Unveiling Food Deprivation in Italy: Socio-demographic Predictors and Immaterial Effects

Giulia Ciancimino,
Roberto Sensi

Abstract. Despite growing global attention to food poverty and advancements in measurement tools, Italy still lacks a comprehensive system for collecting and monitoring relevant data. This gap limits the ability to accurately assess the extent of food deprivation and evaluate the effectiveness of related policies. The integration of the FAO's Food Insecurity Experience Scale (FIES) into the 2022 EU-SILC survey is a positive step forward, but it provides only a partial view of the issue. To deepen the understanding of the prevalence and dynamics of food poverty in Italy, this study introduces a novel Food Deprivation Index that incorporates both the material and social dimensions of food access. The study aims to estimate the prevalence of food deprivation, analysing its distribution across sociodemographic groups and Italian macro-areas. Additionally, through logistic regression models, the study identifies key sociodemographic determinants of food deprivation and explores its impact on psychosocial well-being, controlling for sociodemographic, economic, and social variables. The findings provide key insights for shaping future social policies that ensure secure access to adequate food, addressing both the material dimension – in terms of quantity, quality, and variety – and the social aspects.

Keywords: food poverty, food deprivation, predictors, psychosocial well-being, EU-SILC

1. *Introduction*

The Food and Agriculture Organization (FAO) provides the most widely accepted definition of food security: "all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and

healthy life" (FAO 2001). Food poverty, or food insecurity, occurs when one or more of these conditions are unmet.

In recent years, particularly in the wake of the pandemic and rising inflation, global attention to food poverty has surged. However, this growing awareness has not been accompanied by systematic efforts to monitor the issue in most countries. While the United States and Canada have been tracking food poverty since 1995 and 2004 respectively, only a few European nations, such as the United Kingdom, Greece, and Portugal, have recently introduced specific measurement tools in national surveys (Carrillo-Álvarez 2023; Beacom *et al.* 2021). The lack of comprehensive data infrastructures limits the ability to accurately gauge the prevalence and severity of food poverty, as well as to assess the effectiveness of policy responses. This problem is linked to a broader failure to fully recognize the right to adequate and sufficient food, as outlined in the Universal Declaration of Human Rights.[1]

The present study serves a dual purpose. First, it develops a novel Food Deprivation Index that captures both the material and social dimensions of the phenomenon. Second, it seeks to advance the understanding of food poverty in Italy by identifying the main drivers of food deprivation and assessing its impact on the psychosocial well-being of the population.

Monitoring food poverty in high-income countries presents unique challenges, due to its multidimensional nature. Food poverty is deeply linked with economic, cultural, social, and psychological factors, which vary across geographic contexts. Additionally, the lack of a consistent definition and the proliferation of measurement tools over the past 50 years has made it even more difficult to quantify the phenomenon (Berry *et al.* 2015).

Historically, food poverty discourse was largely centred on developing countries. However, in the mid-1970s, the issue began gaining traction in high-income nations, with early discussions focusing on food supply and market price instability (FAO 1974). By the 1980s, the emphasis had shifted towards food accessibility, both physical and economic (FAO

[1] Article 25 of the Universal Declaration of Human Rights adopted by the United Nations General Assembly on December 10, 1948.

1983). Nutritional and cultural considerations were introduced in the 1990s (FAO 1996), with the social dimension formally added in 2001. This marked the development of the current, widely used FAO definition of food security, incorporating physical, social, and economic dimensions. More recently, the High-Level Panel of Experts on Food Security and Nutrition (HLPE-FSN), under the Committee on World Food Security (CFS), has expanded the food security framework to include the dimensions of agency and sustainability (HLPE 2020). These additions reflect the growing recognition of the importance of individuals' and communities' ability to make informed food choices, influence food systems, and ensure that food security is maintained for future generations without compromising economic, social, and environmental sustainability.

This multidimensional framework has significantly influenced the design of measurement tools for detecting food poverty, resulting in the development of various indicators, indices, and scales. These tools generally fall into three main categories: experience-based scales, dietary diversity indicators, and coping strategy indices (Beacom *et al.* 2021). Among the tools in the first category, the Food Insecurity Experience Scale (FIES) is widely used to assess food insecurity. It consists of eight questions that examine behaviours and emotional responses related to difficulties in accessing food due to financial constraints (Ballard *et al.* 2013; Cafiero *et al.* 2018). The inclusion of the FIES scale in the 2022 Italian edition of the European Union Statistics on Income and Living Conditions (EU-SILC) survey marked a significant step forward in the country's efforts to monitor food poverty. Estimates for 2023 reveal that 1.5% of the Italian population experienced moderate or severe food insecurity, a decrease from 2.3% in 2022. However, significant regional disparities persist, with 2.7% of the population affected in the South, compared to 1% in Central Italy and 0.8% in the North (ISTAT 2024). While these findings offer valuable insights into the distribution of food poverty in Italy, they provide only a partial view of the broader issue. Given the multidimensional nature of the phenomenon, a more comprehensive framework is required to fully capture its extent. Such a framework should include indicators that address both the material and social dimensions of food adequacy, such as participation in food-sharing events and awareness of nutritional content.

In this study, the term 'food poverty' will be used, defined as "the inability to acquire or consume an adequate quality or sufficient quantity of

food in socially acceptable ways, or the uncertainty that one will be able to do so" (Radimer 1990). The choice to use the term 'poverty' rather than 'insecurity', in line with the British sociological debate, aims to highlight the economic dimension of the issue and to explore its connection with other forms of deprivation that significantly impact access to food. In high-income countries like Italy, where food availability is generally not a major concern, economic factors represent the primary – though not the only – cause of inadequate access to sufficient and appropriate food (O'Connor *et al.* 2016; O'Connell, Brannen 2021). Although economic access is a prevalent dimension, the recognition of the multidimensional nature of food poverty conceptually brings this term closer to that of food security. The difference between the two terms is more historical and socio-economic than conceptual (ActionAid 2023). The notion of "food insecurity" is predominantly used in the United States, where it is measured by the USDA's Household Food Security Survey Module and focuses on economic and physical access to adequate food (Coleman-Jensen *et al.* 2017). The term 'food poverty' made its way in Europe from the beginning of the second decade of the 21st century, following the financial crisis of 2007-2008 and the sovereign debt crisis of 2010-2011. The increase in poverty led to greater food deprivation and a rise in the demand for aid from Food Banks. These phenomena have been seen as closely connected in terms of cause and effect, explaining the success of the term 'poverty' over 'food insecurity' (Caraher, Coveney 2016).

In this regard, numerous studies have identified the primary drivers of food poverty in high-income countries as economic factors, such as income level, employment status, and financial stability. Specifically, low income, precarious employment, and high housing costs significantly increase the risk of food insecurity (Baker *et al.* 2024; Gallegos *et al.* 2023; Coleman-Jensen *et al.* 2017). Furthermore, specific sociodemographic characteristics, including female gender, foreign citizenship, low educational attainment, single-parent households, one-person households, and residence in rural areas, have been found to be consistently associated with an increased risk of food poverty (Gallegos *et al.* 2022; Garratt 2020; Grimaccia, Naccarato 2019).

In terms of consequences, food poverty extends beyond mere nutritional deficiencies, profoundly affecting both psychological and social well-being. Research has shown that individuals experiencing food inse-

curity are at a higher risk of mental health issues, including depression and anxiety (Leung *et al.* 2022; Frongillo *et al.* 2017). Food plays a crucial role in social contexts, being deeply intertwined with identity and culture, and significantly contributing to relational well-being (Martin *et al.* 2016). The inability to participate in social food-related experiences, such as dining out with friends or celebrating special occasions, can have severe psychological repercussions, exacerbating social isolation caused by material deprivation and increasing psychological distress (Meshkat *et al.* 2024; Hanna *et al.* 2023; Wolfson *et al.* 2021). Recent qualitative research conducted in Italy has highlighted the psycho-emotional dimension of food poverty, emphasizing the importance of food as a social connector, particularly among adolescents (Palladino *et al.* 2024).

Given the absence of specific monitoring for food poverty, most studies estimating its prevalence in Italy have relied on official statistics and data from household expenditure surveys (HBS) conducted by the Italian National Statistics Institute (ISTAT). In some cases, these studies have established regional thresholds for food expenditure, while in others they have analysed the gap between actual expenditure on a healthy diet and the average food expenditure, offering valuable insights into the phenomenon in the country (Benedetti *et al.* 2024; Bernaschi *et al.* 2023; Marchetti, Secondi 2022; Campiglio, Rovati 2009).

In line with these research efforts, the present is based on EU-SILC data collected in Italy in 2022 by ISTAT and combines the inability to afford adequate food and the exclusion from food-related social activities. The findings are intended to inform the development of more nuanced policies that address both the material and social dimensions of food deprivation.

2. *Materials and methods*

This study is based on data from the EU-SILC survey, specifically from the Italian subset collected in 2022.[2] EU-SILC is a comprehensive European

[2] The analyses were conducted using the Italian microdata from the 2022 EUSILC survey, made freely available by ISTAT. It should be noted that the results and opinions expressed in this work are solely the responsibility of the authors, do not constitute official statistics, and do not and do not in any way implicate ISTAT.

survey coordinated by Eurostat that provides detailed cross-sectional and longitudinal data on various socio-economic indicators, including income distribution, inequality, poverty, material and social deprivation, social exclusion, and quality of life. The harmonised methodology employed by EU-SILC ensures comparability across EU member states, allowing for robust and cross-national analyses.

The Italian segment of the EU-SILC survey focuses on households and their members residing within Italy. The sampling design is a two-stage composite random sampling method, incorporating stratification in the first stage to enhance the representativeness of the sample. This approach allows for accurate cross-sectional estimates, which are representative at the regional level. Data collection is conducted through a combination of Computer-Assisted Personal Interviews (CAPI) and Computer-Assisted Telephone Interviews (CATI).

The survey comprises three main components: a general household questionnaire collecting demographic information about all household members; a family questionnaire that gathers diverse data on the households; and an individual questionnaire completed by all family members aged 16 and over. Annually, the survey samples approximately 40,000 households, encompassing around 80,000 individuals across roughly 900 Italian municipalities. This extensive sample is strategically selected to represent the Italian population accurately. The dataset offers valuable insights into food deprivation and allows for a comparison with other indicators of poverty, deprivation, and social exclusion.

2.1. Data analysis

The analysis was carried out using SPSS software (version 28, IBM, Chicago, IL, USA) and was structured in two main stages to thoroughly examine food deprivation in Italy, including its prevalence, predictors, and implications for well-being.

Initially, we created a composite index of food deprivation using two indicators: the inability to have a proper meal at least every second day due to economic reasons, and the inability to meet with relatives or friends for a meal or a drink at least once a month. This index captures both the material and social aspects of food deprivation (for details see the measures paragraph).

Subsequently, a bivariate analysis was conducted to examine the variations in food deprivation in relation to specific socio-demographic variables. To explore the main predictors of food deprivation, we conducted a binary logistic regression analysis. In this model, food deprivation was the dependent variable, and the independent variables included factors such as the ability to make ends meet, poverty indicator, household type, level of urbanisation, tenure status, geographical region, employment status, educational attainment level, citizenship, and age. The selection of these variables was guided by evidence from the literature, which consistently identifies economic factors, such as income and employment status, and sociodemographic characteristics, such as household composition, educational attainment, and citizenship, as key predictors of food poverty in high-income countries (Baker *et al.* 2024; Gallegos *et al.* 2023; Coleman-Jensen *et al.* 2017, Garratt 2020; Grimaccia, Naccarato 2019). These variables capture both structural and individual determinants of food deprivation, aligning with the study's objectives. The final model achieved a Nagelkerke R^2 of 0.323, indicating that the model explained 32.3% of the variance in food deprivation.

In the second step, we aimed to investigate how food deprivation affects psychosocial well-being. We first used categorical principal component analysis (CATPCA) to create a composite measure of psychosocial well-being(for details see the measures paragraph). The CATPCA method was chosen for its ability to synthesize categorical and ordinal variables into a single composite measure, making it well-suited for capturing the multifaceted nature of psychosocial well-being.

To assess the impact of food deprivation on poor psychosocial well-being, we employed a binary logistic regression model. The model includes key sociodemographic factors identified in the literature as significant predictors of psychosocial well-being, such as age, citizenship, region of residence, poverty status, difficulty in making ends meet, and educational attainment – that have consistently been associated with mental health outcomes (Ruggeri *et al.* 2020; Pourmotabbed *et al.* 2020). Furthermore, we include other socially oriented factors, such as perceived health, access to help from others, and frequency of getting together with friends, which the literature identifies as crucial determinants of psychosocial well-being (Holt-Lunstad *et al.* 2022; Prince *et al.* 2007). By controlling for both sociodemographic factors and these crit-

ical social and health-related predictors, we can more reliably assess the net contribution of food deprivation to psychosocial well-being. The final model achieved a Nagelkerke R^2 of 0.202, indicating that the model explained 20.2% of the variance in poor psychosocial well-being. The relatively moderate R^2 reflects the multifactorial nature of psychosocial well-being, suggesting that additional unmeasured variables, such as self-esteem, mental distress or broader societal factors, may contribute significantly to the variance of individual psychosocial well-being.

Both regression models were conducted using a stepwise forward Wald method, which involves adding predictors one at a time based on their statistical significance. This approach allows for the most important predictors to be identified while controlling for potential confounders, as less significant variables are excluded from the final model. The models provided an "odds ratio" (OR) for each predictor's effect on the dependent variable, taking into account the simultaneous influence of other predictors (Stoltzfus 2011). Predictors that did not reach statistical significance were systematically excluded during the stepwise process. The confidence level for the odds ratios (Exp(B) values) was set at 95%, meaning that predictors with p-values ≤ 0.05 were considered statistically significant. This threshold ensures that there is a 95% confidence that the true value of the odds ratio lies within the calculated range, with a 5% or less probability that this result occurred by chance.

2.2. Measures

The Food Deprivation Index. The index was developed to detect specific aspects of food poverty by integrating both material and social dimensions of deprivation, using two of the 13 indicators from the new Material and Social Deprivation (MSD) EU framework for measuring deprivation (Guio *et al*. 2017).

Material food deprivation. This indicator is widely used to compare food deprivation among European countries and captures the ability to afford a complete meal – including meat, fish, or an equivalent vegetarian option – at least every two days. This measure is collected at the household level and extended to all members of the household, reflecting the financial constraints that prevent regular access to sufficient and nutritious food. By focusing on dietary adequacy, this indi-

cator highlights the economic barriers to maintaining a balanced and healthy diet.

Social food deprivation. This indicator measures ability to meet with friends or family for a meal or drinks at least once a month. It is collected at the individual level for those aged 16 and older, highlighting how food-related social activities are integral to maintaining social relationships and cultural identity (O'Connell *et al.* 2019). Participating in such social activities is crucial, as the inability to engage in them can intensify feelings of social isolation and exacerbate the effects of material deprivation (Martin *et al.* 2016; Palladino *et al.* 2024).

To construct the Food Deprivation Index, these indicators were combined into a binary format: individuals were assigned a value of 1 if they experienced at least one form of deprivation (material or social), and 0 if they did not experience either. This binary approach enables the index to comprehensively capture both the material and social aspects of food deprivation. It is specifically designed for individuals aged 16 and older, as the social food deprivation indicator was administered to this age group. This binary classification also facilitates the application of binary logistic regression, allowing for a detailed analysis of the predictors of food deprivation and its broader impacts on psychosocial well-being.

P*oor psychosocial well-being*. This index was developed using categorical principal component analysis (CATPCA) to synthesise six key indicators of social and psychosocial well-being. These indicators include life satisfaction, happiness, loneliness, satisfaction with personal relationships, trust in others, and satisfaction with leisure time. These variables were chosen because they represent widely recognized dimensions of psychosocial well-being and are commonly used in studies exploring the intersection of social and mental health (Saeri *et al.* 2018; Holt-Lunstad, Steptoe 2022). The first component identified through CATPCA explained 40.6% of the total variance, capturing the most representative aspects of psychosocial well-being. High scores on this dimension are indicative of higher levels of overall life satisfaction, happiness, and satisfaction with personal relationships, while reflecting lower feelings of loneliness. This component was subsequently divided into quartiles, to identify in-

dividuals with varying levels of well-being. The lowest 25% of the distribution was used to classify individuals experiencing poor psychosocial well-being. This binary classification, distinguishing between poor well-being and better well-being, enabled the creation of a dummy variable for use in our logistic regression analysis.

The six indicators included in this composite measure were:

Happiness. Respondents were asked how often they felt happy over the past four weeks, using a five-step scale from "All of the time" to "None of the time". This measure reflects the frequency of positive emotional experiences.

Loneliness. This indicator assessed how often respondents felt lonely in the past four weeks, using a five-step scale from "All of the time" to "None of the time". It captures feelings of isolation and disconnectedness.

Overall life satisfaction. Participants aged 16 and older rated their satisfaction with life on a scale from 0 (not at all satisfied) to 10 (completely satisfied). This indicator evaluates individuals' general contentment with their lives.

Satisfaction with personal relationships. Participants rated their satisfaction with relationships with family, friends, and others on a scale from 0 (not at all satisfied) to 10 (completely satisfied). This measure reflects the quality of social interactions and support.

Trust in others. Respondents rated their general trust in people on a scale from 0 (no trust at all) to 10 (most people can be trusted). This indicator measures perceptions of social trust and moral standards in society.

Satisfaction with leisure time. Participants rated their satisfaction with the amount of time available for enjoyable activities on a scale from 0 (not at all satisfied) to 10 (completely satisfied). This measure assesses how well individuals feel their leisure time meets their needs for personal enjoyment.

3. *Results*

Results relating to the prevalence of food deprivation according to the newly proposed index are first presented. The percentages refer to in-

dividuals aged 16 and over, as social food deprivation is measured at the individual level for this age group and cannot be generalised to the entire household, unlike material food deprivation, which is assessed at the household level. This will be followed by a bivariate analysis results examining index and indicators distribution across key sociodemographic variables and psychosocial well-being component. Finally, the results of two logistic regression models will be presented to identify predictors and impacts on psychosocial well-being of food deprivation.

3.1. Prevalence of food deprivation in Italy

In 2022, 7.5% of the Italian population aged 16 and over reported experiencing material food deprivation, meaning they were unable to afford a meal containing meat, fish, or a vegetarian equivalent every second day. Additionally, 4.8% experienced social food deprivation, being unable to get together with family or friends for a drink or meal at least once a month. When accounting for those experiencing either or both forms of deprivation, the overall incidence of the Food Deprivation Index rises to 10.5%, affecting approximately 5.3 million individuals.

More specifically, around 2.9 million people, or 5.7% of the population, reported experiencing only material food deprivation, while 3% of the population, or about 1.5 million individuals, experienced only social food deprivation. Furthermore, 1.8% of the population – around nine hundred thousand people – suffered from both forms of deprivation simultaneously (Table 1).

Table 1 • Prevalence of food deprivation among people aged 16 and over

People experiencing material food deprivation (unable to afford a meal containing meat, fish, or a vegetarian equivalent every second day)	7.5%
People experiencing social food deprivation (unable to afford to get together with family or friends for a drink or meal once a month)	4.8%
People experiencing both forms of food deprivation	1.8%
People experiencing at least one form of food deprivation (Food Deprivation Index)	10.5%

3.2. Bivariate analysis results

The bivariate analysis revealed notable patterns and differences between the aggregated Food Deprivation Index and its two components – material food deprivation and social food deprivation – across various socio-demographic and geographic variables. As shown in Table 2, While the overall prevalence of food deprivation showed little difference between males and females, with slightly higher rates for females, the disaggregated indicators reveal contrasting trends. Material food deprivation is marginally higher among males, whereas social food deprivation is more prevalent among females. Age also showed minimal variation, with food deprivation incidences ranging from 8.6% among those aged 18-24 years to 12.1% among those aged 35-44 years. Material deprivation follows a similar trend, while social deprivation shows higher prevalence among individuals in their mid-life years, particularly aged 35–44 years.

In contrast, significant disparities were observed based on citizenship status. Foreign nationals, particularly those from non-EU countries, experienced much higher food deprivation compared to Italian citizens and EU citizens. Material food deprivation is particularly pronounced among extra-EU nationals, while social food deprivation is equally high among both EU and extra-EU nationals. A clear inverse relationship is evident between education and food deprivation. Tertiary-educated individuals exhibit the lowest levels of food deprivation across all measures, with social deprivation being virtually absent. Conversely, those with no formal or only early education face significantly higher risks, especially for social deprivation.

The highest incidences of food deprivation were found among the unemployed and those unable to work due to health issues with both material and social dimensions contributing significantly In comparison, employed individuals and students show the lowest levels of deprivation across all dimensions. Household characteristics also revealed significant differences in the distribution of food deprivation (Table 3). Single-parent households and larger families with three or more dependent children are among the most affected. Notably, larger families show significantly higher social deprivation. Furthermore, tenants face more than double the prevalence of food deprivation compared to homeowners. Material deprivation is particularly pronounced among them, but social deprivation also remains significantly elevated.

Since the index specifically addresses both the affordability of food and related social experiences, significant variation in food deprivation was observed based on economic conditions. People living in households with a total income below 60% of the median – considered at risk of poverty according to the Eurostat definition – faced a much higher prevalence of food deprivation compared to those living in households not considered at risk . Nearly half of individuals in households reporting great difficulty making ends meet experience both material and social deprivation, highlighting the interdependence of economic and social vulnerabilities. Table 4 illustrates notable geographic disparities in food deprivation, with the highest prevalence of food deprivation observed in Southern and Insular Italy . Material food deprivation drives much of this disparity, but social deprivation is also notably elevated in these regions. In terms of urbanization, the analysis revealed that food deprivation rates were relatively consistent across different types of areas, with cities experiencing slightly higher rates of both material and social deprivation compared to towns and rural areas.

Finally, Table 5 presents the average scores of our CATPCA-derived psychosocial well-being dimension, broken down by material food deprivation, social food deprivation, and the aggregated Food Deprivation Index. In all three cases, individuals classified as deprived register significantly lower mean scores compared to their non-deprived counterparts. Notably, the social dimension shows the largest gap between deprived and non-deprived groups, but this difference remains within a limited range.

Table 2 • Prevalence of food deprivation by sociodemographic individual variables

Variable	*Category*	*Food Deprivation Index*	*Material food deprivation*	*Social food deprivation*
Sex	Male	10.2%	7.6%	4.4%
	Female	10.8%	7.4%	5.2%
Age	16-24 years	8.8%	6.6%	3.5%
	25-34 years	10.2%	8.1%	4.8%
	35-44 years	12.1%	8.3%	6.4%
	45-54 years	10.6%	7.0%	5.1%
	55-64 years	10.7%	7.7%	4.7%
	65-74 years	11.0%	7.4%	5.4%
	75 and over	9.5%	7.2%	3.6%
Citizenship	Italian	9.6%	7.0%	4.2%
	Foreign (UE)	16.5%	12.5%	12.3%
	Foreign (extra UE)	23.5%	14.3%	12.7%
Educational attainment level	Early childhood education	19.4%	12.0%	11.6%
	Primary education	15.1%	10.2%	7.3%
	Lower secondary education	14.7%	10.3%	7.8%
	Upper secondary education	8.1%	5.8%	3.2%
	Post-secondary non-tertiary education	5.7%	4.9%	1.1%
	Tertiary education	4.6%	4.1%	0.8%
Occupational status	Employed	7.5%	5.4%	3.1%
	Unemployed	27.7%	18.4%	16.8%
	Retired	8.7%	6.6%	3.3%
	Unable to work due to long-standing health problems	26.6%	18.4%	14.1%
	Student, pupil	7.3%	5.3%	2.7%
	Fulfilling domestic tasks	17.0%	11.5%	9.3%

Table 3 • Prevalence of food deprivation by sociodemographic household variables

Variable	*Category*	*Food Deprivation Index*	*Material food deprivation*	*Social food deprivation*
Household type	One person household	12.3%	9.5%	5.1%
	2 adults, no dependent children, both adults under 65 years	11.5%	8.1%	5.9%
	2 adults, no dependent children, at least one adult 65 years or more	9.1%	6.0%	4.6%
	Other households without dependent children	10.3%	7.2%	3.9%
	Single parent household, one or more dependent children	13.9%	10.7%	6.0%
	2 adults, one dependent child	9.6%	6.8%	5.5%
	2 adults, two dependent children	7.5%	5.4%	3.7%
	2 adults, three or more dependent children	16.0%	5.7%	11.8%
Tenure status	Owner	8.3%	6.0%	3.5%
	Tenant	20.2%	14.3%	10.9%
Risk of poverty	Yes	24.0%	15.7%	13.5%
	Not	7.3%	5.5%	2.8%
Ability to make ends meet	With great difficulty	49.1%	33.2%	32.2%
	With difficulty	24.9%	18.2%	10.1%
	With some difficulty	7.1%	5.0%	2.5%
	Fairly easily	1.3%	1.2%	0.1%
	Easily	0.6%	0.5%	0.1%
	Very easily	0.8%	0.2%	0.6%

Table 4 • Prevalence of food deprivation by geographic variables

Variable	*Category*	*Food Deprivation Index*	*Material food deprivation*	*Social food deprivation*
Geographical area	Northwest Italy	6.9%	4.4%	3.0%
	Northeast Italy	5.7%	3.5%	2.6%
	Central Italy	10.2%	8.0%	3.1%
	South Italy	18.3%	13.5%	9.9%
	Insular Italy	12.3%	8.6%	5.9%
Degree of urbanisation	Cities	11.3%	8.6%	5.4%
	Towns and suburbs	9.9%	6.7%	4.6%
	Rural areas	10.5%	7.3%	4.2%

Table 5 • Mean CATPCA scores of psychosocial well-being by food deprivation

Dimension	*Group*	*Psychosocial Well-Being (Mean)*
Material food deprivation	Not deprived	0.032
	Deprived	– 0.621
Social food deprivation	Not deprived	0.022
	Deprived	– 0.785
Food Deprivation Index	Non-deprived	0.056
	Deprived	– 0.641

3.3. Results of binomial logistic regression on predictive factors of food deprivation

The results from the logistic regression analysis, with food deprivation as the dependent variable, identify several significant predictors. The model incorporated a range of variables previously examined in bivariate analysis, and sex was ultimately excluded due to its minimal effect, despite being statistically significant, in favour of focusing on more impactful predictors.

Table 6 presents the odds ratios (Exp(B)), significance levels, and confidence intervals for each predictor in the final model. The analysed predictors can be categorized into three main groups: economic, demographic, and geographic factors. Economic factors. Financial hardship emerged as the strongest predictor of food deprivation. Individuals reporting severe difficulty in making ends meet were over 40 times more likely to experience food deprivation compared to those without financial difficulties. Similarly, the poverty indicator – households with incomes below 60% of the national median – was significantly associated with a higher likelihood of food deprivation, nearly doubling the risk. Tenure status emerges as a significant determinant of food deprivation, with tenants facing a risk nearly 40% higher than homeowners. Demographic factors. Educational attainment showed a strong protective effect, with individuals possessing tertiary education exhibiting the lowest risk of food deprivation. Conversely, those with lower secondary education or less faced significantly higher probabilities. Employment status was another critical factor: unemployed individuals and those unable to work due to health issues had more than double the likelihood of food deprivation compared to employed individuals. Single-person households and families with three or more dependent children also demonstrated elevated risks, while single-parent households showed a more moderate increase. Foreign citizenship further compounded vulnerability, with non-EU citizens facing a 40% higher probability of experiencing food deprivation compared to Italian citizens. Age also played a significant role, with individuals aged 35-44 years and 45-54 years experiencing the highest risks. The likelihood of food deprivation decreased among the youngest (16-24 years) and the oldest age groups (75 years and over), indicating that middle-aged adults may face greater economic pressures.

Geographic factors. Marked regional disparities were observed, with individuals residing in Central and Southern Italy displaying the highest prevalence of food deprivation. Residents of the Islands and Northeast also showed elevated risks compared to the Northwest. Regarding urbanization, rural areas and cities exhibited slightly higher risks of food deprivation than towns and suburbs.

Table 6 • Results of the logistic regression model with food deprivation as dependent variable

Variable	*Category*	*Significance*	*Exp*(B)	95% CI *for* *Exp*(B)
Ability to make ends meet	No difficulty	<0.001	Ref.	-
	With great difficulty	<0.001	44.488	44.265–44.712
	With difficulty	<0.001	18.379	18.292–18.466
	With some difficulty	<0.001	5.115	5.092–5.139
Poverty indicator	Not at risk of poverty	<0.001	Ref.	-
	At risk of poverty	<0.001	1.729	1.725–1.733
Tenure status	Owner	<0.001	Ref.	-
	Tenant	<0.001	1.397	1.394–1.401
Household type	Couple with one or two children	<0.001	Ref.	-
	Couple without children	<0.001	1.300	1.296–1.303
	Single-person household	<0.001	1.390	1.385–1.394
	Single-parent household	<0.001	1.238	1.231–1.244
	Couple with three or more children	<0.001	1.223	1.217–1.230
Educational attainment	Tertiary education	<0.001	Ref.	-
	Up to lower secondary education	<0.001	1.345	1.340–1.350
	Upper secondary education	<0.001	1.050	1.046–1.054
Main activity status	Employed	<0.001	Ref.	-
	Unemployed	<0.001	2.237	2.229–2.246
	Retired	<0.001	1.343	1.337–1.349
	Unable to work due to health issues	<0.001	2.233	2.220–2.245
	Student, pupil	<0.001	1.159	1.152–1.166
	Domestic tasks	<0.001	1.309	1.304–1.313

Citizenship	Italian	<0.001	Ref.	-
	Foreign (EU)	<0.001	1.033	1.027–1.039
	Foreign (non-EU)	<0.001	1.457	1.451–1.462
Age	16–24 years	<0.001	Ref.	-
	25–34 years	<0.001	1.374	1.366–1.382
	35–44 years	<0.001	1.678	1.668–1.688
	45–54 years	<0.001	1.460	1.452–1.469
	55–64 years	<0.001	1.520	1.511–1.529
	65–74 years	<0.001	1.445	1.435–1.455
	75 years and over	<0.001	1.091	1.083–1.099
Geographical region	Northwest	<0.001	Ref.	-
	South	<0.001	1.547	1.542–1.551
	Islands	<0.001	1.086	1.082–1.090
	Northeast	<0.001	1.089	1.085–1.093
	Central	<0.001	1.663	1.658–1.669
Degree of urbanisation	Towns and suburbs	<0.001	Ref.	-
	Cities	<0.001	1.104	1.101–1.106
	Rural areas	<0.001	1.265	1.262–1.269

3.4. Results of binomial logistic regression on the impact of food deprivation on psychosocial well-being

Our analysis of the impact of food deprivation on psychosocial well-being highlights several important findings. The logistic regression model included a range of variables, such as socio-demographic characteristics (age, citizenship, region of residence, poverty status, difficulty in making ends meet, educational attainment and employment status), as well as perceived health, access to help from others, and frequency of getting together with friends. The initial model also included gender and physical activity; however, these were subsequently excluded due to their minimal effect sizes. Table 7 presents the odds ratios (Exp(B)), significance levels, and confidence intervals for each significant predictor in the final model. To enhance clarity and readability, after showing the effect of food deprivation and perceived health, the variables are grouped into economic, demographic, and social factors, reflecting their relevance.

Food deprivation emerged as a significant determinant of psychosocial well-being, with those experiencing food deprivation being about 55% more likely to report poor psychosocial outcomes compared to individuals who are not food deprived. Among the predictors, perceived poor health was found to have the strongest impact on psychosocial well-being. Individuals who rated their health as poor were approximately 3 times more likely to experience negative psychosocial conditions, illustrating the profound link between physical health and mental well-being.

Economic factors. Severe financial hardship more than doubles the risk of poor psychosocial well-being. Those with moderate financial difficulties also exhibit significantly increased odds. Similarly, individuals at risk of poverty were about 20% more likely to report poor psychosocial well-being.

Sociodemographic factors. Age appeared to be closely linked to psychosocial well-being, with the likelihood of experiencing poor mental health increasing with age. For instance, individuals aged 75 and over were almost twice as likely to report poor psychosocial outcomes compared to those aged 16-24.Regarding the educational attainment, those with only elementary education were around 40% more likely to report poor psychosocial well-being compared to individuals with tertiary education. Unemployed or economically inactive individuals show significantly higher odds of poor well-being than those who are employed, whereas categories such as retirees, those fulfilling domestic tasks, and other activities show smaller but still significant increases. Notably, students have a lower risk of poor well-being compared to employed individuals, potentially reflecting age-related factors or other mitigating circumstances. Foreign citizenship shows higher odds of poor well-being, potentially due to social isolation and cultural barriers. Regional disparities were also notable, with residents of the northeastern region being 37% more likely to experience poor psychosocial well-being than those in the northwest. People living in the South and on the Islands also showed elevated risks.

Social factors. Individuals who never meet their friends, or did so only once a year, were twice as likely to report poor psychosocial well-being compared to those who met with friends daily. Lastly, the presence of social support networks played a crucial role. Individuals who lacked access to help from friends, relatives, or neighbours were about twice as likely to report poor psychosocial well-being compared to those who could rely on others for support.

Table 7 • Results of the logistic regression model with psychosocial well-being as dependent variable

Variable	*Category*	*Significance*	*Exp*(B)	95% CI *for* *Exp*(B)
Food deprivation	Not deprived (Ref.)	<0.001	Ref.	-
	Deprived	<0.001	1.551	1.547–1.554
Perceived poor health	No	<0.001	Ref.	-
	Yes	<0.001	3.284	3.276–3.293
Difficulty in making ends meet	No difficulty (Ref.)	<0.001	Ref.	-
	Great difficulty	<0.001	2.506	2.499–2.514
	Difficulty	<0.001	2.861	2.854–2.867
	Some difficulty	<0.001	1.713	1.710–1.716
Poverty indicator	Not at risk (Ref.)	<0.001	Ref.	-
	At risk of poverty	<0.001	1.192	1.189–1.194
Age	16–24 (Ref.)	<0.001	Ref.	-
	25–34 years	<0.001	1.303	1.297–1.308
	35–44 years	<0.001	1.227	1.222–1.233
	45–54 years	<0.001	1.395	1.389–1.401
	55–64 years	<0.001	1.761	1.754–1.769
	65–74 years	<0.001	1.750	1.742–1.758
	75+ years	<0.001	1.946	1.936–1.955
Educational attainment	Tertiary (Ref.)	<0.001	Ref.	-
	Elementary	<0.001	1.399	1.395–1.402
	Upper Secondary	<0.001	1.143	1.141–1.146
Employment status	Employed (Ref.)	<0.001	Ref.	-
	Unemployed	<0.001	1.659	1.654–1.664
	Retired	<0.001	1.051	1.048–1.054
	Unable to work	<0.001	1.858	1.849–1.867
	Student	<0.001	0.752	0.748–0.755
	Domestic tasks	<0.001	1.012	1.010–1.015
	Other	<0.001	1.555	1.548–1.562

To the next page

From the previous page

Citizenship	Italian	<0.001	Ref.	-
	Foreign (EU)	<0.001	1.288	1.282–1.293
	Foreign (non-EU)	<0.001	1.211	1.207–1.214
Region of residence	Northwest (Ref.)	<0.001	Ref.	-
	South	<0.001	1.320	1.317–1.322
	Islands	<0.001	1.282	1.278–1.285
	Centre	<0.001	1.205	1.203–1.208
	Northeast	<0.001	1.377	1.374–1.380
Frequency of getting together with friends	Daily (Ref.)	<0.001	Ref.	-
	Every week	<0.001	1.345	1.342–1.348
	Several times a month	<0.001	1.324	1.320–1.327
	Several times a year	<0.001	1.769	1.764–1.775
	Once a year	<0.001	2.148	2.140–2.156
	Never	<0.001	1.982	1.975–1.988
Help from others	Has help (Ref.)	<0.001	Ref.	-
	No	<0.001	1.825	1.822–1.828

4. *Discussion*

This study provides a novel and comprehensive analysis of food deprivation in Italy by examining its prevalence, identifying key socio-demographic predictors, and exploring its impact on psychosocial well-being. In particular, we introduce a new Food Deprivation Index that captures both material deprivation and social exclusion in food-related activities, offering a more nuanced understanding of food poverty and its patterns in the Italian context. In terms of prevalence, when comparing the Food Deprivation Index with the Food Insecurity Experience Scale (FIES), distinct patterns emerge. While FIES estimates that 2.3% of the Italian population faced moderate or severe food insecurity in 2022, our multidimensional index reveals a much higher incidence, with 10.5% of the population experiencing material or social food deprivation. Despite the fact that a direct comparison of these figures is not possible, as the

FIES results are not available in the microdata file released by ISTAT for 2022, this discrepancy suggests that the two measures capture different aspects of food poverty. FIES focuses on personal food insecurity and the emotional stress related to it, while the Food Deprivation Index reflects both the affordability of a complete meal and participation in food-related social activities. Moreover, results show that material deprivation (7.5%) is more prevalent than social deprivation (4.8%), with a notable proportion of individuals (1.8%) experiencing both dimensions simultaneously. This illustrates the compounding nature of these forms of deprivation. The bivariate analysis suggests that the material dimension is more frequently observed among individuals with characteristics such as poverty risk, specific housing tenure, and certain employment statuses. For example, individuals in households facing great difficulty making ends meet are over five times more likely to be represented among those experiencing material deprivation compared to those in households managing easily. Social food deprivation, while also influenced by economic factors, emerges as a distinct dimension reflecting challenges in maintaining social connections and cultural practices. This form of deprivation is particularly prevalent among foreigners and larger families, indicating that social exclusion may be compounded by cultural and structural barriers. These findings underline the importance of considering social food deprivation, as it reveals vulnerabilities that might otherwise be overlooked by measures focused solely on material deprivation.

These results underscore the intricate relationship between economic, cultural, demographic, and geographic factors in shaping food deprivation. Consistent with existing literature, the findings highlight financial hardship as a pivotal driver of food deprivation, corroborating research across high-income countries that identifies income inequality and economic instability as key contributors to food poverty (Gatton, Gallegos 2023; Beacom *et al.* 2022; O'Connell, Brannen 2021; Loopstra *et al.* 2019; Dowler 2003). In this regard, the multivariate analysis reveals that while the national poverty threshold (income below 60% of the median income) is a significant predictor of food deprivation, a stronger association emerges with the subjective measure of households' perceived ability to make ends meet. In periods of high inflation, such subjective assessments of economic difficulty can become even more pertinent,

as standardised national measures often lag in capturing rapid price increases and regional cost-of-living variations. Consequently, individuals in households facing severe financial difficulties are substantially more likely to experience food deprivation, underscoring the importance of integrating subjective poverty assessments with objective income thresholds. Indeed, standardised national measures often fail to account for variations in the cost of living and local food habits, which are deeply rooted in cultural contexts (Biggeri, Pratesi 2017).

Furthermore, other socio-demographic factors significantly shape the risk of food deprivation, revealing the most vulnerable groups. In line with the findings of recent studies on food poverty predictors (Lund *et al.* 2018; Smith *et al.* 2017), our results indicates that single-person households, individuals with lower educational attainment, the unemployed or economically inactive, and non-EU foreign citizens face a heightened risk of food deprivation. Additionally, regional disparities exacerbate these issues, due to entrenched socio-economic inequalities, including lower employment opportunities and weaker social safety nets (Saraceno *et al.* 2022).

In terms of psychosocial well-being, our bivariate results reveal that both the material and social dimensions of food deprivation are associated with lower mean scores. Although the social component shows the largest gap, the differences remain relatively modest, suggesting a nuanced impact of food-related deprivation on well-being. To capture the combined effects of material and social deprivation, we opted to use the aggregated index as a unified measure in the second logistic regression model. This approach provides a more holistic perspective on food deprivation and its implications, allowing us to account for the interplay between these dimensions within a single framework. The results confirm that individuals classified as food-deprived are approximately 55% more likely to report poor psychosocial well-being compared to those who can afford a proper meal every second day and participate in food-related social occasions. This finding is consistent with existing literature, which highlights a strong association between food insecurity and negative mental health outcomes, such as increased stress, anxiety, and depression (Bergmans *et al.* 2019; Tevie, Shaya 2018; Tarasuk *et al.* 2018; Gundersen, Ziliak 2015; Weaver, Hadley 2009). Among the other variables in the model, perceived health emerges as a major predictor of psychosocial well-being. Individu-

als who report poor physical health are approximately 3 times more likely to experience poor psychosocial well-being, reinforcing the bidirectional relationship between physical and mental health (Fiorillo *et al.* 2023; Butcher *et al.* 2018; Prince *et al.* 2007). As several studies have highlighted, social connectedness is a key protective factor against poor mental health (Holt-Lunstad *et al.* 2022; Saeri *et al.* 2018). In our study, individuals who never meet their friends or lack access to support from family, friends, or neighbours report significantly worse psychosocial outcomes. By incorporating these additional variables that influence psychosocial well-being, the robustness of the observed impact of food deprivation is enhanced (Greenland *et al.* 1999).

While socio-demographic factors such as education level and employment status do impact well-being, their influence is comparatively less pronounced than the effects of food deprivation, perceived health, and social connectedness. Individuals with lower educational attainment and those who are unemployed face increased risks of poor well-being, as education and stable employment are crucial for accessing resources and maintaining social connections (Gutiérrez-García *et al.* 2018; Ross, Mirowsky 2013). Furthermore, foreign citizenship is associated with elevated risks of poor well-being, highlighting the additional hurdles faced by migrants, including social isolation and difficulties in accessing essential services (Gingell *et al.* 2022; Sesti *et al.* 2022; Priebe *et al.* 2016).

5. L*imitation*

This study has some limitations. The choice to use the term 'food deprivation' instead of 'food poverty' reflects the recognition that the available indicators focus primarily on economic access to adequate food and are insufficient to fully capture the multiple dimensions of the issue. Furthermore, it is worth noting that the indicator for meal affordability does not differentiate between different types of protein, which vary significantly in cost, while the measure of social food-related deprivation treats different experiences, such as sharing a drink or a meal, as equivalent, without accounting for their distinct financial, social, and cultural significance.

Moreover, the use of cross-sectional data limits the ability to draw strong causal links and restricts the analysis to a snapshot of food depri-

vation at a single point in time. This prevents an examination of temporal trends that could provide deeper insights into the evolution of food deprivation, particularly in the context of fluctuating poverty rates and economic conditions in Italy. Longitudinal data would allow for an exploration of how food deprivation evolves over time and interacts with broader socio-economic changes. Another limitation lies in the lack of data disaggregated below the macro-regional level, restricting our understanding of local dynamics that are crucial for more targeted interventions. Despite these constraints, this study provides valuable insights by examining both the material and social aspects of food deprivation, identifying the groups most at risk, and exploring the broader impact on psychosocial well-being. These findings lay the groundwork for future research to address these limitations, particularly through the use of longitudinal and more granular data, to better inform targeted and effective policy interventions.

6. *Conclusion*

This study highlights that food deprivation in Italy is intricately linked to monetary poverty, with significant portions of low-income individuals unable to access sufficient, varied, and socially acceptable food. However, the results show that the consequences of food deprivation extend beyond material hardship. Our findings reveal that the inability to afford a proper meal every second day is only one aspect of a broader phenomenon that also encompasses social participation in food-related activities. Policies addressing food poverty often focus on material provisions, but our study underscores the need to also consider the social implications of food deprivation.

Addressing food deprivation effectively requires the development of tailored indicators informed by qualitative research. Such research should capture the nuanced needs and experiences of various vulnerable groups, differentiating by age, gender, disability, and ethnic background. By incorporating the perspectives of those most affected, it could be possible to create context-specific measurement tools that address the diverse manifestations and dynamics of food poverty in Italy. In the short term, integrating existing data sources – such as the FAO's Food Inse-

curity Experience Scale (FIES) – with our novel Food Deprivation Index could provide more accurate prevalence estimates and enable a critical evaluation of recent food policy changes.

The results underscore the importance of addressing the root causes of food deprivation, such as income inequality, inadequate access to affordable housing, and barriers to education and employment. Effective interventions must aim to dismantle these systemic barriers, ensuring that policies address not only quantity and quality of food but also its social acceptability, cultural relevance, and alignment with individual preferences. By tackling these broader issues, based on the right to food, it will be possible to develop comprehensive strategies that provide immediate relief and foster long-term food well-being for all.

References

ActionAid (2023), *Frammenti da ricomporre. Numeri, strategie, approcci in cerca di una politica*, Milano.

Baker S., Gallegos D., Rebuli M.A., Taylor A.J., Mahoney R. (2024), "Food Insecurity Screening in High-Income Countries, Tool Validity, and Implementation: A Scoping Review", *Nutrients*, vol. 16, n. 11, 1684.

Ballard T.J., Kepple A.W., Cafiero C. (2013), "The Food Insecurity Experience Scale. Development of a Global Standard for Monitoring Hunger Worldwide", Rome, Food and Agriculture Organization of the United Nations.

Beacom E., Furey S., Hollywood L.E., Humphreys P. (2021), "Stakeholder-informed considerations for a food poverty definition", *British Food Journal*, vol. 123, n. 2, pp. 441-454.

Beacom E., McLaughlin C., Furey S., Hollywood L.E., Humphreys P. (2022), "Investigating the prevalence and predictors of food insecurity: a comparison of HFSSM and EU-SILC indicators", *British Food Journal*, vol. 124, n. 9, pp. 2705-2721.

Benedetti, I., Crescenzi F., Laureti T., Secondi L. (2024), "Adopting the fuzzy approach to analyze food poverty in Italy: A study on vulnerable households using household budget survey data", *Socio-Economic Planning Sciences*, vol. 95, 102006.

Bergmans R.S., Sadler R.C., Wolfson J.A., Jones A.D., Kruger D. (2019), "Moderation of the association between individual food security and poor mental health by the local food environment among adult residents of Flint, Michigan", *Health Equity*, vol. 3, n. 1, pp. 264-274.

Bernaschi D., Marino D., Felici F. (2023), "Measuring food insecurity: Food Affordability Index as a measure of territorial inequalities", *Italian Review of Agricultural Economics*, vol. 78, n. 3, pp. 79-91.

Berry E.M., Dernini S., Burlingame B., Meybeck A., Conforti P. (2015), "Food security and sustainability: can one exist without the other?", *Public Health Nutrition*, vol. 18, n. 13, pp. 2293-2302.

Biggeri L., Pratesi M. (2017, July), "Monetary poverty indicators at local level: definitions, methods of estimations and comparisons in real terms", in *Proceedings of the 60th World Statistics Congress of the International Statistical Institute*, pp. 16-21.

Butcher L.M., O'Sullivan T.A., Ryan M.M., Lo J., Devine A. (2018), "Utilising a multi-item questionnaire to assess household food security in Australia", *Health Promotion Journal of Australia*, vol. 30, pp. 9-17.

Cafiero C., Viviani S., Nord M. (2018), "Food security measurement in a global context: The food insecurity experience scale", *Measurement*, vol. 116, pp. 146-152.

Campiglio L., Rovati G. (2009), *La Povertà Alimentare in Italia: Prima Indagine Quantitativa e Qualitativa*, Milano, Guerini e Associati.

Caraher M., Coveney J. (eds) (2016), *Food Poverty and Insecurity: International Food Inequalities*, Cham, Springer

Carrillo-Álvarez E. (2023), "Perspective: Food and nutrition insecurity in Europe: Challenges and opportunities for dietitians", *Advances in Nutrition*, vol. 14, n. 5, pp. 995-1004.

Coleman-Jensen A., Rabbitt M.P., Gregory C.A., Singh A. (2017), "Household food security in the United States in 2016", *Economic Research Report*, n. 237. United States Department of Agriculture.

Dowler E. (2003), "Food and poverty in Britain: Rights and responsibilities", in E. Dowler, C. Jones Finer (eds), *Welfare of Food: Rights and Responsibilities in a Changing World*, Hoboken, Wiley-Blackwell.

FAO (2001), *The State of Food Insecurity in the World* 2001, Rome, Food and Agriculture Organization.

– (1996), *Rome Declaration on World Food Security and World Food Summit Plan of Action*, Rome, Food and Agriculture Organization.

– (1983), *World Food Security: A Reappraisal of the Concepts and Approaches. Director General's Report*, Rome, Food and Agriculture Organization.

– (1974), *World Food and Agriculture Situation*, Rome, Food and Agriculture Organization.

Fiorillo A., de Girolamo G., Simunovic I.F., Gureje O., Isaac M., Lloyd C., Mari J., Patel V., Reif A., Starostina E., Summergrad P., Sartorius N. (2023), (2023), "The relationship between physical and mental health: An update

from the WPA Working Group on managing comorbidity of mental and physical health", *World Psychiatry*, vol. 22, n. 1, pp. 169-183.

Frongillo E.A., Nguyen H.T., Smith M.D., Coleman-Jensen A. (2017),"Food insecurity is associated with subjective well-being among individuals from 138 countries in the 2014 Gallup World Poll", *The Journal of Nutrition*, vol. 147, n. 4, pp. 680-687.

Gallegos D., Booth S., Pollard C.M., Chilton M., Kleve S. (2023), "Food security definition, measures and advocacy priorities in high-income countries: a Delphi consensus study", *Public Health Nutrition*, vol. 26, n. 10, pp. 1986-1996.

Gallegos D., McKechnie R., McAndrew R., Russell-Bennett R., Smith G. (2022), "How gender, education and nutrition knowledge contribute to food insecurity among adults in Australia", *Health & Social Care in the Community*, vol. 30, n. 5, pp. e2724-e2736.

Garratt E. (2020), "Food insecurity in Europe: Who is at risk, and how successful are social benefits in protecting against food insecurity?", *Journal of Social Policy*, vol. 49, n. 4, pp. 785-809.

Gatton M.L., Gallegos D. (2023), "A 5-year review of prevalence, temporal trends and characteristics of individuals experiencing moderate and severe food insecurity in 34 high income countries", BMC *Public Health*, vol. 23, n. 1, p. 2215.

Gingell T., Murray K., Correa-Velez I., Gallegos D. (2022), "Determinants of food security among people from refugee backgrounds resettled in high-income countries: A systematic review and thematic synthesis", PLOS ONE, vol. 17, n. 6, e0268830.

Greenland S., Robins J.M., Pearl J. (1999), "Confounding and collapsibility in causal inference", *Statistical Science*, vol. 14, n. 1, pp. 29-46, DOI:10.1214/ss/1009211805.

Grimaccia E., Naccarato A. (2019), "Food insecurity individual experience: a comparison of economic and social characteristics of the most vulnerable groups in the world", *Social Indicators Research*, vol. 143, pp. 391-410.

Guio A.-C., Gordon D., Najera H., Pomati M. (2017), *Revising the* EU *material deprivation variables* (Technical Report, Statistical working papers), Eurostat, Publications Office of the European Union.

Gundersen C., Ziliak J.P. (2015), "Food insecurity and health outcomes", *Health Affairs*, vol. 34, n. 11, pp. 1830-1839.

Gutiérrez-García R.A., Benjet C., Borges G., Méndez Ríos E., Medina-Mora M. E. (2018), "Emerging adults not in education, employment or training (NEET): socio-demographic characteristics, mental health and reasons for being NEET", BMC *Public Health*, vol. 18, pp. 1-11.

Hanna K., Cross J., Nicholls A., Gallegos D. (2023), "The association between loneliness or social isolation and food and eating behaviours: a scoping review", *Appetite*, 107051.

HLPE (2020), *Food Security and Nutrition: Building a Global Narrative towards 2030. A Report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*, Rome, FAO.

Holt-Lunstad J., Steptoe A. (2022), "Social isolation: An underappreciated determinant of physical health", *Current Opinion in Psychology*, vol. 43, pp. 232-237.

ISTAT (2024), *Rapporto SDGs 2024. Informazioni statistiche per l'Agenda 2030 in Italia*. Collana "Letture Statistiche-Temi", https://www.istat.it/storage/rapporti-tematici/sdgs/2024/Rapporto-SDGs2024-Ebook.pdf.

Leung C.W., Laraia B.A., Feiner C., Solis K., Stewart A.L., Adler N.E., Epel E.S. (2022), "The psychological distress of food insecurity: a qualitative study of the emotional experiences of parents and their coping strategies", *Journal of the Academy of Nutrition and Dietetics*, vol. 122, n. 10, pp. 1903-1910.

Loopstra R., Reeves A., Tarasuk V. (2019), "The rise of hunger among low-income households: an analysis of the risks of food insecurity between 2004 and 2016 in a population-based study of UK adults", *Journal of Epidemiology and Community Health*, vol. 73, n. 7, pp. 668-673.

Lund T.B., Holm L., Tetens I., Smed S., Nielsen A.L. (2018), "Food Insecurity in Denmark – socio-demographic determinants and associations with eating – and health-related variables", *The European Journal of Public Health*, vol. 28, n. 2, pp. 283-288.

Marchetti S., Secondi L. (2022), "The economic perspective of food poverty and (in)security: An analytical approach to measuring and estimation in Italy", *Social Indicators Research*, vol. 162, n. 3, pp. 995-1020.

Martin M.S., Maddocks E., Chen Y., Gilman S.E., Colman I. (2016), "Food insecurity and mental illness: Disproportionate impacts in the context of perceived stress and social isolation", *Public Health*, vol. 132, pp. 86-91.

Meshkat S., Pang H., Tassone V.K., Janssen-Aguilar R., Wu M., Jung H., Bhat V. (2024), "Depressive symptoms among adults is associated with decreased food security", PLOS ONE, vol. 19, n. 6, e0303345.

O'Connell R., Brannen J. (eds) (2021), *Families and Food in Hard Times*, London, UCL Press.

O'Connell R., Owen C., Padley M., Simon A., Brannen J. (2019), "Which types of family are at risk of food poverty in the UK? A relative deprivation approach", *Social Policy and Society*, vol. 18, n. 1, pp. 1-18.

O'Connor N., Farag K., Baines R. (2016), "What is food poverty? A conceptual framework", *British Food Journal*, vol. 118, n. 2, pp. 429-449.

Palladino M., Cafiero C., Sensi R. (2024), "Understanding adolescents" lived experience of food poverty. A multi-method study among food aid recipient families in Italy", *Global Food Security*, vol. 41, 100762.

Pourmotabbed A., Moradi S., Babaei A., Ghavami A., Mohammadi H., Jalili C., Miraghajani M. (2020), "Food insecurity and mental health: a systematic review and meta-analysis", *Public Health Nutrition*, vol. 23, n. 10, pp. 1778-1790.

Priebe S., Giacco D., El-Nagib R. (2016), *Public health aspects of mental health among migrants and refugees: a review of the evidence on mental health care for refugees, asylum seekers and irregular migrants in the* WHO *European Region*, World Health Organization, Regional Office for Europe.

Prince M., Patel V., Saxena S., Maj M., Maselko J., Phillips M.R., Rahman A. (2007), "No health without mental health", *The Lancet*, vol. 370, n. 9590, pp. 859-877.

Radimer K.L. (1990), *Understanding Hunger and Developing Indicators to Assess It*, Cornell University.

Ross C.E., Mirowsky J. (2013), "The sense of personal control: Social structural causes and emotional consequences", in S.C. Aneshensel, J.C. Phelan, A. Bierman (eds), *Handbook of the Sociology of Mental Health*, pp. 379-402.

Ruggeri K., Garcia-Garzon E., Maguire Á., Matz S., Huppert F.A. (2020), "Well-being is More than Happiness and Life Satisfaction: A Multidimensional Analysis of 21 Countries", *Health and quality of life outcomes*, vol. 18, n. 1, p. 192.

Saeri A.K., Cruwys T., Barlow F.K., Stronge S., Sibley C.G. (2018), "Social connectedness improves public mental health: Investigating bidirectional relationships in the New Zealand attitudes and values survey", *Australian & New Zealand Journal of Psychiatry*, vol. 52, n. 4, pp. 365-374.

Saraceno C., Morlicchio E., Benassi D. (2022), *La povertà in Italia: soggetti, meccanismi*, politiche Bologna, il Mulino.

Sesti F., Minardi V., Baglio G., Bell R., Goldblatt P., Marceca M., Marmot M. (2022), "Social determinants of mental health in Italy: the role of education in the comparison of migrant and Italian residents", *International Journal for Equity in Health*, vol. 21, n. 1, p. 116.

Smith M.D., Rabbitt M.P., Coleman-Jensen A. (2017), "Who are the World"s Food Insecure? New Evidence from the Food and Agriculture Organization"s Food Insecurity Experience Scale", *World Development*, vol. 93, pp. 402-412.

Stoltzfus J.C. (2011), "Logistic regression: a brief primer", *Academic Emergency Medicine*, vol. 18, n. 10, pp. 1099-1104.

Tarasuk V., Cheng J., Gundersen C., de Oliveira C., Kurdyak P. (2018), "The relation between food insecurity and mental health care service utilization in Ontario", *The Canadian Journal of Psychiatry*, vol. 63, n. 8, pp. 557-569.

Tevie J., Shaya F. (2018), "Does food security predict poor mental health?", *Journal of Public Mental Health*, vol. 17, n. 1, pp. 3-10.

Weaver L.J., Hadley C. (2009), "Moving beyond hunger and nutrition: a systematic review of the evidence linking food insecurity and mental health in developing countries", *Ecology of Food and Nutrition*, vol. 48, n. 4, pp. 263-284.

Wolfson J.A., Garcia T., Leung C.W. (2021), "Food insecurity is associated with depression, anxiety, and stress: evidence from the early days of the COVID-19 pandemic in the United States", H*ealth* E*quity*, vol. 5, n. 1, pp. 64-71.