

## Correspondence

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## Confounders in studies of suicide by occupation

Milner *et al*<sup>1</sup> make a commendable analysis of the effect of occupation on suicide risk, drawing on an imperfect field of research. Their work does not, however, allow for the effects of the differential demographic profiles (particularly gender) of those employed in each occupational category. This is particularly important when, in the UK in 2011, there was an 18.2 per 100 000 suicide rate among males compared with a 5.6 per 100 000 rate among females.<sup>2</sup>

If an occupation were almost entirely filled with men aged 30 to 44, with their suicide rate of 22.2 per 100 000,<sup>2</sup> it would not be surprising that its rate of suicides was significantly higher against all reference groups.

The United Nations Statistics Division figures show a striking difference in the gender balance of the ISCO categories in the UK from 2009 census data. In ISCO-9, with its high suicide rate ratio of 1.8 (95% CI 1.5–2.3) in Milner *et al*, 60.4% were male.<sup>3</sup> In ISCO-4, with its rate ratio of 0.8 (95% CI 0.6–0.9), only 22.5% are male.<sup>3</sup> This relationship does not correlate across the ISCO categories, but it is enough of a confounder to be of interest. Despite the advantages of the rate ratio, it does not correct for gender, whereas the proportionate mortality ratio does. It may be premature to dismiss its utility, until we have better data-sets that are more amenable to correction for demographic factors.

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- 2 Office for National Statistics. *Suicides in the United Kingdom, 2011*. ONS, 2011.
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The paper by Milner *et al*<sup>1</sup> is an excellent meta-analysis, but there are a few lacunae in the interpretation of results. First, suicide rates differ from country to country. Second, causes differ in age groups and in different countries. For example, in India a 2012 analysis<sup>2</sup> revealed that the self-employed category accounted for 38.7% of victims, of whom 11.4% worked in farming/agriculture, 4.7% in business and 2.9% in professional occupations. Students and unemployed victims accounted for 5.5% and 7.4% respectively; 18% of those who died were housewives. Third, educational status also affects suicide rates. In India, the majority of suicides (46%) are by people with a middle- or primary-level education. These

categories have been relatively constant for a long time.<sup>2,3</sup> Fourth, the causes differ from culture to culture: in India, family problems constitute the majority (26%), followed by illness (21%). So, drawing and applying conclusions from meta-analysis to different cultures and countries is difficult.

- 1 Milner A, Spittal MJ, Pirkis J, LaMontagne AD. Suicide by occupation: systematic review and meta-analysis. *Br J Psychiatry* 2013; **203**: 409–16.
- 2 National Crime Records Bureau. *Suicides in India*. NCRB, 2011 (<http://ncrb.nic.in/CD-ADSI2011/suicides-11.pdf>).
- 3 Bhatia MS, Aggarwal NK, Aggarwal BB. Psychosocial profile of suicide ideators, attempters and completers in India. *Int J Soc Psychiatry* 2000; **46**: 155–63.

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**Author's reply:** We welcome the responses to our meta-analysis on occupational gradients in suicide mortality,<sup>1</sup> and would like to reply first to the comments raised by Forrest. He suggests that gender is an unmeasured factor that may be driving the higher rate ratios in the lowest-skilled occupational groups (ISCO-9, elementary and unskilled occupations such as labouring). Certainly, gender has the potential to be a confounder in this circumstance – being associated with employment in high-risk, low-skilled occupations in the ISCO-9 category and suicide. However, it is inaccurate to suggest that our paper does not allow for the differential effects of gender. In fact, we conducted sensitivity tests and found similarities in patterns. Both women and men had higher rates of suicide in the lowest skilled occupational group. There were some differences in the highest skilled group, in which women had elevated rates. The argument by Forrest would suggest that there should also be an elevated rate ratio for males in the highest skilled group, which is largely comprised of a male workforce. Instead, rates for males are significantly lower than those for the working-age population.

Gender is only one of the myriad component causes that contribute to a set of sufficient conditions for suicide. As acknowledged in our paper, suicide in high-risk occupational groups is likely to be due to a number of factors related to socioeconomic disadvantage, low access to services, access to means, and detrimental working conditions. It has been shown in numerous studies that those working in lower skilled jobs are exposed to the worst psychosocial working conditions, including for example high job strain (high demands and low control at work)<sup>1</sup> and job insecurity.<sup>2</sup> Adverse work-related psychosocial stressors have been shown to be associated with common mental disorders<sup>3</sup> and suicide<sup>4,5</sup> across studies. Considering that both males and females have elevated suicide rates in the lowest skilled occupational group in our meta-analysis, we would suggest that factors connected to the social and working environments have the potential to be contributing risks. In short, to assume that the higher suicide rates among the lowest skilled occupational groups is due to a larger proportion of males oversimplifies what is a complex set of causes.

Bhatia and colleagues raise the issue of cultural differences in the epidemiology of suicide. Unfortunately, eligible studies on suicide by occupation were not available from India and because of this we agree that the results of the meta-analysis may not generalisable to this country. They go on to comment about suicide in groups out of the labour force. These were not the topic of our review and therefore have limited bearing on our

conclusions regarding suicide among employed working populations. Last, the finding that suicide is highest among lower educated people in India may also mean a higher rate in lower skilled employed people, as education and occupational status are usually related.

- 1 Milner A, Spittal MJ, Pirkis J, LaMontagne AD. Suicide by occupation: systematic review and meta-analysis. *Br J Psychiatry* 2013; **203**: 409–16.
- 2 Stansfeld SA, Pike C, McManus S, Harris J, Bebbington P, Brugha T, et al. Occupations, work characteristics and common mental disorder. *Psychol Med* 2013; **43**: 961–73.
- 3 LaMontagne AD, Keegel T, Louie AM, Ostry A. Job stress as a preventable upstream determinant of common mental disorders: a review for practitioners and policy-makers. *Aust e-J Adv Ment Health* 2010; **9**: 17–35.
- 4 Ostry A, Maggi S, Tansey J, Dunn J, Hersher R, Chen L, et al. The impact of psychosocial work conditions on attempted and completed suicide among western Canadian sawmill workers. *Scand J Public Health* 2007; **35**: 265–71.
- 5 Schneider B, Grebner K, Schnabel A, Hampel H, Georgi K, Seidler A. Impact of employment status and work-related factors on risk of completed suicide: a case-control psychological autopsy study. *Psychiatry Res* 2011; **190**: 265–70.

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### The rural employment advantage for people with psychosis: is it real?

The population-based study on employment outcome for people with schizophrenia in rural *v.* urban China by Yang *et al*<sup>1</sup> has revived the issue of rural advantage for people with psychoses in terms of functional outcome. However, I would like to point out a few methodological issues and practical considerations in the study that limit the interpretation of its results.

Non-inclusion of premorbid employment as a socio-demographic variable prevents us from gaining insight into the current employment status as a functional outcome marker. In addition, not incorporating elements of total work hours, income status and, most importantly, satisfaction with the current employment and simply considering the dichotomy of employed and unemployed with six subcategories seems too simplistic considering that employment outcome is the primary (and only) outcome that the study deals with. Inclusion of the category of underemployment (in addition to the categories of employed and unemployed), defined as employment not commensurate with one's educational level or premorbid occupational functioning, might have provided further valuable information regarding the employment outcome for these patients.<sup>2</sup> Not including the type of psychotic illness in the regression model is a major drawback, given that some forms of psychotic illness included in the study (such as delusional disorder and brief psychotic disorder) typically are associated with better functional outcome than others (such as schizophrenia).<sup>3,4</sup> Further, a basic question that has been left unaddressed in the discussion is whether the differences in rates of employment in patients in rural *v.* urban China is simply reflective of differences in the overall employment/unemployment rates for the general population in the rural and urban regions of the country. Reports have documented higher unemployment in the urban regions of China than in the rural regions.<sup>5</sup> It would also be important to conceptualise the social integration or social inclusion that the authors have discussed as a composite of employment, community networking and a supportive social environment without undue emphasis only on employment measures.<sup>6</sup> Last, but not least, the authors could have avoided using the term schizophrenia as a synonym for psychotic illnesses

in the title of their paper, considering the spectrum of psychotic illnesses apart from schizophrenia that the study population covered. Notwithstanding the above methodological issues and practical considerations, I would like to congratulate the authors for undertaking a population-based study addressing the crucial issue of rural advantage in psychotic illnesses and the variables mediating the advantage, which has potential policy implications for this disadvantaged population.

- 1 Yang LH, Phillips MR, Li X, Yu G, Zhang J, Shi Q, et al. Employment outcome for people with schizophrenia in rural *v.* urban China: population-based study. *Br J Psychiatry* 2013; **203**: 272–9.
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- 5 China Labour Bulletin. Employment in China. *China Labour Bulletin* 2013; Jun (<http://www.clb.org.hk/en/content/employment-china>). Accessed 13 Dec 2013.
- 6 Baumgartner JN, Susser E. Social integration in global mental health: what is it and how can it be measured? *Epidemiol Psychiatr Sci* 2013; **22**: 29–37.

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**Authors' reply:** Dr Gnanavel's letter has raised several interesting methodological issues related to our paper.<sup>1</sup> He notes that employment is only one measure of social integration and social inclusion. We certainly agree that other measures of social integration beyond employment are needed.<sup>2</sup> But fundamental differences in urban and rural environments make it extremely difficult to develop instruments that can validly assess social integration in both settings. Employment status is one of a very small set of variables about social functioning that can be readily measured and meaningfully compared (with the caveats noted below) between urban and rural settings. More detailed evaluation of community networking and social support may require the development of rural-specific and urban-specific measures; information from surveys that use these scales could then be used to devise and assess targeted interventions.

He also remarks on the need to consider work hours and work satisfaction when assessing the occupational functioning of persons with schizophrenia. We agree with the general point that more in-depth quantitative and qualitative data would enhance the interpretation of rural *v.* urban differences in employment, and encourage researchers to collect such data in future studies. Separate consideration of part-time *v.* full-time work would provide a more detailed understanding of the work status of persons with schizophrenia. As we indicate in the discussion, we believe that the greater flexibility of work in rural areas (i.e., allowing for part-time and full-time work depending on the individual's condition) may be an important factor in the higher rates of employment in rural areas. Comparisons of work satisfaction could also be useful, but such comparisons would require careful development of measures of work satisfaction that can be meaningfully compared for people with schizophrenia across these settings; to our knowledge, such measures are not yet available.

As regards collapsing all psychotic illnesses under the 'schizophrenia' rubric when assessing work status: in our study 90% (86/96) of urban residents with a psychotic illness and