

The Prevalence and Risk of Food Insecurity in the Nordic Region: Preliminary Results

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Abstract Surveys from societies like the USA, Canada, the UK, and France suggest that 5–15% of the population have experienced “food insecurity” in the sense of not having enough food to eat due to a lack of money or other resources. The Nordic countries are among the most affluent societies in the world and it is generally assumed that food insecurity has been eradicated due to relatively low differences in wages and well-developed social security schemes. This representative web survey of food and eating in Denmark, Finland, Norway, and Sweden indicates however that food insecurity does exist in the Nordic region. In line with research from other industrialized countries, it also suggests that women, young people, single parents, and low-income group seem more at risk of experiencing food insecurity than others. These results must be regarded as preliminary, needing to be substantiated by more comprehensive studies. Moreover, there is a need to develop or use more standardized methodologies enabling comparison across countries and mapping trends over time.

Keywords Food insecurity · Food security · Prevalence · Risk groups · The Nordic countries

National surveys indicate that 5–15% of the population in industrialized countries are at risk of experiencing food insecurity (Bocquier et al. 2015; Coleman-Jensen et al. 2015; Holmes 2007; Martin-Fernandez et al. 2013; Tarasuk et al. 2012) in terms of not always having access to enough food for an active, healthy life (Anderson 1990; Hamelin et al. 2002). The social groups most at risk are low-income groups, single parents, and ethnic minorities (Bocquier et al. 2015; Coleman-Jensen et al. 2015; Holmes 2007; Martin-Fernandez et al. 2013; Tarasuk et al. 2012). In addition, adults are generally more at risk than children, not only indicating that

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children are protected from food insecurity, but also suggesting that the risk of food insecurity may vary between household members (Knol et al. 2004; Tarasuk et al. 2012). Although food insecurity is closely associated with low income and poverty, there is no linear relationship between them (Rose 1999). Whereas income based measures are aggregated for a whole year, food insecurity captures periodic food shortages that may reflect transient income shortfalls and/or unexpected expenses. High-income groups may be food insecure if they prioritize other expenses than food, such as a high mortgage or even luxury items such as expensive cars. Poor people may compensate their limited financial resources with high food literacy like knowledge about how to acquire and prepare cheap, nutritious dishes.

So far, research addressing food insecurity in the Western parts of the world have focussed mostly on countries such as the USA, Canada, Britain, France, and Australia (e.g., Bocquier et al. 2015; Coleman-Jensen et al. 2015; Kirkpatrick and Tarasuk 2008; Radimer and Radimer 2002; Richards et al. 2016; Tarasuk et al. 2012; Temple 2006). As little is known about food insecurity in the Nordic countries, this paper addresses the prevalence and risk groups of food insecurity in Norway, Denmark, Sweden, and Finland. Studying prevalence and risk groups of food insecurity at national level is important to understand food insecurity as a social problem, how it relates to the social-political context, and the efficiency of alleviating measures. Knowledge about prevalence and risk groups is also important considering potential effects of ongoing changes taking place in labour markets and social security programmes today (Richards et al. 2016).

The study is part of a Nordic web survey on eating habits and is based on Question HH1 of the American Household Food Security Survey Module (HFSSM), which includes for statements indicating an inadequate amount of food intake due to a lack of money or resources in the last 12 months (For a description of Question HH1, see methodological section, “Food insecurity”). The paper starts with a review of relevant studies on food insecurity in Western countries, emphasizing studies using representative population samples. After a description of methodology, the results from our survey are presented, comparing the four Nordic countries and searching for socio-economic and demographic variations within each of the national samples. A concluding section discusses these findings in the light of its limited scope and findings from other studies. While figures on prevalence are uncertain, social and demographic variations are quite consistent and in line with previous research on food insecurity. Yet, the findings need to be confirmed by further and more comprehensive studies.

Food Insecurity and Risk Groups in Western Parts of the World

Food security refers to “a condition where all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary preferences for an active and healthy life” (FAO 1996). There are several important elements in this definition; the need to focus on the household level, the importance of quantitative as well as qualitative aspects of food security, as well as nutritional needs being acute—even temporary limitations are significant. Caloric deficiency is not the primary outcome of food insecurity in Western countries, but rather dietary imbalances resulting in malnutrition and disorders such as obesity, coronary heart disease, and hypertension. Assessments of food security need to cover this variety of aspects of a satisfactory diet as well distinguishing between different degrees of severity.

There is a growing body of research on food insecurity in rich, Western countries. Many of these studies address food insecurity or the nutritional quality of the diet among targeted sections of society (e.g., Melchior et al. 2009; Niclasen et al. 2013; Tingay et al. 2003). Others focus on soup kitchen and other measures to alleviate the problems (Silvasti 2014). The paper however the overall proportions at a national level. Most surveys assessing the prevalence and risk groups of food insecurity at national level are based on the American survey question battery HFSSM, which includes 18 questions indicating if and to what degree people have experienced food insecurity in the last 12 months. Ten of the questions address food insecurity amongst adults, the rest deal with food insecurity amongst children (see text box).

HFSSM's questions used to assess food insecurity (Coleman-Jensen et al. 2015, 3).

1. "We worried whether our food would run out before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months?
 2. "The food that we bought just didn't last and we didn't have money to get more." Was that often, sometimes, or never true for you in the last 12 months?
 3. "We couldn't afford to eat balanced meals." Was that often, sometimes, or never true for you in the last 12 months?
 4. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Yes/No)
 5. (If yes to question 4) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
 6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (Yes/No)
 7. In the last 12 months, were you ever hungry, but didn't eat, because there wasn't enough money for food? (Yes/No)
 8. In the last 12 months, did you lose weight because there wasn't enough money for food? (Yes/No)
 9. In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (Yes/No)
 10. (If yes to question 9) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
- (Questions 11–18 were asked only if the household included children age 0–17)*
11. "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months?
 12. "We couldn't feed our children a balanced meal, because we couldn't afford that." Was that often, sometimes, or never true for you in the last 12 months?
 13. "The children were not eating enough because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 months?
 14. In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food? (Yes/No)
 15. In the last 12 months, were the children ever hungry but you just couldn't afford more food? (Yes/No)
 16. In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (Yes/No)
 17. (If yes to question 16) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
 18. In the last 12 months did any of the children ever not eat for a whole day because there wasn't enough money for food? (Yes/No)
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The HFSSM originates from a set of food insecurity indicators developed by Radimer et al. (1990) (see also Frongillo 2013; Hamelin et al. 2002) and was first implemented by the US Department of Agriculture (USDA) in 1995 (USDA 2012). Since then, the food security

questions have for the most part remained unchanged, except for the addition of Question HHI and some other minor revisions.

Table 1 gives an overview of selected recent surveys on the prevalence of food insecurity in Western countries. Although all studies refer to the HFSSM, findings are hard to compare because the number of questions, the categorisation and thresholds of food insecurity vary (Tarasuk et al. 2012), and because the interpretation of the questions may vary by language and culture (nation).

The USA has the longest tradition of addressing such questions and also has the most systematic attempts of developing reliable methodologies. Coleman-Jensen et al. (2015) based their survey on HFSSM's 18 questions and found that in the US population, 14% had experienced food insecurity in the previous year. Households were classified as "food insecure" when reporting three or more food insecure conditions. Those reporting multiple indications of reduced food intake and disrupted eating patterns due to inadequate resources for food were classified as having "very low food security." In most, but not all households with very low food security, the respondent reported that he or she had been hungry at some time during the year but did not eat because there was not enough money for food. Very low food security was more prevalent among households with children headed by a single parent, persons living alone, black and Hispanic households, and households with incomes below the poverty line. Food insecurity was more prevalent in principal cities or metropolitan areas.

In Canada, Tarasuk et al. (2012) found that 12.6% among Canadian households had experienced some level of food insecurity. The researchers used the same questions as Coleman-Jensen et al. (2015), but changed the terminology and classifications. Whereas 6% were classified as "moderately food insecure" in the sense of compromising in the quality and possibly quantity of food consumed, 2.6% were categorized as "severely food insecure," with clear indications of food deprivation among household members. The level of food insecurity had increased since 2005 and was highest in the North and the Maritimes and lowest in Alberta and Ontario. Most at risk were households with children under the age of 18. Although households whose major source of income was social assistance tended to be more food insecure than others, the majority of food insecure households was reliant on income from employment. Also, female single parents having an income below the Canadian Low Income Measure, being black, being Aboriginal, and people renting (instead of owning) a home, tended to have a higher risk of being food insecure. Urban areas had slightly more food insecure people than rural areas, but the prevalence differed significantly between cities.

A survey conducted in 2003–2005 aimed at identifying the conditions among the 15% of the British population being materially deprived (Holmes 2007). The survey included the HFSSM battery except questions addressing food insecurity among children. The researchers found that in this materially deprived population, 29% had experienced food insecurity at some time during the previous year, meaning that their access to adequate food was limited by factors such as lack of money or other resources. Fourteen percent was classified as living in moderately/severely food insecure households, meaning that one or more household members were food insecure to the extent of hunger at some time during the year due to limited access to food. The prevalence of food insecurity was lowest among adults in retired households and highest among adults of working age living alone and single households with children.

In 2006–2007, Bocquier et al. (2015) conducted a survey in France using Question HHI from the HFSSM. Those reporting access to enough but not always the food they wanted to eat and those reporting that they sometimes or often did not have enough food to eat because of lack of money were classified as households experiencing food insecurity for financial reasons.

Table 1 Surveys on prevalence and risk groups of different levels of food insecurity (FI) and food security (FS) in Western countries

	USA	Canada	The UK	France	France
Reference	Coleman-Jensen et al. (2015)	Tarasuk et al. (2012)	Holmes (2007)	Bocquier et al. (2015)	Martin-Fernandez et al. (2013)
Year	2014	2012	2003–2005	2006–2007	2010
Scale of measurement	HFSM	HFSM	HFSM	HFSM/HHI	HFSM
No of questions	18	18	15	1	13
Sample	43,253	60,000	Including the 15% experiencing material deprivation among 2477 households	2624	3000 in the Paris metropolitan area
Prevalence	-14% FI -5.6% very low FS	-13% experienced FI -6% moderate FI -2.6% severe FI	-29% (of the 15 %) had experienced FI -14% moderately/severely FI	12.2% experienced food insecurity	6.3% experienced FI 3.9% low FS 2.4% very low FS
Risk groups	Low income, single women, adults living alone, ethnic minorities, and households located in principal cities of metropolitan areas.	Children, social assistance as a major source of income, female lone parents, low income, ethnic minority, living in rented home, living in cities, living in the North and the Maritimes	Single person households, single parents with children—among those with material deprivation	Young, women, single parents with children, low income, low material standard, unhealthy diet and lifestyle	Poor, low-income, and children.

The survey concluded that 12.2% had experienced “food insecurity.” They were on average younger, more frequently women and single parents. The mean income of individuals experiencing “food insecurity” was higher than it was for individuals experiencing “very low food security,” but they reported poorer material and housing conditions. Individuals experiencing food insecurity also tended to eat less vegetables and fruits and reported lower dietary quality and costs.

Another French survey conducted in 2010 focussed on the Paris metropolitan area (Martin-Fernandez et al. 2013). Three out of the eight questions in the HFSSM battery addressing food insecurity among children were included. The study that 6.3% of the households had experienced “food insecurity,” 3.9% had experienced “low food security” (food insecurity with poorer diet but without hunger) and 2.4% had experienced “very low food security” (food insecurity with poorer diet and hunger). In the poorest households, the presence of a child under 3 years of age was associated with an increased risk of food insecurity. Among higher-income households, the household composition appeared to be strongly associated with food insecurity.

In addition to the surveys based on the HFSSM that are reported in Table 1, one Finnish study conducted by Sarlio-Lätheenkorva and Lahelma (2001) is worth mentioning, as it represents, to our knowledge, the only survey so far assessing food insecurity in a Nordic country. The survey is based on five questions from the Edmonton Food Policy Council. Four of them correspond largely with questions in the HFSSM.¹ Those responding positively on three questions were seen as “food insecure,” whereas the rest were classified as “food secure.” The study indicated that 2.7% was food insecure. Low-income households, recent unemployment, and economic problem in childhood were all predictors of food insecurity. A curvilinear association was found between food insecurity and body mass index in the sense that both very thin and obese people were more at risk of being food insecure than others.

Sarlio-Lätheenkorva and Lahelma’s survey was conducted in 1994. The findings of this research most like are outdated and they can in any case not be generalized to the whole Nordic region. Updated observations assessing the prevalence and risk groups of food insecurity in the Nordic region are needed. This small survey, covering four of five Nordic countries (Iceland is lacking), represents in this respect a highly opportune mapping of food insecurity in the Northern parts of Europe.

Methodology

The data used for the analysis were collected through a web-based survey conducted in April 2012 as part of the (Food in Nordic everyday life. A comparative survey of change and stability in eating patterns) research project in Denmark, Finland, Norway, and Sweden (Holm et al. 2015). The questionnaire included questions on eating on the day before as well as questions addressing habits and attitudes towards various food issues. A commercial survey company recruited the respondents from its

¹ The five questions are (1) “Have you had fears of running out of food before you have money to buy more?,” (2) “Have you run out of money to buy food?,” (3) “Have you had too little food due to economic problems?,” (4) “Have you bought cheaper food than you normally buy?,” and (5) “Have you been out of food for at least one day due to economic problems?”

consumer panels consisting of around 150 000 members in Denmark, 35 000 in Finland, 50 000 in Norway, and 90 000 in Sweden. Panel members between the ages of 15 and 80 years were invited by e-mail to take part in the survey. In the invitation, the survey was introduced as a large Nordic survey conducted by universities and research institutes. The topic was not revealed in the invitation, but it was stated that completing the survey would take approximately 20–25 min. As an incentive, the participants were included in a raffle of gift cards.

In order to get nationally representative data from each country, we used stratified random sampling with quotas for gender, age, and region. The use of quotas produced a sample that was reasonably well representative of the populations in the four Nordic countries in terms of gender, age, and region.

In total, 8248 respondents answered the questionnaire. The response rate varied from 9% in Denmark to 13% in Sweden. Web surveys typically have lower response rates than, e.g., postal surveys (Shih and Fan 2008), and in our case, the low response rates are at least partly a result of the length of the survey and the quotas for gender, age group, and region. As we will come back to in the concluding section of this paper, low response rates are one among several factors demanding caution in the interpretation of the results.

Food Insecurity

The analysis of food insecurity is based on Question HH1 in the HFSSM battery. Question HH1 has been used in other surveys (e.g., Bocquier et al. 2015) and is proven to make accurate estimates of food insecurity (Radimer and Radimer 2002).

“The next couple of questions² regard how your household’s economic situation influences the food you have bought/your food shopping.

Which of these statements best describes the food eaten in your household in the last 12 months:

[1] Enough of the kinds of food I/we want to eat

[2] Enough but not always the kinds of food I/we want

[3] Sometimes not enough to eat

[4] Often not enough to eat

[] DK or Refused”

Individuals who reported that “*We/I always have enough food to eat*” were classified as “being food secure.” The rest were classified as “people at risk of experiencing food insecurity.”

Background Variables

The analysis concentrates on background variables that to varying degrees are proven to affect the risk of being food insecure in Western countries: age, types of households, and household income. To control for gender effects, the model also includes gender. Table 2 shows how these variables vary by country.

² We also asked a second question: “*We/I have been forced to buy cheaper food to pay for other things,*” with the response categories “often true,” “sometimes true,” “never true,” and “don’t know.” The question’s response corresponded with HHI’s response, but since the question’s estimates have not been tested in previous research, it was excluded from the analysis.

Table 2 Background variables by country. Bivariate cross table analyses. $N=2079, 2060, 2065, 2044$. Per cent

	Norway	Denmark	Sweden	Finland
Gender				
Male	49.1	49.9	50.3	49.6
Female	50.9	50.1	49.7	50.4
Age				
15–34 years	31.8	30.4	33.6	30.7
35–49 years	29.1	28.1	24.9	25.2
50–80 years	39.2	41.5	41.5	44.1
Type of household				
With parents	12.3	13.1	10.2	7.3
Alone	19.5	21.4	21.3	23.1
Alone with children	5.2	2.8	4.3	3.3
With partner	34.7	37.4	39.3	42.1
With partner and children	24.8	22.9	23.6	21.8
Other	3.5	2.3	1.4	2.4
Household income ^a				
Low	19.4	20.9	21.5	27.9
Low/middle	18.6	11.8	13.5	12.7
Middle	16.7	19.0	14.5	11.1
Middle/high	16.0	15.4	21.7	20.8
High	10.6	11.8	13.8	8.5
No answer	18.7	21.1	14.9	18.9

^aDenmark (DKK) and Sweden (SEK): Low: 0–299.999, low/middle: 300–399.999, middle: 400–599.999, middle/high: 600–799.999, and high: 800.000 and above. Norway (NOK): Low: 0–399.999, low/middle: 400–599.999, middle: 600–799.999, middle/high: 800–999.999, and high: 1 million and above. Finland (EURO): Low: 0–29.999, low/middle: 30–39.999, middle: 40–49.999, middle/high: 500–79.999, and high: 80.000 and above

Statistical Analyses

The analyses are carried out by means of SPSS Statistics, a software package used for statistical analysis. The analyses include three bivariate crosstabs and a linear regression. One bivariate crosstab (Table 2) shows how the overall sample varies by background variables: gender, age, type of household, and household income. The second (Fig. 1) measures the percentage of food secure people and people who have experienced food insecurity of different degrees across the four countries. The third (Table 3) shows how the risk of experiencing food insecurity varies by gender, age, type of household, and household income. The effects of these variables are controlled by means of linear regression analyses, presented in Table 4.

Results

Figure 1 shows that most people in the Nordic countries are food secure in terms of always having enough food to eat of the kinds they want. While the proportions are very similar in

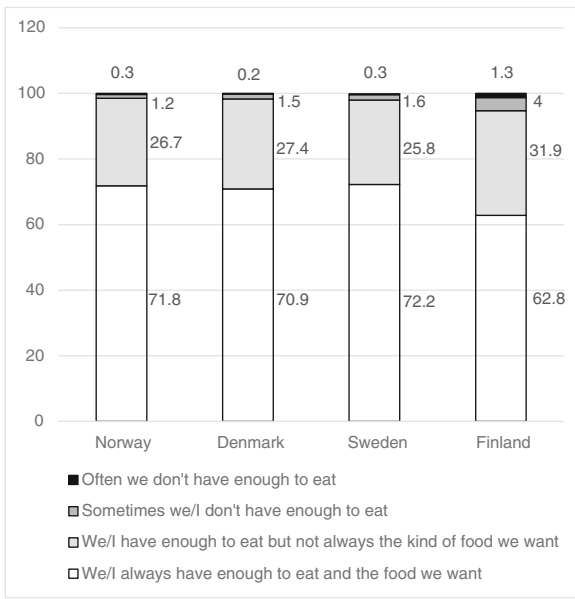


Fig. 1 Prevalence of people at risk of experiencing food insecurity in Norway, Denmark, Sweden, and Finland in 2012. $N=8248$. Per cent

Sweden (72.2%), Norway (71.8%), and Denmark (71.8%), the figure is significantly lower in Finland (62.8%).

Whereas 37.2% among Finnish respondents reported having experienced food insecurity, the corresponding rates among Norwegians, Danes, and Swedes were 28.2, 29.1, and 27.8%, respectively. Yet, high risk of food insecurity does not appear to be widespread, but, even here, Finland takes the lead. In Finland, 4% were at high risk of experiencing food insecurity in terms of reporting that they sometimes or often do not have enough food to eat. In Norway, Denmark, and Sweden, the corresponding percentages were considerably lower 1.5, 1.7, and 1.9%, respectively.

Table 3 shows considerable variations in the risk of being food insecure across socioeconomic strata. With the exception of gender, differences are highly significant ($p \leq .000$) in all four countries. However, some national variations can be observed in the social groups that are most at risk.

In all Nordic countries, the risk of having experienced food insecurity is higher among women than for men. Although the effect of gender is in line with a study of food insecurity in France (Bocquier et al. 2015), it is surprising, given that Norway, Denmark, Sweden, and Finland are among the most egalitarian countries in the world, for example, when it comes to the rate of employment (European Commission 2014a).

In all four Nordic countries, the risk of experiencing food insecurity in 2012 is higher among young people. This is also in line with studies from France (Bocquier et al. 2015). Moreover, the risk of experiencing a high degree of food insecurity decreases with age, except from in Norway. This may indicate that young people in Norway are more protected against such experiences than young people in Denmark, Sweden, and Finland.

Table 3 Proportions of Nordic people reporting that they have experienced food insecurity by background variables. Bivariate crosstabs. Per cent

	NO	DK	SE	FI
Gender				
Female	35.7	32.1	25.4	37.4
Male	30.5	23.7	32.3	44.5
N	2079	2060	2065	1044
Sci square	.012	.000	.001	.001
Age				
15–34 years	49.1	38.0	40.8	52.4
35–49 years	34.5	32.5	29.4	43.9
50–80 years	19.0	17.3	18.8	31.3
N	2079	2060	2065	1044
Sci square	.000	.000	.000	.000
Type of household				
With parents	52.7	19.6	30.5	55.3
Alone	40.5	35.6	36.7	56.7
Alone with children	52.3	48.3	52.3	75.0
With partner	20.1	21.4	20.4	28.6
With partner and children	30.8	30.3	30.8	36.2
Other	40.3	60.4	25.0	60.4
N	2079	2060	2065	1044
Sci square	.000	.000	.000	.000
Household economy				
Low	52.9	44.3	49.5	61.8
Low/middle	34.4	29.2	33.0	38.6
Middle	25.1	28.2	22.7	26.9
Middle/high	18.9	18.9	22.5	27.8
High	15.0	10.3	13.0	20.1
N	1689	1635	1756	1657
Sci square	.000	.000	.000	.000

Food insecurity: have enough food but not always the food they want, or that they sometimes and often do not have enough food

Moreover, the risk of experiencing food insecurity is higher among single parents. Even these results are in line with surveys on food insecurity conducted in the UK (Holmes 2007) and France (Bocquier et al. 2015). Yet, in Norway, the risk of experiencing food insecurity is higher amongst people living with their parents. Separate bivariate cross tabulations show that Norwegians, Danes, Swedes, and Fins who live with their parents tend to be young (data not shown). In general, we would expect that parents protected young people staying at home from experiencing food insecurity. Why this seems not to be the case in Norway, is hard to explain based on accessible data (but we must also consider the overall low rates of food insecurity reported in Norway, making observations made in a population wide survey uncertain).

Finally, the risk of being low and high food insecure is highest in low-income group and tends to decrease with household income. This is a very common finding, corresponding with

Table 4 Variations in food insecurity across socioeconomic groups in four Nordic countries. Linear regressions. B values. $N = 2079, 2060, 2065, 2044$

	Norway	Denmark	Sweden	Finland
Gender (male = 0)				
Female	.042*	.077***	.057**	.057**
Age (50–80 years = 0)				
35–49 years	.140***	.137***	.079**	.101***
15–34 years	.233***	.281***	.225***	.116***
Type of household (with partner and children = 0)				
With partner	−.058*	−.077**	−.080**	−.070*
Alone with children	.100*	.071	.111*	.268***
Alone	−.024	−.056	−.094**	.077*
With parents	.097*	−.264***	−.110**	.139**
Other	−.105	.090	−.233**	.178*
Household economy (high = 0)				
Middle/high	−.069*	−.028	.045	−.051
Middle	.014	.085**	.056	−.064
Low/middle	.097**	.096**	.157***	.019
Low	.229***	.198***	.303***	.215***
Constant	.153***	.123***	.121***	.263***
R square	.130	.122	.124	.134

*** $p < 0.00$, ** $p < 0.01$, * $p < 0.05$

research conducted in other Western countries (Coleman-Jensen et al. 2015; Tarasuk et al. 2012; Holmes 2007; Martin-Fernandez et al., 2013; Bocquier et al. 2015). The association is not linear, with the risk increasing first of all in the lowest income section.

Summing up, Table 4 shows that the risk of experiencing food insecurity in the Nordic countries varies significantly by gender, age, types of household, and household economy. This is in line with research from the USA (Coleman-Jensen et al. 2015), Canada (Tarasuk et al. 2012), the UK (Holmes 2007), and France (Martin-Fernandez et al., 2013; Bocquier et al. 2015).

Table 4 presents the results from the linear regression analyses of the country samples, showing that the effects and patterns observed in Table 3 are statistically significant even when controlled for other background variables. While there are almost certainly correlations between the included socio-economic variables, they all significantly contribute to explain the variation in the risk of being food insecure. This is the case in all four countries, even though gender as well as household type seems to be somewhat less important in Norway when controlled for the other background variable. Overall, even though the model includes relatively few explanatory variables, the R square shows that it does explain a relatively high proportion of the overall variation—12–13%.

Discussion

Norway, Denmark, Sweden, and Finland are among the most affluent countries in the world. The Scandinavian welfare state model established after World War II is characterized by high

taxes, universal social welfare programmes, and limited economic inequalities (Esping-Andersen 1990). The idea that some people do not have enough food to eat is not in line with this model (Silvasti 2014). In effect, discussions about food insecurity are rarely put on the public agenda (Richards et al. 2016).

This study indicates that in the Nordic populations 27 to 37% were experiencing some degree of food insecurity in 2012. In other Western countries, corresponding overall rates are much lower—highest in the USA with 14% in 2014 (Coleman-Jensen et al. 2015). Since the definitions and classifications of food insecurity vary between the Nordic and other Western countries, the findings are hard to compare. Notwithstanding, the rates observed in this survey are surprisingly high and need to be further explored in future studies.

Like the study of Bocquier et al. (2015), the analysis of food insecurity in this paper is based on Question HH1 in the HFSSM battery. Interestingly, Bocquier et al.'s study indicates that 12.2% in the French population has experienced food insecurity, which represents less than half the rate observed in the Nordic countries for the same year. Since the French analysis and our Nordic study are based on the same question, the difference cannot be the outcome of different definition and classifications of food insecurity made by the researchers. However, we cannot rule out that the gap reflects that the French and the Nordic population have interpreted Question HH1 differently. Moreover, since the level of poverty and financial inequality in the Nordic countries tends to be the same or lower than in France (e.g., OECD 2014; European Commission 2014b), the gap can hardly be explained by different socio-political systems. It may, however, reflect that food is an important part of French culture (Rozin et al. 1999), and, hence, that the French population is less likely to go easy on their demands for food, even when the household's finances are scarce. If food is culturally more important in France, the French population may be expected to have higher food literacy, with better competence to compensate for a lack of financial resources. Pointing in the opposite direction, Nordic people, being used to high income levels and generous social security systems, may react more strongly to constraints on their household budget, compared to poor sections of the French population who may have long-time experience of low income and fewer expectations. In any case, the findings do give support to claims that the incidence of food insecurity is not a mere reflection of income inequalities and that the sociocultural and practical context needs to be considered as well.

The study finds that between 1 and 4% among the Nordic populations had experienced a high degree of food insecurity. These figures are more in line with observations made elsewhere. Yet, whether these rates are high or low compared to those observed in other Western countries may still be hard to tell due to the varying classifications of food insecurity that are used in other surveys, as well as the possibility of national variations in expectations and understanding of food security. The rates nevertheless do indicate that food insecurity does exist in the Nordic countries today. Importantly, the risk of experiencing food insecurity is higher in Finland than in Norway, Denmark, and Sweden. This relatively higher risk may reflect that the social inequality increased more in Finland than in other European countries since the beginning of the 1990s until the financial crisis reversed this development after 2008 (Silvasti 2014). The finding is also in accordance with Finnish reports on the increasing number of people visiting soup kitchens and food banks (Silvasti 2014). Such observations underline that food insecurity cannot be understood independently from its specific social-political context. This, in turn, suggests that cross-country comparative studies might be valuable to the understanding of the dynamics of household food security (Richards et al. 2016).

In accordance with surveys conducted in other Western countries (Bocquier et al. 2015; Coleman-Jensen et al. 2015; Holmes 2007; Martin-Fernandez et al. 2013; Tarasuk et al. 2012), the findings in this Nordic study indicate that young people, single mothers, and low-income groups are more at risk of experiencing food insecurity. More surprisingly, Nordic women seem more at risk of being food insecure than men. This effect remains statistically significant if we control for the effect of single mothers, indicating that not only single mothers are more at risk of being food insecure, but women in general. Even if the Nordic countries are among the most egalitarian in the world, differences in wage levels still prevail and women also tend to be overrepresented among those depending on only basic social security benefits. This may make them more precarious even when it comes to food security.

Overall, our findings indicate that food insecurity does exist in the Nordic countries, especially in Finland and generally more prevalent among females, young people, single mothers, and low-income groups. That being said, the results must be interpreted with caution. First of all, food insecurity was assessed by using HFSSM's Question HHI. Although Radimer and Radimer (2002) show that the response to this question provides a valid estimation of food insecurity, it does not capture the full range of conditions and behaviour associated with food insecurity assessed by the more comprehensive HFSSM battery. Second, while the web survey design does allow bigger samples (due to lower costs), rates of participation are low. Third, web-based surveys tend to exclude parts of the population that are often poorer, most prominently immigrants without sufficient understanding of the country's language, but even individuals without a permanent address. We may expect a higher incidence of food insecurity among such groups. Hence, if the sample is biased, the rate of food insecurity observed in this study may be under- rather than overestimated, especially when it comes to very low food security.

The findings observed in this study must be regarded as preliminary and must be explored by more encompassing surveys. Most preferably, these surveys should be based on the full instrument of the HFSSM, as this could make the results comparable to results from other parts of Europe, the USA, and Canada. With the exception of the UK and France, little is known about the prevalence and risk groups of food insecurity in Europe. Preferably, Nordic surveys should be conducted in conjunction with comparable surveys in other European countries as well. By comparing cross national results and interpret them considering the national context of which they form part, some of the socio-economic, cultural and political conditions, processes and mechanisms influencing individuals' risk of food insecurity may be revealed. In effect, politicians at national and European levels will be better prepared to prevent and reduce problems of food insecurity.

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