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The association between relative deprivation and self-rated health, depressive symptoms, and smoking behavior in Taiwan

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ABSTRACT

Relative deprivation has been hypothesized as one explanation for the association between income inequality and health. However, few studies have examined the effect of relative deprivation on psychosocial and behavioral outcomes. Using a cross-sectional data from the National Survey on Knowledge, Attitude, and Practice of Health Promotion in Taiwan, this study examined the relationship between relative deprivation and physical health (self-rated health), psychosocial health (depressive symptoms), and behavioral health (smoking) among working-age Taiwanese men and women. We found that higher relative deprivation (measured by the Yitzhaki Index) is significantly associated with a higher prevalence of poor self-rated health, depressive symptoms, and current smoking in both genders. After controlling for demographic variables and absolute income, the prevalence ratios (PRs) of reporting poor health for each 10,000 NT-dollars higher in the Yitzhaki Index are between 1.25 and 1.57, depending on the reference groups. The PRs were between 1.33 and 1.77 for depressive symptoms, and between 1.04 and 1.46 for smoking. Additionally, the depressive symptoms attenuated the association between relative deprivation and self-rated health. The results were consistent with various definitions of reference groups. In conclusion, this study suggests that the psychosocial process of relative deprivation is a crucial mechanism linking income inequality to health. Narrowing the income gap between rich and poor may protect the physical and mental well-being of the population and reduce the prevalence of smoking.

Introduction

Taiwan has experienced rapid growth in income inequality over the last few decades, with a Gini coefficient that increased from 0.28 in 1980 to 0.34 in 2010 (Council for Economic Planning and Development, 2011). Despite mixed findings, a large number of empirical studies from various countries and settings have suggested that income inequality has an adverse effect on population health (Subramanian & Kawachi, 2004; Wilkinson & Pickett, 2006, 2009). Furthermore, a meta-analysis of multi-level studies has corroborated that income inequality affects mortality and poor self-rated health (Kondo, Sembajwe, et al., 2009). If income inequalities reduce population health, a better understanding of the mechanisms linking income distribution to health is essential for the development of healthy public policy.

Relative deprivation has been hypothesized as one explanation for the association between income inequality and population health (Kawachi & Kennedy, 1999; Wilkinson, 1997). Based on relative deprivation theory by WG Runciman (1966), the difference between a person's desire and reality can produce a negative psychosocial effect. Runciman noted that an individual is relatively deprived if (i) he does not have X, (ii) he sees another person or persons who have X, (iii) he wants X, and (iv) he sees it as feasible that he should have X (Runciman, 1966, p. 10). If we consider "X" to be income, then unequal income distribution within a society increases people's sense of relative deprivation. People who consider themselves economically disadvantaged relative to their reference group (the people to whom they compare themselves) experience an increase in psychosocial stress (e.g., anxiety, shame, and frustration). Relative deprivation may affect health directly, through a biological process (neuro-endocrine response) that harms physical and mental well-being, or indirectly, by increasing the risk of engaging in adverse health behaviors, such as cigarette smoking (Wilkinson, 1996, 1997). In addition to psychosocial pathways, researchers have proposed that relative deprivation can affect health through material pathways, such as unequal access to material goods, services, and social activities that have become standards of living in a society (Lhila & Simon, 2010; Sweet, 2011). Empirical tests of the relative deprivation hypothesis have been provided by

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previous studies that examined the relationship between relative deprivation and self-rated health in Nordic countries (Åberg Yngwe, Fritzell, Lundberg, Diderichsen, & Burstrom, 2003), the United States (Eibner & Evans, 2005; Subramanyam, Kawachi, Berkman, & Subramanian, 2009), Britain (Gravelle & Sutton, 2009; Jones & Wildman, 2008; Lorgelly & Lindley, 2008), and Japan (Kondo, Kawachi, Subramanian, Takeda, & Yamagata, 2008).

Although self-rated health is a measure of general health status, the effect of relative deprivation on other health outcomes must be examined to test the relative deprivation hypothesis. However, despite the fact that psychosocial and health-compromising behavior mechanisms have been emphasized hypothetically, a recent review study has shown that research attempting to link relative deprivation to specific psychological and behavioral health outcomes is limited (Adjaye-Gbewonyo & Kawachi, 2012). Previous work has shown that relative deprivation, measured by the Yitzhaki Index, is associated with mental illness among women in Great Britain (Wildman, 2003), the use of mental health services (Eibner, Sturn, & Gresenz, 2004), higher risk of smoking and lower rates of exercising and seatbelt use among men in the United States (Eibner & Evans, 2005), and a higher probability of maternal smoking behavior in pregnant women (Lhila & Simon, 2010). In contrast to these findings, Siahpush et al. (2006) did not find an association between the Yitzhaki Index and smoking status. Ling (2009) also found no significant association between relative deprivation and current smoking behavior among older adults in China. Sun et al. (2012) found no relationship between self-perceived relative income and depression, stress, or smoking among urban Chinese youth.

In addition, evidence has shown that the psychosocial effects of social comparisons on health and diseases may differ between genders (Pham-Kanter, 2009). Another study using a temporal approach suggested that income inequality harms the self-rated health of men, but not the self-rated health of women. A gender-specific association between relative deprivation and health is a possible explanation for these findings (Zheng, 2009). Thus, further research is required to identify gender differences in the effect of relative deprivation on health.

In this study, we sought to test the relative deprivation hypothesis by examining the relationship between relative deprivation in income (measured by the Yitzhaki Index) and physical health (self-rated health), psychosocial health (depressive symptoms), and behavioral health (smoking) among working-age Taiwanese men and women. We also investigated whether depressive symptoms mediate the relationship between relative deprivation and self-rated health to explicitly test the psychosocial pathway of relative deprivation. Previous studies have shown that in Taiwan, the association between mortality and income inequality increased over the years 1976–1985–1995, whereas the relationship with average income diminished (Chiang, 1999). Based on the explanation of epidemiological transition by Wilkinson (1996, 1997), when the major causes of death change from infectious diseases to chronic diseases due to economic development, psychosocial factors may be more important than material living standards in determining population health. Therefore, we hypothesize that greater relative deprivation is associated with worse self-rated health, a higher prevalence of depressive symptoms, and smoking behavior in the Taiwanese population.

Methods

Data

Data for the analysis were obtained from the National Survey on Knowledge, Attitude, and Practice of Health Promotion in Taiwan (Taiwan-HPKAP), which was conducted between October 2002 and March 2003 by the Bureau of Health Promotion at the Department of Health in Taiwan. The aim of the Taiwan-HPKAP was to measure knowledge levels, attitudes, and behavior patterns related to health promotion among the non-institutionalized civilian population aged 15 and over in Taiwan. A multi-stage stratified sampling procedure was used to obtain a nationally representative sample. Trained investigators interviewed sample participants face to face with a structured questionnaire (Bureau of Health Promotion, 2004). Overall, 32,600 individuals were selected, and 26,755 participants were interviewed (an overall response rate of 81.9%). We restricted the sample to individuals of working age (25–64 years old). We also restricted the sample to the labor force (the employed and the unemployed) because individual income data may not be valid for assessing the relative deprivation of the population that is not in the labor force (homemakers, students, and those who are serving military duty, retired, or disabled). The final sample for this study included 8233 men and 5459 women aged 25–64 years old.

Outcome variables

The outcome variables were as follows: self-rated health, depressive symptoms, and smoking behavior. Self-rated health was assessed with the question, “Generally, would you say your current health status is: excellent, good, fair, poor, or very poor?” From this question, we dichotomized the outcome into poor perceived health if the respondent rated “poor” or “very poor” (versus not). Self-rated health has been considered a valid measure of general health and strongly predicts mortality (Idler & Benyamini, 1997; Kopp, Skrabski, Rethelyi, Kawachi, & Adler, 2004).

The second variable was depressive symptoms, assessed using the Taiwanese Depression Questionnaire (TDQ). The TDQ is a four-point scale with 18 items and is a culturally-specific self-rating instrument for the effective screening of depression in Taiwan (Lee, Yang, Lai, Chiu, & Chau, 2000). Participants were guided to use a scale from 0 to 3 to rate items related to mood, sleeping problems, appetite, energy, interest in normal activities, crying, and feelings about the future. The scores of the TDQ range from 0 to 54, and a score of 19 or above is considered an indicator of depressive symptoms. The Cronbach’s alpha coefficient for the TDQ was 0.90, and the comparison of the TDQ with the structured clinical interview for the DSM-III-R indicated a sensitivity of 0.89 and a specificity of 0.92 at a cutoff score of 19 (Lee et al., 2000).

The third variable was cigarette-smoking status, measured by a standard question distinguishing current cigarette smokers (i.e., those who have smoked at least 100 cigarettes in their lifetime and now report smoking cigarettes every day or some days) from non-current smokers.

Relative deprivation

Following the method used in most previous studies (Adjaye-Gbewonyo & Kawachi, 2012), relative deprivation was measured by the Yitzhaki Index (Yitzhaki, 1979), which was operationally developed based on the definition of relative deprivation by Runciman (1966). The Yitzhaki Index measures the relative deprivation of an individual i (RDi) by summarizing the difference between that individual’s income (y_i) and all others with higher incomes (y_j) within that person’s reference group, divided by the reference group sizes (N). The function is defined as $RDi = 1/N \Sigma(y_j - y_i)$, $\forall y_j > y_i$. Furthermore, Yitzhaki demonstrated that the total relative deprivation in a reference group is the mean income times the Gini coefficient for that group (Yitzhaki, 1979). The income measure for calculating the Yitzhaki Index was the individual’s average monthly income in the past year, including the