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RESEARCH REPORT

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Study objective: To examine trends in educational mortality and morbidity inequalities in Korea.
Design: Census data (1990, 1995, 2000) and death certificate data (1990–91, 1995–96, 2000–01) were used for mortality. For morbidity, four waves (1989, 1992, 1995, and 1999) of Social Statistics Survey from Korea's National Statistical Office were used. Morbidity indicators were self rated health and self reported illness in the past two weeks. Trends were studied using indices for both the relative and absolute size of socioeconomic inequalities in health.
Setting: South Korea.
Patients (or Participants): Representative annual samples of the adult population aged 30–59 in Korea.
Main results: Based on trends in relative index of inequalities, the relative level of socioeconomic mortality inequality remained virtually unchanged in men and women in the past 10 years. Meanwhile, inequalities in self rated health have increased over time in both sexes. Most of the total increase in health inequalities happened between 1995 and 1999. Inequalities in self reported acute illness increased in the past 10 years.
Conclusions: The rise in inequalities in morbidity requires increased social discourse and policy discussions about health inequalities in Korean society.

Monitoring changes in health inequalities over time is essential to understanding the impacts of social change on health as well as evaluating policies aimed at reducing these disparities. Indeed, if our goal is to reduce health inequalities, then monitoring them in a reliable way over time is a necessary first step. Trends in socioeconomic health inequalities have been examined in Great Britain,[1 2] Europe,[3–8] and the United States.[9] While the existence of health differentials among socioeconomic groups has been shown in Korea and other parts of Asia,[10–12] investigations regarding changes in socioeconomic health inequalities over time in these areas have been scarce. This may be salient given the enormous changes in economic conditions across Asia during recent decades.

Most studies that examined trends in health inequality used either mortality[1 3 9] or morbidity indicators[2 4–8] as outcome measures but rarely used both simultaneously. Describing inequality trends according to both mortality and morbidity is more comprehensive and may more closely approximate the multidimensional nature of population health. The aim of this study was to examine trends in educational mortality and morbidity inequalities among a nationally representative sample of the Korean population.

METHODS

Data sources and study subjects

Census data, available electronically from the Korean Statistical Information System,[13] and death certificate data available to the public were used for this study. To explore changes over time, 1990, 1995, and 2000 census data were used as denominators and 1990–91, 1995–96, and 2000–01 (all November—October) death certificate data were used as numerators. For mortality data decedent's age was not determined by age at death, but by calculation of the numbers of years between the date of birth on death certificate data and the time of the last census. The results of using date of birth information will be similar to those from mortality follow up in cohort studies, if (1) census and death certificate data cover all Koreans residing in Korea, (2) emigration and immigration numbers are comparatively small compared with the total population, and (3) misclassification bias for educational level is slight. As individual death certificate information was not directly linked to information from the census, numerator/denominator bias may occur in calculating education specific mortality rates, producing biased educational mortality differentials. However, according to a previous study that used these methods,[10] these possibilities have been reviewed and were expected to be small.

For trends in morbidity inequality Social Statistics Survey (SSS) data from Korea's National Statistical Office were used. These face to face interviews are conducted nationally from randomly selected households each year on the 10th day after the week that includes the 15th day of September. Sections regarding health were included in 1989, 1992, 1995, and 1999. Non-response rates for these surveys are very low (1.7% in 1999). SSS data from 1989 onward are available to the public.

This study included men and women aged 30–59. Adults aged less than 30 were excluded as they may not yet have completed their education. Adults aged 60+ were not included because college graduates in this group were very rare, especially among women. In the 1989 SSS data, only 10 of 5692 women aged 60+ (0.2%) reported completion of a college education. In addition, the Korean Statistical Information System[13] did not provide education and one year specific numbers for adults aged 60+ in the 1990 and 1995 census, presenting age collapsed population numbers for the over 60 education groups.

Study subjects for mortality consisted of 146 151 deaths (from death certificate data) of 26 852 658 men (from three census surveys) and 53 789 deaths (from death certificate data) of 26 314 593 women (from three census surveys). For morbidity, 82 012 men and 84 403 women from four SSS rounds were included as study subjects.

Socioeconomic position measures

Education was used as the indicator of socioeconomic position. Educational level was measured as the highest level of education completed. Because middle and high school categories were combined in 1990–1991 death certificate data, these two education groups were categorised together into secondary education for comparison over time. Education was classified into three categories (elementary or less, middle or high school, and college or higher) for mortality and four categories (elementary or less, middle school, high school, and college or higher) for morbidity.

After examination of the data, it was determined that income and occupation could not be included as socioeconomic position indicators. Income information is not included on death certificates in Korea, and questionnaires about income were inconsistent across waves of the SSS. In addition, occupational classifications in survey data from the National Statistical Office (census and SSS data) and registration data (death certificate data) were changed in 1993. These changes and inconsistencies thus made using income or occupation as socioeconomic indicators difficult.

Health outcome measures

Health outcome measures used in this study were death (from death certificate data) and two indicators of morbidity (self rated health and self reported illness in the past two weeks in SSS data). Self rated health was measured by the question ''How would you rate your health compared to others your age?'' with five answer categories ranging from ''very good'' to ''very poor''. The categories ''fair'', ''poor'', and ''very poor'' were combined to yield a measure of self rated health less than good. The question ''Did you have any illness in the past two weeks?'' with answer categories of ''yes'' and ''no'' was used to establish self reported illness. Questions regarding long term illness were not included in SSS.

Analysis

Education specific mortality rates were calculated using mortality data. These rates were directly age adjusted to one year age groups, with distribution of 2000 census data as the standard, producing age standardised mortality rates. Prevalence rates of self rated health less than good and self reported acute illness were calculated for morbidity data. These rates were also directly standardised to five year age groups, using the age distribution of 1999 SSS data. Confidence intervals of these age adjusted prevalence rates were estimated.

Key points

- Investigations regarding trends in socioeconomic health inequalities have been scarce in Korea and other parts of Asia. Most studies on trends in health inequality used either mortality or morbidity indicators as outcome measures but rarely used both simultaneously.
- Based on trends in relative index of inequalities, the relative level of socioeconomic mortality inequality remained virtually unchanged in men and women in the past 10 years.
- However, inequalities in self rated health have increased over time in both sexes. Most of the total increase in health inequalities happened between 1995 and 1999.

Men and women were analysed separately for both mortality and morbidity rates. Education specific relative risks for mortality were computed using Poisson regression analyses with the data of sex, one year age, and education specific numbers of population and deaths. Odds ratios for self rated health less than good and self reported acute illness were estimated by means of logistic regression.

The relative index of inequality (RII), a measure of effect that permits meaningful comparison of socioeconomic health inequalities over time,[1 4–7 9 14 15] was computed. To calculate the RII, a relative educational position indicator was computed. This indicator is a value between 0 and 1, assigned by calculating the relative position in the cumulative population distribution of the central subject in each group of the educational hierarchy, and was entered as an independent variable in our analyses. The regression coefficient of the relative educational position indicator and the standard error were used to calculate the rate ratio with 95% confidence intervals. This rate ratio is the RII for mortality data.[1 2 9] The RII in morbidity data is an odds ratio that is computed from logistic regression analysis.[4–7] The RII is the relative risk of dying, or the odds of reporting morbidity at the lowest end of the educational hierarchy as compared with the risk of dying, or the odds of reporting morbidity at the very top of the educational hierarchy. The trend in the RII was estimated by including an interaction term of the relative educational position indicator and the variable that identified the year of the data in the model. All analyses were performed with SAS statistical software.[16]

RESULTS

As table 1 shows, age standardised mortality rates in both sexes decreased over time. Male mortality rates were greater than those of women. Graded educational mortality differences were found in both sexes at different times. Based on RIIs, the relative level of socioeconomic mortality inequality remained unchanged in men for the past 10 years ($p = 0.66$). The trend in RII among women showed a decreasing pattern but was not significant ($p = 0.11$). However, differences in age standardised mortality rates between the lowest and highest educational group, that is absolute level of inequalities, provide a different picture. In women, mortality rates of the elementary or less group remained virtually unchanged (from 368 in 1990–91 to 355 in 2000–01) while mortality rates of college graduates decreased from 157 in 1990–91 to 98 in 2000–01. As the result, the absolute mortality inequalities widened over time.

Graded patterns of educational inequalities in the prevalence rates of self rated health being less than good were detected in men at different time points (table 2). In women, the gradient was not clear in 1989 (RII = 0.96 (0.86 to 1.07)). Self rated health inequalities measured by RII trends increased over time in both men and women ($p = 0.001$ and $p<0.0001$). Moreover, the increase in RII was most notable between 1995 and 1999 in both sexes. RII increased in men (RII increase = 0.55, from 1.71 to 2.26) and women (RII increase = 0.59, from 1.35 to 1.94) between 1995 and 1999 accounting for 92% of male (RII increase = 0.61, from 1.67 to 2.26) and 60% of female total increases (RII increase = 0.98, from 0.96 to1.94) between 1989 and 1999. Furthermore, the RII increase between 1995 and 1999 was statistically significant in both sexes while all other comparisons between successive surveys (except for the comparison between 1989 and 1992 in women) did not yield statistically significant RII differences.

As table 3 shows, women with more education were more likely to report illness in the past two weeks in 1989 and 1992. However, this pattern was reversed in 1995 and 1999 with less educated women reporting acute illness more easily.

Table 1 Education specific age standardised mortality rates,* relative risks,† relative indices of inequalities (RII),‡ and rate differences§ among Korean men and women aged 30–59: Korean 1990, 1995, 2000 census and 1990–1991, 1995–1996, 2000–2001 death certificate data

	Elementary or less	Middle or high school	College or higher	Total
Men aged 30–59				
1990–1991				
Population (n)	1618825	4576447	1766084	7961356
Deaths (n)	25696	21835	4147	51678
Age standardised mortality rates	1383	552	293	668
RR (95% CI)	4.48 (3.65 to 5.50)	1.96 (1.60 to 2.40)	1.00	
RII (95% CI)	7.03 (5.56 to 8.89)			
Rate difference	1090			
1995–1996				
Population (n)	1213680	5210657	2615143	9039480
Deaths (n)	19818	25403	4799	50020
Age standardised mortality rates	1462	519	233	564
RR (95% CI)	5.42 (4.39 to 6.69)	2.36 (1.94 to 2.88)	1.00	
RII (95% CI)	7.81 (6.02 to 10.13)			
Rate difference	1229			
2000–2001				
Population (n)	981812	5513676	3356334	9851822
Deaths (n)	14620	24426	5407	44453
Age standardised mortality rates	1284	440	211	451
RR (95% CI)	5.31 (4.47 to 6.30)	2.29 (1.96 to 2.68)	1.00	
RII (95% CI)	7.57 (6.01 to 9.54)			
Rate difference	1073			
RII Trend (p value)	0.66			
Women aged 30–59				
1990–1991				
Population (n)	3121854	4060401	612504	7794759
Deaths (n)	14151	5337	560	20048
Age standardised mortality rates	368	185	157	257
RR (95% CI)	2.77 (2.15 to 3.57)	1.34 (1.04 to 1.73)	1.00	
RII (95% CI)	4.25 (3.42 to 5.28)			
Rate difference	211			
1995–1996				
Population (n)	2411637	5265741	1154054	8831432
Deaths (n)	10032	7053	771	17856
Age standardised mortality rates	359	170	106	204
RR (95% CI)	3.27 (2.54 to 4.21)	1.76 (1.37 to 2.25)	1.00	
RII (95% CI)	3.76 (2.96 to 4.77)			
Rate difference	253			
2000–2001				
Population (n)	1875375	6001489	1811538	9688402
Deaths (n)	7016	7673	1196	15885
Age standardised mortality rates	355	146	98	164
RR (95% CI)	2.87 (2.32 to 3.54)	1.61 (1.32 to 1.96)	1.00	
RII (95% CI)	3.27 (2.59 to 4.13)			
Rate difference	257			
RII Trend (p value)	0.11			

*Age standardised mortality rates were calculated with age adjustment to one year age groups according to the direct method with the distribution of 2000 census data as the standard; †relative risks were computed using Poisson regression analyses with the data of sex, cause, one year age, education specific number of death and population. ''college or higher'' groups was the referent (1.0); ‡relative indices of inequalities were computed using Poisson regression analyses with the data of sex, one year age, cause, education specific number of death and population; §rate difference = (age standardised mortality rates in college or higher group)–(ages standardised mortality rates in elementary or less group).

According to RII trends, levels of inequalities for self reported acute illness have increased in the past 10 years in both sexes (men $p = 0.0012$, women $p<0.0001$). The RII in 1999 was statistically greater in women as compared with the RII in 1995. In addition, age adjusted prevalence rates of self reported acute illness increased over time in both sexes. This pattern was more notable in women who recorded a 4.7% rise (20.4% in 1989 to 25.1% in 1999) in the prevalence rate compared with men (2.5% increase, 14.4%–16.9%). This increase was attributable to the rise in self reported illness from women with less education (that is, elementary or less education).

According to the comparison of RIIs by year, levels of relative educational inequalities were greater in self rated health than those of self reported acute illness. However, the greatest level of inequality was found in mortality. Based on RIIs, levels of relative educational inequalities in mortality and morbidity were greater in men than women and persisted over time.

DISCUSSION

Results of this study showed that, based on RII trends from 1990 to 2001, relative educational mortality inequalities in Korean men and women remained virtually unchanged. The level of mortality inequality in women appeared to have narrowed, but the RII trend was not statistically significant. In contrast, absolute mortality inequality—a mortality rate difference—was found to have widened between women with elementary or less education and those with college or

Policy implications

- In response to persisting mortality inequalities and increasing morbidity inequalities, Korean government should give priority to socioeconomic health inequalities in the social policy agenda.

Table 2 Education specific age adjusted prevalence rates* of self rated health less than good and their odds ratios† and relative indices of inequalities (RII)‡ among Korean men and women aged 20–59: 1989, 1992, 1995, 1999 Social Statistics Survey of Korea's National Statistical Office

	Elementary or less	Middle	High	College or higher	Total
Men aged 30–59					
1989					
Number of the surveyed	5200	4357	7415	3331	20303
Self rated health less than good (n)	2522	1954	2900	1170	8546
Age adjusted prevalence rates (95% CI)	45.5 (44.1 to 46.8)	45.1 (43.6 to 46.6)	40.6 (39.5 to 41.7)	35.9 (34.2 to 37.5)	42.2 (41.5 to 42.9)
Odds ratio (95% CI)	1.51 (1.38 to 1.66)	1.46 (1.33 to 1.61)	1.20 (1.10 to 1.31)	1.00	
RII (95% CI)	1.67 (1.51 to 1.86)				
1992					
Number of the surveyed	4590	4424	8502	4188	21704
Self rated health less than good (n)	2610	2304	3997	1659	10570
Age adjusted prevalence rates (95% CI)	53.0 (51.5 to 54.4)	51.8 (50.4 to 53.3)	47.9 (46.9 to 49.0)	40.4 (38.9 to 41.8)	48.9 (48.2 to 49.5)
Odds ratio (95% CI)	1.73 (1.58 to 1.89)	1.56 (1.43 to 1.70)	1.33 (1.24 to 1.44)	1.00	
RII (95% CI)	1.86 (1.68 to 2.05)				
1995					
Number of the surveyed	3488	3940	9275	4926	21629
Self rated health less than good (n)	2142	2219	4813	2257	11431
Age adjusted prevalence rates (95% CI)	58.6 (57.0 to 60.3)	55.2 (53.7 to 56.8)	52.6 (51.6 to 53.6)	46.3 (44.9 to 47.7)	53.0 (52.3 to 53.7)
Odds ratio (95% CI)	1.63 (1.49 to 1.79)	1.42 (1.31 to 1.55)	1.25 (1.17 to 1.34)	1.00	
RII (95% CI)	1.71 (1.55 to 1.89)				
1999					
Number of the surveyed	2268	2884	8406	4818	18376
Self rated health less than good (n)	1497	1765	4329	2135	9726
Age adjusted prevalence rates (95% CI)	60.3 (58.3 to 62.3)	59.0 (57.2 to 60.8)	52.1 (51.0 to 53.2)	44.5 (43.1 to 45.9)	52.9 (52.2 to 53.6)
Odds ratio (95% CI)	2.09 (1.87 to 2.33)	1.79 (1.63 to 1.98)	1.30 (1.21 to 1.40)	1.00	
RII (95% CI)	2.26 (2.02 to 2.52)				
RII trend (p value)	0.001				
Women aged 30–59					
1989					
Number of the surveyed	10441	4982	4602	1063	21088
Self rated health less than good (n)	6374	2881	2526	556	12337
Age adjusted prevalence rates (95% CI)	57.8 (56.9 to 58.8)	60.4 (59.1 to 61.8)	59.3 (57.9 to 60.7)	53.0 (50.0 to 56.0)	58.6 (58.0 to 59.3)
Odds ratio (95% CI)	1.07 (0.94 to 1.23)	1.20 (1.05 to 1.37)	1.12 (0.98 to 1.29)	1.00	
RII (95% CI)	0.96 (0.86 to 1.07)				
1992					
Number of the surveyed	9387	5584	5938	1519	22428
Self rated health less than good (n)	6597	3671	3659	895	14822
Age adjusted prevalence rates (95% CI)	67.0 (66.0 to 67.9)	67.8 (66.5 to 69.0)	63.7 (62.5 to 64.9)	58.9 (56.4 to 61.4)	66.2 (65.5 to 66.8)
Odds ratio (95% CI)	1.26 (1.12 to 1.42)	1.25 (1.11 to 1.41)	1.12 (1.00 to 1.25)	1.00	
RII (95% CI)	1.21 (1.09 to 1.35)				
1995					
Number of the surveyed	7219	5419	7373	2048	22059
Self rated health less than good (n)	5232	3729	4646	1221	14828
Age adjusted prevalence rates (95% CI)	68.2 (67.1 to 69.3)	69.2 (68.0 to 70.4)	65.3 (64.2 to 66.3)	60.5 (58.3 to 62.6)	67.4 (66.8 to 68.0)
Odds ratio (95% CI)	1.34 (1.20 to 1.50)	1.34 (1.20 to 1.49)	1.13 (1.02 to 1.25)	1.00	
RII (95% CI)	1.35 (1.21 to 1.50)				
1999					
Number of the surveyed	4767	4144	7610	2307	18828
Self rated health less than good (n)	3710	3025	4780	1360	12875
Age adjusted prevalence rates (95% CI)	73.5 (72.3 to 74.8)	72.5 (71.2 to 73.9)	65.3 (64.3 to 66.4)	59.8 (57.7 to 61.8)	68.4 (67.7 to 69.0)
Odds ratio (95% CI)	1.81 (1.60 to 2.04)	1.60 (1.43 to 1.79)	1.14 (1.03 to 1.25)	1.00	
RII (95% CI)	1.94 (1.72 to 2.19)				
RII trend (p value)	<0.0001				

*Age adjusted prevalence rates were calculated with age adjustment to five year age groups according to the direct method with distribution of 1999 data; †odds ratios were computed using logistic regression. ''college or higher'' groups was the referent (1.0); ‡relative indices of inequalities were computed using logistic regression analyses.

higher education. These contrasting relative and absolute socioeconomic differentials highlight how attention needs to be paid to how inequality is measured, in regard to assessing the magnitude and trends in socioeconomic health inequalities.[14 15]

In contrast with mortality, the level of relative inequality in self rated health being less than good increased during the past 10 years among both sexes. Based on RII, relative inequalities in self reported acute illness increased in the past 10 years. An interesting finding was that the relation between education and self reported acute illness reversed in women, but not in men. Korean women with less education reported less acute illness than those with more education in 1989 and 1992 but disclosed more acute illness in 1999. This reversal in socioeconomic health gradient appeared to happen to women in a comparatively short period. One explanation may be attributable to the fact that self rated illness is a function of both the burden of disease pathology and individual perceptions. The individual's perception is further influenced by social and cultural

Table 3 Education specific age adjusted prevalence rates* of self reported acute illness and their odds† ratios and relative indices of inequalities (RII)‡ among Korean men and women aged 20–59: 1989, 1992, 1995, 1999 Social Statistics Survey of Korea's National Statistical Office

	Elementary or less	Middle	High	College or higher	Total
Men aged 30–59					
1989					
Number of the surveyed	5200	4357	7415	3331	20303
Self reported acute illness (n)	814	649	1055	391	2909
Age adjusted prevalence rates (95% CI)	14.7 (13.7 to 15.7)	15.1 (14.0 to 16.1)	14.9 (14.0 to 15.7)	11.9 (10.8 to 13.0)	14.4 (13.9 to 14.9)
Odds ratio (95% CI)	1.27 (1.12 to 1.46)	1.29 (1.13 to 1.48)	1.25 (1.11 to 1.42)	1.00	
RII (95% CI)	1.25 (1.08 to 1.45)				
1992					
Number of the surveyed	4590	4424	8502	4188	21704
Self reported acute illness (n)	805	738	1259	588	3390
Age adjusted prevalence rates (95% CI)	15.7 (14.7 to 16.8)	16.6 (15.5 to 17.7)	15.3 (14.5 to 16.0)	14.6 (13.5 to 15.7)	15.7 (15.2 to 16.2)
Odds ratio (95% CI)	1.12 (1.00 to 1.27)	1.15 (1.02 to 1.30)	1.05 (0.94 to 1.16)	1.00	
RII (95% CI)	1.17 (1.02 to 1.34)				
1995					
Number of the surveyed	3488	3940	9275	4926	21629
Self reported acute illness (n)	650	626	1284	666	3226
Age adjusted prevalence rates (95% CI)	17.3 (16.1 to 18.6)	15.5 (14.4 to 16.6)	13.8 (13.1 to 14.5)	13.4 (12.5 to 14.4)	14.9 (14.4 to 15.4)
Odds ratio (95% CI)	1.39 (1.23 to 1.58)	1.19 (1.05 to1.34)	1.02 (0.92 to 1.13)	1.00	
RII (95% CI)	1.46 (1.27 to 1.67)				
1999					
Number of the surveyed	2268	2884	8406	4818	18376
Self reported acute illness (n)	526	551	1354	673	3104
Age adjusted prevalence rates (95% CI)	20.0 (19.3 to 21.6)	18.5 (17.1 to 20.0)	16.5 (15.7 to 17.3)	14.1 (13.1 to 15.1)	16.9 (16.3 to 17.4)
Odds ratio (95% CI)	1.61 (1.41 to 1.85)	1.33 (1.17 to 1.51)	1.16 (1.05 to 1.28)	1.00	
RII (95% CI)	1.65 (1.42 to 1.90)				
RII trend (p value)	0.0012				
Women aged 30–59					
1989					
Number of the surveyed	10441	4982	4602	1063	21088
Self reported acute illness (n)	2148	1038	894	223	4303
Age adjusted prevalence rates (95% CI)	19.4 (18.6 to 20.1)	22.0 (20.9 to 23.2)	21.1 (19.9 to 22.3)	23.1 (20.6 to 25.6)	20.4 (19.8 to 20.9)
Odds ratio (95% CI)	0.81 (0.69 to 0.95)	0.96 (0.82 to 1.13)	0.91 (0.77 to 1.07)	1.00	
RII (95% CI)	0.79 (0.69 to 0.91)				
1992					
Number of the surveyed	9387	5584	5938	1519	22428
Self reported acute illness (n)	2213	1318	1303	357	5191
Age adjusted prevalence rates (95% CI)	22.4 (21.6 to 23.3)	24.6 (23.5 to 25.7)	23.3 (22.3 to 24.4)	26.5 (24.3 to 28.7)	23.2 (22.7 to 23.8)
Odds ratio (95% CI)	0.85 (0.74 to 0.97)	0.96 (0.84 to 1.09)	0.91 (0.80 to 1.04)	1.00	
RII (95% CI)	0.79 (0.69 to 0.91)		0.86 (0.76 to 0.97)		
1995					
Number of the surveyed	7219	5419	7373	2048	22059
Self reported acute illness (n)	1779	1131	1542	431	4883
Age adjusted prevalence rates (95% CI)	23.0 (22.1 to 24.0)	21.3 (20.2 to 22.4)	21.5 (20.6 to 22.4)	20.8 (19.1 to 22.6)	22.1 (21.6 to 22.7)
Odds ratio (95% CI)	1.10 (0.96 to 1.25)	0.96 (0.84 to 1.09)	0.99 (0.88 to 1.12)	1.00	
RII (95% CI)	1.10 (0.97 to 1.24)				
1999					
Number of the surveyed	4767	4144	7610	2307	18828
Self reported acute illness (n)	1531	1078	1651	470	4730
Age adjusted prevalence rates (95% CI)	27.9 (26.6 to 29.2)	25.5 (24.2 to 26.8)	23.7 (22.7 to 24.6)	21.8 (20.1 to 23.5)	25.1 (24.5 to 25.7)
Odds ratio (95% CI)	1.35 (1.19 to 1.55)	1.19 (1.05 to 1.36)	1.05 (0.94 to 1.18)	1.00	
RII (95% CI)	1.42 (1.25 to 1.61)				
RII trend (p value)	<0.0001				

*Age adjusted prevalence rates were calculated with age adjustment to five year age groups according to the direct method with distribution of 1999 data; †odds ratios were computed using logistic regression. ''College or higher'' groups was the referent (1.0); ‡relative indices of inequalities were computed using logistic regression analyses.

context. A systematic under-reporting of illness by people with lower socioeconomic position has been highlighted in other studies,[17 18] suggesting that the more disadvantaged may report less poor health despite their objectively worse health status. This may be related to people matching their expectations for health with their perceived health. Despite this underreporting, several studies in industrialised countries have revealed that poor people reported greater illness burden than rich people.[19 20] However, the rich report more ill health than the poor in many underdeveloped countries even though the rich have a better objective health status and lower mortality rates.[21 22] It has been suggested that this may reflect a richer (or more educated) person's greater likelihood to have access to health services, receive diagnoses, and thus report illness.[23 24]

Our result may be related to the expansion of Korea's national health insurance, whereby universal coverage started in late 1989 along with the final inclusion of the self employed as beneficiary.[25] Given that the coverage of Korea's national health insurance was expanded from workers in

large companies in 1977 to the self employed,[25] the difference in labour market participation rates between men and women might contribute to the gender difference in educational inequalities of self reported acute illness. Furthermore, this expansion of national health insurance may explain both the upsurge in the prevalence rates of poor self rated health between 1989 and 1992 and greater increase in self reported acute illness in women than men in the past 10 years in this study. The lack of socioeconomic self rated health gradient among women in 1989 can be also understood in this context.

This study includes periods of Korean economic crisis, which started in November 1997 and ended in August 2001, as study period. The population health footprint of that economic crisis needs investigating. Despite a potential negative health impact of the economic crisis, mortality rates among all educational groups continued to decline in both sexes. There is no evidence that the Korean economic crisis widened socioeconomic inequalities in all cause mortality. On the other hand, the latest Korean economic crisis may have widened educational inequalities in self rated health. Most of the total increase in relative inequalities in self rated health was made between 1995 and 1999. However, this increase in relative socioeconomic health inequality was not accompanied by a general deterioration of self rated health for all educational groups. While in 1999, college graduates had similar levels of self rated health compared with 1995, those with middle or less education expressed worse levels of self rated health. A definitive conclusion on the relation of the Korean economic crisis with socioeconomic mortality inequalities will not be possible until further analyses of cause specific mortality in the midst of the economic crisis are completed. Future studies should include more objective morbidity indicators and income and/or occupation as indicators of socioeconomic position.

Health inequalities in self rated health were greater than those in self reported acute illness among both sexes over time. When more objective criteria of suffering or disability were used, steeper gradients were evident, with the poorer groups displaying worse health status.[4 11 26] A previous study suggested that perceived general health was related to chronic diseases but not to acute conditions.[27]

This study explored educational inequality trends in mortality and two subjective morbidity indicators. Educational health inequalities were found to be greater in regard to the objective measure (all cause mortality) than in the subjective ones (two morbidity indicators in this study) among both sexes. This was also true in regard to trends over time. This highlights the importance of considering the outcomes used to monitor health inequalities in populations.

Socioeconomic health inequalities in women have appeared to be smaller than those of men when researchers used mortality data[28 29] rather than morbidity data as the outcome.[30] The idea that gender differences in socioeconomic health inequalities depend on the measure of inequality used has been investigated.[28 31] Given that socioeconomic health gradients for mortality and morbidity measures remained steeper over time among men than women in this study, inequality differences between women and men may not be artefacts but interesting observations that can trigger thinking about their aetiological processes.[30]

Although this study did not find any rise in relative mortality inequalities, the importance of increasing socioeconomic inequalities in subjective morbidity measures should not be overlooked in Korea, where life expectancies approach the level of western industrialised countries and the burden of people's subjective health status is perhaps growing in importance.[32] The rise in inequalities in subjective health between socioeconomic groups, regardless of concurrent increased inequalities in objective health measures, requires increased social discourse and policy discussions about health inequalities in Korean society where socioeconomic health inequalities have not taken priority in the policy agenda.

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ECHO

Disaster management and the AIDS epidemic

Please visit the *Journal of Epidemiology and Community Health* website [www.jech.com] for a link to the full text of this article.

Despite efforts to tackle the HIV/AIDS epidemic the global prevalence of the disease is still increasing. Some 42 million people are infected with HIV and fewer than 5% have access to adequate treatment. The World Health Organisation has declared the epidemic a global health emergency. Now a call has been made for governments to step up the response by declaring states of emergency and instituting full disaster management.

The United Nations defines a disaster as ''any serious disruption of the functioning of a society, causing widespread human, material or environmental losses which exceed the ability of a society to cope using only its own resources''. The HIV/AIDS epidemic satisfies this definition in some countries in sub-Saharan Africa. Over 23 million people worldwide have died of the disease, often young adults whose loss is felt most acutely by society. Such losses could threaten the fabric of societies and lead to their collapse.

The three main components of a formal disaster response are official recognition of the disaster, appropriate policy actions, and an appropriate management system. Each country must itself declare a state of emergency. By doing so they announce that the situation is critical and open the way for international humanitarian aid. They may better cope with legal, operational, and bureaucratic obstacles and use the Trade-Related Aspects of Intellectual Property Rights (TRIPS) provisions for public health emergencies. They would be able to apply for compulsory licences to manufacture and import, where appropriate, generic versions of antiretroviral drugs and other drugs needed to treat HIV and AIDS.

The recognition of disaster phases could make it easier to come to appropriate decisions. A three phase approach (phases I, II, and III; predisaster, early warning, and emergency/disaster; or green, yellow, and red phases) would enable focused decisions as the situation became more serious. Phases could be based on seroprevalence: $<1\%$, phase I; between 1% and 10%, phase II; $>10\%$, phase III. Bureaucratic indolence and ineptitude could be overcome more easily and, when appropriate, emergency powers could be phased out.

Disaster management might use an incident command system that encourages commitment to a common goal, clarity of purpose, responsibility, and authority, recognises competence and is intolerant of petty obstructions. Non-health sectors such as construction, military, education, and finance would be integrated into the common objective. Lessons learnt from the SARS outbreak could apply.

Declaring a state of emergency is a public admission that all is not well and could have adverse political consequences and affect trade. There may, however, be political capital in showing a strong commitment to tackling the epidemic and obtaining international help. Agencies empowered to cut through bureaucratic, political, and legal barriers could abuse such powers and national and international monitoring to ensure the preservation of human rights may be necessary.

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