

ORIGINAL PAPER

D. Gunnell · F. Rasul · S. A. Stansfeld · C. L. Hart · G. Davey Smith

Gender differences in self-reported minor mental disorder and its association with suicide

A 20-year follow-up of the Renfrew and Paisley cohort

Accepted: 30 May 2002

Abstract *Background* Suicide rates are around three times higher in men than women; in contrast women have a higher prevalence of community-diagnosed depression. To investigate this paradox we examined the association of General Health Questionnaire (GHQ)-caseness (score ≥ 4), a measure of possible minor mental disorder, with suicide risk in a general population cohort. *Methods* Data were derived from a cohort study based on the 8,466 men and women in the Renfrew and Paisley cohort who completed a 30-item GHQ in the period from 1972 to 1976 and who were followed up to 1995 for all-cause and suicide mortality. *Results* The long-term suicide risk associated with possible minor mental disorder was higher in men [hazard ratio 6.78 (1.36–33.71)] than women [hazard ratio 1.66 (0.43–6.45)]; test for interaction between gender and GHQ with respect to suicide risk: $p = 0.09$. *Conclusion* These findings indicate either that the long-term risk of suicide in the context of a past episode of minor mental

disorder is higher in males than females or that there are sex differences in the validity of responses to mental health screening questionnaires. Further research is required to replicate our finding in larger studies and, if confirmed, clarify which explanation underlies it.

Key words minor mental disorder – depression – gender differences – suicide – cohort study – Renfrew and Paisley

Introduction

Suicide rates in Britain are around three times higher in men than women (Charlton et al. 1992). In contrast, depression, one of the principal antecedents of suicide, is more often reported by women than men in population health surveys (Jenkins et al. 1997). A female excess of minor psychiatric morbidity is also seen in population surveys using psychiatric screening instruments such as the General Health Questionnaire (GHQ). In the 1994 Health Survey for England, for example, 19% of women, compared to 12% of men, scored 4 or more on the 12-item GHQ (Colhoun and Prescott-Clarke 1996). The sex differences in self-reported minor mental disorder observed in population surveys such as this provide only a crude indication of differences in the prevalence of the more severe disorders which are likely to precede suicide. However, a female excess of more severe depression is consistently reported in population surveys (summarised in Jenkins et al. 1997).

Long-term follow-ups of community surveys demonstrating female excesses of minor mental disorder provide an opportunity to investigate the paradoxical sex differences in the prevalence of mental disorder and suicide. We have examined sex differences in suicide risk in men and women with possible minor mental disorder, assessed using the 30-item General Health Questionnaire (GHQ) and followed up for 20 years.

D. Gunnell (✉) · G. Davey Smith
Department of Social Medicine
University of Bristol
Canyng Hall
Whiteladies Road
Bristol BS8 2PR, UK
Tel.: +44-1 17/9 28 72 53
Fax: +44-1 17/9 28 72 36
E-Mail: D. J.Gunnell@Bristol.ac.uk

F. Rasul · S. A. Stansfeld
Department of Psychiatry
St Bartholomew's and The Royal London
School of Medicine and Dentistry
Basic Medical Sciences Building
Queen Mary
University of London
Mile End Road
London E1 4NS, UK

C. L. Hart
Department of Public Health
University of Glasgow
1 Lilybank Gardens
Glasgow G12 8RZ, SCO

Subjects and methods

This analysis is based on the 3,783 men and 4,683 women, members of the Renfrew and Paisley (MIDSPAN) cohort, who completed the 30-item GHQ between 1972 and 1976 when they were aged 45–64 years (Rasul et al. 2001). Subjects have been flagged on the NHS Central Register and death details are available up until 1995. Using Cox's Proportional Hazards Regression we investigated the association of GHQ-caseness (scores of 4 or more) in the period from 1972 to 1976 with suicide (deaths coded ICD-9 E950-9 or E980-9) over up to 20 years of follow-up. We assessed the possible confounding effects of social class, marital status and smoking measured at baseline.

Results

At baseline 583 (15.4%) of the men and 949 (20.3%) of the women were classified as case positive. Over the follow-up period there were 3,685 deaths (1,988 male and 1,697 female). The hazard ratio for all-cause mortality in relation to GHQ-caseness was 1.27 (95% CI 1.13–1.43) in males and 1.12 (95% CI 1.00–1.27) in females. Sixteen of these deaths (6 male and 10 female) were suicides.

The mean time between GHQ-completion and suicide was 7.8 years in males and 9.9 years in females. In the fully adjusted analyses there was a sixfold increase in suicide risk in GHQ-positive men (hazard ratio 6.78, 95% CI 1.36–33.71) compared to a more modest increase in females (hazard ratio 1.66, 95% CI 0.43–6.45) (Table 1); test for interaction between gender and GHQ with respect to their effects on suicide: $p = 0.09$. There was no clear evidence that these associations were strongly confounded by social class, marital status or smoking. Suicide risk in relation to GHQ-caseness did not change over the follow-up period.

Discussion

This analysis shows a strong association in males between possible minor mental disorder, detected using the GHQ-30, and suicide risk in the 20 years following questionnaire completion. There is some evidence of a

more modest increased suicide risk in GHQ case-positive females.

There are two main limitations to this analysis. Firstly, due to the relative rarity of suicide, the statistical models were based on few events ($n = 16$) and, surprisingly, there were more female than male suicides. Confidence intervals around our estimated effect sizes are, therefore, wide. Over the years studied, the rates of suicide in Scotland for males and females aged 45+ were approximately 20 per 100,000, and 10 per 100,000 respectively. We would, therefore, have expected around 9 female and 15 male suicides over the approximately 20 years of follow-up (Source World Health Statistics Annual 1993). Reasons for the paucity of male suicides is unclear, but may reflect selection biases to the cohort as a whole and to the sub-group of men who completed the GHQ. Our assessment of GHQ-suicide associations in males would have been over-estimated (biased) if some of the male suicides had been miscoded or lost to follow-up and such missing data occurred more frequently for GHQ case-negative men. We think such an effect is unlikely.

Secondly, the General Health Questionnaire is a screening tool for diagnosable psychiatric disorder, rather than a direct measure of depression (Goldberg 1972). Around 40% of subjects scoring above the 4/5 threshold on the GHQ have psychiatric disorder identifiable using the Clinical Interview Scale (CIS) (Stansfeld and Marmot 1992). In view of this limitation, it is surprising that a one-off measure of probable minor mental disorder was so strongly associated with subsequent suicide risk throughout a period spanning two decades. This suggests that as well as prevalent minor mental disorder the GHQ-30 may also be identifying more enduring aspects of an individual's mental health and, consequently, suicide risk.

We are aware of no previous studies of gender differences in suicide risk amongst people with minor mental disorder detected in this way. Our findings are, however, consistent with those in the first 9 years of follow-up of a Finnish cohort where the suicide risk associated with self-reported life dissatisfaction was two times greater in men than women, although gender differences diminished in subsequent years (Koivumaa-Honkanen et al. 2001).

Our analysis suggests that the contrasting sex differences in the prevalence of mental disorder and suicide may be explained in part by the greater suicide risk associated with minor mental disorder in males. There are four possible explanations for the excess risk in males. Firstly, these could be chance findings, reflecting the imprecision resulting from estimating hazard ratios based on a small number of suicides. Secondly, men with mental disorder may be more likely to successfully act on suicidal impulses than women. Thirdly, because men are less likely to receive or seek medical and social support when depressed, the lack of such support may increase their risk of suicide (Parslow and Jorm 2000). Fourthly, it is possible that the threshold for men reporting psy-

Table 1 Association between General Health Questionnaire caseness in the period from 1972 to 1976 and subsequent suicide risk (up to 1995)

Variable	Hazard ratio (95% Confidence Interval) for suicide in those scoring ≥ 4 on the GHQ-30	
	Males (n = 6 suicides)	Females (n = 10 suicides)
Age-adjusted	5.96 (1.20–29.59)	1.75 (0.45–6.79)
Age and social class ^a	6.29 (1.26–31.36)	1.71 (0.44–6.63)
Age and marital status ^b	6.36 (1.28–31.59)	1.19 (0.67–2.11)
Age and smoking ^c	5.99 (1.21–29.71)	1.70 (0.44–6.62)
Age and all the above	6.78 (1.36–33.71)	1.66 (0.43–6.45)

^a coded manual/non manual

^b coded married, single, divorced, widowed

^c coded never/ex-smoker/1–14 per day/15–24 per day/25+ per day

chological symptoms on questionnaires is higher than that for women (Stansfeld and Marmot 1992). Thus, the men who do report symptoms may have more severe disorder – as suggested by their heightened suicide risk. Such an interpretation has parallels in cardiovascular epidemiology where the specificity of questionnaire-reported angina is lower in women than men (Garber et al. 1992). Further research is required to confirm these findings and, if replicated, to determine which of the explanations underlies the observed gender differences. The findings of such research may have implications for the use of questionnaire surveys to determine the population prevalence of mental disorder and for understanding gender differences in suicide.

■ **Acknowledgements** This study was funded by the British Heart Foundation. We thank Professor Anthony Mann for kindly providing us with information on his initial validation of the GHQ. We also thank Pauline MacKinnon and Jane Gow for the retrieval and coding of death data.

References

1. Charlton J, Kelly S, Dunnell K, Evans B, Jenkins R, Wallis R (1992) Trends in suicide deaths in England and Wales. *Population Trends* 69: 10–17
2. Colhoun H, Prescott-Clarke P (eds) (1996) *Health Survey for England 1994*. HMSO, London
3. Garber CE, Carleton RA, Heller GV (1992) Comparison of “Rose Questionnaire Angina” to exercise thallium scintigraphy: different findings in males and females. *Journal of Clinical Epidemiology* 45: 715–720
4. Goldberg DP (1972) *The Detection of psychiatric illness by Questionnaire*. Oxford University Press, London
5. Koivumaa-Honkanen H, Honkanen R, Viinamaki H, Heikkila K, Kapiro J, Koskenvuo M (2001) Life satisfaction and suicide: 20-year follow-up study. *Am J Psychiatry* 158: 433–439
6. Jenkins R, Lewis G, Bebbington P, Brugha T, Farrell M, Gill B, Meltzer H (1997) The National Psychiatric Morbidity surveys of Great Britain – initial findings from the household survey. *Psychological Medicine* 27: 775–789
7. Parslow RA, Jorm AF (2000) Who uses mental health services in Australia? An analysis of data from the National Survey of Mental Health and Wellbeing. *Aust NZ J Psych* 34: 997–1008
8. Rasul F, Stansfeld SA, Davey Smith G, Hart CL, Gillis C (2001) Sociodemographic factors, smoking and common mental disorder in the Renfrew and Paisley (MIDSPAN) study. *Journal of Health Psychology* 6: 149–158
9. Stansfeld S, Marmot MG (1992) Social class and minor psychiatric disorder in British Civil Servants: a validated screening survey using the General Health Questionnaire. *Psychol Med* 22: 739–749
10. *World Health Statistics Annual 1993 (1994)* WHO. Geneva