Having lunch at staff canteen, consumption of plant foods and mental health among municipal employees

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ABSTRACT

Background and objectives: Consumption of vegetables, fruit, berries, and other foods of plant origin has been shown to prevent chronic diseases, and there is increasing evidence on the benefits of plant foods to mental health. Among employed populations, work environments, including staff canteens, could offer opportunities for promoting plant food consumption in different employee groups. This study among Finnish municipal employees examined whether having lunch at staff canteen, occupational class and other socioeconomic factors are associated with the consumption of various plant foods, and whether plant food consumption is further associated with general mental health.

Data and methods: The data used in the study were derived from the ongoing Helsinki Health Study (HHS). The HHS baseline survey (N=8960) among the 40-60-year-old employees of the City of Helsinki was conducted in 2000-2002, and follow-up surveys were carried out in 2007, 2012 and 2017. Among younger, under 40-year-old, employees, a survey was carried out in 2017 (N=5898). These two datasets included information on plant food consumption measured with a food frequency questionnaire, sociodemographic and socioeconomic factors (e.g. education, occupational class, income, wealth, economic difficulties), working conditions (e.g. job strain), and mental health (SF-36). Statistical analysis methods including group-based trajectory modelling for identifying fruit and vegetable consumption trajectories and multivariate regression modelling were used to examine the associations between plant food consumption, socioeconomic and work-related factors, having lunch at staff canteen and mental health.

Results: The main results were that long-term trajectories showed fruit, berry, and vegetable consumption to be low and mostly stable among the majority of the study participants. Lower education, occupational class, income, wealth as well as economic difficulties were associated with lower plant food consumption trajectories among the middle-aged and ageing employees. Among under 40-year-old employees, those who regularly had lunch at a staff canteen consumed plant foods more frequently. And further, those who had plant foods more often, had better mental health compared to others. Results obtained in this study were overall highly similar among women and men.

Conclusions: The results of this study highlight the importance of prevention and intervention related to the dietary habits and mental health of employees. Promotion of fruit, vegetable and other plant food consumption should be the interest of employers as well as policy makers. Intervention studies would be needed to provide information on effective means to increase plant food consumption among employees and to investigate concrete ways to utilise the workplace and staff canteens in plant food promotion.

1 Background

Among employed populations there is strong potential to support health and work ability through the promotion of healthy lifestyles. A wealth of evidence from studies among both employed and general populations have shown that the consumption of foods of plant origin – including fruit, berries, fresh and cooked vegetables, wholegrains and plant fats – is a key factor in the prevention of obesity and chronic diseases (Bertoia et al. 2015, Aune et al. 2017, Muraki et al. 2013). Increasingly, plant food consumption has been suggested to be beneficial also in terms of general mental health (Saghafian et al. 2018). Despite the health benefits of plant foods, their consumption level is low. In Finland, the most recent national survey, FinDiet 2017, showed that only 14% of men and 22% of women reach the recommended daily minimum consumption level of 500 grams of vegetables, fruit, and berries (Valsta et al. 2018).

Mental disorders of different degrees of severity increasingly contribute to the global burden of disease, affecting the work ability of individuals and leading to an early exit from the workforce (OECD 2015, Murray et al. 2012, Järvisalo et al. 2005). General mental health problems such as depressive and anxiety symptoms (Goldberg 1972, Fryers et al. 2003), can affect up to 20-30% of European employees yearly (Dewa et al. 2014, Vieth 2009, Steel 2014), and lower their psychosocial and work-related functioning, leading to a lowered work ability (Stansfeld et al. 2011, Rai et al. 2010, Lahelma et al. 2015). There is evidence from many European countries showing that even mild mental disorders are associated with for example later sickness absence (Stansfeld et al. 2011, Bertilsson et al. 2015, Gjesdal et al. 2016, Hjarsbech et al. 2011, van Hoffen et al. 2015, Roelen et al. 2014, Thorsen et al. 2013).

Within a population, consumption of different foods, including plant foods such as fresh vegetables and fruit, varies by sociodemographic characteristics such as age and sex as well as living arrangements and environments (Ricciuto et al. 2006, Ball et al. 2015, Seiluri et al. 2011). Socioeconomic position has been a particularly strong determinant of plant food use, and people in lower occupational, educational and income classes have been shown to purchase and consume less of e.g. vegetables and fruit than people in higher positions (Ricciuto et al. 2006, Ball et al. 2015, Lallukka et al. 2010). There is some evidence showing that these associations may differ according to indicators used. In the Helsinki Health Study (HHS) cohort of midlife municipal employees, income was shown to be a stronger determinant of fruit and vegetable consumption than education (Lallukka et al. 2010).

Workplace canteens have been shown to partly contribute to the eating habits among employees (Raulio 2010, Roos et al. 2004). Workplace interventions have also produced results suggesting a potential to promote a higher consumption level of plant foods such as fruit and vegetables (Thorsen et al. 2010). Workplace canteens could also reach employees in different occupational groups and classes, including those in lower socioeconomic positions. This could be particularly useful as employees in lower occupational classes and with lower education and income have been observed to consume plant foods less often than employees in higher positions (Ricciuto et al. 2006, Seiluri et al. 2011, Lallukka et al. 2010).

This study investigated associations between plant food consumption, having lunch at staff canteen and mental health among employees of the City of Helsinki. The study had two main objectives. First, this study examined whether differing long-term trajectories can be found in the use of plant foods among employees who were 40-60-year-old at the

beginning of the follow-up, and whether socioeconomic circumstances are associated with these trajectories. Second, the study examined associations between having lunch at staff canteen and plant food consumption, and further between plant food consumption and general mental health.

2 Data and methods

Helsinki Health Study survey data

This study was conducted as a part of the ongoing Helsinki Health Study (HHS) which is a follow-up study of almost twenty years among the employees of the City of Helsinki. The City of Helsinki is the largest employer in Finland with a staff of about 40000, with the employees representing hundreds of occupations in mainly social and health care, education, public transportation, cultural services, environmental and technical maintenance and public administration. The HHS baseline postal surveys were conducted in 2000-2002 among the employees reaching the age of 40, 45, 50 and 60 in each year (N=8960, 80% women, response rate 67%). The HHS follow-up surveys were conducted in 2007 (N=7332, response rate 83%), 2012 (N=6814, response rate 79%), and 2017 (N=6832, response rate 82%). In this study, data from these baseline and follow-up surveys were utilised in the first sub-study. The second sub-study was based on survey data from The Young Helsinki Health Study (YHHS) survey. The survey was conducted in 2017 among all those employees of the City of Helsinki, whose year of birth was 1978 or later, and who at the time of the survey had been employed for 4 months or more with a contract of at least 50% (N=5898, response rate 51.5%). The survey was conducted with 1) online questionnaires, and 2) identical postal questionnaires among those who did not respond online, and 3) telephone interviews among those who did not respond to online or postal questionnaires. The ethical aspects of the HHS and the YHHS have been approved by ethics committees at the Faculty of Medicine, University of Helsinki, and the City of Helsinki health authorities.

Measures

The Short Form 36 (SF-36) questionnaire was included to measure health functioning. The SF-36 measures health related functioning and wellbeing in eight subscales, one of which is general mental health. This mental health subscale is also known as the five-item Mental Health Index (MHI-5). MHI-5 is widely used and has shown good specificity and sensitivity for detecting general mental health disorders and depression in general populations (Cuijpers et al. 2009). The MHI-5 consists of five items which concern nervousness, sadness, peacefulness, mood and happiness during four weeks preceding the survey. The 6-point response scale ranged from 1 ‘all the time’ to 6 ‘none of the time. A total sum score for the MHI-5 was calculated and varied from 0 ‘lowest level of mental health’ to 100 ‘highest level of mental health’. The lowest quartile of the sum score was used as the cut-off point to dichotomize the measure into ‘poor’ and ‘good’ general mental health for the purposes of this study.

Having lunch at staff canteen was assessed with the following question: “Where do you usually have your lunch?” The response categories were: 1) at the staff canteen, 2) somewhere else at the workplace (e.g. in the coffee room), 3) in a restaurant or a café, 4) somewhere else than previously mentioned locations, and 5) I don’t have lunch. Respondents who chose the first category were classified as having lunch at the staff canteen, and others as not having lunch at the staff canteen.

Consumption of different food items was measured with a 14-item food frequency questionnaire (FFQ). In this study, the utilised food items of the FFQ consisted of: fruit, berries, fresh vegetables, cooked vegetables, vegetarian dishes, wholegrain bread. Respondents were asked to estimate the frequency of consumption of the different food

items during the past four weeks, with response alternatives ranging from '2 times a day' to 'not during the past 4 weeks'. A total sum of consumption frequency per month was calculated for each item. In addition, a dichotomy variable of daily vs. non-daily consumption of each food item was formed.

Sociodemographic covariates included age, sex and marital status. Socioeconomic indicators included parental education, childhood economic difficulties, own education, occupational class, household income, current economic difficulties, housing tenure and household wealth. Psychosocial working conditions included Karasek's job strain categorised into active work, high job strain, low job strain and passive work, mental workload categorised into low and high, workplace atmosphere categorised into good and poor, and workplace bullying measured using an instructed question about being bullied currently, previously or never.

Statistical methods

The data were analysed with statistical methods, including calculations of prevalence (N, %), means and odds ratios with their 95% confidence intervals in logistic regression models. In the first sub-study, trajectory analysis was utilised. Long-term trajectories of fruit, berry and vegetable consumption were identified using group-based trajectory modelling which is an application of finite mixture modelling. Certain statistical criteria were applied as the basis of choosing the number of optimal trajectories and their shapes, and as the result of this process each participant was assigned to the trajectory for which they had the highest group membership probability (Nagin & Odgers 2010). Associations of multiple socioeconomic circumstances (including e.g. occupational class, income and wealth) with the trajectory group memberships were then examined by fitting multinomial

logistic regression models which produced odds ratios (OR) with 95% confidence intervals (CI). The statistical analyses were performed using STATA version 15, SAS statistical software version 9.4 (SAS Institute Inc., Cary, NC, USA) and IBM SPSS Statistics version 25.

Results

Plant food consumption and its changes over time

Four long-term trajectories of fruit, berry and vegetable consumption were identified among middle-aged and ageing employees, shown in Figure 1: increasing higher, decreasing higher, stable moderate and stable low. A low level of consumption, which prevailed over the study period, was common: 35% of participants were assigned to the stable low and 43% of participants to the stable moderate trajectory. Higher consumption levels were less common, respectively, as only 10% of participants were assigned to the decreasing higher and 12% to the increasing higher trajectory.

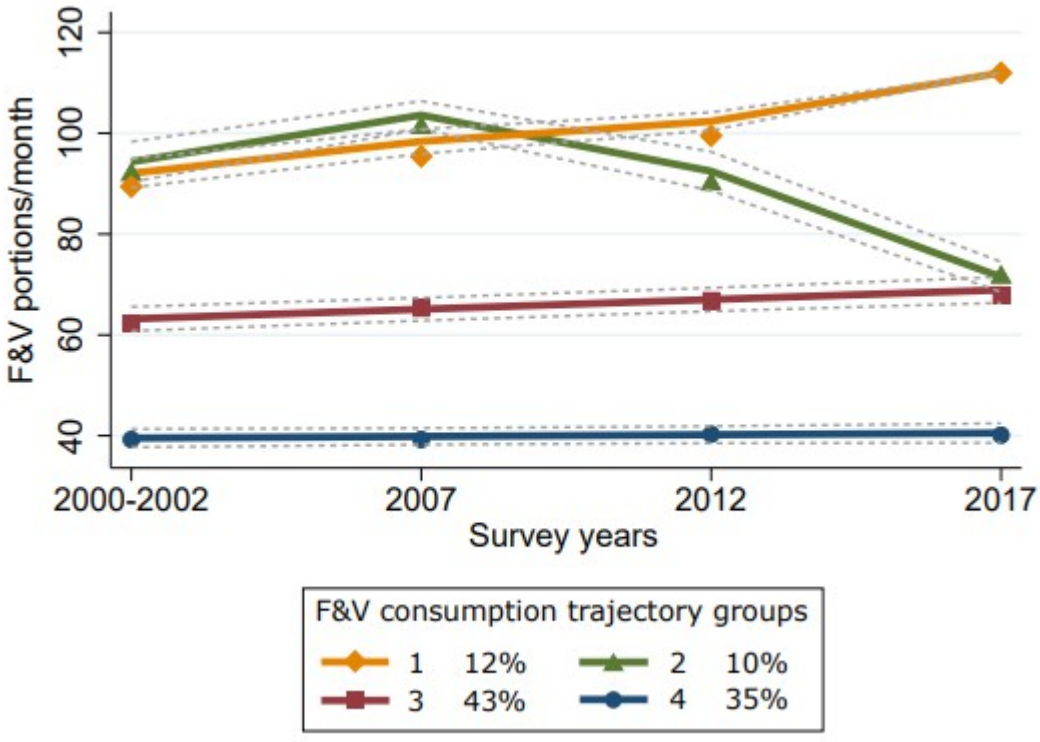

Figure 1. Fruit and vegetable (F&V) consumption trajectories and their prevalence (%), identified by group-based trajectory modelling; group means and fitted lines with 95% confidence intervals.

Socioeconomic circumstances and plant food consumption

All studied socioeconomic circumstances were associated with the long-term trajectories of fruit, berry and vegetable consumption. Low parental education was associated most clearly with the stable low (OR 1.57, CI 1.25-1.97) trajectory, as were childhood economic difficulties (OR 1.66, CI 1.29-2.14). Among adulthood socioeconomic circumstances, the strongest association with the fruit and vegetable trajectories was found for occupational class (OR range 2.60, CI 2.15-3.15 – 3.96, CI 2.81-5.59). Similarly to low occupational class, low own education, low household income and wealth, as well as living in rented housing and reporting current economic difficulties were also associated with lower fruit and vegetable trajectories.

Having lunch at staff canteen and plant food consumption

Daily consumption (%) of the different plant foods and mean portions/month are shown in Table 1, by having/not having lunch usually at staff canteen, separately for women and men. The logistic regression models, presented in Table 2, showed that having lunch at staff canteen was associated with the consumption of fresh and cooked vegetables among both women and men. Employees who regularly had lunch at staff canteen, compared to those who had lunch elsewhere, were approximately twice as likely to consume fresh vegetables daily. A less strong association was observed for cooked vegetables. Adjustments for socioeconomic position and working conditions slightly attenuated the associations but they remained clear (data not shown). For the other food items, no associations were observed.

Table 1. Having lunch at staff canteen and plant food consumption (daily use %, portions/month means).

	Women		Men	
	Having lunch at staff canteen	**Not having lunch at staff canteen**	**Having lunch at staff canteen**	**Not having lunch at staff canteen**
Fruit				
Daily users, %	52	51	30	32
Portions/month, mean	27	27	19	18
Berries				
Daily users, %	29	29	12	14
Portions/month, mean	16	17	11	10
Fresh vegetables				
Daily users, %	**82**	**69**	**63**	**45**
Portions/month, mean	**39**	**36**	**31**	**26**
Cooked vegetables				
Daily users, %	**32**	**25**	**20**	**12**
Portions/month, mean	**19**	**17**	**16**	**12**
Vegetarian dishes				
Daily users, %	27	25	18	18
Portions/month, mean	**18**	**17**	13	13
Wholegrain bread				
Daily users, %	43	41	35	35
Portions/month, mean	**23**	**22**	21	21

Table 2. Associations between having lunch at staff canteen and plant food consumption, odds ratios (OR) with 95% confidence intervals (CI) from logistic regression analysis.

	Women	Men
	Having lunch at staff canteen (ref. not having)	**Having lunch at staff canteen (ref. not having)**
Daily consumption of (ref. non-daily):	**Age-adjusted OR (95% CI)**	**Age-adjusted OR (95% CI)**
Fruit	1.00 (0.88-1.14)	0.91 (0.69-1.19)
Berries	0.99 (0.85-1.14)	0.86 (0.59-1.26)
Fresh vegetables	**1.96 (1.67-2.30)**	**2.13 (1.65-2.76)**
Cooked vegetables	**1.36 (1.18-1.57)**	**1.71 (1.21-2.43)**
Vegetarian dishes	1.13 (0.98-1.31)	0.95 (0.69-1.32)
Wholegrain bread	1.04 (0.91-1.18)	0.99 (0.76-1.29)

Plant food consumption and mental health

Consumption of the different plant foods was clearly associated with general mental health Among women, daily consumers of fruit, berries, fresh and cooked vegetables as well as wholegrain were more likely to have good general mental health compared to women who did not consume these foods daily. The strongest association was found for fresh vegetables. Among men, the associations were in line with those found for women, but somewhat stronger. Men with daily consumption of fruit, berries, fresh and cooked vegetables, and wholegrain bread had clearly higher odds for good mental health compared to men with non-daily consumption. The strongest association was, similarly to women, found for fresh vegetables. Among both women and men, after adjustments for covariates, most of the association remained unaffected.

Table 3. Associations between plant food consumption and general mental health. Odds ratios (age-adjusted) with 95% confidence intervals (CI) from logistic regression analysis.

	Women	**Men**
	Good mental health (ref. poor)	**Good mental health (ref. poor)**
Daily consumption of (ref. non-daily):	**Age-adjusted OR (95% CI)**	**Age-adjusted OR (95% CI)**
Fruits	**1.39 (1.21-1.59)**	**1.49 (1.11-2.01)**
Berries	**1.32 (1.13-1.54)**	**1.57 (1.03-2.39)**
Fresh vegetables	**1.51 (1.30-1.76)**	**1.78 (1.36-2.33)**
Cooked vegetables	**1.25 (1.07-1.46)**	**1.57 (1.07-2.32)**
Vegetarian dishes	0.91 (0.78-1.07)	0.82 (0.58-1.15)
Wholegrain bread	**1.20 (1.04-1.38)**	**1.35 (1.01-1.79)**

Conclusions

This study examined, first, long-term trajectories of plant food consumption and their socioeconomic determinants, and second, associations between plant food consumption, having lunch at staff canteen, and mental health. The study population consisted of women and men employed by the City of Helsinki, middle-aged and ageing in the first sub-study and under 40-year-old in the second sub-study. The main results of the study were that long-term trajectories showed fruit, berry, and vegetable consumption to change only little and to be low among the majority of the study participants. Lower education, occupational class, income, wealth as well as economic difficulties were associated with lower plant food consumption trajectories among the employees. Under 40-year-old employees who regularly had lunch at a staff canteen consumed plant foods more frequently. And further, those who had plant foods more often, had better mental health compared to others. Results obtained in this study were overall highly similar among women and men.

The results of this study highlight the importance of prevention and intervention related to the dietary habits and mental health of employees. Firstly, milder mental disorders and problems are very prevalent and frequent among employees. Thus, it would be important to focus on developing efficient measures and policies to promote employee health and wellbeing in the long-term. In the light of the results of this study, promotion of fruit, vegetable and other plant food consumption could possibly increase the mental health and wellbeing among employees, and workplace canteens could provide opportunities for contributing to the consumption level. This should be the interest of employers as well as policy makers, and intervention studies on the subject could provide concrete means to be implemented in the working life and workplace environments.

Different kinds of interventions have already been made internationally which could be applied in the working places for increasing plant food use as a part of a health promoting diet. Results from such intervention studies need to be put into practice, and also new cost-effective ways to support employee health behaviours should be developed to suit different kinds of employee groups and working environments. Further evidence from prospective studies with register based mental health outcomes would also be warranted. Overall, in future research, attention should be paid on the different employee groups and in which particular ways plant food consumption could be enhanced among them most effectively. In particular, ways to support health promoting behaviours and choices among employees in lower occupational classes and manual work should be explored in order to tackle the socioeconomic health inequalities among the employed population.

References

Aune D, Giovannucci E, Boffetta P et al. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality – a systematic review and dose-response meta-analysis of prospective studies. Int J Epidemiol 2017;46:1029-56.

Ball K, Lamb KE, Costa C et al. Neighbourhood socioeconomic disadvantage and fruit and vegetable consumption: a seven countries comparison. Int J Behav Nutr Phys Act 2015;12:68.

Bertilsson M, Vaez M, Waern M, Ahlborg G Jr, Hensing G. A prospective study on self-assessed mental well being and work capacity as determinants of all-cause sickness absence. J Occup Rehabil 2015;25:52-64.

Bertoia ML, Mukamal KJ, Cahill LE. Changes in intake of fruits and vegetables and weight change in United States men and women followed for up to 24 Years: Analysis from three prospective cohort studies. PLoS Med 2015;12:e1001878.

Cuijpers P, Smits N, Donker T, Have M, de Graaf R. Screening for mood and anxiety disorders with the five-item, the three-item, and the two-item Mental Health Inventory. Psych Res 2009;3:250-5.

Dewa CS, Loong D, Bonato S, Hees H. Incidence rates of sickness absence related to

mental disorders: a systematic literature review. BMC Public Health 2014;14:205.

Fryers T, Melzer D, Jenkins R. Social inequalities and the common mental disorders: a systematic review of the evidence. Soc Psych Psych Epid 2003;38:229–37.

Gjesdal S, Holmaas TH, Monstad K, Hetlevik Ø. GP consultations for common mental disorders and subsequent sickness certification: register-based study of the employed population in Norway. Fam Pract 2016; pii: cmw072.

Goldberg DP. The Detection Of Psychiatric Illness By Questionnaire. Oxford University Press: London, 1972.

Hjarsbech PU, Andersen RV, Christensen KB, Aust B, Borg V, Rugulies R. Clinical and non-clinical depressive symptoms and risk of long-term sickness absence among female employees in the Danish eldercare sector. J Affect Disord 2011;129:87-93.

van Hoffen MFA, Joling CI, Heymans MW, Twisk JWR, Roelen CAM. Mental health symptoms identify workers at risk of long-term sickness absence due to mental disorders: prospective cohort study with 2-year follow-up. BMC Public Health 2015;15:1235.

Järvisalo J, Andersson B, Boedeker B, Houtman I (eds.). Mental disorders as a major challenge in prevention of work disability: experiences in Finland, Germany, the Netherlands and Sweden. Helsinki: The Social Insurance Institution, Finland, Social security and health reports 66, 2005.

Lahelma E, Pietiläinen O, Rahkonen O, Lallukka T. Common mental disorders and cause-specific disability retirement. Occup Environ Med 2015;72:181-7.

Lallukka T, Pitkäniemi J, Rahkonen O et al. The association of income with fresh fruit and vegetable consumption at different levels of education. Eur J Clin Nutr 2010; 64: 324-327.

Muraki I, Imamura F, Manson JE et al. Fruit consumption and risk of type 2 diabetes: results from three prospective longitudinal cohort studies. BMJ 2013; 347: f5001.

Murray C, Vos T, Lozano R, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012;380:2197-223.

Nagin DS and Odgers CL. Group-based trajectory modeling in clinical research. Annu Rev Clin Psychol 2010;6:109–38.

OECD. Fit Mind, Fit Job: From Evidence to Practice in Mental Health and Work. OECD Publishing, Paris, 2015.

Rai D, Skapinakis P, Wiles N, et al. Common mental disorders, subthreshold symptoms and disability: longitudinal study. Br J Psychiatry 2010;197:411–12.

Raulio S, Roos E, Prättälä R. School and workplace meals promote healthy food habits. Public Health Nutr 2010;13:987-92.

Ricciuto L, Tarasuk V and Yatchew A. Socio-demographic influences on food purchasing among Canadian households. Eur J Clin Nutr 2006; 60: 778-790.

Roelen CA, Hoedeman R, van Rhenen W, Groothoff JW, van der Klink JJ, Bültmann U. Mental health symptoms as prognostic risk markers of all-cause and psychiatric sickness absence in office workers. Eur J Public Health 2014;24:101-5.

Roos E, Sarlio-Lähteenkorva S, Lallukka T. Having lunch at a staff canteen is associated with recommended food habits. Public Health Nutr 2004;7:53-61.

Saghafian F, Malmir H, Saneei P et al. Fruit and vegetable consumption and risk of depression: accumulative evidence from an updated systematic review and meta-analysis of epidemiological studies. Br J Nutr 2018;119:1087-1101.

Seiluri T, Lahelma E, Rahkonen O et al. Changes in socio-economic differences in food habits over time. Public Health Nutr 2011;14:1919–1926.

Stansfeld SA, Fuhrer R, Head J. Impact of common mental disorders on sickness absence in an occupational cohort study. Occup Environ Med 2011;68:408-13.

Steel Z, Marnane C, Iranpour C et al. The global prevalence of common mental disorders: a systematic review and metaanalysis 1980–2013. Int J Epidemiol 2014;43:476–93.

Thorsen AV, Lassen AD, Tetens I, Hels O, Mikkelsen BE. Long-term sustainability of a worksite canteen intervention of serving more fruit and vegetables. *Public Health Nutr* 2010;13:1647-1652.

Thorsen SV, Rugulies R, Hjarsbech PU, Bjorner JB. The predictive value of mental health for long-term sickness absence: the Major Depression Inventory (MDI) and the Mental Health Inventory (MHI-5) compared. BMC Med Res Methodol 2013;13:115.

Valsta L, Kaartinen N, Tapanainen H et al. Nutrition in Finland - FinDiet 2017 Study. Helsinki, Finland: National Institute for Health and Welfare, 2018.

Vieth H. Mental health policies in Europe. Euro Observer 2009;3:1-4.