)	65 (430)
Frequently	9 (20)		2 (4)		(0)		(0)		3 (7)		0 (0)		22 (102)	7 (43)
p[3]				<0.01				0.11				<0.01		<0.01

	RUSSIAN ORIGIN MEN		RUSSIAN ORIGIN WOMEN		SOMALI ORIGIN MEN		SOMALI ORIGIN WOMEN		KURDISH ORIGIN MEN		KURDISH ORIGIN WOMEN		GEN. POP. MEN[1]	GEN. POP. WOMEN[1]
	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]		
Risky drinking[5]														
Yes	23 (41)	<0.01	21 (58)	<0.01	0[4] (0)	<0.01	0[4] (0)	<0.01	10 (26)	<0.01	3 (8)	<0.01	45 (216)	50 (326)
p[3]				0.53								<0.01		0.13
Lifetime regular tobacco smoking														
Yes	55 (107)	0.03	33 (105)	<0.01	8 (18)	<0.01	0 (1)	<0.01	39 (106)	<0.01	7 (17)	<0.01	64 (203)	52 (209)
p[3]				<0.01				<0.01				<0.01		0.01
Current tobacco smoking														
No smoking	65 (170)	0.04	84 (374)	0.02	89 (179)	<0.01	99 (259)	<0.01	68 (224)	<0.01	93 (266)	<0.01	68 (345)	76 (517)
Occasional	7 (15)		7 (23)		1 (4)		0 (1)		2 (7)		2 (5)		12 (56)	9 (54)
Daily	28 (66)		10 (40)		10 (27)		1 (2)		29 (94)		5 (16)		20 (83)	15 (96)
p[3]				<0.01				<0.01				<0.01		0.01
Daily consumption of cigarettes														
None	49 (83)		70 (238)		92 (135)		100 (182)		65 (182)		94 (215)		na	na
1–10	19 (41)		25 (76)		6 (12)		0 (1)		13 (35)		5 (11)			
≥ 11	32 (57)		5 (17)		2 (5)		0 (0)		22 (58)		1 (3)			
p[3]				<0.01				0.01				<0.01		

	RUSSIAN ORIGIN MEN		RUSSIAN ORIGIN WOMEN		SOMALI ORIGIN MEN		SOMALI ORIGIN WOMEN		KURDISH ORIGIN MEN		KURDISH ORIGIN WOMEN		GEN POP MEN[1]	GEN. POP. WOMEN[1]
	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	p[2]	% (n)	% (n)
Lifetime cannabis use														
Yes	21 (45)		14 (38)		0[4] (0)		0[4] (0)		6 (15)		1 (2)		na	na
p[3]				<0.01								<0.01		
Cannabis use during the past 12 months														
Yes	9 (13)		2 (4)		0[4] (0)		0[4] (0)		3 (8)		0[4] (0)		na	na
p[3]				<0.01								<0.01		
Lifetime intravenous drug use														
Yes	$8x10^{-10}$ (1)		$9x10^{-10}$ (1)		0[4] (0)		0[4] (0)		$9x10^{-10}$ (1)		0 (0)		na	na
p[3]				0.53								0.55		

na Not available

[1] Gen. pop. refers to the general population comparison group

[2] p-value in comparison to the general population

[3] p-value in comparison between genders

[4] Age-adjustment not applied

[5] During past 12 months

5.2.1 Russian origin participants

The prevalence of abstainers is higher among Russian origin population (11% of men and 16% of women) when compared with the general population. The proportion of participants reporting binge drinking was 64% among men and 30% among women, and these prevalence rates were significantly lower than among the general population, where 86% of men and 71% of women reported binge drinking. The prevalence of risky drinking, measured with AUDIT-C score, was lower among the Russian origin population than the general population.

The majority of men (65%) and women (84%) reported no current tobacco smoking, and 45% of men and 63% of women reported to never having smoked during their lifetime. Current daily tobacco smoking was reported by 28% of men and 10% of women, with the prevalence being higher among Russian origin men compared with the general population (20%). Lifetime regular tobacco smoking prevalence, however, was higher among men of the general population (64%) compared with the Russian origin men (55%).

Lifetime cannabis use was reported by 21% of men and 14% of women. Lifetime intravenous drug use was reported by less than five participants.

Associations between substance use and background factors are described in **Table 6**, **Table 7**, and **Table 8**. Among Russian origin population, older age decreased the odds for binge drinking among women and for lifetime cannabis use among both men and women. Older age and older age at migration, in part, increased the odds for daily tobacco smoking among men.

With respect to the men, living alone and lower basic education increased the odds for daily tobacco smoking and unsatisfactory economic situation increased the odds for binge drinking. Age at migration correlated negatively with binge drinking among women and with lifetime cannabis use in both genders. Poorer self-evaluated language proficiency in Finnish/Swedish decreased the odds for binge drinking among men but increased the odds for daily tobacco smoking.

Table 6. Background factors associated with binge drinking during the past 12 months among the Russian origin population.

	MEN	**WOMEN**
	OR (95% CI)	OR (95% CI)
Age		
Continuous	**0.98 (0.95–1.00)**	**0.9 (0.92–0.96)**
Marital status		
Married or cohabiting	1.0	1.0
Other	1.3 (0.57–2.79)	1.0 (0.56–1.77)
Educational attainment		
High school	1.0	1.0
Secondary school Or less	1.4 (0.62–3.29)	1.6 (0.81–3.32)
Employment status		
Employed	1.0	1.0
Unemployed	1.43 (0.72–2.85)	0.60 (0.33–1.09)
Economic situation		
Satisfactory	1.0	1.0
Unsatisfactory	2.5 (1.27–5.01)	0.7 (0.39–1.20)
Age at migration		
Continuous	0.98 (0.96–1.003)	**0.9 (0.91–0.95)**
Language Proficiency		
Good	1.0	1.0
Fair or less	**0.3 (0.16–0.68**)	0.6 (0.34–1.12)
Refugee background		
Yes	na	na

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval
na Not available

Table 7. Background factors associated with daily tobacco smoking among the Russian origin population

	MEN	**WOMEN**
	OR (95% CI)	OR (95% CI)
Age		
Continuous	**1.03 (1.01–1.05**)	1.00 (0.98–1.02)
Marital status		
Married or cohabiting	1.0	1.0
Other	**3.6 (1.73–7.60)**	1.5 (0.71–2.96)
Educational attainment		
High school	1.0	1.0
Secondary school Or less	**3.3 (1.73–6.36)**	1.6 (0.75–3.42)
Employment status		
Employed	1.0	1.0
Unemployed	1.4 (0.76–2.62)	0.6 (0.31–1.31)
Economic situation		
Satisfactory	1.0	1.0
Unsatisfactory	1.3 (0.67–2.36)	1.3 (0.66–2.55)
Age at migration		
Continuous	**1.03 (1.01–1.05)**	0.98 (0.95–1.002)
Language Proficiency		
Good	1.0	1.0
Fair or less	**2.6 (1.21–5.41)**	0.9 (0.44–1.99)
Refugee background		
Yes	na	na

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval
na Not available

Table 8. Background factors associated with lifetime cannabis use among the Russian origin population.

	MEN	**WOMEN**
	OR (95% CI)	OR (95% CI)
Age		
Continuous	**0.9 (0.89–0.96)**	**0.9 (0.87–0.93)**
Marital status		
Married or cohabiting	1.0	1.0
Other	1.1 (0.44–2.60)	1.0 (0.41–2.26)
Educational attainment		
High school	1.0	1.0
Secondary school Or less	1.6 (0.61–4.07)	0.7 (0.23–2.12)
Employment status		
Employed	1.0	1.0
Unemployed	1.5 (0.66–3.31)	0.6 (0.25–1.40)
Economic situation		
Satisfactory	1.0	1.0
Unsatisfactory	1.9 (0.81–4.55)	0.8 (0.35–1.70)
Age at migration		
Continuous	**0.9 (0.90–0.96)**	**0.9 (0.87–0.93)**
Language Proficiency		
Good	1.0	1.0
Fair or less	0.7 (0.29–1.73)	0.5 (0.22–1.21)
Refugee background		
Yes	na	na

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval
na Not available

5.2.2 Somali origin participants

The majority of Somali origin men (98%) and women (100%) reported abstaining from alcohol use during the previous year. Only a few individual participants reported alcohol use and binge drinking. For this reason, Somali origin participants were not included in further analyses of the factors associated with alcohol use. None of the Somali origin participants reported drug use.

Nearly all women (99%) and the majority of men (90%) were non-smokers. Somali origin men reported a lower prevalence of daily tobacco smoking (10%) compared with the general population men (20%). Among women, only a few individual participants reported daily tobacco smoking, highlighting the gender differences in substance use but also the low prevalence of self-reported substance use. No further analyses could be conducted concerning Somali origin women and tobacco smoking.

The background factors associated with daily tobacco smoking were analyzed among Somali origin men. The associations between daily tobacco smoking and background factors are described in **Table 9**. Amongst men, living alone, lower educational attainment and unsatisfactory economic situation increased the odds for daily tobacco smoking. Being unemployed or otherwise outside the labor market and older age at migration decreased the odds for daily tobacco smoking.

Table 9. Background factors associated with daily tobacco smoking among Somali origin men.

	MEN
	OR (95% CI)
Age	
Continuous	0.98 (0.94–1.01)
Marital status	
Married or cohabiting	1.0
Other	**7.0 (2.94–16.56)**
Educational attainment	
High school	1.0
Secondary school Or less	**5.1 (1.77–14.63)**
Employment status	
Employed	1.0
Unemployed	**0.4 (0.16–0.94)**
Economic situation	
Satisfactory	1.0
Unsatisfactory	14.8 (4.34–50.63)
Age at migration	
Continuous	0.95 (0.92–0.99)
Language Proficiency	
Good	1.0
Fair or less	0.84 (0.30–2.35)
Refugee background	
Yes	1.6 (0.49-5.06)

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval

5.2.3 Kurdish origin participants

The majority of the Kurdish origin women (85%) and half of the Kurdish origin men (51%) reported abstaining from alcohol use during the previous 12 months. These figures were significantly higher compared with the general population, where only 7% of men and 8% of women reported abstaining from alcohol use. A quarter of Kurdish origin men (26%) reported binge drinking during the previous 12 months,

which was significantly less than among men of the general population (86%). Similarly, the prevalence of risky drinking measured with the AUDIT-C score was lower among the Kurdish origin population than among the general population (10% among Kurdish origin men and 3% among women). The differences in alcohol use prevalence rates were statistically significant between men and women, and the prevalence rates were higher among men.

Among women, the majority reported to having never smoked (93%), and over half of the men reported no tobacco smoking during their lifetime (61%). No current tobacco smoking was reported by 68% of men. Daily tobacco smoking was more common among the Kurdish origin men (29%) than among the men of the general population (20%), but the situation was reversed in Kurdish origin women where the prevalence was lower (5%) than among the women of the general population (15%).

Lifetime cannabis use was reported by 6% of men, and 3% reported cannabis use during the previous year. Among women the prevalence of lifetime cannabis use was smaller (1%), and no one reported cannabis use during the past year. Intravenous drug use was reported only by a few individual participants.

Associations between substance use and background factors are described in **Table 10**, **Table 11**, and **Table 12**. Younger age associated with binge drinking, daily tobacco smoking and lifetime cannabis use among men, but these associations were not detected in women. Age at migration also correlated negatively with binge drinking among both genders. In the Kurdish origin population, living alone increased the odds for binge drinking among women and for daily tobacco smoking among men. Among women, lower education decreased the odds for binge drinking, while poorer self-rated language proficiency in Finnish/Swedish decreased the odds for both binge drinking and daily tobacco smoking. In contrast, in men, poorer self-reported language proficiency in Finnish/Swedish increased the odds for daily tobacco smoking. Being unemployed or otherwise outside of the labor market decreased the odds for binge drinking among women and daily tobacco smoking among men. Having a refugee background was not associated with the use of substances under study. The prevalence of lifetime cannabis use among women was too low to allow any further analyses.

Table 10. Background factors associated with binge drinking during past 12 months among Kurdish origin population.

	MEN	**WOMEN**
	OR (95% CI)	OR (95% CI)
Age		
Continuous	**0.95 (0.93–0.97)**	0.97 (0.93–1.02)
Marital status		
Married or cohabiting	1.0	1.0
Other	1.5 (0.88–2.64)	**4.4 (1.92–10.26)**
Educational attainment		
High school	1.0	1.0
Secondary school Or less	1.2 (0.72–1.85)	**0.3 (0.14–0.88)**
Employment status		
Employed	1.0	1.0
Unemployed	0.64 (0.41–1.01)	**0.24 (0.11–0.56)**
Economic situation		
Satisfactory	1.0	1.0
Unsatisfactory	0.8 (0.49–1.27)	0.5 (0.19–1.19)
Age at migration		
Continuous	**0.96 (0.94–0.98)**	**0.93 (0.90–0.97)**
Language Proficiency		
Good	1.0	1.0
Fair or less	1.2 (0.78–1.95)	**0.05 (0.01–0.23)**
Refugee background		
Yes	1.24 (0.67–2.28)	1.79 (0.68–4.72)

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval

Table 11. Background factors associated with daily tobacco smoking among Kurdish origin population.

	MEN	**WOMEN**
	OR (95% CI)	OR (95% CI)
Age		
Continuous	**0.98 (0.96–0.996)**	0.99 (0.95–1.02)
Marital status		
Married or cohabiting	1.0	1.0
Other	**1.8 (1.08–2.98)**	1.3 (0.53–3.21)
Educational attainment		
High school	1.0	1.0
Secondary school Or less	1.2 (0.80–1.84)	0.6 (0.25–1.29)
Employment status		
Employed	1.0	1.0
Unemployed	**0.98 (0.96–0.995)**	0.6 (0.24–1.34)
Economic situation		
Satisfactory	1.0	1.0
Unsatisfactory	**2.1 (1.30–3.32)**	1.9 (0.66–5.38)
Age at migration		
Continuous	0.99 (0.97–1.02)	0.96 (0.92–1.001)
Language Proficiency		
Good	1.0	1.0
Fair or less	**2.1 (1.32–3.19)**	**0.3 (0.13–0.78)**
Refugee background		
Yes	1.6 (0.83–2.99)	0.5 (0.21–1.18)

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval

Table 12. Background factors associated with lifetime cannabis use among Kurdish origin men.

	MEN
	OR (95% CI)
Age	
Continuous	**0.95 (0.91–0.98)**
Marital status	
Married or cohabiting	1.0
Other	2.2 (0.61–7.96)
Educational attainment	
High school	1.0
Secondary school Or less	1.9 (0.78–4.52)
Employment status	
Employed	1.0
Unemployed	1.3 (0.53–3.20)
Economic situation	
Satisfactory	1.0
Unsatisfactory	1.8 (0.69–4.60)
Age at migration	
Continuous	0.96 (0.92–1.002)
Language Proficiency	
Good	1.0
Fair or less	0.98 (0.44–2.19)
Refugee background	
Yes	1.1 (0.43–3.04)

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval

5.2.4 General population comparison group

Associations between substance use and background factors are described in **Table 13**. In the comparison group of the general population, none of the background factors were associated with binge drinking among men. A lower level of education increased the odds for daily tobacco smoking among men. Among women, older age and being unemployed or outside the labor market decreased the odds for binge

drinking but living alone and a lower level of education increased the odds for daily tobacco smoking.

Table 13. Background factors associated with binge drinking during past 12 months and daily tobacco smoking among the general population.

	BINGE DRINKING[1]		**DAILY TOBACCO SMOKING**	
	MEN	WOMEN	MEN	WOMEN
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age				
Continuous	0.99 (0.97-1.01)	**0.98 (0.96-0.99)**	1.00 (0.98-1.02)	1.02 (0.996-1.03)
Marital status				
Married or Cohabiting	1.0	1.0	1.0	1.0
Other	0.6 (0.32-1.30)	0.9 (0.64-1.33)	1.5 (0.85-2.80)	**2.2 (1.36-3.58)**
Educational attainment				
High school	1.0	1.0	1.0	1.0
Secondary School or less	0.9 (0.49-1.69)	0.8 (0.52-1.19)	**3.4 (1.89-6.11)**	**2.5 (1.52-4.01)**
Employment status				
Employed	1.0	1.0	1.0	1.0
Unemployed	0.69 (0.36-1.31)	**0.63 (0.42-0.94)**	1.61 (0.91-2.84)	0.67 (0.40-1.13)

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval
[1] During past 12 months

5.3 Current depressive and anxiety symptoms, suicidal ideation and substance use (sub-study II)

The associations between current depressive and anxiety symptoms, measured with the HSCL-25 scale, and substance use appeared to have unique characteristics in each of the study populations, and the associations are presented in **Table 14**. The associations could not be analyzed among the Somali origin population, due to the low prevalence rates of substance use and the limited sample size.

Among the Russian origin population, the presence of current depressive and anxiety symptoms did not associate with any of the substance use behaviors under study. However, suicidal ideation, increased the odds for lifetime cannabis use.

Among the Kurdish origin population, current depressive and anxiety symptoms increased the odds for lifetime cannabis use when adjusted for background factors. Suicidal ideation increased the odds for binge drinking and lifetime cannabis use.

Among the general population, current depressive and anxiety symptoms and suicidal ideation increased the odds for daily tobacco smoking when adjusted for sociodemographic factors.

Table 14. Associations between depressive and anxiety symptoms and substance use among Russian and Kurdish origin populations.

	RUSSIAN ORIGIN[1]				KURDISH ORIGIN[1]				GENERAL POPULATION[2]			
	OR	95% CI	*p*	n	OR	95% CI	*p*	n	OR	95% CI	*p*	n
Binge drinking[3]												
Depressive and anxiety symptoms	1.2	0.64–2.32	0.55	433	1.5	0.91–2.52	0.11	455	2.3	0.84–6.22	0.11	848
Suicidal ideation	1.1	0.25–4.67	0.92	432	**2.4**	**1.32–4.33**	**<0.01**	**453**	1.7	0.44–6.83	0.43	846
Daily tobacco smoking												
Depressive and anxiety symptoms	0.6	0.21–1.51	0.25	440	1.6	0.99–2.54	0.06	461	**2.4**	**1.18–4.79**	**0.02**	**851**
Suicidal ideation	1.2	0.26–5.91	0.79	439	1.3	0.73–2.19	0.39	459	**5.0**	**1.36–17.72**	**0.02**	**849**
Lifetime cannabis use[4]												
Depressive and anxiety symptoms	1.6	0.70–3.69	0.26	433	**6.1**	**2.56–14.49**	**<0.01**	**454**	na			
Suicidal ideation	**5.6**	**1.87–16.96**	**<0.01**	**432**	**5.5**	**1.94–15.57**	**<0.01**	**452**	na			

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval
[1] Adjusted for age, gender, marital status, educational attainment, employment status, economic situation, language proficiency and age at migration to Finland
[2] Adjusted for age, gender, marital status, educational attainment, and employment status
[3] During past 12 months
[4] Analyses among Kurdish origin population using age-adjustment with 2-class age variable (18–29; ≥ 30) vs 3-class variable among Russian origin population

5.4 Potentially traumatic experiences (PTEs) and substance use (sub-study III)

The associations of potentially traumatic experiences (PTEs) in the country of origin and substance use were examined among the study populations of Russian and Kurdish origins; the results are presented in **Table 15**. No data on the PTEs among the general population were available, and the prevalence of substance use among the Somali origin population was too low in this sample size to make it possible to undertake any multivariate analyses.

PTEs increased the odds for binge drinking among the Kurdish origin population when background factors were adjusted for and the association remained significant also after adjusting for current depressive and anxiety symptoms.

Among the Russian origin population, PTEs increased the odds for lifetime cannabis use, but the association was reduced to non-significance after adjusting for current depressive and anxiety symptoms.

Table 15. Associations between potentially traumatic experiences (PTEs) among the Russian and Kurdish origin populations.

	RUSSIAN ORIGIN				**KURDISH ORIGIN**			
	OR	95% CI	*p*	n	OR	95% CI	*p*	n
Binge drinking[1]								
Model 1	1.25	0.75–2.08	0.40	523	**2.65**	**1.30–5.42**	**0.008**	**496**
Model 2	1.02	0.59–1.78	0.99	443	**2.35**	**1.17–4.73**	**0.016**	**460**
Daily tobacco smoking								
Model 1	1.64	0.93–2.89	0.088	526	1.73	0.90–3.35	0.10	496
Model 2	1.55	0.84–2.88	0.16	449	1.46	0.73–2.92	0.28	496
Lifetime cannabis use								
Model 1	**2.17**	**1.12–4.18**	**0.021**	**525**	1.40	0.39–4.97	0.60	495
Model 2	1.81	0.90–3.61	0.094	445	0.85	0.28–2.54	0.77	459

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval
[1] During past 12 months
Model 1: adjusted for age, gender, sociodemographic background (marital status, educational attainment, employment status, economic situation) and migration related variables (refugee status for Kurdish origin population), age at migration, language proficiency)
Model 2: adjusted for age, gender, current depressive and anxiety symptoms (HSCL-25 > 1.75)

5.5 Perceived discrimination (PD) and substance use (sub-study III)

The associations between perceived discrimination (PD) in the host country and substance use among Russian and Kurdish origin populations are reported in **Table 16**. The analyses concerning the Somali origin population could not be undertaken, due to the low prevalence rates of substance use and the limited sample size, and no data on general population were available.

In the multivariate models, perceived discrimination increased the odds for lifetime cannabis use among the Kurdish origin population, and the association remained significant after adjusting for current depressive and anxiety symptoms. Among the Russian origin population, perceived discrimination increased the odds for daily smoking in the univariate analyses adjusting for age and gender, but this association was attenuated after adjusting for background factors and current depressive and anxiety symptoms.

Table 16. Associations between perceived discrimination (PD) and substance use among Russian and Kurdish origin populations.

	RUSSIAN ORIGIN				**KURDISH ORIGIN**			
	OR	95% CI	*p*	n	OR	95% CI	*p*	n
Binge drinking[1]								
Model 1	0.92	0.59–1.45	0.73	522	1.63	0.98–2.70	0.059	496
Model 2	1.15	0.72–1.84	0.56	442	1.45	0.89–2.35	0.14	460
Daily tobacco smoking								
Model 1	1.23	0.71–2.12	0.46	524	1.36	0.86–2.14	0.19	496
Model 2	1.63	0.91–2.93	0.10	450	1.20	0.75–1.91	0.45	460
Lifetime cannabis use								
Model 1	1.59	0.89–2.84	0.12	523	**3.89**	**1.38–10.97**	**0.010**	**495**
Model 2	1.60	0.85–3.01	0.14	443	**3.52**	**1.16–10.71**	**0.026**	**459**

Statistically significant findings in bold
OR Odds ratio
CI Confidence interval
[1] During past 12 months
Model 1: adjusted for age, gender, sociodemographic background (marital status, educational attainment, employment status, economic situation) and migration related variables (refugee status for Kurdish origin population), age at migration, language proficiency)
Model 2: adjusted for age, gender, current depressive and anxiety symptoms (HSCL-25 > 1.75)

5.6 Overall contextual factors associated with substance use: Best fitted models

Associations between all the previously mentioned explanatory factors i.e. contextual factors (sociodemographic and migration related background, current depressive and anxiety symptoms, potentially traumatic experiences, and perceived discrimination) and substance use were examined with Akaike's Information Criterion (AIC) to determine which factors would be the most strongly associated with substance use, and thereafter which multivariate models would best explain substance use among each of the study populations. This analysis could not be executed among the Somali origin participants due to the small prevalence rates of substance use and the limited sample size (**Table 5**).

The models explaining lifetime cannabis use explained approximately 30% of the use, while the models explaining binge drinking and daily tobacco smoking had slightly lower indices of determination (22–25%). Only the model explaining daily tobacco smoking among Russian origin population had an index of determination below 20%.

5.6.1 Russian origin population

Among the Russian origin population, factors indicating sociodemographic situation and migration related phenomena, were often selected to the five best fitting models. The five best fitting models are reported in **Table 17**.

The five best fitting models explaining binge drinking included age, age at migration, gender, language proficiency and education. Potentially traumatic experiences and perceived discrimination were not incorporated into the best fitting models explaining binge drinking, but they were selected into the five best fitting models explaining daily tobacco smoking, in addition to the previously mentioned background factors. In the five best fitting models explaining lifetime cannabis use, the strongest explanatory factors were age and age at migration, but perceived discrimination, potentially traumatic experiences, and current depressive and anxiety symptoms were also included into the best fitting models.

The best fitting models explaining binge drinking, daily tobacco smoking and lifetime cannabis use are presented in **Figure 9**, **Figure 10**, and **Figure 11**. Younger age at migration and male gender were included into the best fitting model explaining binge drinking (**Figure 9**). These factors together with perceived discrimination predicted lifetime cannabis use (**Figure 11**). Daily tobacco smoking was predicted by lower level of education, male gender, and poorer self-reported language proficiency in Finnish or Swedish (**Figure 10**).

Table 17. Five models with best fitting indices (AIC) showing contextual factors associated with substance use among the population of Russian origin.

	BEST FITTING MODELS	AIC	R^2
Binge drinking[1]			
1.	Age at migration, gender	513.38	0.2395
2.	Language proficiency, gender, age	513.62	0.2440
3.	Age at migration, language proficiency, gender	514.07	0.2428
4.	Educational attainment, language proficiency, gender, age	514.08	0.2479
5.	Age at migration, educational attainment, gender	514.10	0.2428
Daily tobacco smoking			
1.	Educational attainment, language proficiency, gender	353.08	0.1766
2.	Age at migration, educational attainment, language proficiency, gender, age	353.64	0.1885
3.	Educational attainment, language proficiency, gender, PD	353.94	0.1805
4.	Educational attainment, language proficiency, gender, PTE	354.31	0.1793
5.	Educational attainment, language proficiency, gender, age	354.44	0.1788
Lifetime cannabis use			
1.	Age at migration, gender, PD, age	331.57	0.2737
2.	Age at migration, gender, PTE, PD, age	331.89	0.2792
3.	Age at migration, gender, PTE, age, depressive and anxiety symptoms	331.91	0.2784
4.	Age at migration, gender, PD, age, depressive and anxiety symptoms	331.98	0.2781
5.	Age at migration, gender, PTE, PD, age, depressive and anxiety symptoms	332.19	0.2839

AIC Akaike's Information Criterion
[1] During past 12 months

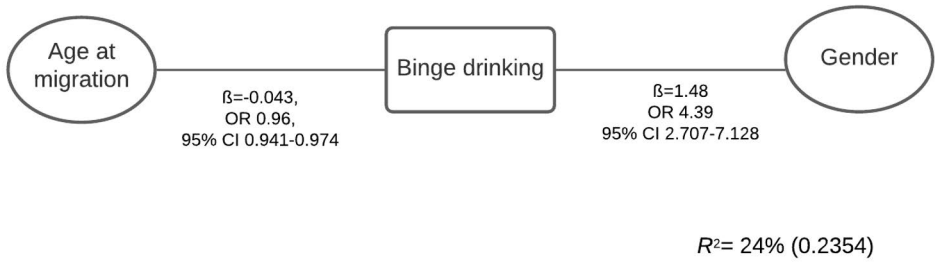

Figure 9. Best fitting model of contextual factors explaining binge drinking during past 12 months among the Russian origin population. R^2=0.2354

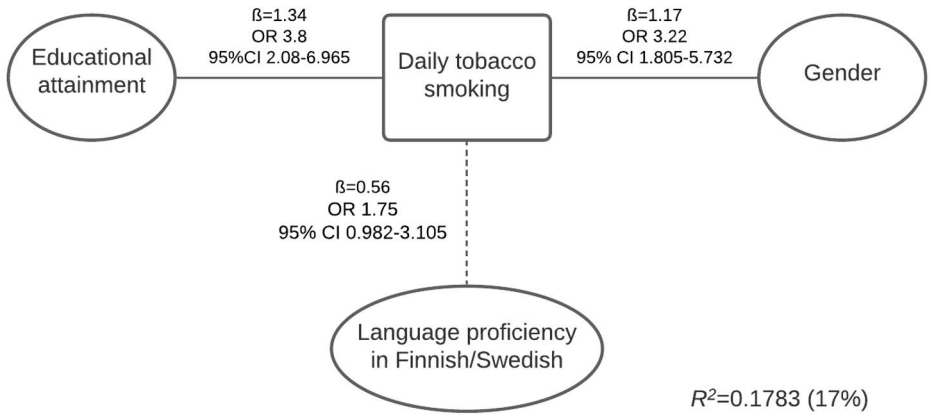

Figure 10. Best fitting model of contextual factors explaining daily tobacco smoking among the Russian origin population. R^2=0.1783 (18%). Statistically not significant associations marked with dotted line.

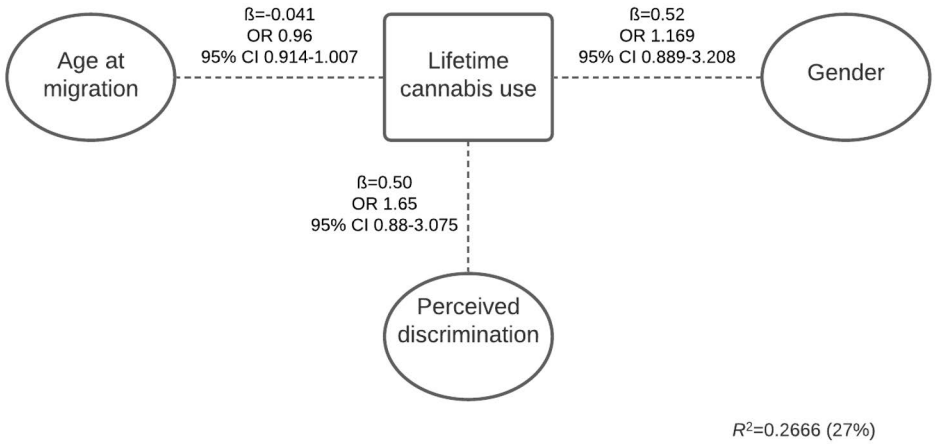

Figure 11. Best fitting model of contextual factors explaining the lifetime cannabis use among Russian origin population. R^2=0.2666 (27%). Statistically not significant associations marked with dotted line.

5.6.2 Kurdish origin participants

Background factors, current depressive and anxiety symptoms, potentially traumatic experiences (PTEs), and perceived discrimination (PD) were found to be included in several of the best fitting models explaining substance use **Table 18**.

PTEs, current depressive and anxiety symptoms and sociodemographic indicators were incorporated into the majority of the models explaining binge drinking, while the best fitting models explaining daily tobacco smoking included most often background factors in conjunction with depressive and anxiety symptoms. PD, depressive and anxiety symptoms, and background factors were selected to the five best fitting models explaining lifetime cannabis use.

The best fitting models explaining binge drinking, daily tobacco smoking and lifetime cannabis use are presented in **Figure 12**, **Figure 13**, and **Figure 14**. Among the Kurdish origin population, living alone, being employed, male gender and PTEs seemed to predict binge drinking in the best fitting model (**Figure 12**). Daily tobacco smoking was predicted by younger age at migration, poorer economic situation, poorer language proficiency in Finnish or Swedish, male gender and current depressive and anxiety symptoms in the best fitting model (**Figure 13**). Lifetime cannabis use was predicted by living alone, male gender, refugee status, perceived discrimination, and current depressive and anxiety symptoms in the best fitting model (**Figure 14**).

Table 18. Five models with best fitting indices (AIC) showing contextual factors associated with substance use among the population of Kurdish origin.

BEST FITTING MODELS		AIC	R^2
Binge drinking[1]			
1.	Marital status, employment status, gender, PTE, age	373.70	0.2207
2.	Marital status, employment status, gender, PTE, PD, age	374.11	0.2256
3.	Age at migration, marital status, employment, gender, PTE	374.28	0.2189
4.	Marital status, employment status, gender, PTE, age, depressive and anxiety symptoms	374.38	0.2248
5.	Age at migration, marital status, employment, gender, PTE, depressive and anxiety symptoms	374.48	0.2245
Daily tobacco smoking			
1.	Age at migration, economic situation, language proficiency, gender, depressive and anxiety symptoms	392.57	0.2453
2.	Age at migration, employment status, economic situation, language proficiency, gender, depressive and anxiety symptoms	392.80	0.2504
3.	Age at migration, economic situation, language proficiency, gender, PTE, depressive and anxiety symptoms	393.19	0.2493
4.	Age at migration, marital status, economic situation, language proficiency, gender, depressive and anxiety symptoms	393.36	0.2488
5.	Age at migration, economic situation, language proficiency, gender	393.43	0.2369
Lifetime cannabis use			
1.	Marital status, gender, PD, depressive and anxiety symptoms, refugee background	133.05	0.298
2.	Marital status, gender, PD, age, depressive and anxiety symptoms	133.11	0.2976
3.	Marital status, gender, PD, depressive and anxiety symptoms	133.12	0.2844
4.	Age at migration, marital status, gender, PD, depressive and anxiety symptoms	133.87	0.2926
5.	Marital status, gender, PD, age, depressive and anxiety symptoms, refugee background	133.87	0.3057

AIC Akaike's Information Criterion
[1] During past 12 months

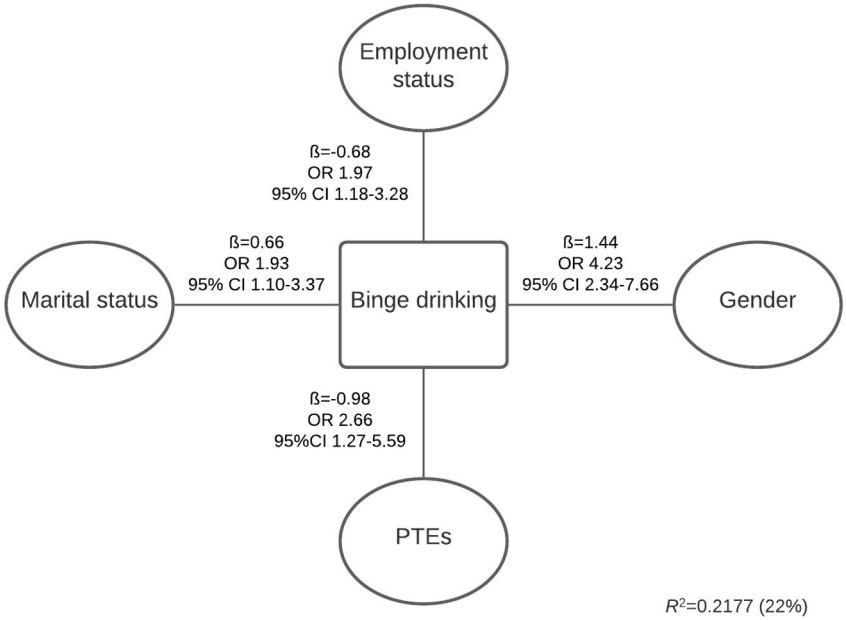

Figure 12. Best fitting model of contextual factors explaining binge drinking during past 12 months among Kurdish origin population. R^2=0.2177 (22%).

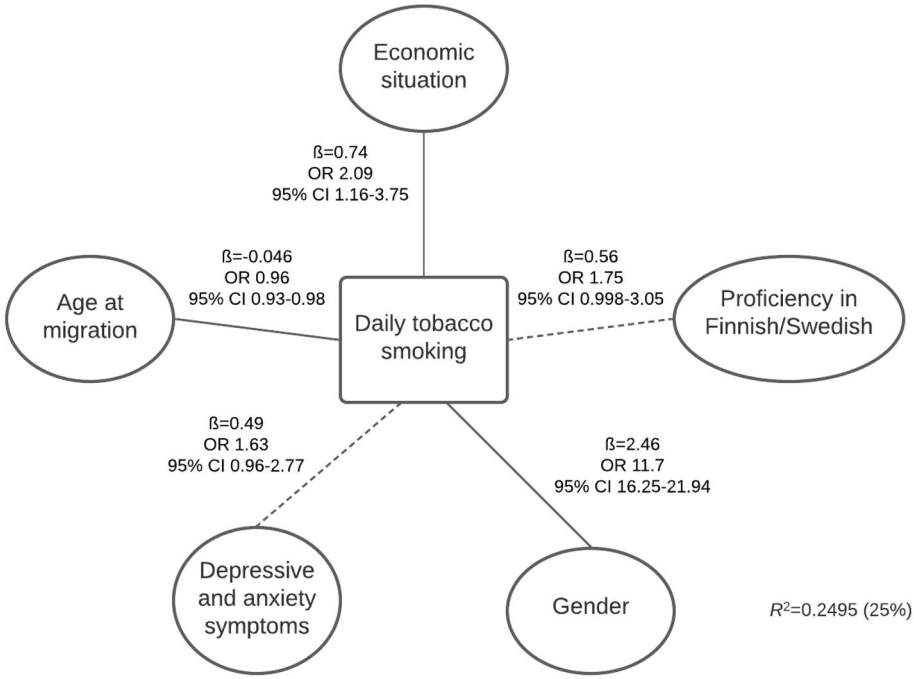

Figure 13. Best fitting model of contextual factors explaining daily tobacco smoking among Kurdish origin population. R^2=0.2495 (25%). Statistically not significant associations marked with dotted line.

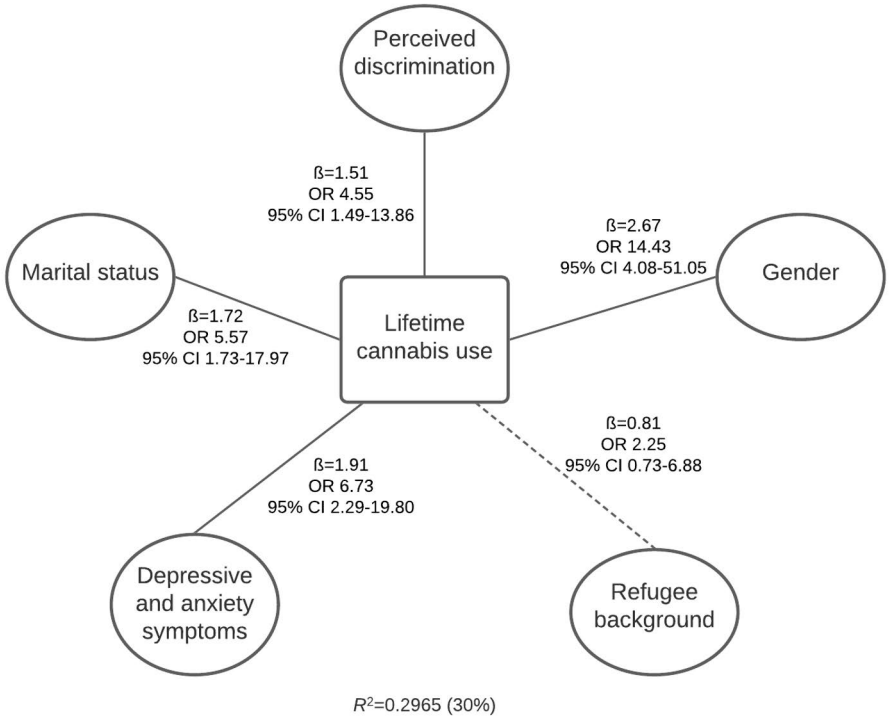

Figure 14. Best fitting model of contextual factors explaining lifetime cannabis use among the Kurdish origin population. R^2=0.2965 (30%). Statistically not significant associations are marked with dotted line.

6 Discussion

This thesis aimed to examine the substance use and associated factors among Russian, Somali, and Kurdish origin migrants now living in Finland. The study design was a population-based survey, and the data were collected mainly as face-to-face interviews and health examinations from individuals aged 18–64 years old. The main finding of this thesis was that substance use occurs in all the studied migrant groups but the patterns of substance use and associations to contextual factors were unique to each group.

6.1 Substance use in Russian origin population

Alcohol use, binge drinking, and risky drinking were less prevalent in the Russian origin population when compared to the general population. Daily tobacco smoking was more common among men than in men in the general population, but the situation was reversed in Russian origin women where it was less prevalent than among the female general population. Gender gaps were evident in all of the substances examined in this thesis. The prevalence of the reported cannabis use corresponded to the prevalence rates reported elsewhere (UNODC, 2020d).

Comparative information concerning the substance use among Russian origin migrants in the host countries is rather scarce. Israeli studies have reported alcohol use among migrants from the Former Soviet Union (FSU) in comparison to the general population, and found that FSU migrants were more likely to be current drinkers and have AUD (Schiff, Rahav, & Teichman, 2005; Shmulewitz et al., 2012; Weiss, 2008). FSU origin adolescents were also more likely to report binge drinking than their native Israeli counterparts (Isralowitz & Reznik, 2007). Contrary findings have been reported in the United States (US) where the prevalence of binge drinking among FSU migrants was lower (Hoffman, Liddell, Bryant, & Nickerson, 2018) and the prevalence of lifetime abstinence higher than among US born whites (Mehta & Elo, 2012). There do not seem to be comparative studies which would have investigated the prevalence of tobacco smoking or cannabis use in Russian or FSU origin migrants in comparison with the general population.

Among the Russian origin population, certain SES indicators were associated with current binge drinking (age, poorer economic situation) and daily tobacco

smoking (age, marital status, educational attainment) as well as lifetime cannabis use (age), and the associated factors varied between the genders. In addition, migration-related factors were associated with substance use.

Current symptoms of depression and anxiety in general were not associated with substance use. However, suicidal ideation as a single symptom was associated with lifetime cannabis use. Potentially traumatic experiences (PTE) associated with lifetime cannabis use but when background factors were included in the models, this association became attenuated. Perceived discrimination was not associated with substance use in the Russian origin population.

When all the contextual factors, i.e. socio-demographic factors, migration-related factors, depressive and anxiety symptoms, PTEs, and PD were analyzed in relation to substance use, SES indicators and migration-related variables were present in all of the models explaining substance use, while depressive and anxiety symptoms, PTE and PD were inconsistently evident in some of the models.

The lower prevalence of alcohol use and binge drinking among Russian origin population might be an example of the "healthy migrant effect", in which migrants are theorized to be healthier or adhere to a healthier lifestyle than the general population in the host country. Some studies in the US have reported confirmatory findings concerning the healthy migrant effect of substance use among migrant populations (Kennedy et al., 2014; McDonald & Kennedy, 2004b; Mehta & Elo, 2012; Salas-Wright & Vaughn, 2014). The mechanisms of migrant selection by self-selection or by migrating as a result of employment or education could be particularly relevant with respect to substance use, as it is possible that the individuals with problem-level substance use are more likely to stay in their country of origin. However, this healthy migrant effect seems to apply only to alcohol use habits among the Russian origin population. A larger share of Russian origin participants had obtained a higher level of educational attainment than the general population. In addition, a majority had migrated to Finland due to employment or family ties implying that the majority of the Russian origin participants had not been compelled to leave their home country. The Russian origin population in this study could be interpreted to represent the situation of voluntary migration.

When associations to contextual factors were examined, substance use among the Russian origin population was associated mainly with indicators of their sociodemographic background. Similar associations between age, economic situation, gender and alcohol use have been widely reported among general populations (Bloomfield et al., 2006; Connor et al., 2016; Schuckit, 2009; WHO, 2018a; Wilsnack et al., 2009). Likewise, age, marital status, education and employment, which were associated with daily tobacco smoking among Russian origin population, have been commonly associated with smoking among general populations (Casetta et al., 2017; Giskes et al., 2005; Hiscock et al., 2012; Huisman

et al., 2005; Laaksonen et al., 2005; Moodie et al., 2013). The association between PD and tobacco smoking was attenuated to non-significance when socio-demographic factors were included in the analyses. This highlights the importance of socio-demographic factors concerning substance use among the Russian origin population. The findings also imply that the factors associated with substance use are shared across origins rather than being specific to each population group. From this perspective, the findings could be interpreted by the social determinants of health (SDH) framework. This framework explains the health inequities as being attributable to structural factors within a society, e.g. social class, gender, living conditions, and describes the reasons for these health inequities concerning different populations and migrant groups in more depth than the healthy migrant effect (Castañeda et al., 2015; Hossin, 2020; Malmusi, Borrell, & Benach, 2010).

Duration of stay in Finland (host country) and proficiency in Finnish/Swedish language were also associated with substance use among the Russian origin population. These migration-related associations were multifaceted depending on the substances and genders. Both age at migration and proficiency in local languages are sometimes used as indicators of acculturation. Interestingly, among Russian origin women, binge drinking was associated with a longer stay in Finland. It is possible that acculturation and adaptation introduce changes in drinking habits. Among the Finnish general population, women's drinking has been increasing during the previous decades, and the gender gap in drinking has been declining (Mäkelä et al., 2012). Previous studies examining acculturation of minorities or foreign origin adults and adolescents have reported contradictory results concerning acculturation and the use of different substances (Abraído-Lanza, Chao, & Flórez, 2005; Areba, Watts, Larson, Eisenberg, & Neumark-Sztainer, 2021; Cano et al., 2015; Delforterie et al., 2014; Fosados et al., 2007; Reiss et al., 2015; Sussman & Truong, 2011), and the results of this study seem to highlight the inconsistency of these associations. The explanatory power of the cultural and acculturation frameworks on health behavior has been questioned (Castañeda et al., 2015; Hossin, 2020; Malmusi et al., 2010; Viruell-Fuentes, Miranda, & Abdulrahim, 2012). It has been claimed that the cultural and acculturation frameworks place the responsibility of health behavior on individuals rather than distinguishing the structural factors behind the individual's behavior (Castañeda et al., 2015; Viruell-Fuentes et al., 2012). Migration itself has been recognized as a social determinant of health predisposing individuals and populations to health inequities (Castañeda et al., 2015; Marmot, 2016; Rechel et al., 2013). The framework of social determinants of health might be particularly relevant in explaining substance use among the Russian origin population, as predominantly indicators of sociodemographic situation were associated with substance use.

6.2 Substance use in Somali origin population

The prevalence rates of substance use among the Somali origin participants were low in comparison to the general population. Particularly women reported nearly non-existent substance use. The gender gap was evident concerning daily tobacco smoking. Both genders reported low prevalence rates of alcohol use. Among Somali origin men, daily tobacco smoking was associated only with indicators of sociodemographic situation. Due to the low prevalence rates, only limited analyses could be conducted, and in fact, no more detailed analyses concerning women could be performed.

A rather limited number of comparative studies have reported alcohol use, tobacco smoking or cannabis use among Somali origin individuals in comparison with the general population. A lower prevalence of tobacco smoking among Somali origin adolescents living in the US in comparison to the general population has been reported in a state-wide study (Wilhelm, Parks, Eisenberg, & Allen, 2021). The gender gap in smoking was reported among a Somali origin population in London (Bhui et al., 2003) and among Somali origin adolescents in Minnesota (Giuliani, Mire, Ehrlich, Stigler, & Dubois, 2010; Wilhelm et al., 2021). Generally, low rates of alcohol use have been reported among Somali refugees in Ethiopia (Feyera et al., 2015), London (UK) (Bhui et al., 2003) and Somali origin adolescents in Minnesota (US) (Areba et al., 2021).

The reasons behind the low prevalence of substance use among Somali origin population could stem from cultural explanations. The prohibition of the use of alcohol and other psychoactive substances in the Muslim holy book, the Quran, are possibly significant reasons for the low prevalence rates of alcohol use as the majority of the participants reported that they were Muslims (AlMarri & Oei, 2009; Baasher, 1981; Bhui et al., 2006; Hafeiz, 1995). On the other hand, these factors might also lead to under-reporting of substance use, particularly in situations where the interviewer originates from the same community (Areba et al., 2021; Bhopal, 2014a; Bhui et al., 2006).

The protective role of religion and religiousness has been documented concerning PTSD among older Somali origin migrants in Finland (Mölsä, Kuittinen, Tiilikainen, Honkasalo, & Punamäki, 2017). Other studies have also reported low rates of stress or affective symptoms among Somali origin individuals despite the high prevalence of perceived discrimination (Castaneda et al., 2015; Jasinskaja-Lahti, Liebkind, & Perhoniemi, 2006). These findings have been explained by support within the Somali origin community, social networks and the religious community (Areba, Duckett, Robertson, & Savik, 2017; Areba et al., 2021; Cavallera et al., 2016; Jasinskaja-Lahti et al., 2006; Mölsä et al., 2017). Religion might also have an important role in resilience and post-traumatic growth in providing experiences of hope and meaning in life, and these effects might be particularly

important among the Somali population (Areba et al., 2017; Cavallera et al., 2016; Mölsä et al., 2017).

6.3 Substance use in Kurdish origin population

Alcohol use habits among the Kurdish origin population seemed to be healthier in comparison to the general population, with a higher prevalence of abstinence and a lower prevalence of binge drinking. In comparison, daily tobacco smoking was more prevalent among Kurdish origin men than among their counterparts in men in the general population. The prevalence of lifetime cannabis use was low. All forms of substance use were more prevalent among Kurdish origin men than women.

The Kurdish origin population differed from those of Russian and Somali origins, when associations between contextual factors and substance use were studied. Unlike among other populations, several layers of contextual factors, i.e. sociodemographic factors, migration-related factors as well as current symptoms of depression and anxiety, suicidal ideation, traumatic experiences and perceived discrimination were all variably associated with substance use among the Kurdish origin population. This was evident also in the models best explaining substance use. Current daily tobacco smoking and lifetime cannabis use were associated with experiencing clinically significant symptoms of depression and anxiety, and binge drinking was associated with suicidal ideation. Binge drinking was also associated with pre-migration potentially traumatic experiences (PTEs), while alcohol use and lifetime cannabis use were associated with perceived discrimination (PD) in the host country.

Despite the lower rates of alcohol use and binge drinking than among the general population, alcohol use was nevertheless reported among the Kurdish origin population (49% in men and 15% in women). Prior to this study, no comparative research had been conducted on the prevalence of substance use among Kurdish origin migrants. It is often presumed that individuals who originate from Muslim majority countries do not use alcohol. These assumptions are probably based on the prohibition of alcohol and other psychoactive substances in the Muslim holy book, the Quran, and the restrictive alcohol policies in many Muslim majority countries (Al-Ansari, Thow, Day, & Conigrave, 2016; AlMarri & Oei, 2009; Baasher, 1981; Hafeiz, 1995). In the clinical context, these assumptions could mean that health care professionals may overlook alcohol or substance use as a risk factor or etiological factor among patients who are assumed to be Muslim by religion or patients who originate from Muslim majority countries. The findings concerning the prevalence of alcohol use and binge drinking among Kurdish origin population highlight the fact that the substance use habits cannot be deduced from region or culture of origin *per se*, but they need to be enquired.

The multifaceted associations between substance use and the several layers of contextual factors could be explained from perspectives of several frameworks. Some of the associations between substance use and sociodemographic indicators are similar as those identified in the Russian origin population and among general populations as reported in the literature (Bloomfield et al., 2006; Connor et al., 2016; Hiscock et al., 2012; Laaksonen et al., 2005; WHO, 2018a). Similar sociodemographic factors seem to be associated with substance use across countries of origin.

Because of the associations between traumatic experiences prior to migration, perceived discrimination and current psychological symptoms (depressive and anxiety symptoms and suicidal ideations), explaining the substance use habits merely with the social determinants of health (SDH) framework seems insufficient. The majority of the Kurdish origin participants had migrated to Finland for humanitarian reasons, and therefore they could be considered to represent forced migrants. The context of involuntary migration includes often intense and severe stressors before migration from the country of origin, during the journey, and in the post-migration phase in the host country (Patel et al., 2017). The situations in which forced migrants and involuntary migrants live might, however, differ largely. The Kurdish origin participants in this study reported severe traumatic experiences (e.g. torture) more frequently than the other migrant groups under study (Castaneda et al., 2017).

Particularly among the Kurdish origin men, the factors describing hardship in their current life circumstances were associated with both binge drinking and daily tobacco smoking. It seems possible that one of the motivations behind substance use among Kurdish origin men is coping with current hardships or difficult situations. Observations of substance use as a way to cope with difficulties of mental health, stigma and their situation in life has been reported among immigrant men (Kour et al., 2019), marginalized refugees (Horyniak, Higgs, et al., 2016) and asylum seekers (Dupont et al., 2005). Substance use as a coping strategy might be particularly relevant considering the high prevalence of clinically significant symptoms of depression and anxiety among the Kurdish origin population (Rask et al., 2015) and the treatment gap in mental (Castaneda et al., 2020). In addition to substance use as a coping strategy, the associations between potentially traumatic experiences (PTEs), depressive and anxiety symptoms and substance use among the Kurdish origin population could be explained by the self-medication theory of substance use. According to the self-medication theory, substances are sometimes used to self-treat psychological and physiological symptoms e.g. those caused by traumatic experiences (Bonn-Miller et al., 2011, 2007; Brady et al., 2006; Breslau et al., 2003).

The results concerning Kurdish origin population could also be interpreted from the perspectives of the cultural and acculturation framework. Residing in an

environment where alcohol use and intoxication by alcohol is widely accepted and widely available, such as in Finland, might alter the alcohol use habits by some migrants (Room, 2005; Salas-Wright & Vaughn, 2014; Westermeyer, 1995b; Westermeyer et al., 2006). This could be particularly relevant for individuals feeling marginalized by the host society, having experienced severe traumatic events and possibly suffering from psychological symptoms (Dupont et al., 2005; Horyniak, Higgs, et al., 2016; Kour et al., 2019).

Nearly half of the Kurdish origin participants reported having experienced discrimination or racism in their new host country and previous studies have reported associations between PD and various aspects of health and wellbeing (Castaneda et al., 2015; Rask et al., 2018). Here, the total alcohol use and lifetime cannabis use were associated with PD among the Kurdish origin population, but associations to binge drinking were not significant. This could indicate that PD affects other aspects of health and wellbeing but does not exacerbate alcohol use or increase binge drinking behavior among the Kurdish origin migrants. This finding is in line with results from a Dutch study reporting that associations between PD and substance use differ between different population groups (Visser et al., 2017). However, as both PD and PTE were frequently selected to the models explaining substance use and some associations to substance use remained significant even after adjusting for sociodemographic factors, migration related factors and depressive and anxiety symptoms, it is possible that PTEs and PD are discrete and independent risk factors for substance use particularly among forced migrants.

The different theoretical frameworks to explain the substance use among the Kurdish origin population may be summarized by the intersectionality framework, which encompasses a wide range of vulnerable circumstances as a basis of inequalities in wellbeing (Hossin, 2020). In the framework of intersectionality gender, ethnicity, social class or migrant status are not approached as distinct categories but rather as a combination vulnerable of situations that are experienced simultaneously (Viruell-Fuentes et al., 2012). This framework provides a way of explaining substance use by taking into account pre-migration and post-migration conditions as well as the social determinants of health and the structural factors causing inequities (Hossin, 2020). The results of this thesis highlight the various simultaneous vulnerable situations to which the Kurdish origin participants had been exposed in their countries of origin, during the process of forced migration, and during the post-migration phase in the new host country. These vulnerable situations could mean that they have experienced severe traumatic events, dangerous journeys, faced discrimination and racism as well as having to overcome structural issues in their host country, e.g. accessibility and availability of mental health care, labor markets and living environments. The Kurdish origin individuals, in particular, have a background of being a stateless group, who have been frequently oppressed and

discriminated in their regions of origin (Assari, Micol-Foster, Dejman, Ayoubian, & Moghani Lankarani, 2015; Sulaiman-Hill & Thompson, 2012; Taloyan, Johansson, Johansson, Sundquist, & Koctürk, 2016; Taloyan et al., 2008).

6.4 Methodological aspects

This population-based study presents substance use behavior among three migrant groups, migrants in Finland of Russian, Somali, and Kurdish origin. The unique data from the Finnish Migrant Health and Wellbeing Study (Maamu) have a relatively high response rate in comparison to other previously conducted migrant surveys. One of the strengths of the data is the availability of the general population data from the Health 2011 Survey, which was used as a reference group.

In this study, analyses were conducted separately for each migrant group, which can be considered as a major strength. With this procedure, cultural and other differences between the groups can be recognized, and this reduces the observation bias (Bhopal, 2014b; 2014a; Marmot, 2016). Sometimes migrants are grouped together as a single migrant population or by larger geographical areas, e.g., African origin migrants or Asian origin migrants, but this approach is likely to conceal some of the differences in substance use. As was evident here, this study is one of the first to report substance use among Kurdish origin individuals and report associations to important pre- and post-migration stressors.

Despite these above-mentioned strengths, this study has also important limitations. The sample size is limited, and participation rate of some groups, particularly the Somali origin population is smaller than the other populations. The sample size limited the possibility to conduct further analyses among the Somali origin population in particular, and among the Kurdish origin women to some extent. The limited sample sizes have possibly led to rather wide confidence intervals and the lack of statistical power in some of the analyses. A finite population correction was used in the analyses to approach this problem. The effects of attrition are difficult to estimate, and selection bias is possible concerning individuals with problematic substance use. Weighting coefficients determined by the main factors of non-response were used to handle attrition. The small sample sizes and low prevalence of substance use among women did not enable us to conduct gender-subdivided analyses. This was approached by adjusting for gender, but it is likely that this does not completely account for the major gender differences in substance use. The data were collected in several ways, and this may cause method specific variance.

Alcohol use is often under-reported in health surveys, irrespective of the respondents' origins (Boniface, Kneale, & Shelton, 2014). For example, the low prevalence rates of substance use among Russian origin migrants might result from

under-reporting. In addition, the negative cultural connotations of substance use particularly among Somali and Kurdish origin populations, who were predominantly Muslim by religion, might have led to under-reporting. In this study, the interviews were carried out by field personnel who were native speakers of Russian, Somali or Kurdish. In general, this was considered to be a useful approach as interpreters were not needed and it also helped in creating confidence. However, substance use is a sensitive theme which participants might have preferred to discuss with interviewers who were not from the same cultural communities. On the other hand, had the interviewer not been a native speaker of the interviewees' language, the use of an interpreter would have been necessary, and the interpreter would probably have been a member of the same cultural community. Substance use behavior might have been explored more specifically if it had been possible to combine the interviews with laboratory analyses of markers of alcohol, tobacco or cannabis use, and this is recommended in future research.

The main outcomes were dichotomized due to the limits of participation rates and in an attempt to operationalize the substance use behaviors in a clinically relevant manner. Particularly the outcome variable "lifetime cannabis use" can be considered as a weak measure. The reference categories in the outcome variables (binge drinking, daily tobacco smoking) included those individuals who used alcohol but who did not report binge drinking and individuals who smoked but who did not smoke on a daily basis. The problems related to dichotomization of the binge drinking variable were approached by performing also post-hoc analyses in sub-study III, where the total score of AUDIT-C was used as a continuous variable in addition to a dichotomized variable. Estimating alcohol use with a validated measure, the AUDIT-C, could be considered a strength but on the other hand, the instrument has not been validated among Russian, Somali or Kurdish origin populations and therefore it is not known whether the cut-off scores which have been validated in the Finnish general population for risky drinking are appropriate for these migrant origin populations. Another limitation is that tobacco smoking and cannabis use were enquired without the application of screening instruments such as Heaviness of Smoking Index (HIS) or Cannabis Abuse Screening Test (CAST). It is recommended that these kinds of screening instruments should be applied in the future.

In general, causality cannot be deduced from cross-sectional data, and therefore the direction of associations reported in this study cannot be concluded with this data and the analyses. In the future, the collection of longitudinal data is recommended, since this may provide the possibility elucidate changes in substance use behavior. Examining substance use prior to migration, after short term stay and in long term would give a more precise picture of substance use habits in the new country of residence. This would be relevant from perspectives of public health and health care

system. Questions about the substance use in the country of origin might have given more precise information about changes in substance use behavior after migration. Even a single item about the use of alcohol, tobacco, cannabis and intravenous drugs in the country of origin (yes vs. no) might have revealed interesting perspectives on whether the substance use had been initiated in the country of origin or in Finland. However, asking for details about substance use that has occurred several years or even decades ago might not be all that reliable. Another main limitation is that information was not available on disorder level substance use or mental health problems. Had information been available on the use of other psychoactive substances e.g., khat use, it might have been possible to evaluate the total substance use of the Somali origin population in greater detail.

Symptoms of depression and anxiety, potentially traumatic experiences (PTEs) and perceived discrimination (PD) were measured with scales that have previously been used among migrant, forced migrant and minority populations (Bean, Derluyn, Eurelings-Bontekoe, Broekaert, & Spinhoven, 2007; Castaneda et al., 2017, 2015; Davidson, Murray, & Schweitzer, 2010; Hollifield et al., 2002; Rask et al., 2018; Tinghög & Carstensen, 2010). However, these scales and their cut-off scores have not been validated among these specific populations examined here. Harvard Trauma Questionnaire (HTQ) and Everyday Discrimination Scale (EDS) were adapted from their original versions, and this could be considered as a limitation. Additionally, many of the items describing the sociodemographic circumstances and migration-related phenomena were subjective and self-reporting measures (e.g., economic situation, language proficiency, employment).

Kuittinen et al. 2016 have reported that the subscales of Hopkins Symptoms Checklist (HSCL-25) could not be validated among Russian, Somali, and Kurdish origin populations. Due to these findings, the subscales were not used in the analyses. Despite the limitations related to HSCL-25, incorporating symptoms of depression and anxiety as a confounding factor when assessing substance use is a novel approach that has not been applied previously. Here, depressive and anxiety symptoms were analyzed as a dichotomized variable and this could be considered as a limitation, but it was partly avoided in sub-study II by conducting *post-hoc* analyses using the HSCL-25 score as a continuous variable in the univariate analyses. Suicidal ideation was evaluated using a single item from the HSCL-25. This could be viewed as a limitation as no other aspects of suicidal behavior were examined. Indeed, using a scale specific for identifying suicidal tendencies, would have given a significantly greater perspective of the relevance of the findings, and this approach is recommended in future research.

6.5 Implications

The findings emerging from this study demonstrate that substance use occurs among all three migrant populations under study. This implies that substance use needs to be screened in a similar and uniform manner despite the origin, race, ethnicity or presumed culture or religion of the respondent. The substance use habits of an individual cannot be deduced from their native language, appearance or assumed cultural affiliation. Therefore, one of the implications of this research is that there should be uniform screening for substance use with validated scales such as AUDIT-C, HIS, and CAST. Addressing substance use is particularly important not only in mental health care but also in other social and healthcare contexts, e.g. primary health care, where individuals in vulnerable situations are encountered. However, as substance abuse, and sometimes also substance use, are stigmatized in some communities, it might be important to justify these questions by explaining that they are asked of everyone and in a similar manner.

The occurrence of substance use indicates that psychoeducation about substance use, risk level use and treatment possibilities for problematic substance use might be important for all new residents in host countries where certain aspects of substance use are widely accepted and prevalent. For example, substance use literacy could be increased with mobile applications and web-based resources designed together with the migrant communities. These would provide psychoeducation about substance use and risk level use as well as information about treatment possibilities with a low threshold, in various languages, and in culturally sensitive ways.

In addition, there might be an additional demand for tailored services for certain populations. Kour et al. (2020) found a need for narrating experiences in relation to cultural beliefs and values in mental and substance use services. The varying prevalence rates of substance use in the different populations emphasize the need for specific and targeted services, e.g. tailored smoking cessation services being targeted to certain population groups due to the higher prevalence rates and health hazards. These migrant communities could be invited to contribute to developing culturally appropriate and sensitive services, and some services could possibly also be disseminated through existing community-based networks (Giuliani et al., 2008). As an example, support for smoking cessation around Ramadan by text messages combining faith and health related content has been viewed as potentially acceptable by Somali origin men (Pratt et al., 2020). The results of this thesis highlight the need for evidence-based substance use services and interventions that are acceptable and appropriate for individuals with culturally diverse or forced displacement backgrounds, as has also been recognized in earlier research (Horyniak, Higgs, et al., 2016).

The high prevalence of depressive and anxiety symptoms, traumatic experiences, and perceived discrimination alongside concurrent substance use among the

examined Kurdish origin population highlights how these individuals would benefit from available, accessible, and culturally sensitive health, mental health and substance abuse services. Providing appropriate and adequate psychosocial and psychotherapeutic services for forced migrants who have likely experienced traumatic events and losses in the country of origin and during the journey is an essential step as a foundation to continuing the individual's life in his/her new environment. Delays in receiving treatment for impaired mental health may lead to substance use as a coping strategy. Increasing the cultural competence of healthcare professionals is crucial in improving these services (Kour et al., 2020; McCann et al., 2016). Increasing cultural competence is essential also for addressing substance use and providing brief counselling in a culturally sensitive way in healthcare and social services.

Furthermore, discrimination and racism need to be better recognized as significant determinants of health and wellbeing (Schouler-Ocak et al., 2021). In many respects, dealing with discrimination is a political issue and outside of the field and objectives of medicine and psychiatry, but the impacts of failing to address this problem can be heard in the patients' narratives. However, structural discrimination can also be seen in the context of health services, e.g. as a barrier to access the services as well as a cause for substandard treatment outcomes, as demonstrated by recent findings of service gaps in mental health (Castaneda et al., 2020; Kieseppä, Holm, et al., 2021; Kieseppä, Jokela, et al., 2021; Kieseppä et al., 2019). For example, equality in terms of treatment outcomes needs to be the goal rather than just providing a similar service for all the users.

The research implications of this thesis include generating comparative data on substance use of migrant origin individuals, which requires the usage of standardized measurements for all forms of substance use. Gathering longitudinal data on substance use would be a new standpoint, and looking into changes in substance use behavior and risk factors would be possible using longitudinal data. Longitudinal data would deepen and expand the understanding of substance use behavior in the context of migration. Moreover, qualitative methods could enrich and elaborate on the findings of cross-sectional and register-based studies. In addition, there is a need for validating the screening instruments of risky substance use among non-native populations to meet the needs of both research and clinical purposes.

Much of the current research on mental health and substance use among migrated populations has focused on describing distress, adversity and risks. This perspective might cause so-called pathologizing and medicalizing of their experiences in the host countries. In the future, addressing the themes of resilience and protective factors would help to broaden the research on migrant and refugee experiences. In addition, qualitative research on these themes as well as substance use behavior is essential to explain the findings of cross-sectional studies.

Furthermore, the results of this thesis lead to questioning the usual way of considering European or Northern American habits and behavior as "normal" and others as aberrant. For example, in the context of alcohol, drinking alcohol and even binge drinking are considered normative and thus in this study also viewed as the reference, to which other habits such as abstention were compared. The conceived idea that alcohol is widely used all around the world is at odds with the reality since the majority of the global population abstain from alcohol use (WHO, 2018a). In this example, the definitions of "normal" or normative in science and policy are not based on evidence of health hazards but on the customs of European and Northern American, mainly Caucasian populations. This calls for a reconsideration of the reference populations and a re-definition of the kinds of substance use to be regarded as risky in the context of global population dynamics.

7 Summary/Conclusions

This thesis reports the prevalence rates of alcohol use, tobacco smoking and cannabis use among the study populations of Russian, Somali and Kurdish origins. Interestingly, a lower prevalence of alcohol use and binge drinking was reported among all the migrant origin populations in comparison with the general population. Daily tobacco smoking was more common among Russian and Kurdish origin men than in the general population. Similar sociodemographic factors were associated substance use among migrant populations and the general population.

Secondly, the research aimed to examine the associations between substance use and contextual factors consisting of current sociodemographic situation, migration related factors, depressive and anxiety symptoms, and traumatic experiences prior to arrival in the host country and perceived discrimination in the host country, i.e. Finland. The associations were evident in diverse ways among the different populations, and they were not uniform. Among the Russian origin population, lifetime cannabis use was associated with suicidal ideation. In the Kurdish origin population, symptoms of depression and anxiety were associated with daily tobacco smoking and lifetime cannabis use, and suicidal ideation was associated with binge drinking. Potentially traumatic experiences (PTEs) were associated with lifetime cannabis use among the Russian origin population, and with binge drinking and alcohol consumption among the Kurdish origin population. Perceived discrimination (PD) was not significantly associated with substance use among the Russian origin population but was associated with alcohol consumption and lifetime cannabis use among the Kurdish origin population.

The Russian origin population could be considered as mainly voluntary migrants; in these individuals, substance use was mainly associated with sociodemographic factors, similarly to previous findings concerning general populations. The Kurdish origin population had a mainly forced migration background and we identified several layers of contextual factors, i.e. sociodemographic factors, migration-related factors as well as symptoms of depression and anxiety, traumatic experiences and perceived discrimination which were all variably associated with substance use.

The results of this thesis highlight that, indeed, there is substantial variation in substance use between populations, but nonetheless substance use was present in all three study populations. These findings highlight that substance use cannot be presumed by the appearance, origin or native language of an individual. In the healthcare context, this means that substance use needs to be screened similarly in all patients or clients. These results are also indicative of the vulnerable situations and preconditions to which certain migrants, particularly forced migrants, might be exposed. These findings highlight that perceived discrimination is an important determinant of health and wellbeing among migrant origin populations, and furthermore, that zero tolerance of discrimination and racism needs to be achieved in all policies to reduce health disparities and promote belonging and wellbeing in a diverse population.

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