Published in final edited form as:
Eur J Public Health. 2016 August ; 26(4): 575–581. doi:10.1093/eurpub/ckv243.

Cumulative Social Risk in Childhood and Smoking and Excessive Alcohol Use in Adulthood

Rishi Caleyachetty, MBBS PhD[1,2], **Kay-Tee Khaw, MBBChir FRCP**[3], **Paul G Surtees, PhD**[3], **Nicholas WJ Wainwright, PhD**[3], **Nicholas Wareham, MBBS PhD**[1], and **Simon J Griffin, MBBS DM**[1,3]

[1]Medical Research Council Epidemiology Unit, University of Cambridge, Cambridge, United Kingdom

[2]National Collaborating Centre for Women's and Children's Health, Royal College of Obstetricians and Gynaecologists, London, United Kingdom

[3]Department of Public Health and Primary Care, Institute of Public Health, University of Cambridge School of Clinical Medicine, Cambridge, United Kingdom

Abstract

Objective—To examine the association between exposure to different domains of childhood cumulative social risk and smoking and excessive alcohol use in adulthood.

Study design—We used data from a retrospective cohort study of adults aged 40–75 years in 1993–1997 living in England (N= 19,466). Participants reported exposure to childhood social risk factors (parental unemployment, parental substance misuse, physical abuse, maternal separation, parental divorce, being sent away from home), current smoking behavior and alcohol intake. Exploratory tetrachoric factor analysis was used to identify different domains of childhood social risk. We created a childhood cumulative social risk scores (range 0 to ≥3) from summing the total number of social risk factors and domain specific social risk factors (range 0 to 2 or 3). Poisson regression was used to examine the associations between childhood social risk scores and smoking and excessive alcohol use in adulthood.

Results—There was a significant linear association between the number of childhood social risk domains and adult smoking (both sexes: $p<0.001$) and excessive alcohol use (men only: $p<0.008$). The prevalence of adult smoking was also increased in men who were exposed to two or more maladaptive family functioning factors and a parental separation experience ($p=0.032$).

Conclusion—These findings may help inform the design of early childhood policies and programs of children exposed to multiple social risk factors in order to attenuate long-term disparities in cigarette smoking and excessive alcohol intake.

Keywords

cumulative social risk; children; cigarette smoking; alcohol

Correspondence to: Rishi Caleyachetty MBBS, PhD. National Collaborating Centre for Women's and Children's Health, Royal College of Obstetricians and Gynaecologists, 27 Sussex Place, Regent's Park, London NW1 4RG; r.caleyachetty@icloud.com; Tel: +44 (0) 20 7772 6490; Fax: +44 (0) 20 7723 0575.

Europe PMC Funders Author Manuscripts

Introduction

Cigarette smoking and excessive alcohol intake are major public health problems[1, 2] and associated with a considerable disease burden and large healthcare expenditures globally[2, 3]. In high-income countries such as the United Kingdom and United States, both tobacco and excessive alcohol use are among the leading causes of mortality and morbidity in adulthood[4–6].

Exposure to social risk factors earlier in the life course may be associated with social disparities in tobacco and excessive alchol use in adult life[7]. Adults exposed to social disadvantage in childhood (e.g. abuse, living with a substance-abusing family member, parental unemployment, absence of a parent because of divorce or separation) are more likely to be current smokers or drink alcohol excessively in later life[8–10]. But rather than being exposed to a singular childhood social risk factor, a proportion of these adults may have been exposed to multiple childhood social risk factors within their home as in the real world social risk factors tend to cluster in an individual[11]. Children confronted by exposure to more than one social risk factor (i.e. cumulative social risk) at home may be more likely to smoke or drink alcohol excessively later in life than children exposed to a singular social risk factor. Previous studies have found an association between exposure to childhood cumulative social risk and adult smoking behavior and alcohol problems (e.g. alcohol dependence, initiation of alcohol use)[12–17]. However, these studies did not examine different domains or contexts of social risk that children may encounter[18]. Consideration of this may help inform the design of early childhood policies and programs of children exposed to multiple social risk factors to attenuate long-term disparities in cigarette smoking and excessive alcohol intake.

The aim of the present study was to examine the association between exposure to different domains of childhood cumulative social risk and smoking and excessive alcohol use in adulthood utlizing data from The European Prospective Investigation into Cancer Study-Norfolk cohort (EPIC-Norfolk) Study, a population-based cohort study in Norfolk, England.

Methods

Study population

We used data collected as part of the EPIC-Norfolk prospective cohort — a component of the European Prospective Investigation of Cancer (EPIC) study in 10 countries[19]. The EPIC-Norfolk is a population-based cohort study of 30,445 adults recruited at age 40–75 years from a general practice age–sex register in Norfolk, England between 1993 to 1997. Participants answered a baseline questionnaire which included questions on cigarette smoking behavior and alcohol intake. Childhood social risk factors were assessed in 20,921(68.7%) participants using the postal “Health and Life Experiences Questionnaire” (1996-2000) designed to measure a range of social variables[20]. Of the 20,921 participants who completed the Health and Life Experiences Questionnaire we excluded those with missing information on maternal separation (n=171), parental divorce (n=466), parental unemployment (n= 373), being sent away from home (n=193), parental substance abuse

(n=34), and experience of physical abuse (n=66), smoking status (n=146), alcohol misuse status (n=160), social class (n=359) and educational level (n=0). After these exclusions, a final sample of 18,953 participants were included in our analysis. We then compared selected socio-demographic characteristics of participants with those of the population of England using the 2001 United Kingdom census[21]. As the data were non-stochastic in nature, statistical testing was not performed. The proportion of adults aged 60 years or more was greater in the study sample compared with residents of England (45.7% vs. 33.8%). The study sample also had a lower proportion of adults with no qualifications (35.2% vs. 41.2%) and adults belonging to lower social classes (16.5% vs. 31.2%) compared with residents of England. All participants gave written informed consent beforehand and the EPIC-Norfolk study protocol was approved by the Norfolk Local Research Ethics Committee.

Social risk factors in childhood

Singular social risk factors in childhood—Exposure to 6 social risk factors prior to age 17 years were retrospectively reported through the Health and Life Experiences Questionnaire and included separation from their mother for more than 1 year, parental divorce, parental unemployment, being sent away from home because of doing something wrong, parental alcohol or drug use, and experience of physical abuse.

Childhood Cumulative Social Risk Scores—Exposure to each of the 6 social risk factors was used to create a childhood cumulative social risk score. For each childhood social risk factor, an individual was categorized and assigned a value of 0 (unexposed) or 1 (exposed); the sum of the social risk factors present in each individual was used as a single exposure for the outcome of interest. Categories 3-5 were combined into one category for analyses due to the small number of participants in category 4 and 5, resulting in the childhood cumulative social risk score including 0, 1, 2, and ≥3.

Outcomes

Current smoking status was derived from yes/no response to the question “Do you smoke cigarettes now?”. Total alcohol consumption was estimated as the total number of units consumed in a week based on responses to the following question: “How many alcoholic drinks do you have each week?” with four separate categories of drinks. A unit of alcohol (approximately 8 g) was defined as a half pint of beer, cider, or lager; a glass of wine; a single unit of spirits (whisky, gin, brandy, or vodka); or a glass of sherry, port, vermouth, or liqueurs. From this, we created a binary variable to identify individuals whose usual weekly alcohol consumption was likely to exceed the recommended limits of 21 units and 14 units for men and women, respectively[22].

Socio-demographic variables

Socio-demographic variables included date of birth (continous age), sex (male, female), education status [≤ O-level (completion of schooling up to 15 years), A-level (completion of schooling up to age of 17 years), degree or equivalent], and social class (professional, managerial and technical, skilled non-manual, skilled manual, partly skilled, unskilled).

Europe PMC Funders Author Manuscripts

Statistical Analysis

Poisson regression models were used to estimate prevalence ratios (PR) and 95% confidence intervals (CI) for the association of exposure to each singular childhood social risk factor with current cigarette smoking and excessive alcohol intake in adulthood, respectively. PR were adjusted for age, social class and education.

Tetrachoric factor analysis (oblique rotation) was used to determine the minimum number of interpretable factor(s) contained in the set of childhood social risk factors and identify a subset of childhood social risk factors that corresponds to each of the underlying factor(s). Three of six childhood social risk factors had significant loadings on the first factor of maladaptive family functioning (e.g. parental substance misuse, physical abuse, parental employment problems), with factor loadings of 0.67-0.81. The second factor represented parental separation (e.g. parental divorce, separated from mother, sent away from home), with factor loadings factor loadings 0.60–0.87. Childhood cumulative risk scores for maladaptive family functioning and parental separation experiences was the simple summation of the singular childhood social risk factors. For both these cumulative social risk scores categories 2 and 3 were combined into one category for analyses due to the small number of participants in category 3, resulting in the cumulative social risk scores including 0, 1, 2 or 3. In addition we constructed a cumulative social risk domain score for the domains of maladaptive family functioning and parental separation experiences separately for children with risk in no single domain, risk in one domain, or risk in both domains, yielding a cumulative domain social risk score from 0 to 2. The PR for cigarette smoking and alcohol misuse by levels of childhood cumulative social risk scores adjusted for age, sex and adult social class and education were estimated. For analyses of the childhood cumulative social risk scores, we used the likelihood ratio test to check for departures from the linearity of the associations. Linear trend associations between cumulative social risk scores and adult smoking and alcohol misuse were assessed by including the cumulative social risk variable in the models as a continuous variable. The significance test for this variable represents a linear trend test[23]. To test if cumulative exposure was more significant than singular exposures we controlled for each singular childhood social risk factor in the model that also included the cumulative social risk score variable. If the cumulative social risk score coefficient was still significant this suggested the cumulative effect greater than any singular social risk factor. We then looked at the multiplicative product of cumulative social risk exposure of maladaptive family functioning factors by cumulative risk exposure of parental separation experiences, after controlling for the main effects of each cumulative social risk metric. Significance of the interaction terms was assessed by the Wald test. All analyses were conducted using Stata version 11.0 (College Station, TX: StataCorp LP)

Results

Table 1 shows the characteristics of the participants. Approximately 1 out of 5 adults reported exposure to at least one childhood social risk factor. The most common childhood social risk factors were exposure to maternal separation (Men=13.6% and Women=12.8%) parental employment problems (Men=9.0% and Women=8.4%) and parental substance

misuse (Men=6.0% and Women=6.3%). Compared to women, men were less likely to report child physical abuse (p= <0.001), being sent away from home, p= 0.001) and 2 or 3 maladaptive family functioning risk factors. Men were more likely to report 2 or 3 parental separation experiences compared to women (p=0.048).

Singular childhood social risk factors

Most singular childhood social risk factors in both sexes were associated with current cigarette smoking after adjustment for age, social class and education (table 2). Adults exposed to singular childhood social risk factors were not more likely to be misusing alcohol after adjustment for age, social class and education, with the exception of those adults exposed to parental substance use or parental divorce.

Childhood cumulative social risk scores

Adult smoking—Adults exposed to ≥3 childhood social risk factors (men: PR=2.40, 95% CI=1.71-3.37; women: PR=1.62, 95% CI=1.12-2,35), 2 or more maladaptive family functioning risk factors (men: PR=1.46, 95% CI=1.02-2.10; women: PR=1.70, 95% CI=1.27-2.27) and 2 or more parental separation experiences (men: PR=1.89, 95% CI=1.36-2.62) respectively, were more likely to be current adult smokers after adjusting for age, social class, and education (table 3). We then fitted models with cumulative social risk scores as a continuous variable, for which the likelihood ratio test did not reveal any departures from a linear trend. There were significant associations between the total number of childhood social risk factors (men: p=<0.001; women: p=<0.001), number of maladaptive family functioning risk factors (men: p=0.007; women: p=<0.001), and the number of parental separation experiences (men: p=<0.001; women: p=<0.001) and current adult cigarette smoking. In both sexes, the cumulative effects of childhood social risk on current smoking was statistically significant when we controlled for each one of the singular childhood social risk factors (results not shown). The association between the number of childhood social risk domains and adult smoking was present in both sexes (p <0.001).

After accounting for the main effects of the maladaptive family functioning risk and parental separation experiences risk scores, the interaction term was significant for men exposed to 2 or 3 maladaptive family functioning risk factors and 1 parental separation experiences (p=0.032).

Excessive alcohol intake in adulthood—Only men exposed to ≥3 childhood social risk factors (PR=1.63, 95% CI: 1.13-2.34) and 2 or more maladaptive family functioning risk factors (PR=1.66, 95% CI: 1.22-2.27) were more likely to excessively use alcohol in adulthood, after adjusting for age, education, and social class (table 3). There was a significant association between the total number of childhood social risk factors and excessive alcohol intake in adulthood (p=0.001). In men, the cumulative effects of childhood social risk on excessive alcohol intake in adulthood were significant when we controlled for each one of the singular childhood social risk factors except for parental substance misuse (results not shown).

Europe PMC Funders Author Manuscripts

In men, there was a significant association between the number of childhood social risk domains and excessive alcohol use ($p < 0.008$). There was no evidence of an interaction between the cumulative social risk scores of maladaptive family functioning risk factors and parental separation experiences on current alcohol misuse.

Discussion

This study reports increased prevalence of current smoking and alcohol misuse in adulthood with increasing number of childhood social risk factors. Exposure to childhood social factors across increasing domains of childhood social risk was associated with smoking in both sexes and excessive alcohol intake in men only. In addition, both cumulative risk exposure to maladaptive family functioning factors and parental separation experiences appeared to interact, whereby the prevalence of adult smoking was increased in men who were exposed to two or more maladaptive family functioning factors and a parental separation experience.

Studies that have examined the association between childhood cumulative social risk and adult cigarette smoking or adult alcohol misuse [12–17] failed to examine different domains of social risk within the household (such as maladaptive family functioning factors or parental separation experiences), which may increase the likelihood to smoke cigarettes or drink alcohol excessively in adulthood. Distinguishing between distinct contexts of social risk in childhood may be important for the design of prevention and early intervention strategies focused for children exposed to maladaptive family functioning and/or being raised by single mothers. For example, a family intervention that specifically targeted maladaptive family functioning was effective in reducing current alcohol and drug use among adolescents[24]. Given the possible interaction of different domains of childhood social risk on cigarette smoking in later adult life, strategies might need to be designed as a comprehensive community pediatric programs that enhance as many aspects of family life as possible. While data on this is sparse[25], a comprehensive nurse home visitation program directed toward enhancing parenting, social networks, and maternal personal and health-related behaviors was associated with significantly reduced cigarette and alcohol use among children after a 15-year follow-up[26].

Exposure to multiple social risk factors may reflect a more stressful home environment compared to households where children are only be exposed to a singular social risk factor. Home environments in which children are exposed to multiple social risk factors may be characterized by less acceptance, affection, emotional support, low parental involvement, (including less limit setting and less presence at home)[27] all of which may increase likelihood to smoke and use alcohol over the life course. In addition, early exposure to various forms of trauma may also disrupt neuro-developmental processes[28], giving rise to social, emotional, and cognitive repercussions that may also increase the risk of initiating and maintaining cigarette smoking and alcohol use[29].

Strengths of this study include examining associations between childhood social risk factors with current smoking and excessive alcohol intake in later adult life in a large dataset of childhood social risk factors and adult health risk behaviour in England. This study also extends previous research by examining different domains of childhood social risk. Several

study limitations, however, merit consideration. First, because of the time lapse between childhoood social exposures and the initiation of the cohort study, participants may have difficult recalling the experiences. We investigated this by examining the mean number of reported childhood social risk factors according to year of birth. There was no evidence that younger participants (i.e those whose experience was more recent) reported more childhood social risk factors than older participants[20]. Second, this analysis is based on a retrospective cohort design, which prevents the confirmation of a temporal association between childhood cumulative social risk and cigarette smoking and excessive alcohol intake in adulthood. We also acknowledge the possibility that residual confounding might attenuate the strong PRs estimates in this study. Third, the findings from this study relate to participants born over a wide time period (1916-1957), and thus the concern might be that the magnitude of the association between childhood cumulative social risk and smoking or excessive alcohol intake varies by age or cohort group. However, we found no significant interaction between childhood cumulative social risk scores and age group or birth cohort group, suggesting consistency over time. Comparative cross-national analyses from more recent birth cohorts are needed to ascertain whether the association between different domains of childhood cumulative social risk and smoking and excessive alcohol use in adulthood is generalizable outside of the UK. Fourth, adults with missing information were more likely to have no qualifications, and belong to a lower social class. Thus the current findings are probably underestimates of the true magnitude of the association between childhood cumulative social risk and cigarette smoking and excessive alcohol intake. Finally, we assumed that the components of the childhood cumulative social risk score have no temporal order. Childhood social risks may form chains of sequential social risks and thus tend to occur together or social risks may more follow one another sequentially but risk of adult health behaviors are not increased until the effect of the final exposure in the chain (“trigger effect”)[30]. Future research might overcome some of the aforementioned concerns, by collecting data on the age of when the child was exposed to a specific social risk factor and whether the exposure continues throughout childhood.

In summary, increasing exposure to childhood social risk factors was associated with higher prevalence of smoking and excessive alcohol intake in later adult life. In addition, cumulative exposure to maladaptive family functioning and parental separation experiences, as well as their interaction were also significantly associated with current smoking in adulthood. These findings highlight the importance of considering children’s exposure to multiple social risk factors in the design of early childhood policies and programs to curb smoking and excessive alcohol intake in later adult life.

Acknowledgments

Source of funding and conflict of interest statement: None declared

Dr Rishi Caleyachetty wrote the first draft.

No honorarium, grant, or other form of payment was given to anyone to produce the manuscript.

Europe PMC Funders Author Manuscripts

References

[1]. Ezzati M, Lopez AD, Rodgers A, Vander Hoorn S, Murray CJ. Selected major risk factors and global and regional burden of disease. Lancet. 2002; 360:1347–60. [PubMed: 12423980]

[2]. Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. Lancet. 2009; 373:2223–33. DOI: 10.1016/S0140-6736(09)60746-7 [PubMed: 19560604]

[3]. Barnum H. The economic burden of the global trade in tobacco. Tobacco Control. 1994; 3(4):358–61.

[4]. Danaei G, Ding E, Mozaffarian D, Taylor B, Rehm J, Murray C, et al. The Preventable Causes of Death in the United States: Comparative Risk Assessment of Dietary, Lifestyle, and Metabolic Risk Factors. PLoS Med. 2009; 6(4):e1000058. [PubMed: 19399161]

[5]. Sheron N, Gilmore I, Parsons C, Hawkey C, Rhodes J. Projections of alcohol-related deaths in England and Wales--tragic toll or potential prize? Lancet. 2012; 379:687–8. Epub 2012 Feb 20. DOI: 10.1016/S0140-6736(12)60244-X [PubMed: 22353260]

[6]. Murray CJ, Richards MA, Newton JN, Fenton KA, Anderson HR, Atkinson C, et al. UK health performance: findings of the Global Burden of Disease Study 2010. Lancet. 2013; 381:997–1020. doi: 10.16/S0140-6736(13)60355-4. Epub 2013 Mar 5. [PubMed: 23668584]

[7]. Galea S, Nandi A, Vlahov D. The social epidemiology of substance use. Epidemiol Rev. 2004; 26:36–52. [PubMed: 15234946]

[8]. Norman RE, Byambaa M, De R, Butchart A, Scott J, Vos T. The long-term health consequences of child physical abuse, emotional abuse, and neglect: a systematic review and meta-analysis. PLoS Med. 2012; 9:e1001349. doi: 10.1371/journal.pmed.. Epub 2012 Nov 27. [PubMed: 23209385]

[9]. Wolfinger NH. The effects of parental divorce on adult tobacco and alcohol consumption. J Health Soc Behav. 1998; 39:254–69. [PubMed: 9785697]

[10]. Taylor SE, Repetti RL, Seeman T. Health psychology: what is an unhealthy environment and how does it get under the skin? Annu Rev Psychol. 1997; 48:411–47. [PubMed: 9046565]

[11]. Adler N, Bush NR, Pantell MS. Rigor, vigor, and the study of health disparities. Proc Natl Acad Sci U S A. 2012; 109:17154–9. Epub 2012 Oct 8. DOI: 10.1073/pnas.1121399109 [PubMed: 23045672]

[12]. Anda RF, Croft JB, Felitti VJ, Nordenberg D, Giles WH, Williamson DF, et al. Adverse childhood experiences and smoking during adolescence and adulthood. JAMA. 1999; 282:1652–8. [PubMed: 10553792]

[13]. Ford ES, Anda RF, Edwards VJ, Perry GS, Zhao G, Li C, et al. Adverse childhood experiences and smoking status in five states. Prev Med. 2011; 53:188–93. Epub Jun 25. DOI: 10.1016/j.ypmed.2011.06.015 [PubMed: 21726575]

[14]. Ramiro LS, Madrid BJ, Brown DW. Adverse childhood experiences (ACE) and health-risk behaviors among adults in a developing country setting. Child Abuse Negl. 2010; 34:842–55. DOI: 10.1016/j.chiabu.2010.02.012 [PubMed: 20888640]

[15]. Koss MP, Yuan NP, Dightman D, Prince RJ, Polacca M, Sanderson B, et al. Adverse childhood exposures and alcohol dependence among seven Native American tribes. Am J Prev Med. 2003; 25:238–44. [PubMed: 14507531]

[16]. Pilowsky DJ, Keyes KM, Hasin DS. Adverse childhood events and lifetime alcohol dependence. Am J Public Health. 2009; 99:258–63. doi: 10.2105/AJPH.008.139006. Epub 2008 Dec 4. [PubMed: 19059847]

[17]. Dube SR, Miller JW, Brown DW, Giles WH, Felitti VJ, Dong M, et al. Adverse childhood experiences and the association with ever using alcohol and initiating alcohol use during adolescence. J Adolesc Health. 2006; 38:444.e1–10. [PubMed: 16549308]

[18]. Evans GW, Li D, Whipple SS. Cumulative risk and child development. Psychol Bull. 2013; 139:1342–96. doi: 10.037/a0031808. Epub 2013 Apr 8. [PubMed: 23566018]

[19]. Day N, Oakes S, Luben R, Khaw KT, Bingham S, Welch A, et al. EPIC-Norfolk: study design and characteristics of the cohort. European Prospective Investigation of Cancer. Br J Cancer. 1999; 80:95–103. [PubMed: 10466767]

[20]. Surtees PG, Wainwright NW. The shackles of misfortune: social adversity assessment and representation in a chronic-disease epidemiological setting. Soc Sci Med. 2007; 64:95–111. Epub 2006 Sep 25. [PubMed: 16997441]

[21]. Office for National Statistics. [Accessed Nov 30, 2014] Neighbourhood Statistics. Available at http://www.neighbourhood.statistics.gov.uk/

[22]. Royal College of Physicians, Royal College of Psychiatrists, Royal College of General Practitioners. Alcohol and the Heart: Sensible Limits Reaffirmed. London: Royal College of Physicians; 1995.

[23]. Woodward, M. Epidemiology: Study Design and Data Analysis. New York: Chapman & Hall/CRC; 1999.

[24]. Sonrisrebon DA, Coarsworrh JD, Perez-Vidal A, Mirrani V, Jean-Gilles M, Szapocznik J. Brief structural/strategic family therapy with African American and Hispanic high-risk youth. Journal of Community Psychology. 1997; 25(5):453–71.

[25]. Appleyard K, Egeland B, Dulmen M, Alan Sroufe L. When more is not better: The role of cumulative risk in child behavior outcomes. J Child Psychol Psychiatry. 2005; 46(3)

[26]. Olds D, Henderson CJ, Cole R, Eckenrode J, Kitzman H, Luckey D, et al. Long-term effects of nurse home visitation on children's criminal and antisocial behavior: 15-year follow-up of a randomized controlled trial. JAMA. 1998; 280:1238–44. [PubMed: 9786373]

[27]. Santisteban DA, Tejeda M, Dominicis C, Szapocznik J. An efficient tool for screening for maladaptive family functioning in adolescent drug abusers: the Problem Oriented Screening Instrument for Teenagers. Am J Drug Alcohol Abuse. 1999; 25:197–206. [PubMed: 10395155]

[28]. Shonkoff JP, Boyce WT, McEwen BS. Neuroscience, molecular biology, and the childhood roots of health disparities: building a new framework for health promotion and disease prevention. JAMA. 2009; 301:2252–9. DOI: 10.1001/jama.2009.754 [PubMed: 19491187]

[29]. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. Am J Prev Med. 1998; 14:245–58. [PubMed: 9635069]

[30]. Kuh D, Ben-Shlomo Y, Lynch J, Hallqvist J, Power C. Life course epidemiology. J Epidemiol Community Health. 2003; 57:778–83. [PubMed: 14573579]

Europe PMC Funders Author Manuscripts

Table 1

Frequency (and percentage) of adult socio-demographic characteristics, cigarette smoking and alcohol misuse

	Male (n = 8398)	Female (n = 10 555)	
	N(%)	N(%)	
Mean age (SD)	59.5 (9.2)	58.4 (9.2)	
Education level[a]			
Degree	1308 (15.6)	1233 (11.7)	
A-level	3881 (46.2)	3810 (36.1)	
O-level	736 (8.8)	1315 (12.5)	
<O level	2473 (29.5)	4197 (39.8)	
Social class			
I	687 (8.2)	689 (6.5)	
II	3234 (38.5)	3766 (35.7)	
III non-manual	1075 (12.8)	2175 (20.6)	
III manual	2060 (24.5)	2150 (20.4)	
IV	1112 (13.2)	1356 (12.9)	
V	230 (2.7)	419 (4.0)	
Childhood social risk factors			
Parental unemployment	757 (9.0)	882 (8.4)	
Parental substance misuse	507 (6.0)	662 (6.3)	
Physical abuse	260 (3.1)	553 (5.2)	
Maternal separation	1141 (13.6)	1353 (12.8)	
Parental divorce	333 (4.0)	449 (4.3)	
Sent away from home	59 (0.7)	39 (0.4)	
Number of childhood social risk factors			
0	6083 (72.4)	7553 (71.6)	
1	1743 (20.8)	2283 (21.6)	
2	442 (5.3)	538 (5.1)	
≥3	130 (1.6)	181 (1.7)	
Cigarette smoking status			
Yes	938 (11.2)	1111 (10.5)	
No	7460 (88.8)	9444 (89.5)	
Alcohol misuse			
Yes	1230 (14.7)	815 (7.7)	
No	7168 (85.4)	9740 (92.3)	

SD, standard deviation.

[a]A-level defined as completion of schooling up to age of 17 years;

O-level defined as completion of schooling up to age of 15 year

Europe PMC Funders Author Manuscripts

Table 2

Association between single childhood social risk factors and current cigarette smoking and excessive alcohol intake in adulthood

	Smoking				Excessive alcohol intake			
	Male		Female		Male		Female	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1 PR (95% CI)	Model 2 PR (95% CI)
	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)		
Parental unemployment	1.17 (0.94–1.45)	1.09 (0.88–1.35)	1.15 (0.93–1.41)	1.11 (0.90–1.37)	1.14 (0.94–1.38)	1.18 (0.98–1.43)	0.72 (0.53–0.96)	0.76 (0.58–1.04)
Parental substance misuse	1.37 (1.08–1.73)	1.30 (1.03–1.64)	1.49 (1.22–1.83)	1.48 (1.21–1.82)	1.40 (1.14–1.72)	1.44 (1.17–1.76)	1.38 (1.08–1.77)	1.43 (1.12–1.83)
Physical abuse	1.49 (1.10–2.02)	1.46 (1.08–1.98)	1.51 (1.22–1.87)	1.52 (1.22–1.88)	1.18 (0.88–1.58)	1.18 (0.88–1.59)	1.01 (0.75–1.36)	1.01 (0.75–1.36)
Maternal separation	1.34 (1.12–1.59)	1.32 (1.11–1.57)	1.30 (1.10–1.54)	1.32 (1.11–1.56)	1.09 (0.92–1.28)	1.08 (0.92–1.27)	1.12 (0.91–1.37)	1.09 (0.89–1.34)
Parental divorce	1.49 (1.14–1.95)	1.48 (1.13–1.93)	1.22 (0.94–1.58)	1.23 (0.95–1.59)	1.29 (1.00–1.65)	1.27 (0.99–1.63)	1.07 (0.78–1.48)	1.07 (0.77–1.47)
Sent away from home	3.35 (2.19–5.11)	2.92 (1.91–4.47)	2.18 (1.13–4.21)	2.28 (1.18–4.40)	1.03 (0.53–1.98)	1.07 (0.55–2.06)	1.99 (0.89–4.44)	1.77 (0.79–3.95)

PR, prevalence ratio; CI, confidence interval. Model 1 adjusted for age. Model 2 adjusted for age, adult social class and education.

Europe PMC Funders Author Manuscripts

Table 3

Association between childhood cumulative social risk scores and current cigarette smoking and excessive alcohol intake in adulthood

	Smoking				Excessive alcohol intake			
	Men		Women		Men		Women	
	Model 1 PR (95% CI)	Model 2 PR (95% CI)	Model 1 PR (95% CI)	Model 2 PR (95% CI)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
No. of childhood social risk factors								
0 (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.20 (1.02–1.40)	1.16 (0.99–1.36)	1.22 (1.06–1.41)	1.23 (1.06–1.42)	1.12 (0.98–1.29)	1.14 (0.99–1.31)	0.99 (0.83–1.17)	0.99 (0.83–1.17)
2	1.35 (1.04–1.76)	1.27 (0.97–1.65)	1.71 (1.37–2.14)	1.68 (1.35–2.10)	1.23 (0.97–1.55)	1.25 (0.98–1.58)	1.08 (0.80–1.47)	1.12 (0.83–1.53)
≥3	2.54 (1.81–3.57)	2.40 (1.71–3.37)	1.62 (1.12–2.35)	1.62 (1.12–2.35)	1.61 (1.12–2.31)	1.63 (1.13–2.34)	1.27 (0.80–2.04)	1.32 (0.83–2.12)
P_{trend}	<0.001	<0.001	<0.001	<0.001	0.002	0.001	0.446	0.332
No. of maladaptive family functioning risk factors								
0 (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.24 (1.04–1.48)	1.18 (0.99–1.41)	1.27 (1.08–1.48)	1.25 (1.07–1.46)	1.10 (0.93–1.29)	1.12 (0.95–1.32)	0.92 (0.75–1.13)	0.95 (0.78–1.17)
2 or 3	1.57 (1.10–2.26)	1.46 (1.02–2.10)	1.75 (1.31–2.34)	1.70 (1.27–2.27)	1.60 (1.17–2.18)	1.66 (1.22–2.27)	1.22 (0.82–1.80)	1.31 (0.88–1.93)
P_{trend}	0.001	0.008	<0.001	<0.001	0.007	0.002	0.945	0.591
No. of parental separation experiences								
0 (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.29 (1.08–1.53)	1.27 (1.07–1.51)	1.34 (1.14–1.57)	1.35 (1.16–1.59)	1.12 (0.95–1.31)	1.12 (0.95–1.31)	1.11 (0.91–1.35)	1.08 (0.89–1.31)
2 or 3	1.96 (1.41–2.72)	1.89 (1.36–2.62)	1.31 (0.86–1.98)	1.31 (0.87–1.98)	1.21 (0.85–1.72)	1.19 (0.83–1.69)	1.21 (0.73–1.98)	1.22 (0.74–2.00)
P_{trend}	<0.001	<0.001	<0.001	<0.001	0.090	0.106	0.209	0.302
No. of childhood cumulative social risk domains								
0 (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Europe PMC Funders Author Manuscripts

	Smoking				Excessive alcohol intake			
	Men		Women		Men		Women	
	Model 1 PR (95% CI)	Model 2 PR (95% CI)	Model 1 PR (95% CI)	Model 2 PR (95% CI)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
1	1.21 (1.04–1.41)	1.17 (1.01–1.36)	1.27 (1.11–1.45)	1.27 (1.11–1.45)	1.17 (1.02–1.33)	1.18 (1.04–1.34)	1.08 (0.98–1.19)	1.01 (0.85–1.19)
2	1.84 (1.42–2.38)	1.74 (1.35–2.26)	1.72 (1.35–2.19)	1.71 (1.34–2.18)	1.21 (0.92–1.58)	1.22 (0.93–1.60)	1.07 (0.87–1.31)	1.17 (0.85–1.62)
$\mathbf{P_{trend}}$	<0.001	<0.001	<0.001	<0.001	0.014	0.008	0.154	0.503

PR, prevalence ratio; CI, confidence interval. Model 1 adjusted for age. Model 2 adjusted for age, adult social class and education.

Eur J Public Health. Author manuscript; available in PMC 2017 August 08.