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Differential inequity in health expectancy by region in Belgium

Submitted: 17 February 2005
Accepted: 30 May 2005
Published Online First: 21 September 2005

Summary

Objectives: To evaluate the size of social inequities in health between regions in Belgium using a composite health measure, the disability free life expectancy (DFLE).

Methods: Mortality data (5-years follow-up of the 1991 census) are combined with the 1997 Health Interview Survey to estimate the DFLE by education. Differences in partial life expectancy$_{25–74}$ (LE$_{25–74}$) and in DFLE$_{25–74}$ between those at the bottom and those at the top of a relative social scale are used to compare the regional inequities.

Results: The higher educated person has a longer LE, with more years free of disability and less years with disability (in years: Flemish males: LE = 46.48; DFLE = 42.08; Walloon males: LE = 44.92; DFLE = 39.80; Flemish females: LE = 47.90; DFLE = 41.93; Walloon females: LE = 46.90; DFLE = 39.84) compared to the population at the bottom of the education hierarchy (in years: Flemish males: LE = 44.86; DFLE = 30.16; Walloon males: LE = 42.77; DFLE = 27.00; Flemish females: LE = 46.86; DFLE = 28.30; Walloon females: LE = 45.44; DFLE = 25.30). The inequity in LE and in DFLE is larger in the Walloon Region than in the Flemish Region. Only the regional difference in inequity in LE is statistically significant.

Conclusion: The DFLE can be used to monitor the size of health inequities.

Keywords: Equity in health – Health expectancy – Life expectancy – Disability free life expectancy – Education.

Kindig and Stoddart (2003) defined population health as "the health outcomes of a group of individuals, including the distribution of such outcomes within the group". They suggested that summary measures should include both the length of life and health-related quality and function of those life years. Health expectancy (HE), i.e. the expected number of years lived in full health, is such a measure. The distribution of HE has been proposed as an indicator to define and to measure health inequality (Gakidou et al. 2000).

HEs have been calculated for several countries (WHO 2000; 2001; Robine et al. 2001). Cross-country comparison remains difficult because of incomparability of methods of calculation, data collection and definitions of morbidity (Robine et al. 1999). Several countries have calculated HEs according to socio-economic status (SES) (Wilkins & Adams 1983; Bebbington 1993; Van De Water et al. 1996; Valkonen et al. 1997; Doblhammer & Kytir 1998; Davis et al. 1999; Melzer et al. 2000; Brønnum-Hansen 2000; Cambois et al. 2001; Crimmins & Saito 2001; Bostrom & Persson 2001). However, there are only few cross-country comparisons of the size and pattern of socio-economic differences in HE (Sihvonen et al. 1998).

In Belgium, the overall levels of mortality and morbidity are substantially higher in the Walloon region (southern part of the country) than in the Flemish region (northern part) (Van Oyen et al. 1996; 2002). Estimates of HEs by SES corroborate with the findings in other countries: people in a lower socio-economic position do not live as long; they live fewer years in good health and live more years in poor health (Bossuyt et al. 2004).

The purpose of this paper is to describe the socio-economic health gap in both the Flemish and the Walloon region of Belgium and to evaluate if the inequity is different by region. More specifically the question addressed includes: how does, by educational attainment, the distribution of health, measured as life expectancy (LE) and disability free life expectancy (DFLE), differ between regions. Using the DFLE, a composite health measure, the paper focuses on the relationship between inequities in mortality and inequities in morbidity. The paper consists of an intra-country comparison and

0303-8408/05/050301–10
DOI 10.1007/s00038-005-5017-y
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therefore does not face the limitations of cross-country comparisons: 1) inter-survey differences, 2) cross-country differences in socio-economic classifications and 3) cross-country differences in cohort effects, i. e. the changing relative size of educational groups over time. In addition, in Belgium, the egalitarian social and economic policies on health differences, such as the social security system, the welfare system and the accessibility to the health care system are defined and developed at federal level and therefore remain by and large similar for the country as a whole.

Throughout the paper inequity is measured as the difference between the top (value = 1) and the bottom (value = 0) of a continuous scale. Such a scale is independent of the structure or indicator determining the socio-economic hierarchy. Contrary to previous publications (Pamuk 1988; Sihvonen et al. 1998; Bossuyt et al. 2004), the variance of the inequity is estimated. Confidence intervals (95 % CI) of the size of the inequity in LE and the inequity in DFLE are presented and the statistical significance of any observed differential inequity between the regions is evaluated.

Methods

The calculations of HE require data on both mortality and morbidity. Mortality data were derived from the Belgian National Mortality Database (NMD). The NMD consists of a follow-up of the Belgian census population from 1991 up to 1996 and allows to draw up SES-specific life tables (Deboosere & Gadeyne 2002). The NMD is based on the 1991 Belgian census, linked to National Register records of all deaths and emigrations between the census date (1st of March 1991) and the 1st of January 1996. The total Belgian population (9 978 681 persons) was included. Statistics Belgium made a direct individual link, based on the personal National Register identification number, between the census data and the National Register data with an almost complete match. The 1997 National Health Interview Survey (HIS) provided the morbidity data (Van Oyen et al. 1997). In total, 7 411 subjects, aged 25 years and older have been interviewed. They were selected from the National Register through a multistage sampling procedure.

The prevalence of functional limitations is estimated using the WHO-instrument including Activity of daily living (ADL) functions (transfer in-out bed, in-out chair, dressing, washing of hands or face, eating, going to the toilet), urinary continence, mobility, seeing and hearing. People are defined to be limited in case they had difficulties in performing one of the ADL functions, in case of incontinence, in case of a maximal walking distance of 200 meters, in case they could not follow a television programme with the volume acceptable for others, in case they could not recognise a person from a distance of four meters (de Bruin et al. 1996). For people younger than 60 years, the functional domain scale of the SF-36 instrument (Ware & Sherbourne 1992) was used as a filter. This means that a score of 100 on the SF-36 implied that they did not have to respond to the WHO instrument. They were defined as being "without functional limitations".

The position within the social hierarchy is mainly determined by the dimensions occupation, income and education. Although these dimensions are related to one another, each has its own specific influence on health. Education has some clear benefits. The information is available for practically everyone and educational attainment remains relatively stable over time (Liberatos et al. 1988). In addition, education is less sensitive information than income, with a more accurate response and a lower non-response (Turrell 2000). However, due to its stability, using education as sole dimension of SES may mask important changes in individuals' circumstances (Winkleby et al. 1992). A cohort effect may occur, as over time the social position of a certain educational attainment changes (Tab. 1). Similar to other studies (Sorlie et al. 1995; Davey Smith et al. 1998), the follow-up by SES using the Belgian NMD suggests that education is not the strongest predictor of mortality (Gadeyne & Deboosere 2002). However in this paper the highest educational attainment is used to define the social position because the census data did not have information on income and information on occupational status was limited to those people actually in the workforce at the time of the census. Furthermore only educational attainment was available from the same instrument in both the NMD and the HIS. A four-category classification is used: 1) primary education or less (obtained at about the age of 12 years); 2) lower secondary education (3 years: vocational/technical and general education); 3) higher secondary education (3 years: vocational/technical and general education) and 4) higher education (3+ years: college and university).

The study is limited to people aged 25 years and older, at which time in live all but a few persons have completed their education. Education, region, sex and age-specific probabilities of dying are used to construct the standard life tables to estimate the LE and the 95 % CI of the LE (Chiang 1984). The DFLEs are calculated using the Sullivan method[1] (Crimmins et al. 1993; Jagger et al. 2001). For each socio-economic group in both regions, age (10-year age groups) and sex-specific morbidity prevalences are applied to the life table estimates of the number of person-years lived.

We calculated partial life expectancy (LE) and DFLEs by educational attainment in the age window 25–74 years, because of survey-related limitations. Although the survey protocol

[1] http://www.prw.le.ac.uk/reves/RP408.pdf

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Table 1 Distribution of the level of educational attainment (%) by age, sex and region in the 1991 census, Belgium

Region	Age	Men				Women			
		Primary	Lower secondary	Higher secondary	Higher	Primary	Lower secondary	Higher secondary	Higher
Flemish	25–34	18	21	36	25	21	14	36	29
	35–44	28	22	28	22	36	19	26	20
	45–54	44	18	21	16	52	18	18	12
	55–64	61	14	16	9	67	14	13	6
	65–74	70	11	12	7	78	10	8	5
Walloon	25–34	22	25	33	20	21	21	31	26
	35–44	29	25	26	20	31	26	24	20
	45–54	40	22	20	18	45	25	16	14
	55–64	57	18	15	10	63	20	11	7
	65–74	61	18	13	9	71	16	7	6

Census, 1991, Belgian National Bureau of Statistics

did not exclude the institutionalised population, these people who make up a large proportion of the older aged population were not reached. The $LE_{25–74}$[2] has a maximum length of 50 years. The DFLE and the disability LE (DLE) represent the number of years expected to live without and with functional limitations. The healthy life proportion equals the ratio of years lived up to the age of 75 years without disability divided by the total number of years lived.

To account for changes in the relative distribution and changes in the meaning of the specific levels of educational attainment between cohorts, the socio-economic hierarchy based on the educational attainment was transformed into a 0 to 1 continuous scale (Pamuk 1988; Sihvonen et al. 1998). In this method not only the two extremes of the socio-economic hierarchy are compared but the whole range, calibrated on a weighted scale. The method assumes that the position of a socio-economic group is determined by its relative position, defined as the mid-point of the proportion the group represents on an ordered scale of 100 %. E. g. if in the oldest age group the proportion of subjects with primary education and with lower secondary education is respectively 60 % and 25 %, then the relative position of both groups is respectively 0.30 (midpoint [0–0.60]) and 0.725 (midpoint [0.60–0.85]). Following the methods used in previous papers (Sihvonen et al. 1998; Bossuyt et al. 2004), the mortality and morbidity rates of the educational groups in terms of their relative socio-economic position would be estimated using a weighted ordinary least square regression for each region, sex and (10-year) age group using aggregated data. The weights are defined as the relative sizes of the educational levels in each age group as observed in the 1991 census. The slope of the regression line represents the difference in mortality or morbidity between the bottom (the intercept) and the top of the socio-economic hierarchy within each region, sex and 10-year age group. The probability of death and the prevalence of disability at position 0 and at position 1 would then be used to calculate the LE and DFLE at the bottom (position 0) and the top (position 1) of the social hierarchy. This method has however two limitations. The first is the use of aggregated data which induces problems related to small sample size and the assumption of a simple linear association between the relative socio-economic position and the probability of death or the prevalence of disability. This assumption is simplistic and not robust against deviation from a linear association. A second limitation of the previously used method is that it does not allow taking into account the sampling design in the estimation of the morbidity prevalence at different positions of the social hierarchy. We therefore estimated the age, sex and region specific probability of death and the age, sex and region specific prevalence of disability at position 0 and position 1 (the bottom and the top of the social hierarchy) using a logistic regression method with the relative socio-economic position of each individual as a variable in the model. As described above this position is defined by the distribution of the educational attainment in the cohort the individual belongs to. In addition to this, the logistic regression models used to estimate the disability prevalence took into account the full survey design features: stratification, clustering at the household level and a weight factor representing the inverse of the probability of selection and participation in the survey. The age-specific regression based estimates of the probability of dying and of the prevalence of disability are then applied to calculate the $LE_{25–74}$ and the $DFLE_{25–74}$ over the range of the educational hierarchy. The

[2] The subscript "25-74" is used when it is not directly clear from the text that the estimate refers to a partial LE or DFLE

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linear combination procedure provides an estimate of the logit of the probability of death or of the disability prevalence and its standard error for any relative position on the SES-scale. E. g. if the prevalence of disability (π) is estimated as

$$\pi = \frac{e^{\theta}}{1+e}$$

with log*it*(π) and var(θ) = φ obtained through the logistic regression then the variance of π is estimated using the Delta method (Oehlert 1992) as

$$\mathrm{var}(\pi) = \left[\frac{e^{\theta}}{(1+e^{\theta})^2}\right]^2 * \varphi$$

In a similar way the probability of death and its variance were estimated. Using the estimated region, sex and age-specific probabilities of death and prevalences of disability at position 0 and position 1, the $LE_{25–74}$ and in $DFLE_{25–74}$ and their variances were estimated at the bottom and the top of the socio-economic hierarchy. The inequity in LE and in DFLE and their variances are defined as the difference in $LE_{25–74}$ and in $DFLE_{25–74}$ between both extremes (position 0 and position 1) of the relative SES-scale.

Results

The results of the logistic regression are shown in Table 2. First the coefficients and their standard error are given as they have been used in estimating the region, sex and age specific probability of death and prevalence of disability over the socio-economic gradient. E. g. the logit of being disabled estimated at the top of the SES-hierarchy for a man in the age group 45–54 years living in the Flemish region equals –2.65 [= –1.76 + (–0.31) + (–0.26) + (–1.46) + 1.14], which corresponds with a prevalence of 0.0660 [= $e^{-2.65}/(1+e^{-2.65})$]. The last two columns show the corresponding odds ratio (OR) and 95 % CI. The odds of mortality is 1.75 times greater in men compared to women. It is smaller in the Flemish region (OR = 0.64). Mortality is lower in the younger age groups (OR = 0.04 in the age group 25–34 years to 0.42 in the age group 55–64 years) compared to the 65–74 years old. The odds of mortality is 0.64 times smaller at the top than at the bottom of the social hierarchy. The prevalence of disability was lower in men (OR = 0.73) than in women. The prevalence was lower in the Flemish region (OR = 0.77) than in the Walloon region and in younger age groups (OR = 0.08 in the 25–34 years to 0.51 in the 55–64 years) than in the oldest age group. Subjects at the highest SES position are less likely to be disabled (OR = 0.17) than in those at the bottom of the social hierarchy.
The estimates of the $LE_{25–74}$ and $DFLE_{25–74}$ are presented in Table 3. The LE in Flemish men was 45.77 years of which he can expect to live 37.29 years or 81 % without disability. The LE for Walloon men was smaller: 43.88 years with 35.15 years or 80 % without disability. The number of years expected with disability for men at age 25 years up to age 75 years is 8.48 in the Flemish region and 8.73 in the Walloon region. The LE in women, respectively 47.42 and 46.16 years in the Flemish and Walloon region, was larger than in men. The years without disability were 37.44 (79 %) for women in the Flemish region and 34.97 (75 %) in the Walloon region. The years with disability for women were by region respectively 9.88 and 11.37.

Health inequity among men

In the Flemish region, the inequity in LE or the difference between the top and the bottom of the social hierarchy is 1.62 years (46.48 versus 44.86), while the difference in DFLE between the top (42.08 years) and the bottom (30.16 years) amounts up to 11.92 years (Tab. 3, Fig. 1). At age 25, subjects at the bottom of the social gradient not only live fewer years and fewer years without disability, they can also expect to live more years to live with disability. The DLE is 10.30 years larger at the bottom (14.70 years) compared to the top (4.40 years). The proportion of remaining life free of disability at age 25 years up to 75 years is 0.67 at the bottom compared to 0.91 at the top.
In the Walloon region the inequity in LE between the top (44.92 years) and the bottom (42.77 years) is 2.15 years. The inequity in DFLE is 12.80 years (39.80 vs. 27.00) and the difference in DLE is –10.65 years (5.12 vs.15.77). A man in the Walloon region who is at the lowest educational level has less years to live in the age window of 25–74 years with fewer years without disability and more years with disability. The healthy life proportion in the age window was 0.89 at the top versus 0.63 at the bottom.
In Tables 4 and 5 the size of the inequity in LE and in DFLE are given together with their 95 % CI. In both regions, the inequities are statistically significant although the difference between the top and bottom of the DFLE, the composite health measure, is much larger. The size of the inequity in LE is 0.53 years (95 % CI: 0.43–0.64) larger in the Walloon region. The difference in the inequity in DFLE between the regions is 0.88 years (95 % CI: –4.01–5.75) but not statistically significant.

Health inequity among women

A similar pattern of inequity is observed in both women and men (Tab. 3, Fig. 1). The difference in LE between the top and the bottom of the educational attainment distribution among women in the Flemish region is 1.04 years (47.90 vs. 46.86). The difference in DFLE is much larger: 13.63 years (41.93 years vs. 28.30). As their male fellow citizens, women at the

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Table 2 Parameter estimates and standard error, ORs and 95 % CI of mortality[a] and of being disabled[b], National Mortality Database, 1991–1996 and National Health Interview Survey, 1997, Belgium

	Coefficient	Standard error	OR	95 % CI
Mortality				
Relative SES-position	–0.44	0.008	0.64	(0.63–0.65)
Sex (Men = 1)	0.57	0.004	1.75	(1.75–1.76)
Region (Flemish =1)	–0.43	0.004	0.64	(0.64–0.65)
Age (ref = 65–74 yr)				
25–34	–3.25	0.010	0.04	(0.04–0.04)
35–44	–2.60	0.007	0.07	(0.07–0.08)
45–54	–1.66	0.006	0.19	(0.19–0.19)
55–64	–0.86	0.005	0.42	(0.42–0.43)
Intercept	–1.33	0.007		
Disability				
Relative SEsS-position	–1.76	0.260	0.17	(0.10–0.29)
Sex (Men = 1)	–0.31	0.117	0.73	(0.58–0.92)
Region (Flemish =1)	–0.26	0.121	0.77	(0.61–0.98)
Age (ref = 65–74 yr)				
25–34	–2.49	0.211	0.08	(0.05–0.13)
35–44	–1.92	0.182	0.15	(0.10–0.21)
45–54	–1.46	0.185	0.23	(0.16–0.33)
55–64	–0.67	0.200	0.51	(0.35–0.76)
Intercept	1.14	0.217		

a: based on a logistic regression
b: based on a logistic regression taking into account the multistage cluster sampling design

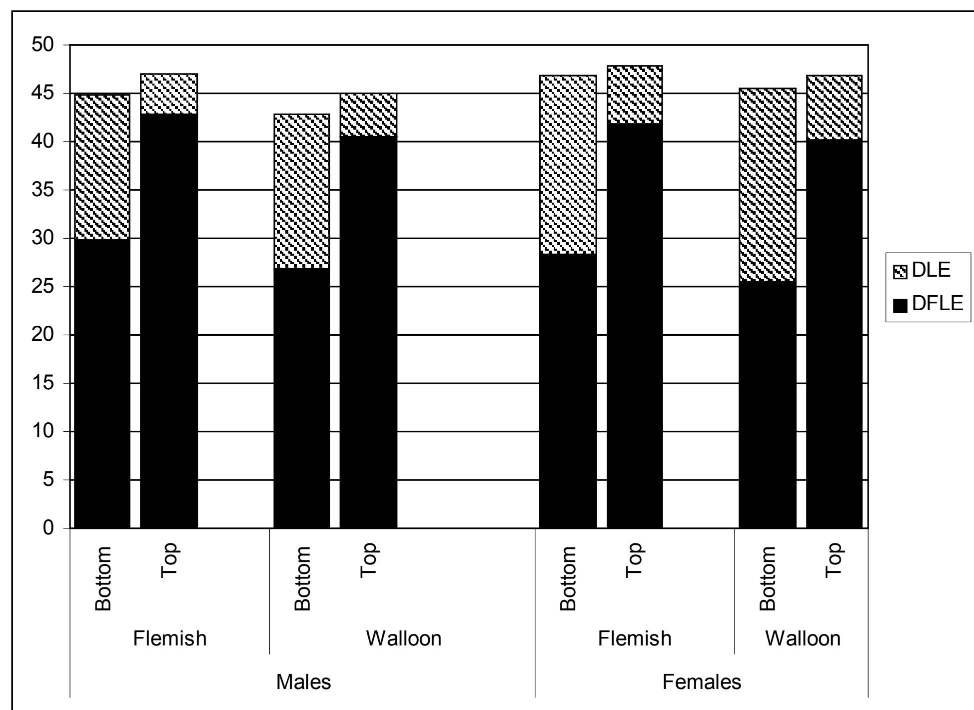

Figure 1 At age 25 years, the disability free life expectancy (DFLE) and disability life expectancy (DLE) between age 25–74 years by educational attainment (relative social position) in the Flemish and Walloon region. National Mortality Database, 1991–1996 and National Health Interview Survey, 1997, Belgium

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Table 3 Regression estimates at age 25 years of life expectancy[a], disability free life expectancy[b], disability life expectancy and healthy life proportion between age 25 and 74 by educational attainment (relative social position) in the Flemish and Walloon Region. National Mortality Database, 1991–1996 and National Health Interview Survey, 1997, Belgium

Region	Level of education	Life expectancy	Disability free life expectancy	Disability life expectancy	Healthy Life proportion
Males					
Flemish	Bottom	44.86	30.16	14.70	0.67
	Top	46.48	42.08	4.40	0.91
	All	45.77	37.29	8.48	0.81
Walloon	Bottom	42.77	27.00	15.77	0.63
	Top	44.92	39.80	5.12	0.89
	All	43.88	35.15	8.73	0.80
Females					
Flemish	Bottom	46.86	28.30	18.56	0.60
	Top	47.90	41.93	5.97	0.88
	All	47.42	37.44	9.98	0.79
Walloon	Bottom	45.44	25.30	20.14	0.56
	Top	46.90	39.84	7.06	0.85
	All	46.16	34.79	11.37	0.75

a: based on a logistic regression
b: based on a logistic regression taking into account the multistage cluster sampling design

Table 4 At age 25 years, the size of the inequity and the difference in size of the inequity in life expectancy[a] between age 25 and 74 (and 95 % confidence interval) by educational attainment (relative social position) in the Flemish and Walloon region. National Mortality Database, 1991–1996, Belgium

	Flemish region		Walloon region		Difference in inequity in life expectancy between the Regions
Level of education	Life expectancy	Inequity in life expectancy	Life expectancy	Inequity in life expectancy	
Men					
Bottom	44.86 (44.84–44.89)	1.62 (1.57–1.66)	42.77 (42.73–42.80)	2.15 (2.09–2.21)	0.53 (0.43–0.64)
Top	46.48 (46.46–46.50)		44.92 (44.89–44.94)		
All	45.77 (45.75–45.79)		43.88 (43.86–43.91)		
Women					
Bottom	46.86 (46.84–46.88)	1.04 (1.01–1.07)	45.44 (45.42–45.46)	1.46 (1.41–1.50)	0.42 (0.34–0.49)
Top	47.90 (47.89–47.91)		46.90 (46.88–46.91)		
All	47.42 (47.41–47.43)		46.16 (46.15–46.18)		

a: regression estimates based on a logistic regression

lowest educational level in the Flemish region live, within the age window considered, fewer years and fewer years without disability and they have also 12.59 more years with disability (5.97 vs. 18.56). The healthy life proportion at the top is 0.88 versus 0.60 at the bottom. In the Walloon region, women at the bottom live 1.46 years less (46.90 vs. 45.44). They live 14.54 years less without disability (39.84 vs. 25.30) and 13.08 years more with disability (7.06 vs. 20.14). The healthy life proportion at the top is larger (0.85) compared to the bottom (0.56).

As in males, the estimates of the inequity in both LE and DFLE are statistically significant (Tab. 4 and 5). The size of the inequity in both the LE and the DFLE is larger among Walloon women than among Flemish women, but this difference in inequity is only statistically significant with respect to the LE.

The patterns observed in and between the two regions are fairly similar in men and women. For a higher overall mortality we observe a larger inequity in mortality in the Walloon

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Table 5 At age 25 years, the size of the inequity and the difference in size of the inequity in disability free life expectancy[a] (DFLE) between age 25 and 74 (and 95 % confidence interval) by educational attainment (relative social position) in the Flemish and Walloon region. National Mortality Database, 1991–1996 and National Health Interview Survey, 1997, Belgium

	Flemish region		Walloon region		Difference in inequity in DFLE[b] between the regions
Level of education	**DFLE[b]**	**Inequity in DFLE[b]**	**DFLE[b]**	**Inequity in DFLE[b]**	
Men					
Bottom	30.16 (28.45–31.87)	11.92 (9.52–14.35)	27.00 (25.32–28.67)	12.80 (10.34–15.26)	0.88 (–4.01–5.75)
Top	42.08 (41.38–42.79)		39.80 (39.01–40.59)		
All	37.29 (36.29–38.29)		35.15 (34.09–36.21)		
Women					
Bottom	28.30 (26.43–30.16)	13.63 (10.84–28.67)	25.30 (23.49–27.11)	14.54 (11.77–17.32)	0.91 (–4.65–6.47)
Top	41.93 (41.00–42.85)		39.84 (38.88–40.80)		
All	37.44 (36.31–38.57)		34.79 (33.76–36.19)		

a: based on a logistic regression taking into account the multistage cluster sampling design
b: Disability free life expectancy

region. The difference in size of the inequity in LE between both regions is statistically significant for both sexes but the differential inequity is somewhat smaller among women. For an overall higher level of morbidity in the Walloon region, we observe a slightly larger size of the inequity in the Walloon region. This regional difference in the size of the inequity in morbidity is not statistically significant for both men and women. The differential inequity in LE and DFLE is mainly a result of a worse health status of those at the bottom of the socio-economic hierarchy in the Walloon region. E. g. the difference in the DFLE of the subjects at the lowest position is, compared to the same educational level in the Flemish region, 3.16 years in males and 2.28 years in females whereas the regional difference among those at the top is 2.28 years among males and 2.09 years among females.

Discussion

Health inequalities are substantial in both regions: the higher educated can expect to live longer and to have healthier lives than their less educated fellow citizens. Higher educated people also spent a larger proportion of the life expectancy without functional limitations so that they can live more years without disability and fewer years with disability. The size of the inequity in mortality is smaller than the inequity in morbidity. Comparing both regions, a similar pattern of inequity was observed in men and women. The differences over the socio-economic gradient in LE and in DFLE tend to be larger in the Walloon region. The difference in the size of the inequity is statistically significant with respect to the LE. The difference in the size of the inequity in DFLE is not statistically significant notwithstanding the fact that the absolute size of the difference in inequity of the DFLE is larger compared to the difference in inequity in LE. This is due to the fact that the LE estimation uses total population data while the DFLE is estimated using total population data (information on mortality) combined with survey data (information on morbidity).
The strength of the study resides in the within country comparison. As the participation rate in the Health Interview Survey was similar in both regions (61 %), differential selection by region would not have been a likely explanation for the observed differences in the inequity in DFLE between both regions. Secondly, previous studies that published data on differences in health expectancy indicators using a relative socio-economic scale to define the inequity did not include measures to evaluate the observed differences (Sihvonen et al. 1998; Bossuyt et al. 2004). In this paper a method of variance estimation is proposed.
There are several possible scenarios to explain the interaction between the inequity in mortality as measured by the LE and the inequity in morbidity as measured by a composite health measure such as the DFLE (Sihvonen et al. 1998). A first scenario is related to mortality selection of people according to their health: people in poor health die, so that the surviving population remains healthy. This selection is more pronounced in the lower educated group, the subgroup in the population with the highest mortality, and is stronger when overall mortality rates of a population are high. Secondly at the other end, there is the complementary selection process in that a lower mortality creates marginal survivors who are unhealthy and frail. This type of selection is stronger in the higher educated group and when overall mortality rates are declining. Both scenarios would tend to increase the inequity

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in mortality and reduce the inequity in morbidity but they act at the different ends of the socio-economic gradient. A third hypothesis suggested brings forward common determinants for both the inequity in morbidity and mortality. The paper was not set up to evaluate these scenarios and it is not clear to identify which of the scenarios is best fitted by the data. A decomposition of the cause of mortality contribution to the educational related inequity in LE in Belgium identified cancer, heart disease-stroke and asthma-COPD. These causes contributed to two thirds of the differences in both men and women (Nusselder et al. 2005). In men cancer and heart disease-stroke had an almost equal part, while in women cardiovascular disease was the most important contributor. Almost one fifth of the differences in DFLE, defined using the SF-36 functional limitations (Ware & Sherbourne 1992), was in men related to the mortality differences; in women this proportion was 10 %. The remaining inequity in DFLE in men was related to low back pain and arthritis (40 %) and heart disease-stroke and asthma-COPD (33 %). In women, heart disease-stroke and astma-COPD counted for more than half and arthritis for more than one third of the inequity (Nusselder et al. 2005). The contribution of the non-fatal chronic disease to the inequity in DFLE does not favour the first two hypotheses.

The research results pose a set of public health questions. Not only are the overall levels of mortality and morbidity in both regions different (Van Oyen et al. 2002), in both regions a substantial social inequity in health is observed with a tendency to have a somewhat larger difference, although not always statistically significant, in the region with the worst health status:

1) How much of the regional differences in the distribution of HE is attributable to (un)avoidable factors? There is little evidence for a significant variation in the genetic distribution between the two regions. Differential access and use of the health care system are, as mentioned in the introduction, not likely contributor either. The prevalence of risk behaviour (smoking, lack of physical activities, obesity, unhealthy nutritional habits) is higher in the Walloon region (Bietlot et al. 2000) and can play a role as determinant of chronic diseases such as cancer, cardiovascular diseases and COPD (Nusselder et al. 2005). Furthermore, although both regions are relatively wealthy, the Walloon region has been confronted with a worse economic situation including higher unemployment rates during the second part of the 20th century. Research should further be oriented at the identification of the contribution of causes of mortality and causes of functional limitations to the inequity in LE and DFLE in each region in order to recognize factors associated with the regional differences and the differential health inequity between the regions.

2) Which policy should be advocated to reduce the size of the inequities? Should public health policy focus on the unequal size of the inequity in mortality or rather on the unequal size of the inequity in morbidity? Should policies favour improving the bottom part or the middle part of the HE distribution (Gakidou et al. 2000)? Answers to these questions are not value-free and imply a selection either towards cure/care or towards disease prevention/health promotion or, in other words, setting priorities on prevention of premature mortality or prevention of diseases.

Conclusions

As a summary measure of health in a population, combining information on both mortality and morbidity, HEs have the advantage of being measured in units (expected years of healthy life) that are easily communicable and understandable. The prevalence-based indicator used in this paper describes the current health status of the population in both regions, indicating a substantial social inequity. The size of the inequity, defined by a relative scale, can be estimated. Using its variance, the size of the inequity and comparisons of the inequity between populations can be statistically evaluated. HE indicators provide a measure to assess, to monitor and to compare the pattern and the size of social inequities in health and are therefore an important instrument in stimulating the policy debate.

Acknowledgement

Funding: Belgian Federal Office for Scientific, Technical and Cultural Affairs (OSTC)–AG/03/007-AG/50/21.

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Zusammenfassung

Ungleichheiten der Gesundheits- und Lebenserwartung in den zwei Regionen in Belgien

Fragestellung: Evaluieren der Ungleichheiten der Gesundheits- und Lebenserwartungen zwischen den zwei belgischen Regionen mittels eines zusammengestellten Gesundheitsmasses, der Lebenserwartung ohne Behinderung (DFLE).

Methoden: Sterbetafeln (Follow-up-Studie fünf Jahre nach der Volkszählung 1991) werden mit der Gesundheitsbefragung 1997 kombiniert zur Schätzung der DFLE nach Ausbildung. Unterschiedliche Teillebenserwartung$_{25–74}$ (LE$_{25–74}$) und DFLE$_{25–74}$ zwischen der obersten und der ersten „Sprosse" der sozialen Leiter werden benutzt zum Vergleich der regionalen vertikalen Ungleichheiten.

Ergebnisse: Höher ausgebildete Personen haben eine höhere Lebenserwartung mit mehr Jahren ohne Behinderung und weniger Jahren mit Behinderung (in Jahren angegeben: flämische Männer: LE = 46,48; DFLE = 42,08; wallonische Männer: LE = 44,92; DFLE = 39,80; flämische Frauen: LE = 47,90; DFLE = 41,93; wallonische Frauen: LE = 46,90; DFLE = 39,84) als die Personen am anderen Ende des Spektrums (in Jahren angegeben: flämische Männer: LE = 44,86; DFLE = 30,16; wallonische Männer: LE = 42,77; DFLE = 27,00; flämische Frauen: LE = 46,86; DFLE = 28,30; wallonische Frauen: LE = 45,44; DFLE = 25,30). Die vertikale Ungleichheit in der LE und der DFLE ist in der wallonischen Region grösser als in der flämischen. Nur der regionale Unterschied in der vertikalen Ungleichheit der LE ist statistisch signifikant.

Schlussfolgerung: Die DFLE kann zur Berechnung der Ungleichheiten der Gesundheits- und Lebenserwartungen angewandt werden.

Résumé

Différences d'inégalités d'espérance de vie par région en Belgique

Objectifs : Évaluer l'importance des inégalités sociales de santé entre les régions en Belgique sur base d'une mesure de santé composite, l'espérance de vie sans incapacité (EVSI).

Méthodes : Les données de mortalité (suivi du recensement de 1991 après cinq ans) ont été combinées avec les données de l'enquête de santé par interview de 1997 afin d'estimer l'EVSI en fonction du niveau d'éducation. Les différences d'espérance de vie partielle$_{25–74}$ (EV$_{25–74}$) et d'EVSI$_{25–74}$ entre les personnes situées en bas et en haut d'une échelle sociale relative ont été utilisées pour comparer les inégalités régionales.

Résultats : Les personnes ayant un niveau d'éducation plus élevé ont une plus grande EV avec plus d'années sans incapacité et moins d'années avec des incapacités (en années: hommes en Flandre: EV = 46,48; EVSI = 42,08; hommes en Wallonie: EV = 44,92; EVSI = 39,80; femmes en Flandre: EV = 47,90; EVSI = 41,93; femmes en Wallonie: EV = 46,90; EVSI = 39,84) par rapport à la population ayant un niveau d'éducation moins élevé (en années: hommes en Flandre: EV = 44,86; EVSI = 30,16; hommes en Wallonie: EV = 42,77; EVSI = 27,00; femmes en Flandre: EV = 46,86; EVSI = 28,30; femmes en Wallonie: EV = 45,44; EVSI = 25,30). L'inégalité de l'EV et de l'EVSI est plus importante en Région wallonne qu'en Région flamande. Seule la différence régionale de l'inégalité quant à l'espérance de vie est statistiquement significative.

Conclusion : L'EVSI peut être utilisée pour le suivi de l'importance des inégalités de santé.

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