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Article

Trends in socioeconomic inequalities in self-rated health, smoking, and physical activity of Japanese adults from 2000 to 2010

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ABSTRACT

Health disparities in Japan are attracting increasing attention. Temporal trends in health disparities should be continuously monitored using multiple indices of socioeconomic status (SES) and health-related outcomes. We explored changes in socioeconomic differences in the health of Japanese adults during 2000–2010. The data was taken from the Japanese General Social Surveys, the cross-sectional surveys for nationally representative samples of Japanese adults. We used 14,193 samples (individuals of 20–64 years of age) in our analysis. We estimated age-adjusted prevalence ratios of the lowest SES group in comparison with the highest SES group using Poisson regression models with robust error variance. Relative index of inequality (RII) and slope index of inequality (SII) were also calculated. We examined the changes in the association between health-related outcomes (self-rated health (SRH), smoking, and physical activity) and SES indices (income, education, occupation, and subjective social class identification). The results showed temporally expanding trends for the associations of current smoking with SES, especially among women, in both relative and absolute measures. In contrast, no expanding trends were seen for SRH and physical activity. Although the smoking rates declined through the first decade of the 21st century, the socioeconomic disparities in smoking prevalence among Japanese adults expanded, especially among women. Researchers and policymakers should continuously monitor the trends that may cause future disparities in smoking-related morbidity and mortality.

1. Introduction

A social gradient in health has been widely observed and is considered a common feature of societies, especially in Western countries (Kawachi & Kennedy, 2002; Marmot, 2004). The associations between socioeconomic status (SES) and health have been reported in many countries worldwide. However, the strength of the associations may vary depending on the SES indices, health outcomes, and countries (Davey Smith et al., 1998; Eikemo, Bambra, Joyce& Dahl, 2008; Geyer, Hemstrom, Peter, & Vagero, 2006; Hanibuchi, Nakaya, & Murata, 2012; von dem Knesebeck, Verde, & Dragano, 2006).

In recent times, health disparities in Japan have attracted increasing attention. The relatively low level of socioeconomic inequalities has previously been discussed as one of the possible determinants of the longevity in the Japanese population (Ikeda et al., 2011; Marmot & Smith, 1989). However, during the last few decades, the number of empirical studies on health inequalities in Japan has rapidly increased, probably due to the growing interest in the widening economic disparity (Tachibanaki, 2005), and the studies have shown associations between SES and health. Some of the examples are mortality (Fujino et al., 2005; Ito et al., 2008), cardiovascular disease incidence (Honjo, Iso, Inoue, Tsugane, & Japan Public Health Center-based Prospective Study, 2008), self-rated health (SRH) (Honjo et al., 2006; Shibuya, Hashimoto, &Yano, 2002), and health behaviors including smoking (Fukuda, Nakamura, & Takano, 2005a, 2005b). However, the strength of the associations seemed to be weaker in Japan than in other countries (Hanibuchi et al., 2012; Kagamimori, Gaina, & Nasermoaddeli, 2009; Martikainen, Lahelma, Marmot, Sekine, Nishi, & Kagamimori, 2004; Nakaya and Dorling 2005).

Trends in socioeconomic inequalities in health have been sufficiently reported in many European countries (Kunst et al., 2005). However, in Japan, most studies have considered a specific point in time and temporal changes in health inequalities have not been sufficiently investigated. A few studies have pointed out that changes in the trends of health disparity were seen in the 1990s.

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An ecological study examining the trends in the association between life expectancy and age-adjusted mortality and per capita income has reported that health inequalities had been decreasing until 1995 but increased between 1995 and 2000 (Fukuda, Nakao, Yahata, & Imai, 2007). However, individual level studies using the Comprehensive Survey of Living Conditions (CSLC), a large-scale nationwide survey by the Japanese government, have reported stable or narrowing trends in income-related health inequalities (Hiyoshi, Fukuda, Shipley, & Brunner, 2013b; Kondo, Subramanian, Kawachi, Takeda, & Yamagata, 2008; Asada & Ohkusa, 2004; Kachi, Inoue, Nishikitani, Tsurugano, Yano, 2013). Kachi et al. (2013) used CSLC between 1986 and 2007 and found that despite widening income inequalities, income-related inequalities in SRH among working age adults narrowed during the period of economic stagnation. This phenomenon, observed since the late 1990s, has been caused by the deterioration in SRH among the middle and high income groups.

These early studies have several limitations. Most of the studies used the same data (CSLC). Validation using other data sources is required to strengthen the evidence. As the health-related data from CSLC have been available every three years, they are not sufficient to explore temporal changes within relatively short periods. The SES indices of these studies, also related to the data source, have been limited to the income- and occupation-based classes. Education and subjective social class identification have remained unexplored. Outcome measures have been limited to SRH and health-related quality of life; however, health-related risk behaviors should also be explored in terms of temporal trends.

The present study analyzes the changes in socioeconomic disparities in health among Japanese adults since 2000. We examined (for the 2000–2010 period) the changes in associations between three health-related outcomes—SRH, smoking, and physical activity—and four SES measures—income, education, occupation, and subjective social class identification.

2. Methods

2.1. Data

We used the data from the Japanese General Social Surveys (JGSS) 2000–2010 for our analysis. The JGSSs are the cross-sectional social surveys that were conducted every one or two years: in 2000, 2001, 2002, 2003, 2005, 2006, 2008, and 2010. The JGSS data consists of a nationally representative sample of individuals of 20–89 years of age living in Japan selected using a two-stage stratified random sampling design. Data were collected using a combination of interviews and self-administered questionnaires. More details about the survey methods are available at the website of the JGSS (JGSS Research Center, 2016).

JGSSs in 2003, 2006, 2008, and 2010 used two types of self-administered questionnaires (Forms A and B) and assigned Form A to half of the subjects, and Form B to the other half. Form A mainly consists of replicating core questions, while Form B contains a module for specific topics in each survey year. In the present study, we only used the data from the Form A, which included our main outcome variables for health and health behaviors. The data were suitable for tracing time trend due to the consistency of the questionnaire. The numbers of valid response (response rates, for the years from 2000 to 2010) were 2893 (64.9%), 2790 (63.1%), 2953 (62.3%), 1957 (55.0%), 2023 (50.5%), 2124 (59.8%), 2060 (58.2%), and 2507 (62.2%). We limited the analytic samples to those of working age (20–64 years old) because, in older people, health disparity might have different characteristics (Nakaya & Dorling, 2005). The number of respondents was not sufficiently large for stratified analysis by age groups, and we removed the people aged 65–89 from our analysis. Therefore, the number of samples used for our analysis was 14,193 (6547 men and 7646 women).

An ethical review was not required because the JGSS data are available via the Social Science Japan Data Archive (Center for Social Research and Data Archives, 2016) for the secondary analysis for academic purposes.

2.2. Outcome

SRH was obtained using the question of "How would you rate your health condition?" with possible responses on a 5-point scale from 1 (Good) to 5 (Poor). The variable was dichotomized into 1 ("4" and "5": poor) and 0 ("1," "2," and "3": good). Smoking was defined as "1" if the respondent was a current smoker and as "0" otherwise. The frequency of exercise or sports activity was used as the outcome variable of physical activity. The respondents were asked, "Do you regularly do any exercises or play any sports (walking, swimming, baseball, etc.)?" The choice of answers was "several times a week, about once a week, about once a month, several times a year, and scarcely any exercise." Physical activity was defined as "1" if the respondents exercised or participated in sports about once a week or less and as "0" if they exercised several times a week. The question about physical activity was first included in the JGSS-2002; thus, the study period for this variable was 2002–2010.

2.3. Socioeconomic status (SES)

Income, education, occupation, and class identification were used as SES measures. Household incomes were used as categorical values. We took the median value of each category and then calculated equivalent income by dividing the household income by the square root of the number of family members. The equivalent income was categorized into four groups: <150 million yen, 150–299.9 million yen, 300–449.9 million yen, and ≥ 450 million yen, using about one-half of the median equivalent income as a cut-off value. Education was classified into four groups: junior high school, high school, junior/technical college, and university or above. For occupation, the original classification consisted of 188 categories. To obtain a ranked category according to the occupational class, we applied occupational prestige score from the National Survey of Social Stratification and Social Mobility in 1995 (Tsuzuki, 1998) and reclassified into quartiles. Occupational prestige score is an index of social positions based on occupation. A survey of the Japanese population was conducted, and the score was calculated as an average value of the occupational rating for each occupational category. For subjective class identification, respondents were asked, "If we were to divide the contemporary Japanese society into the following five strata, which would you say you belong to?" There were five strata: Upper, Upper Middle, Middle, Lower Middle, and Lower. Considering the extremely small number of "Upper" cases, "Upper" and "Upper Middle" were merged into one category, and thus the variable was reclassified into four groups.

2.4. Statistical analysis

We estimated age-adjusted prevalence ratios (PRs) and 95% confidence intervals (CIs) for the lowest SES category in comparison with the highest category, using binary health-related outcomes including SRH, smoking, and physical activity as dependent variables and each SES index as an independent variable. Poisson regression models with robust error variance (Zou, 2004) were fitted because odds ratios by logistic regression were considered inappropriate when the prevalence of outcomes was not rare and