



Use of alcohol, tobacco and illicit drugs among ethnic Norwegian and ethnic minority adolescents in Hordaland county, Norway: the youth@hordaland-survey

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ABSTRACT

Objective: To describe potential differences in unhealthy behaviours among ethnic Norwegian adolescents and minority adolescents from countries within the European Union, European Economic Area or US (EU/EEA countries) and adolescents from non-EU/EEA countries. Specifically, we aimed to investigate ethnic differences in use of alcohol, tobacco and illicit drugs, and potential confounding due to socio-demographic characteristics.

Design: Cross-sectional population-based study of adolescents aged 16–19 ($N = 10,122$), with self-reported ethnicity as grouping variable, and self-reported use of alcohol, tobacco and illicit drugs as dependent variables.

Results: We found that minority adolescents from EU/EEA and non-EU/EEA countries differed from ethnic Norwegian adolescents on important indicators of unhealthy behaviours. Compared to Norwegian adolescents, adolescents from EU/EEA were more likely to report having tried to smoke, to be a daily smoker and to ever having tried an illicit drug (adjusted odds ratio (OR) ranging from 2.01 to 3.74). They were, however, less likely to have tried snus (a form of smokeless tobacco; adjusted OR 0.64; confidence interval (CI) 95% 0.43–0.97) and to report daily snus use (adjusted OR 0.31; CI95% 0.15–0.67). There were no differences in having tried alcohol. Non-EU/EEA adolescents were less likely to have ever tried alcohol (OR 0.24; CI95% 0.18–0.31), snus (OR 0.47; CI95% 0.34–0.65) and to smoke (0.68; CI95% 0.52–0.91), and less likely to report daily snus use (OR 0.36; CI95% 0.21–0.62) compared to Norwegian adolescents. There were no differences with regard to having tried illicit drugs and reporting being a daily smoker. All differences observed were robust to adjustment for age, gender and family socio-economic status.

Conclusion: The presents study identified important differences in unhealthy behaviours across different ethnic groups in Norway. The differences in the prevalence of unhealthy behaviours among ethnic minorities are still relevant in a public health perspective, and potential mechanisms should be investigated further.

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1. Introduction

Adolescence is the period in which many begin to experiment with alcohol, tobacco and illicit drugs. The use of alcohol, tobacco and illicit drugs are closely linked to morbidity, mental health problems, social problems and mortality (Chang et al. 2011; Hale and Viner 2012; Saban and Flisher 2010; Skogen et al. 2014; Viner 2005; Viner and Taylor 2007), and is therefore characterised as unhealthy behaviours. Use of alcohol, tobacco and illicit drugs is associated with many socio-economic factors, and in complex ways. In general, there is evidence to support that these kinds of behaviour are more common among males than females, and more common later in adolescence compared to early adolescence. There is strong evidence that tobacco use and the use of illicit drugs is associated with lower socio-economic status (SES) and less family affluence, while the evidence for such an association between alcohol use and SES seems to be more complex (Aura, Sormunen, and Tossavainen 2016; Danielsson et al. 2012; Hibell et al. 2012; Lemstra et al. 2008; Richter et al. 2013). Social influences have been found to be important in relation to a wide array of health-related behaviours, including smoking, alcohol and drug use. For adolescents family, norms and practices, as well as peer influence play an important part in the initiation and development of health-related behaviours (Boyd, Corbin, and Fromme 2014; Institute of Medicine (US) and National Research Council (US) Committee on the Science of Adolescence 2011; Salvy et al. 2014; Scalici and Schulz 2014; Simons-Morton and Farhat 2010). As with other factors, the social influences may have negative or positive impact on the health-related behaviours.

These unhealthy behaviours are in part regulated by cultural and religious norms (Heath 1995), and there is large variation in how acceptable the use of, for example, alcohol is across different cultures and religions. While there are larger differences within Christian cultures in the amount of alcohol (if any) that can be consumed, alcohol is much less acceptable in Muslim cultures according to their faith (Bock, Cochran, and Beeghley 1987; Ghandour, Karam, and Maalouf 2009). In line with this, studies based on European samples have found a general pattern of no or less alcohol consumption among immigrants from non-Western countries compared to the host population (Abebe et al. 2014; Amundsen 2012; Amundsen, Rossow, and Skurtveit 2005; Rodham et al. 2005). In contrast, the use of tobacco and even cannabis in some cases are more prevalent among minority immigrant groups compared to the host population (Abebe et al. 2014; Rodham et al. 2005; Svensson and Hagquist 2010).

The number of immigrants has increased in several countries in the last decades, and there are self-evident and important reasons to gain knowledge about the health and health-related behaviours among immigrants. For example, improving our understanding of these factors and their precursors may facilitate health personnel to better reach immigrants more optimally, and to develop tailored prevention programmes and medical treatment schemes (Abebe 2010). Although there is increasing ethnic diversity among adolescents in the Nordic countries, few Nordic studies have specifically investigated the use of alcohol, tobacco and illicit drugs among adolescents across ethnic groups (Abebe et al. 2014; Svensson and Hagquist 2010). There are, however, some notable exceptions, including a recent Norwegian study by Abebe and colleagues employing data on adolescents in junior and senior high schools in Oslo (Abebe et al. 2014). That study

investigated binge drinking, cannabis and tobacco use among ethnic Norwegian and ethnic minority adolescents. Abebe and colleagues concluded that adolescents from the Middle East, Asia and Africa had a lower risk of binge drinking and cannabis use compared to ethnic Norwegians, while there were few differences with regard to tobacco use. The exception was a higher prevalence of daily tobacco use among adolescents born natively by immigrant parents (second-generation immigrants) from Europe and the US, and lower prevalence of daily tobacco use among adolescents born natively by immigrant Asian parents compared to ethnic Norwegians.

Most previous investigations of drug use and ethnicity among adolescents in Norway are, however, based on data from Oslo, the capital and largest metropolitan area in Norway (Amundsen, Rossow, and Skurtveit 2005; Ihlebæk and Amundsen 2007). Oslo has by far the most immigrants, and 32% of the Oslo-population are immigrants compared to 16% in Norway in general (Statistics Norway 2015). As such, immigrant adolescents outside of Oslo to a larger degree live in a culture which is different from their parents' (Ihlebak and Amundsen 2007), and it is likely that this may impact the diversity of unhealthy behaviour across ethnic groups outside of Oslo. There is still a need for more research regarding ethnic differences in unhealthy behaviour among minority groups compared to the host nation in Western countries (Abebe et al. 2014; Rodham et al. 2005).

The aim of the present population-based study was to describe potential differences in unhealthy behaviour among ethnic Norwegian adolescents and minority adolescents from within the European Union or European Economic Area (EU/EEA countries) and adolescents from non-EU/EEA countries. Specifically, we investigate ethnic differences in use of alcohol, tobacco and illicit drugs, and potential confounding due to socio-demographic characteristics.

2. Methods

2.1. Description of the sample

The present study is a secondary analysis of the cross-sectional population-based study 'youth@hordaland'. All adolescents born 1993–1995 (age range: 16–19 years) and living in Hordaland county (Norway) were invited to complete the survey ($n = 19,430$), and 10,220 (53%) agreed to participate. Youth@hordaland was carried out in close collaboration with the county council administration, and all upper secondary schools in Hordaland county participated. The overall aim of the youth@hordaland-survey was to gather information about health, lifestyle, school performance and health-service use in adolescents. The data were collected from January to May 2012. The adolescents received information about the study and login details via their official school e-mail, followed by an SMS reminder for a majority of the students. One school class (about 45 min) during regular school hours was allocated for the completion of the Internet-based questionnaire. A teacher was present to organise the data collection and to ensure confidentiality. For those not at school during the allotted time, the questionnaire could be completed at other times at their convenience during the study period. Some schools arranged catch up days, and we also arranged for participation for adolescents in hospitals or institutions during the study period. The adolescents who were not in school received information by mail to their home addresses. In addition, adolescents in mental health facilities, juvenile

detention centres and other institutions were contacted and given the opportunity to participate. The adolescents' parents were informed about the study, while the adolescents themselves consented to participate in the study as Norwegian regulations state that individuals aged 16 years and older are required to consent themselves. Hordaland county is generally regarded representative of Norway as a whole, comprising the second-largest city of Norway (Bergen) as well as large rural areas. Official statistics of the general population (not just adolescents) show that Hordaland county does not deviate in any substantial degree from the national average on many key parameters, including socio-demographic indicators and several health indicators. A previous study has supported the representativeness of the sample (Hysing et al. 2016). Although the participants of the youth@hordaland-study are primarily high-school students, the official data show that 92% of all adolescents in Norway aged 16–18 attend high school (Statistics Norway 2013), compared to 98% in the present sample (Skogen et al. 2014). The study was approved by the Regional Committee for Medical and Health Research Ethics in Western Norway.

2.2. Grouping variable – definition of ethnicity

All participants were asked whether they were born in Norway or in another country. If they answered another country, they were prompted to choose which country they were born in from a list of 192 countries. The same initial question and potential prompt were repeated for both paternal and maternal country of birth. Based on this information we approximated Statistics Norway's definition of immigrants: 'Immigrants are persons who are resident in Norway, but who are born abroad to two foreign-born parents and have four foreign-born grandparents' (Andreassen, Dzamarija, and Slaastad 2015, 12). The participants were classified into ethnic Norwegians (abbreviated 'Norwegians'); immigrants from the EU, the European Economic Community (EEA) and the US (abbreviated 'EU/EEA') and immigrants from outside of the EU/EEA (abbreviated 'non-EU/EEA'). In the case of missing information about one or both parents' country of birth, the participant's own country of birth was used to categorise ethnic status ($n = 3$), and in the case of parents being born in different regions (i.e. one in the EU/EEA and one outside of the EU/EEA), the participant's own region of birth was again used ($n = 9$). The results presented in the present paper were similar when using a less restrictive categorisation based on only parental country of birth or participant's country of birth (data not shown). In a sub-analysis we also investigated the differences in unhealthy behaviours between immigrants from a mainly Muslim country (i.e. countries with >50% Muslims, Amundsen, Rossow, and Skurtveit 2005) and ethnic Norwegian adolescents.

2.3. Measures of unhealthy behaviour: alcohol, drugs, smoke and snus use

The study included a binary measure of alcohol onset 'Have you ever tried alcohol?' (Yes/No), and usual alcohol use was measured using the self-reported units (defined in the present paper as a 0.33 l drink containing 4.5% alcohol (a standard-sized bottle of beer in Norway)) of beer, cider, wine, spirits and illegally distilled spirits usually consumed during a 14-day period. Debut of Illicit drug-use was assessed by the question 'Have you ever tried hash, marihuana or other narcotic substances?' (Yes/No). Furthermore, the participants were asked whether they had tried smoking cigarettes or snus (a form

of smokeless tobacco traditionally used in Norway and Sweden, Øverland et al. 2013). Those who reported having tried smoking cigarettes were prompted to indicate if they smoked, and whether they smoked on a daily basis. The same prompt was repeated for those having tried snus. Two binary variables were constructed, coded '1' for those reporting daily smoking/snus use and '0' for the remaining participants.

2.4. Covariates

Information about age and gender were derived from the participants' social security numbers. Furthermore, the participants indicated their perceived family affluence as (1) 'about the same as others', (2) 'better than others' or (3) 'worse than others'. Paternal and maternal educational attainment were reported by the participants, using the following categories: 'Elementary education', 'secondary vocational education', 'general secondary education', 'university or university college, less than four years', 'university or university college, four years or more' and 'do not know'. And finally, the participants could indicate whether or not their parents were divorced.

2.5. Statistical procedure

The total number of participants with valid information on the ethnicity grouping variable was 10,122 (99.0% of the entire sample). For the main analysis, we employed multiple imputation procedures for handling of missing data on health-related behaviour and covariates (missing ranging from 0.9% to 5.1%). After imputation, crude and adjusted (including gender, age and paternal education, maternal education, marital status and perceived family affluence) logistic regression models were estimated using the ethnicity grouping variable as the primary independent variable with Norwegian as reference. The results were reported using odds ratios (ORs) with 95% confidence intervals (CI95%). In sub-analyses we investigated unhealthy behaviours among adolescents from Muslim countries compared to ethnic Norwegian adolescents, as well as potential differences in usual alcohol consumption during a 14-day period across the three different ethnic categories. The latter included only those who had tried alcohol, and both within-group proportion reporting no usual consumption, and the mean number of standard drinks was estimated (for those answering more than no usual consumption). Based on the self-reported units of alcohol consumed during a 14-day period (see Skogen et al. 2014 for further information), the mean number of alcohol units consumed for each participant was computed, and we employed negative binomial regression modelling to compare the mean across ethnic groups (Knudsen and Skogen 2015).

3. Results

3.1. Characteristics of the sample

The proportion of adolescents from Norway was 96.2%, while adolescents from EU/EEA and non-EU/EEA constituted 1.4% and 2.4%, respectively. The mean age of the sample was 17.8 years (range 16–19 years), and the adolescents from EU/EEA were slightly younger and the non-EU/EEA adolescents were slightly older than the Norwegians

Table 1. Characteristics of sample on key demographic variables, $N = 10,122$.

	Norway ($N = 9736$)	EU/EEA ($N = 143$)	Non-EU/EEA ($N = 243$)	p -Value
Mean age (95%CI)	17.8 (17.8–17.9)	17.7 (17.6–17.9)	17.9 (17.8–18.0)	.034
Gender (% female)	47.1%	43.4%	51.0%	.317
Maternal educational attainment (% higher)	37.1%	37.9%	20.7%	<.001
Paternal educational attainment (% higher)	31.9%	25.9%	28.5%	.177
Perceived family affluence (% poorer)	7.0%	5.1%	12.2%	.005
Parental marital status (% divorced)	32.8%	34.3%	39.4%	.099

(overall $p = .034$; Table 1). There were no gender differences (overall $p = .317$). Both Norwegian and EU/EEA adolescents reported higher maternal educational attainment compared to non-EU/EEA adolescents (overall $p < .001$), while there were no differences in paternal educational attainment (overall $p = .177$). The proportion reporting poorer perceived family affluence was higher among non-EU/EEA adolescents compared to Norwegian and EU/EEA adolescents (overall $p = .005$). There were no differences in parental divorce ($p = .099$).

3.2. Ethnicity and unhealthy behaviours

Compared to Norwegian adolescents, adolescents from EU/EEA were more likely to report having tried to smoke, to be a daily smoker and to ever having tried an illicit drug (adjusted OR ranging from 2.01 to 3.74; Table 2). They were, however, less likely to have tried snus (adjusted OR 0.64; CI95% 0.43–0.97) and to report daily snus use (adjusted OR 0.31; CI95% 0.15–0.67). There were no differences in having tried alcohol.

Non-EU/EEA adolescents were less likely to have ever tried alcohol (adjusted OR 0.24; CI95% 0.18–0.31), snus (adjusted OR 0.47; CI95% 0.34–0.65) and to smoke (adjusted 0.68; CI95% 0.52–0.91).

Table 2. Association between ethnicity (as defined by participants' and both parents' birthplace) and unhealthy behaviours. Crude and adjusted models. OR and 95% confidence intervals in brackets (CI95%), $N = 10,122$.

	Ever tried alcohol OR (CI95%)	Snus ever OR (CI95%)	Smoke ever OR (CI95%)	Ever tried illicit drugs OR (CI95%)	Daily snus use OR (CI95%)	Daily smoker OR (CI95%)
Norway	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
EU/EEA						
Crude	0.81 (0.57, 1.17)	0.64* (0.43, 0.96)	1.95*** (1.37, 2.77)	2.27*** (1.49, 3.45)	0.31** (0.15, 0.67)	3.58*** (2.18, 5.86)
Adjusted ^a	0.83 (0.57, 1.22)	0.64* (0.43, 0.97)	2.01*** (1.41, 2.89)	2.36*** (1.54, 3.62)	0.31** (0.15, 0.67)	3.74*** (2.26, 6.17)
Non-EU/EEA						
Crude	0.28*** (0.22, 0.37)	0.50*** (0.36, 0.69)	0.74* (0.56, 0.97)	0.79 (0.49, 1.27)	0.40** (0.24, 0.67)	1.21 (0.67, 2.18)
Adjusted ^a	0.24*** (0.18, 0.31)	0.47*** (0.34, 0.65)	0.68** (0.52, 0.91)	0.70 (0.43, 1.12)	0.36*** (0.21, 0.62)	1.05 (0.58, 1.90)

95% CIs in parentheses.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

^aAdjusted for gender, age and family SES (including paternal education, maternal education, marital status and perceived family affluence). Analyses performed on imputed data sets. Results similar for original data set with list-wise deletion for handling of missing data.

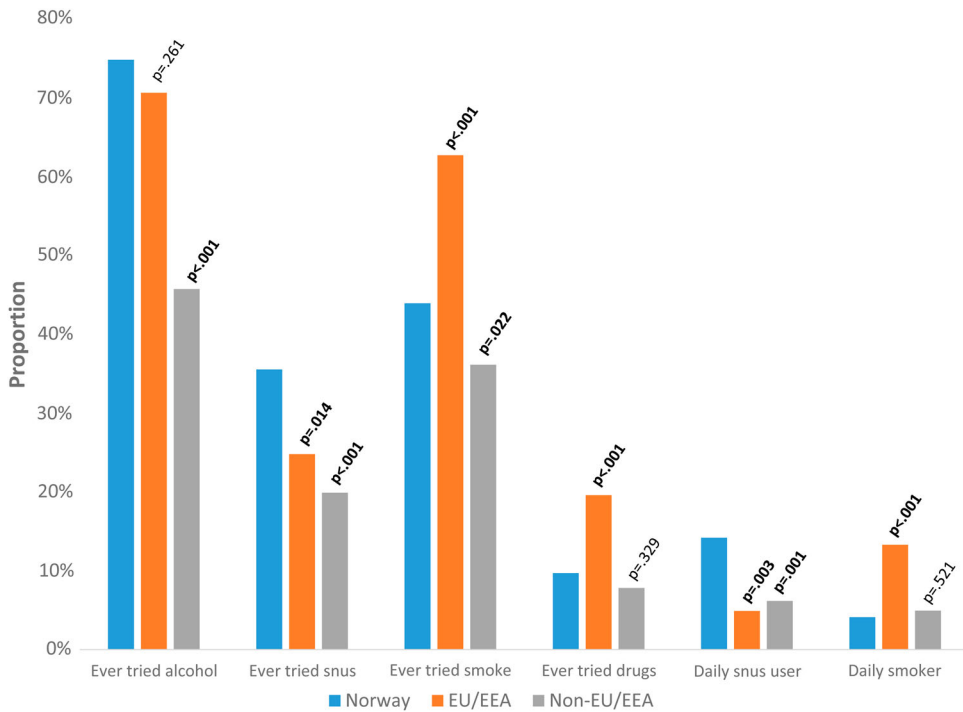


Figure 1. Proportion of unhealthy behaviours across ethnic groups. Ethnic Norwegian adolescents as reference.

CI95% 0.52–0.91), and less likely to report daily snus use adjusted (OR 0.36; CI95% 0.21–0.62) compared to Norwegian adolescents. There were no differences with regard to having tried illicit drugs and reporting being a daily smoker.

Overall, there were only small differences between the crude and adjusted model, indicating that the included potential confounders did not, or only slightly, attenuate the associations. Figure 1 gives an overview of the proportion of unhealthy behaviours stratified by ethnicity. In terms of percentage-points, non-EU/EEA adolescents were substantially less likely to have tried alcohol compared to the rest of the sample, and EU/EEA adolescents were substantially more likely to report having tried smoking, tried illicit drugs and report daily smoking.

In the sub-analysis for immigrants from Muslim countries, the pattern was identical as for non-EU/EEA adolescents. However, the association between being from a Muslim country and not having tried alcohol was stronger (adjusted OR compared to ethnic Norwegian adolescents: 0.17 (CI95% 0.11–0.25) than for adolescents from other non-EU/EEA countries (adjusted OR 0.33 (CI95% 0.22–0.48); p -value for within non-EU/EEA difference = .015).

3.3. Consumption patterns among those reporting having tried alcohol

Of those having tried alcohol, 27.1% ($N = 1970$) of the Norwegian adolescents reported no consumption in the last 14 days, 28.7% ($N = 29$) of the EU/EEA adolescents and 36.9% (N

= 41) of the non-EU/EEA reported no consumption ($p = .064$). This indicated no differences in non-consumption but the numbers in the two latter cells were small, yielding uncertain estimates. For those reporting more than no usual consumption, the mean number of standard drinks (defined as 0.33 L containing 4.5% alcohol) was 10.4 ($N = 5308$) for ethnic Norwegian adolescents, compared to 7.3 units ($N = 72$) for EU/EEA adolescents ($p = .001$) and 11.5 units ($N = 70$) for non-EU/EEA adolescents ($p = .298$). For adolescents from Muslim countries, 44.2% reported no usual consumption which was significantly higher compared to ethnic Norwegian adolescents ($p = .012$), but there was no differences in average consumption (9.5 units) among those reporting alcohol use compared to ethnic Norwegian adolescents ($p = .631$).

4. Discussion

In this recent population-based study of adolescents, we found that minority adolescents from EU/EEA and non-EU/EEA countries differed from ethnic Norwegian adolescents on important indicators of unhealthy behaviours. The differences observed were robust to adjustment for age, gender and family SES. Specifically, adolescents from EU/EEA countries had a higher risk of reporting having tried to smoke and having tried illicit drugs; they were also more likely to report being daily smokers. Snus use was less common in this group. Among adolescents who reported usual alcohol consumption, those from EU/EEA countries reported a lower consumption compared to ethnic Norwegians (mean number of units 7.3 versus 10.4 units). Adolescents from non-EU/EEA countries were less likely to having tried snus and being daily snus users, less likely to having tried to smoke, as well as less likely to having tried alcohol.

4.1. Interpretation of findings

The pattern of differences in unhealthy behaviour in adolescents demonstrated in the present study is in line with results from a study on adolescents in the largest city and metropolitan area of Norway, Oslo, and thus supports the generalisability of the results (Abebe et al. 2014). While the two studies differed in the included variables, the general pattern was similar. The study from Oslo reported less binge drinking among immigrants from countries included in our non-EU/EEA group, in line with the lower level of drinking in this group in the present study. Furthermore, the authors also reported that countries included in our non-EU/EEA group (Asian countries) were less likely to use cigarettes, which is in line with our finding of a lower likelihood of having tried tobacco among non-EU/EEA adolescents. A Swedish study reported that ethnic Swedish adolescents were less likely to use illicit drugs (Svensson and Hagquist 2010). In contrast, the current study found that both ethnic Norwegian adolescents and non-EU/EEA adolescents were comparable with respect to having tried illicit drugs (Svensson and Hagquist 2010) while EU/EEA adolescents were substantially more likely to have tried illicit drugs.

The lower likelihood of having tried alcohol among adolescents from non-EU/EEA countries may be explained by the Muslim countries included in that category (Ghandour, Karam, and Maalouf 2009). This is also supported by the sub-analysis which specifically compared adolescents from Muslim countries with ethnic Norwegian, which further lowered the likelihood of having tried alcohol, as well as the increased likelihood of

non-consumption among the few who had tried alcohol among adolescents from Muslim countries. Several studies have found that Muslim adolescents are less likely to consume alcohol, compared to non-religious peers or peers from other religions (Amundsen 2012; Amundsen, Rossow, and Skurtveit 2005; Abu-Ras, Ahmed, and Arfken 2010; Arfken, Abu-Ras, and Ahmed 2009; Ghandour, Karam, and Maalouf 2009).

Having tried any illicit drugs were more likely among EU/EEA adolescents, probably due to having tried cannabis, as this is the most widespread illicit drug among adolescent in Norway (NOVA 2014; SIRUS 2013). Still, the use of cannabis among adolescents is less common in Norway compared to most other countries in Europe (Hibell et al. 2012) and in the US (UNODC 2011). Also, other life-time uses of any other illicit drugs have been found to be more common in most other European countries, compared to Norway (Hibell et al. 2012). Based on these considerations it is not surprising that there was a higher likelihood of having tried any illicit drug among adolescents in the EU/EEA group.

In Norway, there has been a substantial reduction in the proportion of smokers among adults and adolescents during the past two decades (NOVA 2014). However, at the same time, the proportion of snus user has increased (NOVA 2014). In line with this, the international study, Health Behaviour in School-aged Children, found a much smaller proportion of cigarette smoking among Norwegian adolescents compared to smoking among adolescents in the most other participating countries (WHO 2012). During the same time-period a marked decrease in the reported alcohol consumption and cannabis use among Norwegian adolescents has been observed since 2000 (NOVA 2014). Regarding snus use, we are not aware of any studies which have specifically investigated potential differences between different ethnic groups. As snus use is an unhealthy behaviour that is uncommon in most other countries, and even illegal to market and sell in many countries, this may account for the less frequent use among minority adolescents. Alcohol, smoking and illegal drug use are common worldwide, while the relative local phenomenon of snus use may for the time being decrease the likelihood of snus use among adolescents from outside the Nordic countries.

Overall, the pattern of unhealthy behaviours may be seen as a reflection of their ethnic background, with snus less common and illegal drug use more common. The mechanisms that contribute to these differences in unhealthy behaviours are probably multifactorial, and only some pathways were assessed in the present study. However, it does not seem to be accounted for purely by differences in SES. In our study, adjustments for gender, age, paternal education, maternal education, marital status and perceived family affluence did not alter association between ethnic groups and the measured unhealthy behaviours. The lack of substantial confounding due to key socio-demographic variables is similar to the abovementioned Norwegian study using data from adolescents residing in Oslo (Abebe et al. 2014), as well as a Swedish study (Svensson and Hagquist 2010). Although it is likely that some factors related to family situation and SES can explain some of the differences across the ethnic groups, none of the included factors in the present study affected the crude estimates substantially. The sub-analyses where we investigated unhealthy behaviours among adolescents from Muslim countries compared to ethnic Norwegian adolescents did, however, indicate that cultural background is an important factor in the relationship between ethnicity and unhealthy behaviour. Immigrants tend to assimilate aspects related to health behaviour of the host culture as time goes by, and there is also evidence that immigrants' health behaviour affects the host culture (Amundsen, Rossow,

and Skurtveit 2005). It is therefore difficult to predict how trends in health-behaviours are affected by immigration, and how existing trends in the host culture affect different immigration groups. In summary, the present study indicates that unhealthy behaviour among minority groups must be understood in relation to their ethnic background, as well as the potential influence from the host nation.

4.2. Public health relevance

The present study found consistent differences on key health-related behaviours across different ethnic groups. As the unhealthy behaviours measured in the study are associated with an increased risk of a range of negative outcomes, such as health problems, mental health problems, as well as social and school-related problems (Chang et al. 2011; Hale and Viner 2012; Harrington 2000; Johns 2001; Saban and Flisher 2010; Skogen et al. 2014; Viner 2005; Viner and Taylor 2007) the findings are directly relevant in presenting more detailed and accurate information about the risk of these behaviours in different ethnic groups. Socio-cultural differences in unhealthy behaviours could potentially affect the effectiveness of policy and prevention strategies and this should inform intervention strategies and suggest where to target preventive measures. Based on our and previous findings, preventive strategies on smoking and illicit drugs should especially target immigrants from EU/EEA countries, while targeting immigrants from non-EU/EEA for alcohol prevention seem less relevant (Abebe et al. 2014; Svensson and Hagquist 2010). For snus use, preventative strategies seem particularly relevant for Norwegian youths who are the most frequent users. However, by targeting all youths, such strategies could also hinder immigrant youth from adopting an additional addictive and potentially unhealthy habit. The findings from our study also support the notion that relevant information about health-related risks associated with use of alcohol and tobacco should be available in translated and adapted versions in settings frequented by migrant adolescents and their parents. Moreover, it has been suggested that the process of acculturation and differences in family and cultural background can influence the nature and expression of substance use when trying to adapt norms from the host culture (Marsiglia et al. 2012). These aspects are also important to heed when considering the development of interventions, as the patterning of risk and protective factors probably differ between different immigrant groups.

4.3. Strengths and limitations

The present study has several strengths. First, the youth@hordaland-survey is a recent population-based survey, and data collection was carried out in the beginning of 2012. This ensures a relevant assessment of unhealthy behaviours, as previous studies have shown relatively rapid changes in health-related behaviour among adolescents (NOVA 2014; SIRUS 2013). Second, the size of the population was sufficiently large to investigate a range of unhealthy behaviour as well adjusting for potentially important socio-demographic information. Third, there is reason to believe that the population base of youth@hordaland-survey is representative for adolescents living in Hordaland county. It should, however, be noted that previous findings related to non-participation in population-based

studies have found a higher level of non-participation among individuals with poorer general health, as well as alcohol- and or drug-problems.

Several limitations should also be considered when interpreting the results from this paper. First, all of the information used, except for age and gender, is based on self-report, and misclassification bias and common methods bias cannot be ruled out. A usual concern relating to self-report of alcohol is the issue of underreporting. Previous studies have discussed this issue, and concluded that this is not necessarily true for adolescent populations (Svensson and Hagquist 2010). Rather, a study from the US found that ‘adolescents can be relied upon to respond reasonably consistently to questions in a written survey’ (Stueve and O’Donnell 2000, 1029), when investigating self-reports of substance use and sexual intercourse. In addition, our study was anonymous, and based on these considerations, we believe there is little reason to believe that the reported associations suffer from substantial bias due to self-reporting, and that any bias is more likely to have reduced the associations of interest instead of creating spurious ones. Notwithstanding, differences in the phrasing of the questions related to health-related behaviours may have yielded differences in the associations of interest. Second, despite the large population base, there were too few immigrants for a more detailed analysis of smaller clusters of countries of origin. Third, we had no information about religion, and how this may affect the participants’ lifestyle. Fourth, being an immigrant (as defined by the participant’s and parent’s place of birth) was used as a proxy for ethnicity. The relationship between religion, ethnicity and health-related behaviours is complex, and previous studies have indicated that there is merit in including such information, and to include both information about religious affiliation and personal religiosity (Marsiglia et al. 2005). Fifth, the grouping of several countries into EU/EEA and non-EU/EEA does not allow for any investigation of variation between countries within each group. Although it would have been interesting to investigate the included health-related behaviours specifically for different countries of origin, the relatively small number of immigrants in the sample precludes this. Sixth, a more direct assessment of perceived ethnicity and cultural belonging would have been preferable. Seventh, a higher overall participation rate would have been preferable, and future studies involving adolescents should make further efforts, ideally informed by state-of-the-science methods, to increase the participation rate. Eighth, the very large difference in the sample size between ethnic Norwegians and the minority groups may have put limitations on the comparability across the different groups.

Finally – and related to the previous limitation – it has been suggested that ethnic minorities may be less likely to participate in health research than non-minority individuals, and as such, differential participation rate across ethnic groups is a possibility that should be kept in mind when interpreting the findings.

5. Conclusions

The present study identified important differences in unhealthy behaviour across different ethnic groups in Norway. Specifically, ethnic Norwegians reported more use of alcohol compared to EU/EEA adolescents, and non-EU/EEA adolescents were the least likely to report ever having tried alcohol. Conversely, EU/EEA adolescents were more likely to

be daily smoker and having tried any illicit drug compared to ethnic Norwegians, while non-EU/EEA adolescents were the least likely to have tried to smoke. Snus use was the most prevalent among ethnic Norwegians. The differences in the prevalence of unhealthy behaviours among ethnic minorities are still relevant in a public health perspective, and potential mechanisms should be investigated further.

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Disclosure statement

No potential conflict of interest was reported by the authors.

References

- Abebe, D. S. 2010. *Public Health Challenges of Immigrants in Norway: A Research Review in NAKMI report*, edited by K. H. Hjelde. Oslo: Norwegian Center for Minority Health Research.
- Abebe, D. S., G. S. Hafstad, G. S. Brunborg, B. N. Kumar, and L. Lien. 2014. "Binge Drinking, Cannabis and Tobacco Use among Ethnic Norwegian and Ethnic Minority Adolescents in Oslo, Norway." *Journal of Immigrant and Minority Health* 17 (4): 992–1001.
- Abu-Ras, W., S. Ahmed, and C. L. Arfken. 2010. "Alcohol use among U.S. Muslim College Students: Risk and Protective Factors." *Journal of Ethnicity in Substance Abuse* 9 (3): 206–220.
- Amundsen, E. 2012. "Low Level of Alcohol Drinking among Two Generations of Non-Western Immigrants in Oslo: A Multi-Ethnic Comparison." *BMC Public Health* 12: 535. doi:10.1186/1471-2458-12-535.
- Amundsen, E. J., I. Rossow, and S. Skurtveit. 2005. "Drinking Pattern among Adolescents with Immigrant and Norwegian Backgrounds: A Two-Way Influence?" *Addiction* 100 (10): 1453–1463.
- Andreassen, K. K., M. T. Dzamarija, and T. I. Slaastad. 2015. "Large Diversity in Little Norway." *Immigrants and Norwegian-Born to Immigrants Parents – Population Statistics 2014*. <https://www.ssb.no/en/befolkning/artikler-og-publikasjoner/large-diversity-in-little-norway>.
- Arfken, C. L., W. Abu-Ras, and S. Ahmed. 2009. "Alcohol Use by Muslim College Students in the United States: A Review, 1–10. Clinton Township, MI: Policy Brief. Institute for Social Policy and Understanding.
- Aura, A., M. Sormunen, and K. Tossavainen. 2016. "The Relation of Socio-Ecological Factors to Adolescents' Health-Related Behaviour: A Literature Review." *Health Education* 116 (2): 177–201.
- Bock, E. W., J. K. Cochran, and L. Beeghley. 1987. "Moral Messages: The Relative Influence of Denomination on the Religiosity-Alcohol Relationship." *The Sociological Quarterly* 28 (1): 89–103.
- Boyd, S. J., W. R. Corbin, and K. Fromme. 2014. "Parental and Peer Influences on Alcohol Use during the Transition Out of College." *Psychology of Addictive Behaviors* 28 (4): 960–968.
- Chang, C.-K., R. D. Hayes, G. Perera, M. T. M. Broadbent, A. C. Fernandes, W. E. Lee, M. Hotopf, and R. Stewart. 2011. "Life Expectancy at Birth for People with Serious Mental Illness and Other Major Disorders from a Secondary Mental Health Care Case Register in London." *PLoS ONE* 6 (5): e19590.

- Danielsson, A. K., P. Wennberg, B. Hibell, and A. Romelsjö. 2012. "Alcohol Use, Heavy Episodic Drinking and Subsequent Problems among Adolescents in 23 European Countries: Does the Prevention Paradox Apply?" *Addiction* 107 (1): 71–80.
- Ghandour, L. A., E. G. Karam, and W. E. Maalouf. 2009. "Lifetime Alcohol Use, Abuse and Dependence among University Students in Lebanon: Exploring the Role of Religiosity in Different Religious Faiths." *Addiction* 104 (6): 940–948.
- Hale, D. R., and R. M. Viner. 2012. "Policy Responses to Multiple Risk Behaviours in Adolescents." *Journal of Public Health* 34 (Suppl. 1): i11–i19.
- Harrington, V. 2000. *Underage Drinking: Findings from 1998–99 Youth Lifestyles Survey, Research Findings No. 125*. London: Home Office Research, Development and Statistics Directorate.
- Heath, D. B. 1995. "An Introduction to Alcohol and Culture in International Perspective." In *International Handbook on Alcohol and Culture*, edited by D. B. Heath, 1–6. Westport, CT: Greenwood Press.
- Hibell, B., U. Guttormsson, S. Ahlström, O. Balakireva, T. Bjarnason, A. Kokkevi, and L. Kraus. 2012. *The 2011 ESPAD Report: Substance Use among Students in 36 European Countries*. Stockholm: The Swedish Council for Information on Alcohol and Other Drugs (CAN).
- Hysing, M., A. G. Harvey, S. J. Linton, K. G. Askeland, and B. Sivertsen. 2016. "Sleep and Academic Performance in Later Adolescence: Results from a Large Population-Based Study." *Journal of Sleep Research* 25: 318–324.
- Ihlebak, C., and E. J. Amundsen. 2007. *Majoritet og minoritet: Alkoholbruk blant ungdom utenfor storbyen*. Oslo: Unifob Helse/SIRUS.
- Institute of Medicine (US) and National Research Council (US) Committee on the Science of Adolescence. 2011. "The Psychology of Adolescence." In *The Science of Adolescent Risk-Taking: Workshop*. Washington, DC: The National Academies Press.
- Johns, A. 2001. "Psychiatric Effects of Cannabis." *The British Journal of Psychiatry* 178 (2): 116–122.
- Knudsen, A. K., and J. C. Skogen. 2015. "Monthly Variations in Self-Report of Time-Specified and Typical Alcohol use: The Nord-Trøndelag Health Study (HUNT3)." *BMC Public Health* 15: 172. doi:10.1186/s12889-015-1533-8.
- Lemstra, M., N. R. Bennett, C. Neudorf, A. Kunst, U. Nannapaneni, L. M. Warren, T. Kershaw, and C. R. Scott. 2008. "A Meta-Analysis of Marijuana and Alcohol Use by Socio-Economic Status in Adolescents Aged 10–15 Years." *Canadian Journal of Public Health* 9 (3): 172–177.
- Marsiglia, F. F., S. Ayers, B. Gance-Cleveland, K. Mettler, and J. Booth. 2012. "Beyond Primary Prevention of Alcohol Use: A Culturally Specific Secondary Prevention Program for Mexican Heritage Adolescents." *Prevention Science* 13 (3): 241–251.
- Marsiglia, F. F., S. Kulis, T. Nieri, and M. Parsai. 2005. "God Forbid! Substance Use among Religious and Nonreligious Youth." *American Journal of Orthopsychiatry* 75 (4): 585–598.
- NOVA. 2014. "Ungdata. Nasjonale resultater 2013." In *Rapport 10/14*, edited by NOVA, 1–108. Oslo: NOVA.
- Øverland, S., J. C. Skogen, L. Lissner, O. Bjerkeset, T. Tjora, and R. Stewart. 2013. "Snus Use and Cardiovascular Risk Factors in the General Population: The HUNT3 Study." *Addiction* 108 (11): 2019–2028.
- Richter, M., E. Kuntsche, M. de Looze, and T.-K. Pförtner. 2013. "Trends in Socioeconomic Inequalities in Adolescent Alcohol Use in Germany Between 1994 and 2006." *International Journal of Public Health* 58 (5): 777–784.
- Rodham, K., K. Hawton, E. Evans, and R. Weatherall. 2005. "Ethnic and Gender Differences in Drinking, Smoking and Drug Taking among Adolescents in England: A Self-Report School-Based Survey of 15 and 16 Year Olds." *Journal of Adolescence* 28 (1): 63–73.
- Saban, A., and A. J. Flisher. 2010. "The Association Between Psychopathology and Substance Use in Young People: A Review of the Literature." *Journal of Psychoactive Drugs* 42 (1): 37–47.
- Salvy, S.-J., E. R. Pedersen, J. N. V. Miles, J. S. Tucker, E. J. D'Amico. 2014. "Proximal and Distal Social Influence on Alcohol Consumption and Marijuana Use among Middle School Adolescents." *Drug and Alcohol Dependence* 144: 93–101.

- Scalici, F., and P. J. Schulz. 2014. "Influence of Perceived Parent and Peer Endorsement on Adolescent Smoking Intentions: Parents Have More Say, But their Influence Wanes as Kids Get Older." *PLoS ONE* 9 (7): e101275.
- Simons-Morton, B., and T. Farhat. 2010. "Recent Findings on Peer Group Influences on Adolescent Smoking." *The Journal of Primary Prevention* 31 (4): 191–208.
- SIRUS. 2013. *Bruk av tobakk, rusmidler og vanedannende legemidler i Norge: Hovedfunn fra SIRUS' befolkningsundersøkelse 2012, in SIRUS Rapport 6/2013*. Oslo: Statens Institutt for Rusmiddelforskning.
- Skogen, J. C., B. Sivertsen, A. J. Lundervold, K. M. Stormark, R. Jakobsen, and M. Hysing. 2014. "Alcohol and Drug Use among Adolescents: And the Co-Occurrence of Mental Health Problems. Ung@hordaland, a Population-Based Study." *BMJ Open* 4 (9). doi:10.1136/bmjopen-2014-005357.
- Statistics Norway. 2013. "Videregående opplæring og annen videregående utdanning, 2012 [College Education in 2012]." <https://www.ssb.no/utdanning/statistikker/vgu/aar/2013-05-07>.
- Statistics Norway. 2015. "Immigrants and Norwegian-Born to Immigrant Parents, 1 January 2015." *Population 2015*. <http://www.ssb.no/en/befolkning/statistikker/innvbef>.
- Stueve, A., and L. O'Donnell. 2000. "Inconsistencies Over Time in Young Adolescents' Self-Reports of Substance Use and Sexual Intercourse." *Substance Use and Misuse* 35 (6–8): 1015–1034.
- Svensson, M., and C. Hagquist. 2010. "Adolescent Alcohol and Illicit Drug use among First- and Second-Generation Immigrants in Sweden." *Scandinavian Journal of Public Health* 38 (2): 184–191.
- UNODC (United Nations Office on Drugs and Crime). 2011. *World Drug Report 2011, in Sales No. E.11.XI.10*. New York: United Nations.
- Viner, R. 2005. "Co-Occurrence of Adolescent Health Risk Behaviors and Outcomes in Adult Life: Findings from a National Birth Cohort." *Journal of Adolescent Health* 36 (2): 98–99.
- Viner, R. M., and B. Taylor. 2007. "Adult Outcomes of Binge Drinking in Adolescence: Findings from a UK National Birth Cohort." *Journal of Epidemiology and Community Health* 61 (10): 902–907.
- WHO (World Health Organization). 2012. "Social Determinants of Health and Well-Being among Young People: Health Behaviour in School-Aged Children (HBSC) Study: International Report from the 2009/2010 Survey." In *Health Policy for Children and Adolescents; No. 6*, edited by C. Currie, C. Zanotti, A. Morgan, D. Currie, M. de Looze, C. Roberts, O. Samdal, Otto R.F. Smith, and V. Barnekow. Geneva: WHO.