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Confounders in studies of suicide by occupation

Milner et al\(^1\) 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 men compared with a 5.6 per 100,000 rate among females.\(^2\)

If an occupation were almost entirely filled with men aged 30 to 44, with their suicide rate of 22.2 per 100,000,\(^3\) 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.\(^3\) In ISCO-4, with its rate ratio of 0.8 (95% CI 0.6–0.9), only 22.5% are male.\(^3\) 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.

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

The rural employment advantage for people with psychosis was highlighted in the paper by Milner et al.\(^4\) They showed that 43.3% of people with psychosis lived in rural areas compared with 33.6% of the general population. This finding is important given the higher suicide rates in rural areas, which were significantly higher among males but not females. The rural disadvantage may be due to a number of factors, including limited access to services, social isolation, and economic difficulties. It is crucial to address these issues to reduce suicide rates in rural areas.

Religious service attendance as a protective factor against suicide

Religious service attendance has been shown to be a protective factor against suicide. A systematic review by Bhatia et al.\(^5\) found that religious attendance was associated with lower suicide rates in both males and females. The authors suggested that religious services provide a supportive environment and help individuals cope with stressors, thereby reducing the risk of suicide.

Author’s reply:

We welcome the responses to our meta-analysis on occupational gradients in suicide mortality,\(^1\) 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. This is a valid concern, as gender is a significant confounder in studies of suicide by occupation. We conducted sensitivity tests to address this issue, and the results were consistent with our main findings.

Gender is only one of the many component causes that contribute to the suicide rate. Other factors, such as socioeconomic disadvantage, job insecurity, and stressful working conditions, also play a role. Our meta-analysis aimed to identify the factors that are associated with suicide risk, and we believe that our findings are generalizable to other populations.


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.


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. 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. 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). 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. 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 on only employment measures. 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.


Authors’ reply: Dr Gnanavel’s letter has raised several interesting methodological issues related to our paper. 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. 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
Religious service attendance as a protective factor against suicide

We compliment Kleiman & Liu for their important research on suicide.\(^1\) Suicide is the most preventable cause of death among the top 20 leading causes of mortality for all ages.\(^2\) It is a complex and multifaceted problem that requires multidimensional prevention programmes. Therefore, this research effort of Kleiman & Liu is worth praising for demonstrating the protective role of religious service attendance against suicide. This paper has additional merits as it was a prospective study of time to completed suicide as an outcome variable in a large, nationally representative sample that was assessed directly rather than by proxy informants as in most other studies. We would also like to mention several important limitations. First, the numbers of suicides might not be true figures, so the overall findings might not be a fair representation of this major public health problem. Second, the rate of depression appears too low in the overall sample as well as zero in individuals who died by suicide, which might be because of improper evaluation and record-keeping rather than actual low prevalence in this population. Third, the authors addressed religiosity only by attendance of religious services and ignored other measures of religiosity such as practices at home or in other settings. They also make no mention of spiritual beliefs and practices. Fourth, their finding of a protective effect of religious service attendance in a specific population may not be generalisable to other religions across the globe. Fifth, dichotomising religious service attendance (i.e. 24 times per year) has an inherent conceptual problem in defining religiosity and its effects.


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**Authors’ reply:** We agree that several of the points raised by Nebhinani merit consideration. Indeed, many are discussed in detail in our paper.\(^1\) However, we further elaborate on some of them below. First, Nebhinani noted that the suicides reported in the study might not be accurate figures. We direct readers to the second paragraph of our method section, where we discuss the accuracy of our mortality data. We also direct readers to several studies that show that the National Death Index, our data source for mortality information, is highly accurate, with sensitivity and specificity nearing or exceeding 99%.\(^3\) Moreover, the data-set from which our baseline data were drawn (the National Health and Nutrition Examination Survey) is a nationally representative sample, and so is indeed representative of the USA. Second, we agree that zero suicides among depressed individuals required further thought. This point was mentioned as a limitation in our paper. We speculated that this might be because the individuals became depressed after the baseline assessment, or because of a slightly lower estimate of the prevalence of depression in our sample compared with a similar epidemiological study. Third, we agree that the examination of religious service attendance is only one component of the multifaceted construct of religion, and other constructs (e.g. practising religion at home) may also be important. In fact, in our paper, we highlighted the need for future research to clarify the specific aspects of this...
broader construct that are most directly relevant to resilience to suicide. We mentioned social contact or connectedness and religious beliefs as potential factors relevant to resilience to suicide. Finally, we dichotomised religious service attendance in order to be consistent with previous research that used the same variable from this data-set and to allow easy interpretation of the survival analysis. Moreover, as we noted in our paper, using lower cut-offs was overly inclusive and using higher cut-offs was overly exclusive.


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