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The impact of hearing disability on well-being and health

Summary

Objectives: The aim of the paper is to assess the significance of hearing disability as a public health problem through its association with multiple negative health outcomes: subjective health perception, mental health and social well-being.
Methods: The data come from the participants of the 1997 national health survey in Belgium, who were 15 years and older (n = 8 560). The presence and severity of the hearing disability was estimated through self-reporting. The association of hearing disability with the studied health outcomes was assessed using logistic regression while controlling for confounding factors such as age, sex, co-morbidity and socio-economic status.
Results: The prevalence of hearing disability is 7 % in the population 15 years and older. The prevalence of subjective ill health (Odds Ratio (OR): 1.32), mental ill health (OR: 1.51), and a low appreciation of the social contacts (OR: 1.73) was higher in subjects with hearing disability. No association was found between hearing disability and the frequency of social contacts or with the functional content of the social contacts.
Conclusions: Given the health and social consequences of hearing disability, increased public health attention, including both strategies for prevention, for identification and treatment, is warranted.

Key-Words: Hearing disability – Subjective health perception – Mental health – Social well-being – Health survey.

Communication is very important for human existence. Good hearing is one of the important prerequisites for verbal communication. Although hearing disability is a very common condition, it does not receive much policy nor research attention. Good prevalence data is scarce. The existing data is difficult to interpret and to compare as they come from different study designs and sources, national health surveys, morbidity registration in general practice, specific epidemiological studies, social security agencies, using different definitions, instruments (self-reported disability or measured hearing impairment). Within Europe hearing disability affects a percentage which varies between 6% and 19% of the general population[1,2]. Persons with a hearing disability are the most numerous amongst those with a sensory disability; hearing disability is observed to have a high rank within lists of the top ten most prevalent conditions[3].

The most common loss occurs at higher frequencies, making speech especially difficult to understand when there are background noises. Hearing disability increases with age. However hearing loss is not merely an inevitable consequence of the ageing process as much hearing loss in old ages is also due to preventable, noise-induced wear and tear on the auditory system[4]. Noise-induced hearing loss is the second most common form of sensorineural hearing deficit, after presbycusis (age-related hearing loss)[5]. As a result of the technological evolution noise has become an increasingly important environmental pollutant. Noise at work remains an important contributor. However, in our current increasingly urbanised societies, noisy social and leisure time activities have become a major cause of hearing damage[6].

In this study we sought to quantify the significance of hearing disability as a public health problem through its association with multiple negative health outcomes: subjective health perception, mental health, and social well-being.

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Methods

Study population

The subjects were participants of the 1997 Belgian Health Interview Survey. As most of the information used in this paper was only asked from the age of 15 years, only the 8560 participants of 15 years and older are considered. The participants were selected from the National Population Register using a multistage sampling scheme[7]. Basically, there was a geographical stratification into 12 strata (the provinces and the Brussels Metropolitan Area), aiming at achieving a geographical spread of the interviews. Next the individuals' sample was selected in three stages within each stratum. The first stage consisted of municipalities and sampling was carried out proportional to population size. Whenever a municipality was selected a group of 50 persons was to be interviewed. The next stage random selection operates on households according to a systematic sampling procedure taking into account the statistical sector, the household size, and the age of household reference person. Finally, individuals were selected within households in such a way that four persons at most were interviewed, the reference person and his/her partner being automatically selected. Households within the same statistical sector replaced refusing households and households not reached. These households were of the same household size and had a reference person of the same age. The participation was 60% at household level[8]. Once a household participated the refusal rate within the household was 2.5%.

Data collection

All interviews were done at home by trained interviewers. Next to a household questionnaire, the health interview survey consisted of a face-to-face interview and a self-administrated questionnaire (http://www.iph.fgov.be/epidemio/epien/index4.htm). Of the 8560 participants 128 persons did not fill in the self-administrated part of the survey and information is lacking on 173 persons as information of the face-to-face part was obtained through a proxy interview. Information on hearing disability is missing on 302 subjects. In 96% of the cases this was due to an interviewer error as the instrument came next after other disability questions which were only asked to subjects aged 60 years and over and persons who failed a disability screening instrument (SF-36: physical domain[9]).

Instruments

Hearing disability was measured within the face-to-face interview with a yes/no response to following questions: (1) "Is your hearing good enough (with a hearing aid, if necessary) to follow a TV programme at a volume others find acceptable?"; and for those responding "no": (2) "Can you follow a TV programme with the volume turned up?". For the respondents normally using hearing aids the answers refer to the situation when the hearing aids are used. The not disabled are those answering "yes" to the first question; moderate hearing loss is defined when the answer is "no" to the first and "yes" to the second question; those with a severe hearing disability answered "no" to both questions. The questions on hearing loss are part of the WHO instrument to define disability in health interview surveys[10].

The information on subjective health, mental health, and social well-being were obtained through the self-administrated questionnaire. The subjective health was defined by comparing those indicating their health as very good or good (good subjective health), to those who experienced their health as very bad, bad or fair (subjective ill health) when answering to the standard question "How is your health in general?"[10]. The General Health Questionnaire-12 was used to evaluate the mental health[11]. Strong or weak agreements with negatively presented items and strong or weak disagreements with positively presented items (symptom present) were scored "1", and all other responses (symptoms absent) "0". Subjects having a total score of zero or one were considered to be in good mental health compared to those with a score of two through 12 (mental ill health)[12]. As indicators of social well-being three domains were measured: appreciation, frequency, and functional content of the social contacts[13]. Appreciation of the social contacts was defined to be high if subjects valued their social contacts as very satisfactory or satisfactory and low when they valued them as unsatisfactory or less. Subjects having contacts with relatives, children, friends, or acquaintances at least once a week were categorised as having a high frequency of social contacts; the others as having a low frequency. People having a high functional content of the social contacts could rely on a neighbour, a friend, or family when they needed help unexpectedly; could confide to someone whom they could speak freely to and had someone in their circle or family who could help them with a problem. Those responding "no" to one of those three questions were considered to have a low content of their social contacts.

Statistical analysis

Although the age and sex distribution of the realised sample is similar to that of the Belgian population (Appendix Tab. A1) all estimates reported are weighted. Weights were calculated at the provincial level to account for the stratification. Following parameters were used to obtain the weights: 1) the family size and family composition; 2) the age (five

years) and sex distribution of the province; 3) the distribution of the household sizes and age of the reference persons of the province. The association of hearing impairment with subjective health, with mental and with social well-being was assessed using logistic regression while controlling for age, sex, co-morbidity (having no, one, 2, 3 or 4+ chronic conditions out of a list of 34 conditions (Appendix Tab. A7)), educational attainment (degree of primary school or less, inferior secondary school, superior secondary school, higher education), and professional category (unskilled worker, skilled worker, employee, manager). Those still going to school were classified as having the highest educational level and professional category attained by one of the household members. The variables included in the model were identified as potentials confounding factors in the overall analysis of the national health survey.

Results

In the population of 15 years and older, the prevalence of hearing disability was 7% in males and 6.5% in females. Only a minority of the subjects had severe hearing loss (0.4% in males, 0.9% in females) (Fig. 1, Appendix Tab. A2). The prevalence increased with age: for the oldest age group it was 33% in males and 30% in females. In this age group, the prevalence of severe hearing loss was respectively 1.4% and 4.7%.

Among males, hearing loss was the main cause of disability out of a list of 10 activities[10]. It came second among females after disability due to mobility limitations (Tab. 1). In the population 65 years and older, hearing disability remained the first cause of disability in men. In older women it came in 5th place after disability due to mobility limitations, due to limitations getting on or off a chair, getting in or out a bed and due to limitations in getting dressed or undressed.

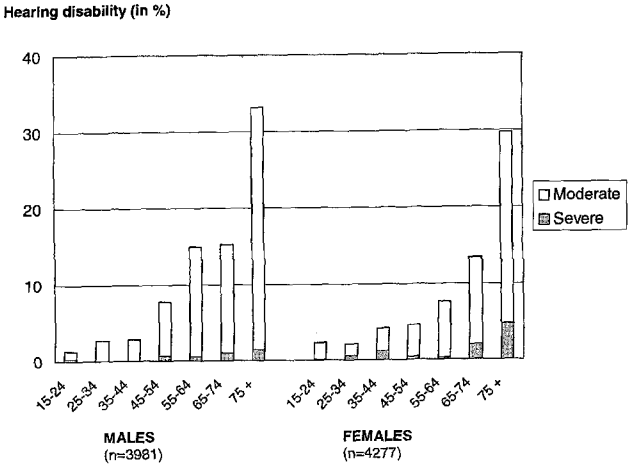

Figure 1 Prevalence of hearing disability (in %) by severity, age, and sex, Belgium 1997

15 years and older	Males	Females
Hearing	7.0	6.5
Mobility	4.3	7.7
Dressing/undressing	3.3	4.7
Getting in/out bed	2.7	5.7
Seeing	2.6	5.7
Getting on/off chair	2.4	5.0
Eating and cutting food	1.2	2.0
Washing hand and face	1.2	2.1
Urinary continence	1.1	3.2
Going to the toilet	1.0	2.4
65 years and older		
Hearing	20.3	19.6
Mobility	19.3	32.6
Dressing/undressing	16.0	19.8
Getting in/out bed	15.0	20.6
Getting on/off chair	12.9	21.3
Washing hand and face	8.1	9.2
Eating and cutting food	7.2	9.5
Urinary continence	6.0	12.3
Going to the toilet	5.3	10.5
Seeing	4.6	13.4

Table 1 Prevalence of disability in selected activities (in %), by sex and age, Belgium 1997

Subjective health

The prevalence of subjective ill health was higher in people with hearing disability (45%) compared to those without any hearing problem (20%) (Tab. 2). The age and sex adjusted odds ratio for subjective ill health was 2.05 (95% CI: 1.65–2.54) in people reporting hearing loss (Tab. 3). After additional adjustment for co-morbidity, educational attainment, and professional category the odds ratio for subjective ill health in people with hearing disability was 1.32 (95% CI: 1.03–1.70). The change in the odds ratio was mainly attributable to the confounding of the co-morbidity.

Mental health

The prevalence of mental ill health was 41% in the subjects with hearing disability and 30% in people without hearing loss (Tab. 2). The age and sex adjusted odds ratio for mental ill health was 1.86 (95% CI: 1.52–2.28) (Tab. 3) After additional adjustment for co-morbidity, educational attainment, and professional category the odds ratio for mental ill health in subjects with hearing disability was 1.51 (95% CI: 1.22–1.87).

	Hearing disability			
	No		Yes	
	%	95% CI	%	95% CI
Subjective health				
Ill	20.5	(19.2 – 21.8)	45.2	(38.8 – 51.8)
Good	79.5	(78.2 – 80.8)	54.8	(48.2 – 61.2)
N	7110		566	
Crude OR[a] (95% CI)	1		3.21	(2.65 – 3.88)
Age-sex adjusted OR[a] (95% CI)	1		1.88	(1.53 – 2.31)
Mental health				
Ill	30.3	(28.8 – 31.8)	41.2	(34.8 – 48.0)
Good	69.7	(68.2 – 71.2)	58.8	(52.0 – 65.2)
N	7334		588	
Crude OR (95% CI)	1		1.61	(1.34 – 1.94)
Age-sex adjusted OR (95% CI)	1		1.81	(1.49 – 2.20)
Appreciation of social contacts				
Low	5.7	(5.0 – 6.4)	11.5	(8.1 – 16.2)
High	94.3	(93.6 – 95.0)	88.5	(83.4 – 91.9)
N	7328		587	
Crude OR (95% CI)	1		2.16	(1.62 – 2.90)
Age-sex adjusted OR (95% CI)	1		2.11	(1.55 – 2.86)
Frequency of social contacts				
Low	8.3	(7.4 – 9.3)	10.9	(7.7 – 15.1)
High	91.7	(90.1 – 92.6)	89.1	(84.9 – 92.3)
N	7353		590	
Crude OR (95% CI)	1		1.34	(1.00 – 1.81)
Age-sex adjusted OR (95% CI)	1		1.12	(0.82 – 1.51)
Functional content of social contacts				
Low	13.1	(12.0 – 14.2)	19.3	(14.3 – 25.1)
High	86.9	(85.8 – 88.0)	80.7	(74.5 – 85.7)
N	7335		591	
Crude OR (95% CI)	1		1.59	(1.26 – 2.01)
Age-sex adjusted OR (95% CI)	1		1.40	(1.10 – 1.78)

[a] Odds ratios (ORs) and 95 % CI are based on logistic regression models.

Table 2 The relation between hearing disability and subjective health, mental health, and social well-being, Belgium 1997

Social health

People reporting hearing loss also reported more frequently a low appreciation of their social contacts (12%) compared to good hearing individuals (6%) (Tab. 2). The age and sex adjusted odds ratio: 2.24 (95% CI: 1.62–3.09) (Tab. 3). After adjustment for age, sex, co-morbidity, educational attainment, and professional category the odds ratio for a low appreciation of the social contacts in people with hearing disability was 1.73 (95% CI: 1.23–2.43).

Subjects with hearing problems had a lower frequency of social contacts. The prevalence of a low frequency was 11% in hearing disabled vs 8% in the not disabled. The age and sex adjusted odds ratio for a low frequency of the social contacts was 1.11 (95% CI: 0.81–1.54) (Tab. 3). After adjustment for the other variables the odds ratios did not change.

The prevalence of a low functional content of social contacts was higher in subjects with hearing disability (19%) compared with the subjects without hearing problems (13%) (Tab. 2). The age and sex adjusted odds ratio for a low functional content of the social contacts was 1.37 (95% CI: 1.06–1.77) (Tab. 3). After adjustment for age, sex, co-morbidity, educational attainment, and professional category the odds ratio did not remain statistically significant: 1.14 (95% CI: 0.87–1.49).

The associations between hearing disability and the different health outcomes remained similar in subjects reporting only moderate hearing disability (Tab. 3).

		OR					
		Hearing disability		Moderate disability		Severe disability	
Subjective Ill health (n = 7111)	Crude	3.45	(2.82 – 4.21)	3.36	(2.73 – 4.14)	4.46	(2.39 – 8.33)
	Age-sex adjusted	2.05	(1.65 – 2.54)	2.01	(1.26 – 4.88)	2.47	(1.26 – 4.88)
	Multivariate adjusted[a]	1.32	(1.03 – 1.70)	1.27	(0.97 – 1.65)	1.98	(0.92 – 4.27)
Mental Ill health (n = 7337)	Crude	1.65	(1.36 – 2.01)	1.72	(1.41 – 2.10)	1.11	(0.57 – 2.13)
	Age-sex adjusted	1.86	(1.52 – 2.28)	1.95	(1.58 – 2.41)	1.13	(0.58 – 2.18)
	Multivariate adjusted	1.51	(1.22 – 1.87)	1.57	(1.26 – 1.97)	1.01	(0.51 – 1.97)
Low appreciation of social contacts (n = 7300)	Crude	2.28	(1.67 – 3.10)	2.36	(1.72 – 3.25)	1.49	(0.48 – 4.62)
	Age-sex adjusted	2.24	(1.62 – 3.09)	2.32	(1.67 – 3.24)	1.46	(0.47 – 4.56)
	Multivariate adjusted	1.73	(1.23 – 2.43)	1.77	(1.24 – 2.51)	1.31	(0.40 – 4.28)
Low frequency of social contacts (n = 7300)	Crude	1.33	(0.97 – 1.81)	1.38	(1.00 – 1.90)	0.83	(0.25 – 2.75)
	Age-sex adjusted	1.11	(0.81 – 1.54)	1.15	(0.83 – 1.60)	0.75	(0.23 – 2.47)
	Multivariate adjusted	1.11	(0.79 – 1.55)	1.15	(0.81 – 1.63)	0.72	(0.21 – 2.45)
Low functional content of social contacts (n = 7300)	Crude	1.62	(1.27 – 2.07)	1.75	(1.36 – 2.25)	0.52	(0.16 – 1.70)
	Age-sex adjusted	1.37	(1.06 – 1.77)	1.48	(1.14 – 1.91)	0.46	(0.14 – 1.51)
	Multivariate adjusted	1.14	(0.87 – 1.49)	1.21	(0.93 – 1.60)	0.42	(0.12 – 1.41)

[a] Odds ratios (ORs) and 95 % CI are based on logistic regression models. The multivariate model is with adjustment for age, sex, comorbidity, educational attainment, and professional category.

Table 3 The impact of hearing disability (OR[a] and (95 % CI)) on subjective health, on mental health and social well-being

Discussion

The present data document a high prevalence of hearing disability (7%) in the Belgian population of 15 years and older. The prevalence is increasing rapidly with age and is already 5% or higher in those of 45–54 years old. The instrument used in this study has been proposed by the WHO working party on harmonisation of instruments for Health Interview Surveys[10]. To our knowledge, there are currently no data available on the validity and the relation to the audiometric measurements of the instrument used. However, since the questions asked about the problem "even with hearing aid" and because the reference is not absolute ("a volume others find acceptable"), the prevalence rates are likely to be conservative. The observed prevalence of hearing disability in the national health interview survey is within the range observed within other European countries[1]. However this information cannot be used as a proxy of the validity because, as mentioned in the introduction, most studies have been using a different methodological approach.

Changes in hearing abilities may affect the health perception, the mental health and social well-being through a decreased interaction and communication ability. A conversation with a person with hearing loss can be difficult and frustrating for both the individual with the limitation, and for the subject who wants to communicate. This frustration then contributes to subtle pressure to limit further dialogue. Subsequently family members, friends, colleagues restrict discussions with the hearing disabled. Similarly, a person with hearing disability may choose to limit difficult verbal interaction. The misunderstandings may be more frequent and more embarrassing when the hearing loss is moderate at the time when both the subject and the environment are not yet fully aware of the problem. Individuals with profound hearing loss may already have adjusted to the disability[14]. In this data set only very few people were categorised as severe hearing disabled and the instrument used is probably too robust to test the hypothesis that the negative health impact of hearing disability is greater when the disability is moderate. Nevertheless the hypothesis remains of public health importance and should be explored with more appropriate data.

Several studies have described the psychosocial consequences of hearing loss. The negative impact of hearing loss on speech perception, learning, self-image, and the development of social skills have been discussed in children[15]. Various studies focusing on elderly populations have described hearing disability as a cause of decreasing physical functioning, social isolation, loneliness, and low self-esteem[14,16–18].

The current data corroborate these findings. After adjustment for age, sex, co-morbidity, and socio-economic status, people with hearing disability more frequently express their health to be bad. They are also more frequently classified to be in mental ill health and they value their social contacts much less. The association, as expressed by the odds ratio, is most pronounced for the appreciation of the social contacts and for mental ill health. The association with the functional content of the social contacts did not remain after additional adjustment for co-morbidity and socio-economic status. There was no association with the frequency of the social contacts.

The observations in this study and their public health implications have to be seen in function of two likely evolutions: the increase of the number of people with hearing disability due to demographic changes and the increase in the age specific prevalence of the disability. About one fifth of the population 65 years and older suffers from hearing loss. As a result of the increasing life expectancy the number of people with hearing disability will grow. However there is also evidence that the prevalence of hearing disability has been increasing over the last decades, not only in the oldest population but also in younger age groups 50 years and over[19]. It is currently unclear why the age-specific prevalence increases. There has been an increase of ototoxic drug exposures (e.g., antibiotics, diuretics)[20]. In addition the general noise level has been increasing, especially the leisure time exposure which would be cumulative to job-related exposure[6,21]. However, the impact of increasing environmental noise levels on the development of hearing impairment remains unknown and controversial[22,23].

In this cross-sectional design it is not possible to make inference on the causal relationship between hearing disability and the health outcomes studied. However the prevalence of those negative health outcomes such as subjective ill health, mental ill health, and the low appreciation of the social contacts were higher in subjects with hearing disability, even when the disability was moderate and after adjustment for the presence of chronic diseases. A one-year follow-up among elderly subjects also identified the independent impact of hearing disability on functional and psychosocial outcomes after adjustment for baseline chronic conditions[18]. Subjective health is an important predictor of future health; it is a determinant of both mortality and morbidity[10,24]. The association with mental ill health and social isolation is important. The burden of mental ill health is substantial not only on the individual but also on the families, social networks, and services with a high cost for society as a whole[25]. The data suggest that more attention should be given to hearing disability. Especially one should be more aware of moderate hearing disability, which is an invisible problem, both for the subject and for his environment. Early identification of hearing loss may decrease the frustration through

recognition of the problem. Further, appropriate interventions are necessary to increase the independence of the disabled person and to preserve the ability to interact better with their environment and to prevent further hearing loss. In younger people, especially those with antecedent of otitis media[26], early detection of hearing loss, particularly when it is noise-induced[5], may help to prevent educational difficulties and further handicapping hearing loss from developing and may help to maintain residual hearing[15]. In older people, hearing testing is also crucial as a hearing impaired may be considered as a demented elderly and the evolution and the severity of dementia may be influenced by the hearing ability. Routine screening of the elderly have been suggested to be worthwhile[27], although the evidence for effective management of the elderly hearing impaired remains poor and without consensus for evaluating the audiological rehabilitation[28].

From a public health perspective, the data demonstrates the impact of hearing disability on well-being and health. As many questions are still open research projects should focus both on strategies for prevention, especially to determine the impact of leisure time exposure and on strategies for identification and for treating this highly prevalent condition.

Zusammenfassung

Der Einfluss der Gehörlosigkeit auf das Wohlbefinden und die Gesundheit

Fragestellung: Ziel der Studie ist es, die Bedeutung der Gehörlosigkeit als ein Public-Health-Problem in Zusammenhang mit vielfältigen Komponenten wie subjektive Wahrnehmung der Gesundheit, mentale Gesundheit und das Wohlbefinden einzuschätzen.

Methoden: Die Daten stammen von der nationalen Gesundheitsumfrage von 1997 in Belgien. Die Teilnehmer waren mindestens 15 Jahre alt (n = 8 560). Mittels Umfrage wurden Anwesenheit und Grad der Hörbehinderung festgelegt. Der Zusammenhang zwischen Gehörlosigkeit und Gesundheitszustand wurde mittels logistischer Regression berechnet, unter Einbeziehung der wechselnden Faktoren wie Alter, Geschlecht, Ko-Morbidität und sozio-ökonomischer Status.

Resultate: Die Prävalenz von Gehörlosigkeit beträgt 7 % in der untersuchten Population. Bei Personen mit Schwerhörigkeit waren die Empfindung einer schlechten subjektiven Gesundheit (Odds Ratio (OR): 1,32), die geistige Gesundheit (OR: 1,51) und die niedrige Schätzung der sozialen Kontakte (OR: 1,73) betonter. Kein Zusammenhang wurde zwischen Gehörlosigkeit und der Häufigkeit oder dem Inhalt sozialer Kontakte gefunden.

Schlussfolgerungen: Im Hinblick auf die Folgen für die Gesundheit und die sozialen Kontakte, vor allem wenn es sich um mässige Schwerhörigkeit handelt, ist es gerechtfertigt, dass eine frühzeitige Feststellung des Gehörverlustes praktiziert wird.

Résumé

L'impact de l'incapacité auditive sur le bien-être et la santé

Objectives: Le but de cette étude est d'estimer l'importance de l'incapacité auditive comme un problème de santé publique en association avec de multiples composantes de la santé: la perception subjective de la santé, la santé mentale et le bien-être social.

Méthodes: Les données proviennent des participants d'une enquête de santé nationale effectuée en 1997 en Belgique, qui avaient 15 ans ou plus (n = 8560). La présence et la sévérité de l'incapacité auditive ont été évaluées par une enquête. L'association entre l'incapacité auditive avec l'état de santé a été évaluée en utilisant la régression logistique tout en contrôlant les facteurs confondants tels que l'âge, le sexe, la co-morbidité et le statut socio-économique.

Résultats: La prévalence de l'incapacité auditive est 7 % dans la population de 15 ans ou plus. La prévalence d'une mauvaise santé subjective (odds ratio (OR): 1,32), d'une mauvaise santé mentale (OR:1,51) et d'une faible appréciation des contacts sociaux (OR:1,73) était plus élevée chez les sujets malentendants. Aucune association n'a été trouvée entre l'incapacité auditive et la fréquence des contacts sociaux ni avec leur contenu (teneur, degré)..

Conclusions: Etant donné les conséquences de l'incapacité auditive sur la santé et sur la vie sociale, il est pleinement justifié de leur accorder d'attention dans le domaine de la santé publique, incluant à la fois des stratégies de prévention, d'identification et de traitement.

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Appendix

Age (years)	Realised sample N	Realised sample %	Belgian population %
Males			
15 – 24	556	13.4	15.9
25 – 34	804	19.4	19.2
35 – 44	822	19.9	18.4
45 – 54	667	16.1	16.4
55 – 64	534	12.9	12.6
65 – 74	486	11.7	10.9
75+	270	6.5	5.7
	4139	100	100
		48.4	48.4
Females			
15 – 24	593	13.4	14.4
25 – 34	840	19.0	17.4
35 – 44	793	17.9	17.7
45 – 54	629	14.2	15.1
55 – 64	560	12.7	12.5
65 – 74	592	13.4	12.6
75+	414	9.4	10.4
	4421	100	100
		51.6	51.6

Table A1 Distribution of the study population (Belgium Health Interview Survey, 1997) and the Belgian population (1997) by age and sex

Age (years)	N	Males Moderate %	Males Severe %	N	Females Moderate %	Females Severe %
15 – 24	517	1.1	0.2	569	2.3	0.1
25 – 34	771	2.7	0.0	801	1.6	0.5
35 – 44	787	2.9	0.0	769	3.0	1.2
45 – 54	639	7.0	0.7	610	4.2	0.4
55 – 64	523	14.5	0.5	541	7.4	0.2
65 – 74	478	14.3	1.0	584	11.4	2.0
75 +	266	31.7	1.4	401	25.0	4.7
Total	3981	6.6	0.4	4277	5.5	1.0

Table A2 Hearing disability (in %) by severity. Belgium 1997

Age (years)	N	Percentiles (P) P10	P25	P50	P75	P90	Mean	SD
15 – 19	252	0	0	0	2	4	1.3	(2.2)
20 – 24	283	0	0	0	1	3	1.2	(2.3)
25 – 29	340	0	0	0	2	3	1.1	(1.9)
30 – 34	421	0	0	0	2	4	1.4	(2.4)
35 – 39	409	0	0	0	2	5	1.5	(2.6)
40 – 44	388	0	0	0	2	6	1.7	(2.8)
45 – 49	342	0	0	0	2	5	1.5	(2.6)
50 – 54	305	0	0	0	1	4	1.2	(2.3)
55 – 59	264	0	0	0	2	4	1.4	(2.6)
60 – 64	257	0	0	0	1	3	1.0	(2.2)
65 – 69	246	0	0	0	1	5	1.0	(2.2)
70 – 74	220	0	0	0	2	4	1.1	(2.0)
75 – 79	149	0	0	0	1	6	1.1	(2.2)
80 – 84	60	0	0	0	1	5	0.9	(1.7)
85 +	40	0	0	0	2	6	1.4	(2.4)
Total	3976	0	0	0	2	4	1.3	(2.4)

Table A3 Mental health in men (n = 3976). Belgium 1997. General Health Questionnaire: Score 0–12

Age (years)	N	Percentiles (P) P10	P25	P50	P75	P90	Mean	SD
15 – 19	263	0	0	1	3	5	1.9	(2.6)
20 – 24	301	0	0	1	3	5	2	(2.5)
25 – 29	407	0	0	0	3	6	1.8	(2.7)
30 – 34	417	0	0	0	2	5	1.5	(2.3)
35 – 39	401	0	0	1	4	8	2.3	(3.1)
40 – 44	367	0	0	0	3	7	2.2	(3.3)
45 – 49	344	0	0	0	3	7	2	(3.2)
50 – 54	267	0	0	0	3	6	2	(3.1)
55 – 59	273	0	0	0	2	6	1.8	(3.3)
60 – 64	266	0	0	0	2	5	1.5	(2.5)
65 – 69	308	0	0	1	4	7	2.3	(3.1)
70 – 74	255	0	0	0	3	7	2	(3.2)
75 – 79	169	0	0	0	3	5	1.7	(2.5)
80 – 84	110	0	0	0	2	10	1.9	(3.3)
85 +	85	0	0	0	3	9	2.2	(3.4)
Total	4233	0	0	0	3	6	1.9	(2.9)

Table A4 Mental health in women (n = 4233). Belgium 1997. General Health Questionnaire: Score 0 – 12

Age (years)	N	Very good %	Good %	Fair %	Bad %	Very bad %
15 – 19	244	39.8	53.3	6.8	0.1	0
20 – 24	275	41.9	49.2	8.3	0.5	0
25 – 29	329	47.3	49	3.1	0.6	0
30 – 34	407	32.3	57.1	8.7	1.6	0.3
35 – 39	395	29.2	60.2	9.4	1.0	0.2
40 – 44	372	27.5	52.6	14.3	5.4	0.1
45 – 49	333	28.1	54	13.3	4.3	0.4
50 – 54	300	19.1	59.6	18.5	2.4	0.3
55 – 59	251	14.9	52.8	25.5	3.7	3.0
60 – 64	245	15.6	51.3	28.1	4.0	1.0
65 – 69	232	16.0	45.0	32.4	5.8	0.7
70 – 74	212	13.0	46.3	31.7	8.8	0.2
75 – 79	143	6.5	40.3	37.6	12.9	2.8
80 – 84	60	11.7	34.0	48.5	5.8	0
85 +	41	6.3	49.8	42.9	1.1	0
Total	3839	28.4	53.2	15	2.9	0.5

Table A5 Perceived health in men (n = 3839). Belgium 1997

Age (years)	N	Very good %	Good %	Fair %	Bad %	Very bad %
15 – 19	255	39.8	53.2	6.9	0.2	0
20 – 24	285	32.9	54.6	11.5	1.0	0
25 – 29	393	34.5	54.9	9.8	0.8	0
30 – 34	404	34.6	51.6	12.7	1.1	0
35 – 39	383	24.7	52.8	20.9	1.2	0.4
40 – 44	364	20.7	49.5	26.2	3.4	0.2
45 – 49	339	20.9	53.2	22.7	3.0	0.3
50 – 54	261	16.6	55.6	22.8	3.6	1.4
55 – 59	261	8.1	60.5	28.1	3.3	0
60 – 64	263	6.2	50.3	30.4	2.3	0.8
65 – 69	297	8.8	46.7	32.8	6.6	5.2
70 – 74	251	7.1	42.1	42.1	6.1	2.5
75 – 79	166	8.0	39.5	47.2	3.7	1.6
80 – 84	106	8.0	27.7	54.1	8.1	2.0
85 +	82	19.5	28.2	30.9	20.5	0.9
Total	4110	23.4	51.5	21.7	2.7	0.7

Table A6 Perceived health in women (n = 4110). Belgium 1997

Age (years)	N	No %	1 %	2 %	3 %	4 or more %
Males						
15 – 19	252	66.0	25.9	5.4	1.1	1.6
20 – 24	283	64.0	21.9	12.4	0.4	1.3
25 – 29	340	66.3	21.6	8.6	1.9	1.6
30 – 34	421	59.6	21.8	10.7	3.6	4.3
35 – 39	410	53.6	28.4	11.9	4.2	1.9
40 – 44	389	45.8	30.4	13.3	5.6	4.9
45 – 49	342	60.7	19.7	8.6	5.2	5.8
50 – 54	306	46.4	27.1	13.9	6.5	6.1
55 – 59	266	47.5	29.2	12	4.7	6.5
60 – 64	257	35.5	25.1	17.4	10.3	11.7
65 – 69	249	30.8	27.0	10.2	5.4	26.7
70 – 74	224	19.6	28.6	23.6	15.7	12.6
75 – 79	151	25.5	28.4	15.9	13.0	17.2
80 – 84	64	19.5	25.8	20.9	25.4	8.4
85 +	42	11.3	29.0	15.9	19.6	24.1
Total	3996	51.9	25.3	11.8	5	5.9

Table A7
Number of chronic conditions[a] during the last 12 months in men (n = 3996), Belgium 1997

Age (years)	N	No %	1 %	2 %	3 %	4 or more %
Females						
15 – 19	264	67.2	14.1	13.4	2.9	2.4
20 – 24	303	48.6	28.9	15.3	2.7	4.6
25 – 29	407	52.7	26.1	12.1	4.9	4.2
30 – 34	418	43.7	29.3	15.5	7.2	4.3
35 – 39	402	43.3	26.3	14.8	8.0	7.6
40 – 44	371	35.1	25.2	12.2	16.7	10.7
45 – 49	345	33.3	26.8	17.0	9.8	13.2
50 – 54	268	32.9	28.2	18.2	9.0	11.6
55 – 59	275	24.7	27.7	23.7	11.1	12.8
60 – 64	269	26.8	21.8	19.2	15.4	16.8
65 – 69	311	23.6	19.4	22.1	14.8	20.2
70 – 74	261	15.2	25.3	29.7	13.1	16.6
75 – 79	172	27.8	20.8	12.3	9.2	29.9
80 – 84	110	15.7	19.4	15.9	13.2	35.7
85 +	87	32.8	20.4	9.8	7.3	29.6
Total	4263	38.9	25.1	16.4	9.0	10.5

[a] Asthma, chronic bronchitis or chronic pulmonary disease; Allergy; Sinusitis; Serious heart disease or heart attack; Hypertension; Disorder of the large or the small bowel for longer than three months; Hepatitis, liver cirrhosis or other disease of the liver; Stones in the kidney; Serious disease of the kidney, other than stones in the kidney; Chronic cystitis; Diabetes mellitus; Thyroid trouble; Glaucoma; Cataract; Parkinson's disease; Depression; Epilepsy; Dizziness with falling; Migraine; Serious or chronic skin disease; Malignant neoplasm or cancer; Chronic spinal affection for longer than three months; Arthrosis of knees, hips or hands; Arthritis of hands or feet; Other rheumatoid arthritis for longer than three months; Stroke and compilications of stroke; Stomach or duodenal ulcer; Gall-stones or inflammation of the gall-bladder; Osteoporosis; Wrist fracture; Hip fracture; Vertebral fracture; Prostate complaints; Prolapse of the womb.

Table A7
Number of chronic conditions during the last 12 months in women (n = 4263), Belgium 1997