

RESEARCH REPORT

Social inequalities in the impact of flexible employment on different domains of psychosocial health

Lucía Artazcoz, Joan Benach, Carme Borrell, Imma Cortès

J Epidemiol Community Health 2005;**59**:761–767. doi: 10.1136/jech.2004.028704

Study objectives: (1) To analyse the impact of flexible employment on mental health and job dissatisfaction; and (2) to examine the constraints imposed by flexible employment on men's and women's partnership formation and people's decision to become parents. For the two objectives the potentially different patterns by sex and social class are explored.

Design: Cross sectional health survey. Multiple logistic regression models separated for sex and social class (manual and non-manual workers) and controlling for age were fitted. Four types of contractual arrangements have been considered: permanent, fixed term temporary contract, non-fixed term temporary contract, and no contract.

Setting: Catalonia (a region in the north east of Spain).

Participants: Salaried workers interviewed in the 2002 Catalan health survey with no longstanding limiting illness, aged 16–64 (1474 men and 998 women).

Main results: Fixed term temporary contracts were not associated with poor mental health status. The impact of other forms of flexible employment on mental health depended on the type of contractual arrangement, sex, and social class and it was restricted to less privileged workers, women, and manual male workers. The impact of flexible employment on living arrangements was higher in men. Among both manual and non-manual male workers, those with fixed term temporary contracts were less likely to have children when married or cohabiting and, additionally, among non-manual male workers they also were more likely to remain single (aOR = 2.35; 95%CI = 1.13 to 4.90).

Conclusion: Some forms of temporary contracts are related to adverse health and psychosocial outcomes with different patterns depending on the outcome analysed and on sex and social class. Future research should incorporate variables to capture situations of precariousness associated with flexible employment.

See end of article for authors' affiliations

Correspondence to:
Dr L Artazcoz, Agència de Salut Pública de Barcelona, Pl. Lesseps 1, 08023 Barcelona, Spain; lartazco@aspb.es

Accepted for publication
14 December 2004

In recent years employers and policy makers have considered labour market flexibility as a means of improving workers' performance and adaptability to technical change and increasing globalisation.¹ Alongside these changes within production, employment conditions have become less stable. However, very little research has been done to analyse the impact of flexible employment on people's health and life conditions. This knowledge is likely to provide some insights into equity considerations that would complement the arguments of those who promote greater flexibility in the labour market based on productivity reasons.

Previous research on job insecurity and health has been largely based on the analysis of perceived insecurity and positive relations with poor psychological and physical health have been found.^{2–7} This approach, however, has some limitations because feelings about job insecurity are to some extent affected by aspects other than the objective contractual arrangements.⁸ For example, Orpen⁹ reported that although perceived flexible employment was related to anxiety and depression among all employees, these mental health indicators did not differ between employees in jobs objectively secure or insecure. Actually, when both dependent and independent variables are subjective and self reported, personality may influence both of them and associations can be overestimated because of the sharing of a common variance.

Recently a handful of studies have explicitly analysed the association between different forms of unstable contractual employment arrangements and mortality¹⁰ or other health outcomes,^{11–15} but their findings are inconsistent. Although the existence of differences between geographical contexts, with different cultural backgrounds and labour policies

cannot be ruled out,^{13–16} there are a number of methodological limitations that could also explain these contradictions. An issue that the research in this area has to face is that of reverse causation, whereby it is not the case that the experience of job instability leads to poor health status but the opposite, that is, people with poorer health are more likely to work in instable job arrangements. For example, it has been shown that among temporary workers good self perceived health status, not having psychological distress, and a non-sedentary life style are associated with achieving a permanent job contract.¹⁷

On the other hand, many studies have been based on one health indicator but the effect of flexible employment can differ depending on the wellbeing indicator used. For example, it can affect workers' social health by limiting partnership formation or the decision of being a parent. It has been shown that holding a job is an important predictor for union formation and parenthood.¹⁸ However, the lack of contractual security can be an additional limitation for the assuming of family responsibilities. Employees expect their contract to finish within a given time period and it is difficult to foresee their future labour market career and therefore also to plan ahead.

At this stage of research it is also important to find out if certain social groups are more or less vulnerable to the damaging effects of flexible employment. For instance, a criticism about the sex imbalance in the existing literature about health and contingent work has been raised.¹⁹ Whereas some studies have not found sex differences in the impact of

Abbreviations: LLI, limiting longstanding illness; CHS, Catalonia health survey

flexible employment on health,²⁰ others have reported less noticeable differences for women^{21 22} and some have simply adjusted the analysis for sex.^{11 13} Moreover, even though it has been reported that social class modifies the effect of unemployment on mental health,²³ as far as we know, this issue has not been explored in the research about flexible employment. Less qualified workers could be more vulnerable to flexible employment because of their lower employability and less power to negotiate their employment conditions.

The objectives of this study are (1) to analyse the impact of flexible employment on mental health and job dissatisfaction; and (2) to examine the constraints imposed by flexible contractual arrangements on men's and women's partnership formation and people's decision to become parents. For the two objectives the potentially different patterns by sex and social class will be explored.

METHODS

Data

The data for this study were derived from the 2002 Catalan health survey (CHS), a cross sectional study based on a representative sample of 8400 members of the non-institutionalised population of Catalonia, a region in north eastern of Spain with about seven million inhabitants. The survey gathered self reported information on morbidity, health status, health related behaviours, as well as socio-demographic data. Participants were randomly selected via a multiple stage random sampling strategy. In the initial sampling stage, municipalities were selected from each of the eight regions of Catalonia (or municipal districts in the case of the Barcelona City health region) according to their population size. In each of the resulting strata cluster random sampling involving proportional probabilities and municipality (or district) weights, was used to select people for participation. Only 12.7% of respondents were replaced as a result of refusal or absence. Full details of the survey have been reported elsewhere.²⁴

For the purposes of this study we selected a subsample of all salaried workers aged 16–64. To avoid possible reverse causation effects, we excluded from our analysis those people reporting a longstanding limiting illness (LLI) in the 12

months preceding the survey, 9.3% of men and 11.5% of women. LLI was asked with the question "During the past 12 months have you had any trouble or difficulty for gainful employment, housework, schooling, studying, because of a chronic health problem (that has lasted or it is expected to last three or more months)?" The final sample under analysis was composed of 1474 men and 998 women.

Dependent variables

- Poor mental health was measured with the 12 item version of the general health questionnaire (12-GHQ),²⁵ included in the CHS questionnaire. This is a screening instrument widely used to detect current, diagnosable psychiatric disorders. It focuses on breaks in normal functioning rather than on lifelong traits; therefore it covers personality disorders or patterns of adjustment when these are associated with distress. Here we used a two point scoring method, rating a problem as absent (0) or present (1) according to the method recommended by the GHQ. Responses were summed and those scoring 3 or more were classified as cases.²⁶
- Job dissatisfaction was measured with the question "All in all, how satisfied would you say you are with your job?", with four categories, from "very satisfied" to "very dissatisfied". This question was dichotomised by combining the categories "dissatisfied" and "very dissatisfied" to indicate job dissatisfaction.
- Limitations in partnership formation and parenthood:
 - Marital status was categorised as never married compared with married or cohabiting. For this analysis, previously married people were excluded.
 - Parental status was categorised as living with children at home or not. This analysis was restricted to people married or cohabiting.

Flexible employment

Flexible employment was assessed through the type of contract. The question had four categories: permanent, fixed term contract, non-fixed term temporary contract, and

Table 1 General description of the population (in percentages). Catalonia health survey, 2002

	Men		Women	
	Non-manual n = 581	Manual n = 893	Non-manual n = 520	Manual n = 478
Poor mental health status	6.7	6.8	12.9	13.8
Job satisfaction				
Very satisfied	21.3	13.2	25.2	11.7
Satisfied	71.4	77.6	69.6	76.6
Dissatisfied	7.1	7.7	4.6	9.8
Very dissatisfied	0.2	1.5	0.6	1.9
Type of contract				
Permanent	85.2	71.7	75.6	60.0
Fixed term temporary contract	10.6	20.4	18.8	27.8
Non-fixed term temporary contract	3.3	6.3	4.2	3.8
No contract	0.9	1.6	1.4	8.4
Marital status				
Single	29.0	39.2	41.9	31.9
Married or cohabiting	68.0	58.1	52.7	59.5
Previously married	3.0	2.7	5.4	8.6
Living with children at home	53.4	45.4	40.2	45.8
Mean age (SD)	39.4 (11.0)	36.0 (12.5)	35.2 (10.3)	35.7 (11.9)

Non-manual workers includes managerial and senior technical staff, freelance professionals, intermediate occupations, managers in commerce, and skilled non-manual workers; manual workers includes skilled, partly skilled, and unskilled manual workers.

Table 2 Prevalence of poor mental health status and job dissatisfaction by type of contract and sex. Age adjusted odds ratios (aOR) and 95% confidence intervals (CI). Catalonia health survey, 2002

	Men (n = 1474)		Women (n = 998)	
	%	aOR (95%CI)	%	aOR (95%CI)
Poor mental health status				
Non-manual				
Type of contract				
Permanent	7.1	1	11.7	1
Fixed term temporary contract	6.6	0.97 (0.32 to 2.93)	11.2	0.81 (0.39 to 1.70)
Non-fixed term temporary contract	0	–	36.4	3.87 (1.52 to 9.85)**
No contract	†	†	†	†
Manual				
Type of contract				
Permanent	5.6	1	12.5	1
Fixed term temporary contract	6.0	1.39 (0.66 to 2.92)	9.0	0.73 (0.36 to 1.46)
Non-fixed term temporary contract	17.9	4.30 (1.96 to 9.44)***	27.8	2.65 (0.89 to 7.90)
No contract	26.7	6.34 (1.89 to 21.22)**	32.5	3.27 (1.54 to 6.94)***
Job dissatisfaction				
Non-manual				
Type of contract				
Permanent	6.3	1	5.4	1
Fixed term temporary contract	14.8	2.72 (1.16 to 6.37)*	5.1	0.95 (0.33 to 2.74)
Non-fixed term temporary contract	5.0	0.83 (0.11 to 6.50)	4.5	0.84 (0.11 to 6.66)
No contract	†	†	†	†
Manual				
Type of contract				
Permanent	8.4	1	9.3	1
Fixed term temporary contract	9.9	1.04 (0.58 to 1.89)	10.6	1.16 (0.58 to 2.33)
Non-fixed term temporary contract	12.5	1.43 (0.61 to 3.34)	11.1	1.23 (0.27 to 5.63)
No contract	26.7	3.88 (1.19 to 12.68)*	33.3	4.91 (2.25 to 10.71)***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. †Fewer than 10 people in the category.

working with no contract. The three latter types of contracts were considered as of objective flexible employment.

Measurement of occupational social class

Occupational social class, assigned according to the respondent's current occupation was measured with a widely used Spanish adaptation of the British classification.²⁷ Class I includes managerial and senior technical staff and freelance professionals; class II, intermediate occupations and managers in commerce; class III, skilled non-manual workers; class IV, skilled (IVa) and partly-skilled (IVb) manual workers; and class V, unskilled manual workers. Because of the low number of people in some categories, the six original social classes were collapsed into two broad classes: non-manual (I and II, III) and manual (IVa-IVb-V).

Data analysis

Multiple logistic regression models were fitted to calculate adjusted odds ratios (aOR) and 95% confidence intervals (CI). Models were separated for sex and social class and adjusted for age. Goodness of fit was obtained using the Hosmer Lemeshow test.²⁸ The analysis included the weights derived from the complex sample design.²⁹

RESULTS

General description of the population by sex and social class

Table 1 shows the general description of the population. Whereas mental health status was better among men, no class differences were found either for men or for women. Job dissatisfaction was higher among manual female workers. Working with temporary contracts was more frequent among manual workers and among women. Moreover, more than 8% of female manual workers were employed with no contract. Being married or cohabiting was more frequent among non-manual male workers, whereas female non-manual workers were more likely to remain single. This pattern was consistent with that of living with children at home.

Poor mental health, job dissatisfaction, and type of contract by sex and occupational social class

Table 2 shows the association of type of contract with poor mental health and job dissatisfaction. Working with fixed term contracts was not associated with poor mental health status in any sex and social class combination. Among non-manual female workers and manual male workers non-fixed term temporary contracts were positively associated with poor mental health (aOR = 3.87; 95% CI = 1.52 to 9.85 and aOR = 4.30; 95% CI = 1.96 to 9.44 respectively). Among manual workers, both men and women, people with no contract were more likely to report poor mental health status (aOR = 6.34; 95% CI = 1.89 to 21.22 and aOR = 3.27; 95% CI = 1.54 to 6.94 respectively).

The pattern of association between job dissatisfaction and type of contract was different than that for mental health. As with mental health, among manual workers working with no contract was positively associated with job dissatisfaction both among men (aOR = 3.88; 95% CI = 1.19 to 12.68) and women (aOR = 4.91; 95% CI = 2.25 to 10.71). Additionally, among non-manual men those with fixed term contracts were more likely to report job dissatisfaction (aOR = 2.72; 95% CI = 1.16 to 6.37).

Limitations in partnership formation and parenthood

Table 3 shows the association of type of contract with marital and parental status. In all groups except manual female workers all forms of non-permanent jobs were associated with non-partnership formation although few associations were statistically significant. Limitations in parenthood were only found among men, both manual and non-manual, with fixed term temporary contracts (aOR = 1.97; 95%CI = 1.10 to 3.53 and aOR = 2.94; 95%CI = 1.16 to 7.47 respectively).

DISCUSSION

Our study produced three main findings: (1) whereas non-fixed term contracts and working with no contract were associated with poor mental health status, no association with fixed term temporary contracts was seen; (2) the effect

Table 3 Limitations in family formation by type of contract and sex. Age adjusted odds ratios (aOR) and 95% confidence intervals (CI). Catalonia health survey, 2002

	%	Men	%	Women
		aOR (95%CI)		aOR (95%CI)
Remaining single†				
Non-manual				
Type of contract				
Permanent	23.9	1	36.7	1
Fixed term temporary contract	65.5	2.35 (1.13 to 4.90)*	66.0	1.47 (0.85 to 2.53)
Non-fixed term temporary contract	70.0	3.00 (0.80 to 11.20)	76.2	3.85 (1.24 to 11.91)*
No contract	†	†	†	†
Manual				
Type of contract				
Permanent	32.0	1	53.9	1
Fixed-term temporary contract	64.6	1.36 (0.85 to 2.18)	38.8	1.24 (0.71 to 2.16)
Non-fixed term temporary contract	49.1	1.10 (0.54 to 2.26)	16.7	0.37 (0.07 to 1.87)
No contract	60.0	8.72 (1.24 to 61.59)*	22.9	0.54 (0.19 to 1.53)
No children‡				
Non-manual				
Type of contract				
Permanent	20.1	1	21.9	1
Fixed term temporary contract	45.0	2.94 (1.16 to 7.47)*	26.2	0.71 (0.30 to 1.67)
Non-fixed term temporary contract	50.0	3.70 (0.72 to 18.91)	33.3	0.71 (0.07 to 6.94)
No contract	†	†	†	†
Manual				
Type of contract				
Permanent	20.2	1	24.2	1
Fixed term temporary contract	36.5	1.97 (1.10 to 3.53)*	28.1	1.06 (0.55 to 2.07)
Non-fixed term temporary contract	25.0	1.17 (0.47 to 2.86)	33.3	1.64 (0.51 to 5.28)
No contract	50.0	4.63 (0.90 to 23.77)	11.1	0.42 (0.12 to 1.49)

*p<0.05. †Fewer than 10 people in the category; ‡analysis restricted to salaried workers single and married or cohabiting; § analysis restricted to salaried workers married or cohabiting.

of flexible contractual arrangements, other than fixed term temporary contracts, on mental health was higher among less privileged groups (women and manual male workers); and (3) the impact of flexible employment, either fixed term or non-fixed term contracts, in family formation was more pronounced among men.

Sex differences in health and employment conditions

As expected, mental health status was poorer and flexible employment more common among women and manual workers.³⁰⁻³² The more frequent type of non-permanent contract was fixed term temporary contracts. In both sexes, flexible employment increased among manual workers. It is important to note that 8.4% of female manual workers had no contract. Most of them (63%) worked as cleaners or carers of dependent people in domestic settings. These findings emphasise the need of increasing research into traditional

female jobs as well as the impact of flexible employment in such jobs

Impact of flexible employment on mental health and job dissatisfaction

Several studies have shown the negative impact of job insecurity on mental health.^{7 11 33} However, we have found no relation between working with fixed term temporary contracts and mental health or job dissatisfaction. In contrast with our result, a higher risk of poor self perceived health status among German workers with fixed term temporary contracts has been reported.¹³ There are several reasons that could explain these contradictory results. The health indicator analysed in the study of Rodriguez,¹³ self perceived health status, is different, reverse causation was not controlled for and, finally, differences between geographical contexts can exist.¹⁶ Actually, in that study no association between fixed term temporary contracts and poor self perceived health status was found in Britain. That is consistent with our results and with another study based on the British household panel survey.¹⁴

To the extent that work related insecurity limits workers' perception of control over their lives, when this is a permanent situation it is likely to be related to chronic stress disorders.³⁴ Unfortunately, the category of fixed term temporary contract is too heterogeneous, including workers perceiving their situation as a transition to a stable situation, as for example those in the initial steps of their working life, and others that after many temporary contracts for a long period, often in several companies, are unable to get a permanent contract and live with a high uncertainty and concern about their working future. This heterogeneity could be a reason for not finding any association between working with fixed term temporary contracts and mental health. In future research, new variables should be considered to capture situations of precariousness, often associated with flexible employment arrangements, such as the uninterrupted time working with non-voluntary temporary

Key points

- Working with non-fixed term temporary contracts is associated with poor mental health status among non-manual female workers and manual male workers.
- Among manual workers, both men and women, working with no contract is related to poor mental health and job dissatisfaction.
- Working with fixed term temporary contracts is not related to poor mental health status in any combination of sex and social class, thus suggesting a need to better characterise situations of precariousness included in this heterogeneous group of workers.
- Working with temporary contracts is associated with delay in partnership formation and the decision to become parents, primarily among men.

contracts, the number of companies or workplaces where the person has been working in a defined period of time or the number of contracts in the past months, for example.

We have found some evidence of poor health outcomes in those forms of flexible employment more likely to be associated with poor employment conditions, such as working with non-fixed term temporary contracts and being employed with no contract. These results are consistent with those of Bardasi *et al*¹⁴ who did not find any association between fixed term temporary contracts and poor mental health but, in both sexes, found some evidence of poor mental health among workers with casual contracts. Moreover, we have also examined the role of social inequalities and we have additionally shown that the negative impact of these forms of contractual arrangements have a higher impact among less privileged workers—that is, women and manual male workers. These results challenge the view that the health effects of flexible employment emerge in a universalistic manner through individual perceptions that bear little relation to social structure.³⁵

In Spain the proportion of employees working with temporary contracts is almost three times that of the EU-15.³⁶ There is a general concern about the fraud in the use of these kinds of contractual arrangements, and primarily about the abuse of non-fixed term contracts as an easy form for employers to adjust the size or composition of their work forces to changing economic conditions. Job flexibility is used as a means of reducing labour costs and increasing control over workers. Although these contracts were originally created for use exclusively in activities of uncertain and limited duration, they are currently associated with precarious work. For example, large construction firms undertake different projects each one easily identifiable and it is the sum of all of them that guarantees the continuity of their economic activity. However, for each project the employer can make non-fixed term contracts and even legally make successive contracts to the same persons for different projects.

In our study 63% of manual male workers with non-fixed term contracts were employed in the construction sector. A significant proportion of persons worked more than 40 hours a week (46% compared with 26% in persons with permanent contracts). It is probable that people with contracts of unknown duration accept hard working conditions and different forms of exploitation, such as long hours, to keep their job (actually, it has been reported that employees with temporary contracts are less likely to have sickness absences).^{11, 37} This can be even more frequent in the Spanish labour market with a high unemployment and growing rates of immigrant workers rate. These results suggest that it is not only the uncertainty about job future

Policy implications

- Labour policies in Spain must increase their efforts to reduce the high rates of flexible contractual arrangements, taken into account the existence of social inequalities.
- Hazard risk assessments at the workplace should specifically analyse the situation of workers with temporary contracts.
- Considering the increasing liberalisation of the labour market, health and working conditions surveys should be more sensitive to situations related to flexible employment and effectively monitor them.

What this paper adds

- As far as we know, this study based on a representative sample of workers in Catalonia, a region of Spain, is the first one examining the impact of flexible employment on workers' health and wellbeing in Spain, the country with the highest rate of temporary contracts in the EU-15. In contrast with many studies based of self perception of job instability, this study focuses on an objective indicator, type of contract.
- We have shown that the impact of flexible employment on psychosocial health depends on the type of contractual arrangement, the health indicator analysed, and on the interaction between sex and social class. Some specific proposals are provided that may help future research to better characterise the precariousness associated with temporary contracts.

that relates to poor mental health status but also the poor working conditions associated with some temporary contracts. However, this is just a speculation that deserves further attention in future research.

The pattern of association of type of contract with job dissatisfaction was different than that for mental health status. However, consistently with the results for mental health, those manual workers with no contract, either men or women, were more likely to report job dissatisfaction. On the other hand, among men, non-manual workers with fixed term contracts showed a higher risk of job dissatisfaction. No association was found with non-fixed term temporary contracts.

Temporary work and limitations in partnership formation and parenthood

As hypothesised, workers with temporary contracts, either fixed term or non-fixed term, were less likely to decide partnership formation and entry into parenthood, but this association was more pronounced among men. It is important to notice that whereas mental health was not related to fixed term temporary contracts, the delay in partnership formation and parenthood is primarily related to this type of contract. This finding suggests that whereas working in a temporary job is not a cause of poor mental health in itself and that more attention should be paid to poor working conditions associated with flexible employment arrangements, uncertainty about the future related to temporary work delays family formation. Married men with fixed term temporary contracts, either of high or of low social class, were less likely to have children. Moreover, among non-manual male workers these contracts were also associated with a lower probability of being married. Conversely, among manual male workers not being married was related to working with no contract.

In Spain holding a job is an important predictor for union formation and parenthood among men.³⁸ In such a country with a strong version of the male breadwinner model, long term and full time employment for men are considered necessary to consolidate an economic basis that is regarded as a necessary prerequisite for these transitions. Among women an association between not being married and working with a non-fixed term temporary contract was only found among non-manual workers. This finding could be explained, among other reasons, by the higher attachment of women of higher education levels to the labour market.³⁹ Besides the impact of flexible employment in shaping the capacity of both women and men to realise

their potential for health, these results illustrate its contribution in the low birth rate in Spain, the lowest in the EU-15 after Ireland,⁴⁰ and emphasises the need for political interventions to reduce the abuses of temporary forms of employment arrangements.

Limitations

This study is limited by its cross sectional design. Although we cannot entirely rule out the possibility that poor mental health causes flexible employment, we reduced the reverse causation effect by excluding those workers who reported a LLI the past 12 months. Thus, it seems reasonable to think that, in most cases, flexible employment was not caused by a health problem. Therefore, we have studied a selected population of "healthy" workers and still we have found a poorer mental health status, higher job dissatisfaction, and limitations in living arrangements in selected groups of workers with flexible contractual arrangements. Moreover, we have used an objective measure of flexible employment, the type of contract, therefore avoiding an overestimation of the associations between subjective dependent and independent variables due to sharing part of the same variance.

We are also limited by the use of secondary data. So, we have considered living with children at home as a proxy of parental status, but in some cases children could have left home. However, the probability of leaving home does not seem to be related to the type of contract of parents or to be related in a different way depending on whether it is the mother or the father who has a temporary contract. Moreover, one of the main characteristics of Spanish society is the delay of the young in leaving the parent's home because, among other reasons, of difficulties of the labour market and to the high cost of dwellings.⁴¹

Finally, another limitation is the lack of a sufficient number of people of some categories that has prevented us from analysing them. Moreover, partially because of the same reason, we could not examine the role of part time work, frequently considered as a form of atypical or precarious employment,¹⁹ because it is still rather uncommon in Spain (only 3.6% of men and 14.9% of women in the sample had these kind of contracts) and it is highly correlated with non-permanent contracts (whereas among full time workers the proportion of people with flexible contractual arrangements was 22% and 28% in men and women respectively, among part time workers it increased to 56%, with no sex differences).

Conclusion

We have shown that the impact of temporary work on mental health is related to those forms of employment arrangements that are potentially associated with precariousness, working with non-fixed term contracts, and with no contract, but not with fixed term contracts. We have also shown that this impact is restricted to less privileged workers such as women and manual male workers. Finally, we have found that, primarily among men, temporary work, either fixed term or non-fixed term, is associated with limitations in partnership formation and the decision to become parents.

Future research should characterise the forms of precariousness associated with flexible contractual arrangements, such as the number of contracts or the firms or workplaces where workers have stayed in the past months and the uninterrupted time working with temporary contracts, as well as the potential sex and social class differences.

Authors' affiliations

L Artazcoz, C Borrell, I Cortès, Agència de Salut Pública, Barcelona, Spain and Red de Investigación Temática de Salud y Género, Spain

L Artazcoz, C Borrell, I Cortès, J Benach, Red de Centros de Investigación de Epidemiología y Salud Pública, Spain
J Benach, Universitat Pompeu Fabra, Barcelona, Spain

Funding: this study was partially funded by the Red de Investigación Temática de Salud y Género (exp G03/042) and the Red de Centros de Investigación de Epidemiología y de Salud Pública (exp c03/09).

Conflicts of interest: none.

REFERENCES

- 1 **Organization of Economic Cooperation and Development.** *Economic outlook.* Paris: OECD, 1998.
- 2 **Joelson L, Wahlquist L.** The psychological meaning of flexible employment and job loss: results of a longitudinal study. *Soc Sci Med* 1987;**25**:179-82.
- 3 **Dooley D, Rook K, Catalano R.** Job and non job stressors and their moderators. *J Occup Psychol* 1987;**60**:115-32.
- 4 **Muntaner C, Nieto FJ, Cooper L, et al.** Work organization and atherosclerosis. *Am J Prev Med* 1998;**14**:9-18.
- 5 **Mattiasson I, Lindgarde F, Nilsson JA, et al.** Threat of unemployment and cardiovascular risk factors: longitudinal study of quality of sleep and serum cholesterol concentrations in men threatened with redundancy. *BMJ* 1990;**301**:461-6.
- 6 **Domenighetti G, D'Avanzo B, Bisig B.** Health effects of flexible employment among employees in the swiss general population. *Int J Health Serv* 2000;**30**:477-90.
- 7 **Ferrie JE, Shipley MJ, Stansfeld SA, et al.** Effects of chronic flexible employment and change in job security on self-reported health, minor psychiatry morbidity, physiological measures, and health related behaviours in British civil servants: the Whitehall II study. *J Epidemiol Community Health* 2002;**56**:450-4.
- 8 **Benach J, Amable M, Muntaner C, et al.** The consequences of flexible work for health: are we looking at the right place? *J Epidemiol Community Health* 2002;**56**:405-6.
- 9 **Orpen C.** Correlations between flexible employment and psychological well-being among white and black employees in South Africa. *Percept Mot Skills* 1993;**76**:885-6.
- 10 **Kivimäki M, Vahtera J, Virtanen M, et al.** Temporary employment and risk of overall and cause-specific mortality. *Am J Epidemiol* 2003;**158**:663-8.
- 11 **Benavides FG, Benach J, Diez-Roux AV, et al.** How do types of employment relate to health indicators? Findings from the second European survey on working conditions. *J Epidemiol Community Health* 2000;**54**:495-501.
- 12 **Virtanen P, Vahtera J, Kivimäki M, et al.** Employment security and health. *J Epidemiol Community Health* 2002;**56**:569-74.
- 13 **Rodríguez E.** Marginal employment and health in Britain and Germany: does unstable employment predict health? *Soc Sci Med* 2002;**55**:963-79.
- 14 **Bardasi E, Francesconi M.** The impact of atypical employment on individual wellbeing: evidence from a panel of British workers. *Soc Sci Med* 2004;**58**:1671-88.
- 15 **Benach J, Gimeno D, Benavides FG, et al.** Types of employment and health in the European Union. Changes from 1995 to 2000. *Eur J Public Health* 2004;**14**:314-21.
- 16 **Virtanen P, Vahtera J, Nakari R, et al.** Economy and job contract as contexts of sickness absence practices: revisiting locality and habitus. *Soc Sci Med* 2004;**58**:1219-29.
- 17 **Virtanen M, Kivimäki M, Elovainio M, et al.** Selection from fixed term to permanent employment: prospective study on health, job satisfaction, and behavioural risks. *J Epidemiol Community Health* 2002;**56**:693-9.
- 18 **Golsch K.** Employment flexibility in Spain and its impact on living arrangements. *Work Employment and Society* 2003;**17**:691-718.
- 19 **Quinlan M, Mayhew C, Bohle P.** The global expansion of precarious employment, work disorganization, and consequences for occupational health: a review of recent research. *Int J Health Serv* 2001;**31**:335-414.
- 20 **McDonough P.** Flexible employment and health. *Int J Health Serv* 2000;**30**:453-76.
- 21 **Ferrie JE, Shipley MJ, Marmot MG, et al.** Health effects of anticipation of job change and non-employment: longitudinal data from the Whitehall II study. *BMJ* 1995;**311**:1264-9.
- 22 **Ferrie JE.** The health effects of major organizational change and flexible employment. *Soc Sci Med* 1998;**46**:243-54.
- 23 **Artazcoz L, Benach J, Borrell C, et al.** Unemployment and mental health: understanding the interactions among gender, family roles, and social class. *Am J Public Health* 2004;**94**:82-8.
- 24 **Servei Català de la Salut.** Document Tècnic Enquesta de Salut de Catalunya. *Enquesta de Salut de Catalunya 2002.* Barcelona: Servei Català de la Salut, Departament de Sanitat i Seguretat Social, Generalitat de Catalunya, 2003.
- 25 **Goldberg D.** *The detection of psychiatric illness by questionnaire.* Oxford: Oxford University Press, 1972.
- 26 **Goldberg D.** *Manual of the general health questionnaire.* Windsor: NFER, 1978.
- 27 **Grupo SEE y Grupo SEMFYC.** Una propuesta de medida de la clase social. *Atención Primaria* 2000;**25**:350-63.
- 28 **Hosmer DW, Lemeshow S.** *Applied logistic regression.* New York: Wiley, 1989.
- 29 **Guillen M, Junca S, Rue M, et al.** Efecto del diseño muestral en el análisis de encuestas con diseño complejo. Aplicación a la Encuesta de Salud de Catalunya. *Gac Sanit* 2000;**14**:399-402.

- 30 **Lahelma E**, Arber S. Health inequalities among men and women in contrasting welfare states. Britain and three Nordic countries compared. *Eur J Public Health* 1994;**4**:213–26.
- 31 **Arber S**, Lahelma E. Inequalities in women's and men's ill health: Britain and Finland compared. *Soc Sci Med* 1993;**37**:1055–68.
- 32 **Popay J**, Bartley M, Owen C. Gender inequalities in health: social position, affective disorders and minor morbidity. *Soc Sci Med* 1993;**36**:21–32.
- 33 **Ferrie JE**, Shipley MJ, Marmot MG, *et al*. An uncertain future: the health effects of threats to employment security in white-collar men and women. *Am J Public Health* 1998;**88**:1030–6.
- 34 **Scott HK**. Reconceptualizing the nature and health consequences of work-related insecurity for the new economy: the decline of workers' power in the flexibility regime. *Int J Health Serv* 2004;**34**:143–53.
- 35 **Benach J**, Benavides FG, Platt S, *et al*. The health-damaging potential of new types of flexible employment: a challenge for public health researchers. *Am J Public Health* 2000;**90**:1316–17.
- 36 **Ministerio de Trabajo y Asuntos Sociales**. Anuario de estadísticas laborales y de asuntos sociales 2002. <http://www.mtas.es/Estadisticas/anuario02> (accessed 12 Jun 2004).
- 37 **Virtanen M**, Kivimäki M, Elovainio M, *et al*. From insecure to secure employment: changes in work, health, health related behaviours, and sickness absence. *Occup Environ Med* 2003;**60**:948–53.
- 38 **Baizán P**. Living arrangements in Spain. In: Corijn M, Klijzing E, eds. *Living arrangements in Europe*. London: Kluwer Academic, 2001.
- 39 **Consejo Económico y Social**. Segundo informe sobre la situación de las mujeres en la realidad sociolaboral española. Madrid: Consejo Económico y Social, 2003.
- 40 **Instituto Nacional de Estadística**. Official population figures 2003, http://www.ine.es/en/prodyser/pubweb/escpif/pobl0304_en.pdf (accessed 2 Sep 2004).
- 41 **Meil G**. La protección social a la familia. España 1998. *Una interpretación de su realidad social*. Madrid: Fundación Encuentro Ministerio de Educación y Ciencia, 1999.

THE JECH GALLERY

Just one look

When your world turns upside down, take a fresh perspective to find a world previously unseen. While some areas are increasingly struggling with human rights and economic concerns, the BRICs (Brazil, Russia, India, and China) are poised for unparalleled economic growth. In emerging economies, an increased standard of living clearly signals the potential for breaking the poor health and poverty cycle, allowing better options for global community health.

Deborah F Salerno

Pfizer Global Research and Development,
Michigan Laboratories, 2800 Plymouth Road,
Ann Arbor, MI 48105, USA;
deborah.salerno@pfizer.com

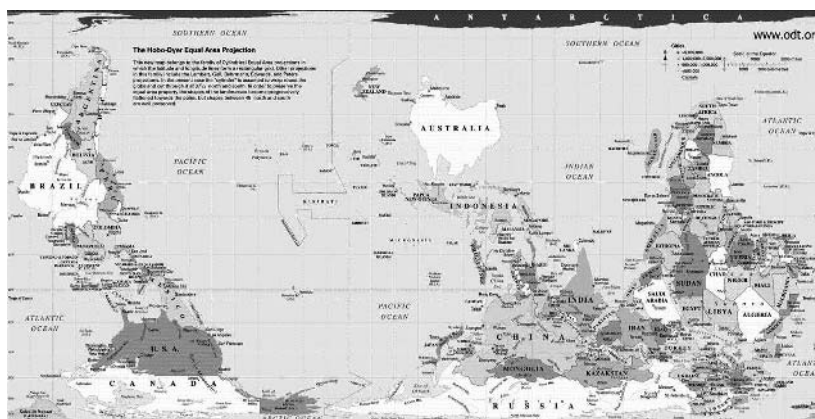


Figure 1 The Hobo-Dyer Equal Area Projection was produced by ODT and Oxford Cartographers. For maps and other related teaching materials contact: ODT, PO Box 134, Amherst, MA 01004, USA; email: odstore@aol.com; web site <http://www.odt.org>

PostScript

BOOK REVIEWS

Statistical analysis of epidemiologic data, 3rd ed

S Selvin. Oxford University Press, £39.95, pp 492. ISBN 0-19-517280-9

This considerably updated edition contains common procedures and methods that are difficult to find in a single textbook. All the procedures are interestingly illustrated with one or more examples.

The first chapter is dedicated to measures of risk (rate, risk, incidence, and prevalence). A difference with other similar textbooks is the inclusion in the chapter of basic measures in survival analysis and its relations with other common risk measures in epidemiology. An introduction to smoothing, adjusting, and transforming is also offered. Chapter 2 considers variation and bias from a statistical point of view. It begins with the definition of a simple model to compare two groups, and an explanation of how selection bias, ecological bias and, confounding can be assessed. After that the model is extended, interaction contrasts are defined to end with the measurement of misclassification bias. The third chapter deals with statistical power and sample size, in which explanations for most common situations in epidemiology are offered. Chapter 4 (cohort data) is mainly dedicated to cohort effect and how to measure it with several examples. The analysis of spatial data is described in chapter 5, where details of the most common methods are given: nearest neighbour, transformed maps, spatial distribution about a point, and

time/distance spatial analysis. Chapter 6 displays the analysis of contingency tables ($2 \times k$ and $2 \times 2 \times 2$) and it is mainly focused in the testing of homogeneity and independence of data. The methods of logistic regression are clearly shown in chapters 7 and 8, starting with the simplest case and ending with the problem of collinearity. The Poisson model is fully described in chapter 9 and appendix B. Chapter 10 deals with the analysis of matched data and the last chapters explain in a useful way survival analysis.

For a full understanding of the text an intermediate level in biostatistics and epidemiology is required. The book is a useful tool for teachers, doctoral students, and professionals who need a more thorough understanding of common statistical procedures in epidemiology and public health.

M Delgado-Rodriguez

Building better health. A handbook of behavioural change

C David Jenkins. Pan American Health Organisation of the World Health Organisation, 2003, pp 378. ISBN 92-75-11590-7

An understanding of health promotion is an essential foundation for all health professionals. Building better health focuses on the themes of disease/illness prevention via health promotion and integrates theory with practise. The book is divided into five parts; laying the foundation, improving health throughout the lifecycle, better understanding of the leading forms of death and disability, intervening more effectively, and the epilogue. The initial chapters concentrate on the imperative for health promotion

setting out the economic and moral standpoint. In particular emphasis is placed on the importance of engaging the community in improving health. The multiplicities of factors that have an impact on health are discussed. From this point the book examines health issues across the lifecycle from pre-natal care to old age. Throughout these sections practical examples are provided that could be applied in many settings. Chapters related to effective interventions provide a useful background to the theory of behaviour change. The array of references could be further used to explore this complex area. The importance of working with communities to achieve change is a central tenant of the book with the proposal that "convenience, convenience, convenience" should be the mantra to aid community participation. The final part of the book provides an interesting discussion of the dilemma of prevention compared with treatment.

The book will appeal to a wide audience with an interest in health and health promotion. The format enables the reader to focus on a particular section if so desired, but is also sufficiently user friendly to enable it to be read from cover to cover. The book is global in appeal as the examples used are from across the world in preference to many that concentrate solely on health impacts in the western world.

Catherine Pritchard

CORRECTION

An editorial error occurred in this article by Dr Salerno (2005;59:767). The email address in the credit line should be odtstore@odt.org [not odstore@aol.com].