



Area characteristics associated with food pantry use in Berlin – A cross-sectional ecological study

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ABSTRACT

Although food pantries have become a crucial component of the food landscapes in many countries, so far they have rarely been included in research on the food environment. This study aims to map and analyze the relation between the proportion of adult food pantry users and child food pantry recipients as well as compositional and structural characteristics of areas in Berlin, Germany.

Publicly accessible data including the percentage of adults and children receiving welfare and those with migration background were used to characterize area composition. Investigated structural resources included the availability of discount stores, stops of the public transport as well as 44 food pantries throughout the city. Small spatial units of two incongruent spatial area data sets were denominated to characterize the 44 food pantry areas and the areas within walking distance (1000 m) to a food pantry. Linear multiple regression models were conducted to model the proportion of food pantry recipients among adults and children. Results of the study showed that the proportion of child food pantry recipients was more than twice as high compared to the proportion of adult food pantry users, with large variations between pantries. The distribution of food pantries largely mirrored the distribution of welfare recipients in Berlin. Results of multiple regression analyses suggested that the percentage of adults receiving welfare benefits and the number of stops around a food pantry were positively, and the percentage of adults with migration background was negatively related to the proportion of adult food pantry users. Among children, the percentage of children receiving welfare benefits, the number of discount grocery stores per 1000 children, and the number of stops around a food pantry were positively related to the proportion of food pantry recipients. Results of the spatial analyses can be used to improve the allocation of social and food services to support impoverished people. Future studies could investigate whether there are unmet needs of food assistance services among inhabitants with migration background.

1. Background

Morbidity risk of diseases like diabetes (Agardh, Allebeck, Hallqvist, Moradi, & Sidorchuk, 2011) or cardiovascular diseases (Addo et al., 2012; Manrique-Garcia, Sidorchuk, Hallqvist, & Moradi, 2011) as well as the risk of pre-mature mortality (Geyer, Hemström, Peter, & Vågerö, 2006; Sommer et al., 2015) follow a socioeconomic gradient and are highest among low-income and impoverished individuals. Therefore, geographical variations of poverty and associated socioeconomic factors such as receipt of welfare benefits have implications for social and health policies and civil society at large.

Given that inequalities in health cannot be entirely explained by differences in the characteristics of individuals (Diez Roux, 2007), a growing body of health research has focused on the role of the physical environment in determining health outcomes (Arcaya et al., 2016; Diez

Roux, 2007). In nutritional sciences, contextual features of areas include inhabitants' access to commercial food outlets in relation to socioeconomic characteristics (Hilmers, Hilmers, & Dave, 2012; Richardson, Boone-Heinonen, Popkin, & Gordon-Larsen, 2012), public transport (Larsen & Gilliland, 2008), and urbanization (Cummins et al., 2009; Richardson et al., 2012). Food sources of individuals with low-income, however, likely differ from those of population groups with higher income.

In Germany, the most prominent civil society actor providing food to low-income individuals is the food bank organization called “Tafel” (“table”). Food banks are defined as centralized warehouses which usually receive large quantities of foods from the industry, manufacturers and other donors and distribute these foods to smaller agencies such as soup kitchen and food pantries (Poppendieck, 1994). Food pantries are usually smaller than food banks and directly serve clients

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Abbreviations

FP	food pantry
LEA	living environment area
PA	planning area
SI	social indicator
WR	welfare recipient

(Poppendieck, 1994).

Being founded in 1993 as an initiative to support homeless people (Federal Association Deutsche Tafel e.V., 2016b), today, over 920 local “Tafel” programs nationwide supply low-income people with foods donated by retailers, bakeries and manufactures (Federal Association Deutsche Tafel e.V., 2016c). Although such programs have initially emerged to provide infrequent emergency food to individuals suffering economic hardship (Berner, Ozer, & Paynter, 2008), food banks and pantries have become a fixed part of food landscapes in many developed countries such as the U.S. (Weinfeld et al., 2014), Canada (Tarasuk, Dachner, & Loopstra, 2014), Australia (Booth & Whelan, 2014) and several European countries (Depa, Hilzenden, Tinnemann, & Stroebele-Benschop, 2015; Lambie-Mumford, 2013; van Steen & Pellenberg, 2014). Unfortunately, many people with low-income chronically depend on food pantry provision (Neter, Dijkstra, Visser, & Brouwer, 2014; Robaina & Martin, 2013).

Despite the increasing number of food banks and food pantries (van Steen & Pellenberg, 2014; Federal Association Deutsche Tafel e.V., 2016a), they have rarely been included in research on the food environment of low-income population groups and all of the few existing studies were conducted in the U.S. (Algert, Agrawal, & Lewis, 2006; Caspi, Lopez, & Nanney, 2016; Mabli, Jones, & Kaufman, 2013). In Europe, the access of low-income, welfare-dependent people to food pantries remains so far largely undefined.

Moreover, while several studies investigated individual-level reasons and determinants of (long-term) food pantry use including job loss, living in a large household, an increase in housing costs, and/or food insecurity (Bhattarai & Duffy, 2003; Daponte, 2000; Kicinski, 2012), so far nothing is known about the structural and compositional characteristics of the environment being related to food pantry use.

A deeper understanding of the relationship between characteristics of the urban area around food pantries including the socioeconomic composition, commercial food outlets and public transport system and food pantry use might contribute to a more comprehensive picture of the environment in which economically deprived groups acquire their food. Since food pantry users suffer from a high level of food insecurity (Neter et al., 2014; Tarasuk & Beaton, 1999), even compared to other low-income groups (Bhattarai, Duffy, & Raymond, 2005;

Kirkpatrick & Tarasuk, 2009), this knowledge could be useful for the allocation of intervention measures and strategies to assist economically disadvantaged people by improving their food security level.

This study focuses on food pantries in Berlin, the capital of Germany, and has two research objectives. First, it maps and analyzes the spatial distribution of urban food pantries in relation to the socio-economic composition of the areas surrounding the pantries, the distribution of commercial discount grocery stores and stops of the public transport net in Berlin. Second, the study investigates the relationship between these compositional and structural environmental factors and the proportion of adult food pantry users and child food pantry recipients.

2. Methods

2.1. Study area and food pantries

The study area includes the city state of Berlin, with a population of about 3.5 million inhabitants in 2014 (Statistical Office for Berlin-Brandenburg, 2015a).

The “Berliner Tafel” project “LAIB und SEELE” is managed in a food pantry style and in 2014, it provided groceries to clients at 45 distribution points mainly located in parochial facilities (Berliner Tafel e.V., 2014). People fulfilling the “Berliner Tafel” self-defined eligibility criteria, i.e. having an income at or below the federal unemployment pay II, receive groceries including mainly fresh fruits, vegetables, and bread for a symbolic contribution of one or two Euro once a week (Berliner Tafel e.V., 2016).

Individual residential addresses were allocated to one food pantry by food bank officials, mostly according to residents' zip code (Berliner Tafel e.V., 2016). Exceptions were addresses from 18 of a total of 120 zip code areas allocated via a combination of the zip and district code. Addresses of six zip code areas were allocated to the nearest food pantries. The term *food pantry area* is used for the area covering all addresses allocated to a food pantry. Clients can use one food pantry only. Addresses of the 45 food pantries and residential zip codes and districts allocating residential addresses to individual food pantries were obtained from the “Berliner Tafel” food bank (Berliner Tafel e.V., 2016).

Due to organizational reasons very few addresses (40 of 388,724) were allocated to one of the 45 food pantries, therefore this food pantry was excluded from further analyses.

During food pantries' opening hours, user statistics including the number of adult users and the number of child food pantry recipients defined as the number of children in the user household are anonymously recorded regularly. Adult food pantry users are also called adult recipients, whereas the child analogue is only called child

Table 1
Descriptive statistics of 44 food pantries in Berlin, Germany.

	All 44 FPs	Mean	SD	Relative SD	Median
number of users	10,505	238.8	107.38	44.97	224.0
number of user households	5946	135.1	54.07	40.02	123.5
number of adult users	7473	169.84	69.09	40.68	154.0
number of child food pantry recipients	3036	69.0	45.09	65.35	57.50
children among users in %	28.90	26.97	9.13	33.85	28.22
number of users/1000 inhabitants	2.95	3.75	2.4	64.00	3.27
number of adult users/1000 inhabitants aged ≥ 18 yrs.	2.47	3.09	1.75	56.63	2.73
number of child recipients/1000 children aged < 18 yrs.	5.64	7.32	6.24	85.25	5.21
number of users/1000 welfare recipients	16.81	22.19	13.37	60.25	18.13
number of adult users/1000 adults aged ≥ 15 yrs receiving welfare recipients	15.62	20.43	12.00	58.74	17.81
number of child recipients/1000 children aged < 15 yrs receiving welfare benefits	20.74	28.17	20.88	74.12	20.38

FP: food pantry; SD: standard deviation.

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