



## Prevalence of food insecurity among food bank users in Germany and its association with population characteristics

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### ABSTRACT

The prevalence of food insecurity (FI) among food bank users in many European countries is unknown. The study aims to examine FI prevalence and associated population characteristics among this particular group of disadvantaged people in Germany. Food insecurity status was assessed among 1033 adult food bank users with a mean age of 53 years (57% female, 43% male) in Germany in 2015 using the food insecurity experience scale (FIES). About half of the participants (55.8%) were single with no children and born in Germany. Over 37% had a self-reported BMI of 30 kg/m<sup>2</sup> or above and 37.4% indicated to smoke.

Over 70% of the food bank users can be described as food insecure. Of those, about 35% were considered mildly food insecure. Almost 30% were categorized as moderately food insecure while over 7% were categorized as severely food insecure. Significant associations with food insecurity were found for gender, age, subjective health status, smoking, duration of food bank use, school education and family type. Among this socially disadvantaged population, food insecurity is highly prevalent and public health efforts should be focusing on this vulnerable population taken into account the identified population and behavioral characteristics associated with food insecurity.

### 1. Introduction

Food insecurity (FI) is described as the “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (Anderson, 1990). The rise of food insecurity is global, also affecting high-income countries such as the UK, Canada, the U.S. or Germany (FAO, 2016).

Research has shown that the path to FI often starts with the anxiety about not having enough food, followed by dietary changes to make limited food supply last longer and ending in decreased food intake (Coates et al. 2006; Radimer et al., 1990; Radimer et al., 1992;).

Thus, individuals suffering from FI do not necessarily differ in their energy intake from food secure individuals but research indicates that their consumption of fruits, vegetables and fish is lower (Bocquier et al., 2015). In general, FI seems to be correlated with poor diet quality which can be partly explained by lower daily diet costs (Bocquier et al., 2015). Food insecure individuals also appear to have a higher risk of poor health (Pruitt et al., 2016) including higher rates of obesity among women (Burns 2004; Dinour et al., 2007; Franklin et al., 2012), diabetes

(Gucciardi et al., 2014), or mental disorders (Ramsey et al., 2012; Siefert et al., 2004; Vozoris and Tarasuk, 2003) than food secure individuals. Overall, FI is more prevalent among low income households (Coleman-Jensen et al., 2015; Martin-Fernandez et al., 2013; Vedovato et al., 2016) and people with low socio-economic status (Carter et al., 2012).

According to a new study comparing FI across 149 countries, 78.2% of people in North America can be described as food secure while 4.9% can be considered suffering from severe FI. In Europe, 74.3% of people are considered food secure while 3.5% are severely food insecure (6.3% with moderate FI and 16.0% with mild FI (Jones, 2017)). The recent report by the Food and Agriculture Organization of the United Nations (FAO), publishing FI prevalence data for many different countries using nationally representative population samples, estimated that in Germany, 4.3% of the population are moderately and severely food insecure. However, as pointed out by the authors, this estimation was based on a sample size of < 100 cases, which substantially reduces its informative value (FAO, 2016).

Foodbank data have been repeatedly used to measure FI among disadvantaged populations (Lindberg et al., 2015; Loopstra et al., 2016;

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Neter et al., 2014;). In the U.K., data by the Trussel Trusts's network of food banks reported that over 1.18 million people were given three-day emergency food supplies in the financial year 2016–2017 (Loopstra and Lalor, 2017). In Germany, the number of food banks has increased substantially over the last fifteen years, and it is estimated that 1.5 million people are currently benefiting from their food distribution (National Association of German Tafel, 2016).

Given the missing information on FI rates in Germany, the aim of this cross-sectional study was to examine FI prevalence among a large sample of food bank users. A second aim of the study was to determine the association of socio-demographic and health variables with FI.

## 2. Methods

### 2.1. Setting and participants

Food bank users in Germany can be described as a group of economically disadvantaged people with low- or no income, unemployment or low paid job, and a reliance on welfare assistance (Depa et al., 2015; Tinnemann et al., 2012). Adult food bank users were recruited at food banks in three different cities in Germany (Stuttgart, Berlin, Karlsruhe). To be included, food bank users had to be over the age of 18 years, be registered food bank users and be able to understand German, English, Russian or Arabic.

Depending on the type of food bank established in the according location, food bank stores and food redistribution points – also called food pantries – were visited several times between May and August of 2015 during opening hours (6–8 times at the four food bank stores in Stuttgart on varying weekdays and at different times during the month; 4 times at the redistribution point in Karlsruhe at different times during the month; 2–3 times at 8 representative redistribution points in Berlin at different times during the month). Visiting food bank users were approached by trained research personnel when entering or leaving the facilities. Research personnel introduced themselves and described their interest in studying eating behavior of food bank users. Interested users were invited to participate in the study by filling out a survey on site. Detailed written information of the study procedures as well as the university contact details were provided. Food bank users who had difficulties reading or understanding the questions were offered help filling out the questionnaire. On average, it took about 15 min to complete the self-reported questionnaire.

Food bank officials gave their permission to recruit clients. Written informed consent was not obtained from food bank users to increase participation. Many people, particularly in this population group, have a general distrust of governmental agencies and academic institutions and are hesitant to give their informed consent because they perceive this act as relinquishing rather than protecting their rights (Yancey et al. 2006). Ethical approval was obtained from the University of Hohenheim ethics committee and agreed with the Helsinki Declaration.

### 2.2. Questionnaires

The self-administered questionnaire included sociodemographic variables including age, gender, country of birth, school education (no graduation, graduation at 10th grade or earlier, and graduation at 12th/13th grade) and household composition (single with no children, single-parent, couple with children, couple without children, other). Questions on self-rated health status using a 5-point Likert scale from “very good” to “very bad” (How do you rate your current health?), smoking (Do you currently smoke? Yes, no), as well as on food bank visiting patterns (For how long have you been visiting a food bank? < 3 months to 3–6 months, 7–12 months, over 12 months; How often do you usually visit a food bank? > 4 times/month, 4 times/months, 2–3 times/month, 1 time or less/month) were also administered. Questions regarding health status were adapted from the DEGS (German health interview and examination survey for adults; Scheidt-

**Table 1**

Question of the FIES and affirmatively answered questions by the study sample (n = 1033).

FIES Questions: During the last 12 months, was there a time when...	n	%
1. ... you were worried you would run out of food because of a lack of money?	480	46.5
2. ... you were unable to eat healthy and nutritious food because of a lack of money?	510	49.4
3. ... you ate only a few kinds of foods because of a lack of money?	622	60.2
4. ... you had to skip a meal because there was not enough money to get food?	312	30.2
5. ... you ate less than you thought you should because of a lack of money?	408	39.5
6. ... your household ran out of food because of a lack of money?	182	17.6
7. ... you were hungry but did not eat because there was not enough money for food?	208	20.1
... you went without eating for a whole day because of a lack of money?	117	11.3

Survey conducted between May and August of 2015 among food bank users in Germany.

Nave et al., 2012) which is a valid German survey. Height and weight were self-reported. The questionnaire has also been used in previous research studies among food bank users (Depa et al., 2015; Tinnemann et al., 2012).

FI was measured using the Food Insecurity Experience Scale (FIES) provided by the FAO (Ballard et al., 2013). The FIES captures the access dimension of food security including aspects from monetary restraint and availability to dietary quality. It also allows interpreting obtained data on different levels of severity. Using an experience-based metric for the severity of the food insecurity condition, the metric is calculated from data on people's direct responses to questions about their access to food of adequate quality and quantity over the last 12 months taking into account the definition of food security as “secure access at all times to sufficient food” (Maxwell and Smith, 1992). The FIES consists of eight questions (see Table 1) and is based on the U.S. Household Food Security Survey Module (US HFSSM) and also took other experience-based food insecurity scales into consideration (e.g. Household Food Insecurity Access Scale - HFIAS and the Escala, Latinoamericana y Caribena de Seguridad Alimentaria -ELCSA) (FAO, 2016). Answer options included “yes, no, refused, don't know”. The FIES is a relatively new measuring instrument, but has been used numerous times assessing FI in many different countries (Frongillo et al., 2017; Jones, 2017).

The questionnaire was provided in German, English, Russian and Arabic. All questionnaires were translated by native speakers using the existing versions of the FIES survey module and the guidelines for translation of the FIES provided by the FAO considering the intended target population. The adopted questionnaires were then validated using a small sample of food bank users in Stuttgart (n = 14) by asking them to rephrase the questions in their own words as if asking a friend (validation method: paraphrasing). One major change to the original questionnaire was the elimination of the words “or other resources (than lack of money)” because some food bank users did not know what was meant by it (they thought they were being asked about stealing food).

### 2.3. Statistical analysis

Severity levels of FI were calculated by the FAO (Nord, 2015) based on their statistical guidelines and depended on the number of questions a participant answered affirmatively. A person who negated all eight question was judged as food secure while someone who answered one up to three questions with “yes” was defined as mildly food insecure. Four up to seven affirmed questions indicated that a participant is moderately food insecure. To be categorized as severely food insecure, a person had to affirm all eight questions. Questionnaires (n = 212)

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