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LETTER TO THE EDITOR

The difference between healthy life expectancy and life expectancy at birth in men is smaller than that in women in populations with high life expectancy

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The World Health Organization (WHO) defines healthy life expectancy as the "average number of years that a person can expect to live in 'full health'". I read the paper by Van Oyen et al. (2013) with interest, because they elucidated gender differences in healthy life expectancy at birth (HLE_b) in European Union (EU) countries by selecting mortality and disability as the contributing factors. They adopted meta-regression analysis as a statistical procedure, and clarified that there was an advantage in men's HLE_b as life expectancy at birth (LE_b) increased. They relied on the procedure by Jagger et al. (2008), which was widely accepted in studies on health inequalities in EU countries (Lagiewka 2012; Robine et al. 2013).

HLE_b in all over the countries has been reported (World Health Statistics 2007; Salomon et al. 2012), and Japan had the highest rank of HLE_b in both the genders. Using World Health Statistics (2007), I could also present the advantage in men's HLE_b against women as life expectancy at birth (LE_b) increased. Namely, the HLE_b against the LE_b in each country was estimated by simple regression analysis with LE_b as an independent variable and HLE_b as a dependent variable.

The regression equation became $HLE_b = 0.925 \times LE_b - 4.5089$ in women, and $HLE_b = 0.9687 \times LE_b - 6.2672$ in men (Fig. 1).Using these equations, the HLE_b in women at 40, 60, and 80 years of LE_b became 32.49, 50.99, and 69.49 years, respectively. In men, the HLE_b at 40, 60, and 80 years of LE_b became 32.12, 51.50, and 70.87 years, respectively. The difference between HLE_b and LE_b in men became smaller than that in women as LE_b is larger, which was in agreement with those by Van Oyen et al. (2013).

LE_b has increased each year, and women live longer than men in most countries. Seifarth et al. (2012) overviewed the past reports on biological mechanisms of gender difference in LE_b and extracted factors such as X-chromosome inactivation, telomere attrition, mitochondrial inheritance, responses to stress, immune function, and metabolic substrate. In addition to these elements, Regan and Partridge (2013) speculated the gender gap on longevity from the view point of steroid hormone and nutrient-sensing signaling pathways.

HLE_b in women is also longer than in men in many countries (Baerlocher 2007), and HLE_b reflects successful aging. But in countries with higher LE_b, the difference between LE_b and HLE_b in men becomes smaller than that in women. Recently, Karcharnubarn et al. (2013) reported the change of HLE in Thailand using national surveys during 2002 and 2007. They calculated HLE/LE in each age and sex, and HLE/LE in men was higher than that in women in every generation. They used three types of HLE, and every indicator showed the same trend, which was in concordance with my study outcome. Furthermore, Harding et al. (2013) reported that employment in later life was associated with lower mortality, and Mackenbach and Looman (2013) presented evidence that economic and political conditions also significantly correlated with the changing patterns of mortality in Europe. These factors should be checked to clarify the difference between HLE_b and LE_b.

I speculate that for the same LE_b, men live relatively shorter period with unhealthy state compared with women in population with high LE_b. Further analysis is needed to find strategies to improve HLE_b in countries with higher LE_b in women.

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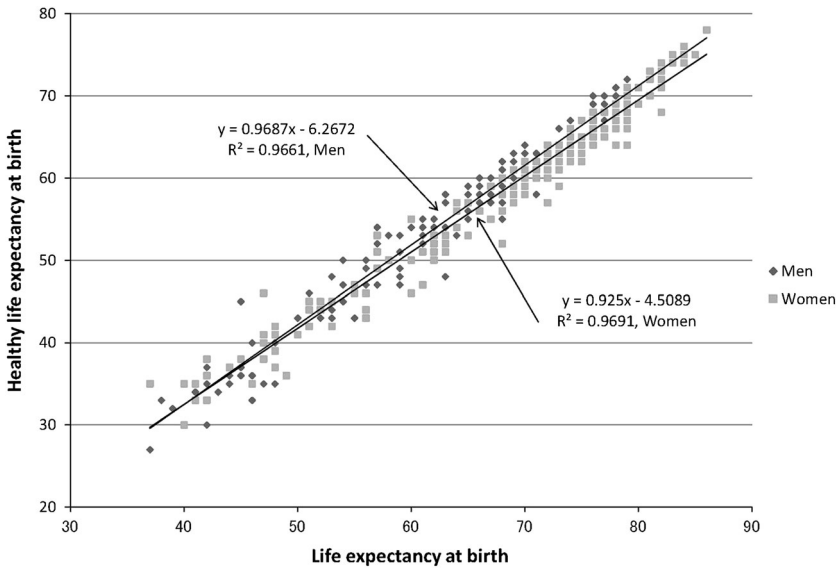

Fig. 1 The relationship between life expectancy at birth and healthy life year at birth separated by gender

Conflict of interest I have no financial support and no conflicts of interest in this study.

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