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Should ecological studies designed to identify distal risk factors focus specifically on elderly suicide rates or broader age-bands?

Suicide rates increase with aging in many countries (Shah and De, 1998). In a recent study of 62 developed and developing countries, suicide rates increased with age for males and females in 25 and 27 countries respectively, and in both sexes in 17 countries (Shah, 2007). Suicide rates increased with age in 47 of the 49 medium- and high-income countries (Kiemo, 2004). Comprehensive understanding of the substantial worldwide variation in population patterns of suicide may be critical for developing prevention programs (Knox *et al.*, 2004). Much is known about individual level proximal risk factors (Shah and De, 1998) and preventative strategies can target identified high-risk groups (Shah and De, 1998). Also, proximal risk factors for elderly suicide victims are generally different from those for younger suicide victims (Shah and De, 1998). However, distal risk factors may be similar for older and younger suicide victims. Such factors include societal socio-economic status (Kennedy *et al.*, 1999; Shah *et al.*, 2008), societal income inequality (Kowalski *et al.*, 1987; Shah *et al.*, 2008), education (Kowalski *et al.*, 1987; Shah and Chaterjee, 2008), degree of urbanization (Stack, 1993; Shah, 2008a), degree of social integration (Durkheim, 1992; Shah, 2008b) and provision of health and mental health service provision (Shah and Bhat, 2008). In general, preventative measures targeting distal risk factors require development of public health strategies at a societal level.

We have previously suggested that ecological studies should focus on general population suicide rates rather then elderly suicide rates (Shah and Bhandarkar, 2009). However, this suggestion requires further refinement because amalgamation of all age-bands may be less sensitive to identifying distal risk factors and we present data to support this assertion.

Data on suicide rates for males and females in the seven 10-year age-bands from 15–24 years to 75+ for males and females for the whole of the U.K. and its three constituent countries (England and Wales, Scotland and Northern Ireland) were ascertained from the World Health Organization (WHO) website at www.who.int/whois/database/mort/table1.cfm. A full data set was available for the 24-year period 1979–2002. The relationship between suicide rates in elderly age-bands 65–74 years and 75+ years and the five 10-year age-bands between 15–24 years and 55–64 years in both sexes for the whole of the U.K. and its three constituent countries was examined using Spearman's correlation coefficient.

The results for the whole of the U.K. show a significant negative correlation between suicide rates in males aged 65–74 years and males aged 15–24 years ($\rho = -0.46$, $P = 0.025$) and 25–34 years ($\rho = -0.85$, $P < 0.0001$), and between males aged 75+ and males aged 25–34 years ($\rho = -0.78$, $P < 0.0001$). There was a significant positive correlation between suicide rates in males aged 65–74 years and males aged 45–55 years ($\rho = 0.70$, $P < 0.0001$) and males aged 55–64 years ($\rho = 0.90$, $P < 0.0001$); the corresponding correlations for males aged 75+ were almost identical. Suicide rates in females aged 65–74 years and 75+ years were not significantly correlated with those in females aged 15–24 years. There were highly significant positive correlations between suicide rates in females aged 65–74 years and females aged 75+ and females in the four 10-year age-bands from 25–34 years to 55–64 years.

The findings for England and Wales and Scotland were similar. However, there were very few significant correlations between the younger age-bands and the older age-bands in both sexes for Northern Ireland.

The highly significant and strong positive correlation between suicide rates in males in

the elderly age-bands and the younger age-bands between 45–54 years and 55–64 years, and in females in the elderly age-bands and the younger age-bands between 25–34 years and 55–64 years for the whole of the U.K., England and Wales and Scotland may support an argument in favor of focusing efforts for identifying distal risk factors on amalgamated suicide rates for the broad age-band 45+ years in males and 25+ years in females. This would also allow greater efficiency in the design, conduct and cost of research studies whereby a larger proportion of the population would be studied. However, caution should be exercised in accepting this view because the findings for Northern Ireland did not support this line of reasoning. We suggest that before concluding that ecological studies should focus on a broader age-band than on specific age-bands (including elderly age-bands) similar analysis should be conducted for all the countries with data on suicide rates in the WHO database to establish if the observations of this study are generally universal.

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