Author's response to reviews

Title: The association between income inequality and all-cause mortality across urban communities in Korea

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Abstract

We revised not to use abbreviations like below.

Background: Korea has achieved considerable economic growth more rapidly than most other countries, but disparities in income level have increased. Therefore, we sought to assess the association between income inequality and mortality across Korean cities.

Methods: Data on household income were obtained from the 2010-2012 Korean Community Health Survey and data on all-cause mortality and other covariates were obtained from the Korean Statistical Information Service. The Gini coefficient, Robin Hood index, and income share ratio between the 80th and 20th percentiles of the distribution were measured for each community. After excluding communities affected by changes in administrative districts between 2010 and 2012, a total of 157 communities and 172,398 urban residents were included in the analysis.

Results: All income inequality measures were significantly associated with all-cause mortality as assessed by Pearson correlation coefficients (Gini coefficient: r = 0.480, Robin Hood index: r = 0.487, 80/20 ratio: r = 0.390, p < 0.001, respectively). After adjusting for other covariates and median household income, mean all-cause mortality increased significantly with increasing Gini coefficient (p = 0.014) and Robin Hood index (p = 0.031), but not 80/20 ratio (p = 0.067).

Conclusions: Our data demonstrate that income inequality measures are significantly associated with all-cause mortality rate across urban communities in Korea.

Introduction to Background

In the past four decades, there has been great interest in the relationship between income inequality and various health indicators including life expectancy (Wilkinson 1992), self-rated health status (Kennedy et al. 1998) and mortality (Kennedy et al. 1996). Research so far
suggests that not only does absolute income influence health but that the inequality of income distribution also has an impact (Lynch et al. 1998). While this association has been studied across a wide range of countries (Collison et al. 2007; Elgar 2010), whether income data are comparable and complete across all samples remains in question (Kennedy et al. 1996). Others have investigated the effect of income inequality on health across regions within countries. However, most of these studies have been conducted in developed countries such as the United States (Massing et al. 2004), Canada (Auger et al. 2009), the United Kingdom (Stanistreet et al. 1999), other European countries (De Vogli et al. 2005; Regidor et al. 2003) and Japan (Shibuya et al. 2002). Furthermore, their results are not in agreement.

Korea has achieved considerable economic growth more rapidly than most other countries, but disparities in income and education have increased, especially after the economic crisis in the late 1990s (Khang et al. 2005). Furthermore, health status varies greatly across regions because of rapid urbanization. According to the Korean Statistical Information Service (KSIS), the region with the highest all-cause mortality in 2012 was Jeollanam-do (436.0 per 100,000) and the lowest was Seoul (339.7 per 100,000) (Korea statistics). However, to our knowledge, few studies have investigated how the association of mortality with income inequality varies by region in Korea. As mentioned above, since most studies have been conducted using post-industrialized countries’ data, investigating the relationship between income inequality and health in emerging nations like Korea may yield new insights. Thus, we sought to assess the association between income inequality and mortality across urban communities in Korea.

4.) Please provide a List of abbreviations used (if any).

We added a list of abbreviations following discussion like below

**Abbreviations**
Korean Statistical Information Service; KSIS, Korean Community Health Survey; KCHS, Korean Centers for Disease Control and Prevention; KCDC, Gini coefficient; GC, Robin Hood index; RHI, income share ratio between the 80th and 20th percentiles of the distribution; 80/20 ratio, standard deviation; SD, Analysis of covariance; ANCOVA, Organization for Economic Cooperation and Development; OECD

5.) Competing Interests

We added Competing interests following a List of abbreviations like below

**Competing interests**

The authors declare that they have no conflict of interests

6.) Authors’ Contributions

We added Authors’ Contributions following Competing interests like below

**Authors' contributions**

JP participated in the design of the study and helped to draft the manuscript. SYR and MAH participated in the design of the study and performed the statistical analysis. SWC conceived of the study, participated in the design of the study and draft the manuscript. All authors read and approved the final manuscript to be published.

7.) Acknowledgements

We added Acknowledgements following Authors' contributions like below
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