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Regional Differences in the Consumption of Benzodiazepines: an Analysis from Belgium

by

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Abstract

Aim of the study: *To examine if differences in benzodiazepine use between two urban regions in Belgium could be explained by socio-demographic and health related factors.*

Method: *Two samples of 2400 respondents from all members of the Christian and socialist health insurance agencies of Aalst and Liège, aged at least 45 years. Respondents were interviewed at home on sociodemographic and health related issues and filled out health related questionnaires. They also showed all the drugs used at the moment of the interview. Univariate and multivariate analyses were done to determine the predictors of benzodiazepine use.*

Main findings: *The prevalence of benzodiazepine use was significantly higher in Liège (27.2%) than in Aalst (19.6%). Marked differences were also found between Aalst and Liège on most sociodemographic and health-related variables. A logistic regression analysis including*

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region, sociodemographic characteristics and health behaviours/attitudes as independent predictors of benzodiazepine use still resulted in a significant influence of the factor 'region'. However, this influence turned out to be insignificant when the respondent's morbidity was taken into account.

Conclusions: *Differences in benzodiazepine use between Liège and Aalst are partly explained by differences in self-reported morbidity. Objective morbidity data and information on prescribers might give more insight in such regional differences.*

Key words*: benzodiazepines, survey, community, drug utilization*

Introduction

Regional differences in the consumption and sales of sedative and anti-anxiety drugs are found in several studies. A cross-national survey in 10 European countries and the United States (1) showed that Belgium had the highest prevalence of sedative and anti-anxiety drug use: 17.6% of all adults used these drugs at least once in the past year. Within Belgium, regional differences exist in the use of benzodiazepines as the most frequently prescribed anti-anxiety and sedative drugs. A study in members of the Belgian socialist health insurance agency found that 20.2% of inhabitants from Wallonia (the southern part of Belgium) took tranquillizers daily, compared to 15.1% of inhabitants from Flanders (the northern part of Belgium) (2). The total consumption (daily and intermittent) was also higher in Wallonia than in Flanders, but this difference was not significant. Since the respondents in this study were members of a particular health insurance agency, they were not representative for the total population. Regional differences in anti-anxiety and sedative drug sales also exist in other European countries (3-5). Some studies examined which factors could possibly explain such regional differences. Williams et al. (1986) found that expenditures in other health services and the degree of urbanisation were independent positive predictors of the sales of tranquillizers and hypnotics (3). However, these factors did not explain the higher sales in the North/Centre of Italy compared to the South. Bjorndal and Fugelli (1989) examined if the higher consumption of tranquillizers and hypnotics in the North of Norway compared to the South could be explained by variations in general practitioners' threshold of prescribing (4). On the basis of written simulations of patients, no difference in threshold of prescribing was found between the general practitioners in the two regions, although the research method (case simulation) is subject to criticism due to insufficient validity.

This article describes the results of a secondary analysis on data gathered in a study about the effect of continuity of care with the general practitioner in the use of health care (6). The aim of this secondary analysis was twofold. First, the two regions of Belgium involved in the study were compared for the prevalence of benzodiazepine use, and its relation to the consumption of other drugs. Second, it was examined whether regional variation in the use of benzodiazepines could be explained by differences between the inhabitants of both regions in sociodemographic and health related factors. The available data had two major advantages. As they represented actual drug consumption, they were more informative than data about drug sales. Moreover, since they were retrieved from individual patients, it was possible to control for other factors at the patient level.

Methods

Sample selection

A sample of 4800 inhabitants from two Belgian regions – Aalst and Liège – was obtained from all members of the Christian and the socialist health insurance agencies aged 45 years or older (n= 245,460). A restriction to two regions was necessary for reasons of feasibility. Aalst and Liège were chosen because they were comparable for their available health services, and both regions disposed of a computerized individual registration system for medical service utilisation. A rectangular structure was used for sample selection, with stratification by region, insurance agency, gender and age. An advantage of this sampling structure was that it allowed for comparisons between corresponding subgroups. The sample was drawn at random from the (anonymous) member lists by the research team. For each case, three other cases within the same age range, sex, insurance agency and area code were provided beforehand, such that refusals could be replaced. A total of 7461 people were contacted to reach the final sample of 4800 respondents.

Materials

Respondents were interviewed at home between April and September 1995. A standardised interview was used to gather information on sociodemographic characteristics (civil state, form of cohabitation, education level, employment status, income, living area, housing) and health related behaviours (smoking, excessive alcohol use [defined as consumption of 6 or more alcoholic beverages during one day at least once in the preceding six months, exercising sports]). Health locus of

control (HLC) was measured by a 9-item scale (7) composed by three dimensions (3 items per scale): internal HLC; external HLC; chance HLC. To reduce the number of missing values, the dimensions were scored positive (value 1) if the respondent (strongly) agreed with at least two of three items, and negative (value 0) if the respondent (strongly) disagreed with at least two of three items. In all other cases, a dimension score was not computed. Health functioning was measured by a Dutch version of the MOS-SF36 (8), which resulted in nine dimension scores: general health, physical functioning, social functioning, role limitations due to physical problems, role limitations due to emotional problems, mental health, vitality, pain and health change. The dimension 'health change' was not used in the analysis, since the great majority of respondents reported no change over the last year. To facilitate interpretation of results and to categorize the scores according to international standards, the MOS-SF36 scales were recoded into four categories according to their quartile scores. For 'social functioning' and both 'role limitations' scales, the lowest quartile was compared to all other scores, because the distribution of the raw scores did not allow for categorisation into four quartiles. Information on morbidity was gathered in a standardised way. First, respondents were asked about all chronic health problems they experienced since at least six months. Afterwards the interviewer read aloud a list of chronic disorders to check for completeness of the answer. Some disorders were possibly not registered if the respondent underestimated their seriousness. On the other hand, disorders might be over-represented if respondents used a common diagnostic name when they did not know the real diagnosis. All disorders were coded with the International Classification of Primary Care (9). If several symptoms, complaints or disorders from the same class were mentioned, only one was withheld for the analysis, to prevent overestimation of symptoms representing the same pathology. To gather information on medication use, the following question was asked: 'Can you show me the medications you use at the moment (homeopathic products, vitamins, minerals, contraceptives, hormonal treatment included)? Are they prescribed or not?' The interviewer wrote down the name, form and dose of each package shown. All products were classified according to the 'Commentated Drug repertory' of the Belgian Centre for Pharmacotherapeutic Information (10). The following information on benzodiazepines was collected: actual use, number and dose unit of different brands used. No information was available on the duration or frequency of benzodiazepine use, neither on the daily dose taken.

Analysis

SPSS was used for data analysis (11). First, drug use was analysed per region and then compared between users and non-users in each region. Second, univariate relationships between sociodemographic and health characteristics on the one hand, and the variables 'region' and 'use of benzodiazepines' on the other hand were examined. Pearson chi square statistics or odds ratios were used for categorical variables; t-tests or Mann Whitney U-tests were used for the comparison of variables of at least ordinal level.

Third, a logistic regression analysis (method enter) was executed to determine significant independent predictors of the use of benzodiazepines. All variables with a p-value on the univariate test < 0.05 for the comparison between users of benzodiazepines and non-users were included in the logistic regression analysis.

Results

Use of benzodiazepines and other medications for the central nervous system

Almost one in four respondents (23.4%) used one or more benzodiazepines at the time of the survey. In most cases (96.6%), the intake of only one brand was reported. As can be seen in table 1, the prevalence of benzodiazepine use was significantly higher in Liège (27.2%) than in Aalst (19.6%, $p<0.001$). Similarly, a significantly higher use was observed in Liège for the following central nervous system drugs: non-benzodiazepine hypnosedatives and anxiolytics, antidepressants, neuroleptics, antihistaminics, anti-epileptics and medications used for migraine (table 1 first column). The separate columns for Aalst and Liège in table 1 also show that use of other drugs for the central nervous system was reported more often in the group of benzodiazepine users compared to non-users for both regions. A combination of benzodiazepines with antidepressants was often reported in benzodiazepine users, with a prevalence of 13% in Aalst and 17% in Liège.

Use of medications for other systems

Significantly more use was reported in Liège compared to Aalst for all medication groups, except for respiratory system drugs (data not shown).

Table 1: Use of other medication for the central nervous system: number of users in Aalst and Liège and comparison of benzodiazepine users with non-users per region.

Medication	Aalst (n=2400) n (%)	Liège (n=2400) n (%)	Aalst (n=2400)			Liège (n=2400)		
benzodiazepines	469	653 (19.6)	BZ users (27.2)	non-users n (%)	p n (%)	BZ users	non-users n (%)	p n (%)
other hypnotics, sedatives, anxiolytics	44 (1.8)	25 (1.0)	16 (3.4)	28 (1.5)	0.005	27 (4.1)	39 (2.2)	0.011
antidepressants	105 (4.4)	177 (7.4)	59 (12.6)	46 (2.4)	<0.001	110 (16.8)	67 (3.8)	<0.001
neuroleptics	55 (2.3)	118 (4.9)	29 (6.2)	26 (1.3)	<0.001	71 (10.9)	47 (2.7)	<0.001
antihistaminics	67 (2.8)	102 (4.3)	23 (4.9)	44 (2.3)	0.002	42 (6.4)	60 (3.4)	0.001
parkinson	26 (1.1)	39 (1.6)	10 (2.1)	16 (0.8)	0.015	19 (2.9)	20 (1.1)	0.002
anti-epileptics	18 (0.8)	33 (1.4)	3 (0.6)	15 (0.8)	0.755	13 (2.0)	50 (1.1)	0.001
spasticity	16 (0.7)	25 (1.0)	3 (0.6)	13 (0.7)	0.934	13 (2.0)	12 (0.7)	0.005
migrain	3 (0.1)	12 (0.5)	1 (0.2)	2 (0.1)	0.548	7 (1.1)	5 (0.3)	0.015
central stimulants	5 (0.2)	8 (0.3)	2 (0.4)	3 (0.2)	0.249	3 (0.5)	5 (0.3)	0.512
cholinesterase inhib.	4 (0.2)	0 (0.0)	1 (0.2)	3 (0.2)	0.784	0 (0.0)	0 (0.0)	–

Legend: n= number; p= p-value statistical test

Univariate comparisons between regions

All available sociodemographic and health related variables were compared between Aalst and Liège with a statistical test, except for the variables used in the rectangular sample selection (age, gender and health insurance).

The left columns of table 2a show marked differences between both regions on almost all variables on which information was gathered in the survey. That is, respondents in Liège differed from respondents in Aalst in the following ways: a lower prevalence of marriage and employment, more people living alone, more people with high educational levels, more people living in an apartment/studio/room, more people from an urban area, more people reporting an insufficient income. For health related behaviours and attitudes, the following differences were found in Liège compared to Aalst: more people smoked, more people exercised sports, more people had a positive score on each of the locus of control dimensions (internal, external and chance). The only variable for which inhabitants from Liège were comparable with inhabitants from Aalst was the prevalence of excessive alcohol use: in both regions the prevalence was somewhat higher than one to five. Table 2b (left columns) shows significantly worse levels of functioning in Liège than in

Aalst on most dimensions of the MOS-SF36, except for role functioning due to physical problems. However, significantly more people in Liège than in Aalst reported a good level of general functioning, which seems to contradict the results on the MOS-subscales and self-reported disorders. Indeed, when respondents were asked about their health disorders, inhabitants from Liège reported more physical and central nervous system disorders than inhabitants from Aalst. No significant difference was found between Aalst and Liège for self-reported mental disorders. On the contrary, a highly significant discrepancy existed for self-reported mental functioning on the MOS-SF36 scale in the advantage of Aalst.

Table 2a: Sociodemographic variables and health related behaviours/attitudes: comparison between regions and between users and non-users for the total sample (n=4800)

Variable	REGION		USE OF BENZODIAZEPINES	
	Aalst (n=2400)	Liège (n=2400)	Users	Non-users
	n (%)	n (%)	n (%)	n (%)
Gender (OR ; 95% CI)*		OR=0.52 (0.45-0.59)		
male	1197 (50)	1200 (50)	422 (37.6)	1975 (53.8)
female	1199 (50)	1200 (50)	700 (62.4)	1699 (46.2)
Age (years)*	t=0.27 (p=0.78)		t=10.42 (p<0.001)	
	mean 68.4(SD 11.45)	mean 68.4 (SD 11.69)	mean 71.5 (SD 10.4)	mean 67.5 (SD 11.74)
Insurance institute				
(OR; 95% CI)*			OR= 0.79 (0.69-0.90)	
CM	1197 (49.9)	1200 (50)	509 (45.4)	1888 (51.4)
SM	1199 (50)	1200 (50)	613 (54.6)	1786 (48.6)
Civil state	p<0.0001		p<0.0001	
married	1633 (68.4)	1302 (54.4)	566 (50.4)	2369 (64.5)
unmarried	111 (4.6)	187 (7.8)	66 (5.9)	232 (6.3)
divorced	79 (3.3)	265 (11.1)	92 (8.2)	252 (6.9)
widowed	566 (23.7)	636 (26.6)	392 (34.9)	810 (22.0)
Education level	p<0.0001		p<0.0001	
no certificate	608 (25.5)	406 (17.1)	256 (23.1)	758 (20.8)
primary education	683 (28.7)	602 (25.3)	345 (31.1)	940 (25.8)
lower secondary	619 (26.0)	691 (29.0)	299 (26.9)	1011 (27.7)
higher secondary	312 (13.1)	346 (14.5)	117 (10.5)	541 (14.8)
higher education	158 (6.6)	335 (14.1)	93 (8.4)	400 (11.0)
Employment status	p=0.003		p<0.0001	
Employed	357 (15.1)	284 (12.0)	42 (3.8)	599 (16.5)
unemployed/work unable	160 (6.8)	202 (8.5)	92 (8.3)	270 (7.4)
retired	1680 (70.9)	1699 (71.5)	883 (79.7)	2496 (68.6)
housewife(man)	173 (7.3)	190 (8.0)	91 (8.2)	272 (7.5)
Housing situation				
(OR; 95% CI)	OR=6.78 (5.66-8.11)		OR= 0.61 (0.52-0.71)	
house	2164 (92.9)	1542 (65.9)	796 (72.8)	2910 (81.4)
apartment/studio/room	165 (7.1)	797 (34.1)	298 (27.2)	664 (18.6)

Variable	REGION		USE OF BENZODIAZEPINES	
	Aalst (n=2400)	Liège (n=2400)	Users	Non-users
	n (%)	n (%)	n (%)	n (%)
Income (OR; 95% CI)	OR= 2.16 (1.85-2.53)		OR= 0.64 (0.54-0.76)	
sufficient	2087 (87.9)	1844 (77.2)	579 (69.6)	3070 (78.1)
insufficient	286 (12.1)	546 (22.8)	253 (30.4)	861 (21.9)
Living Area				
(OR; 95% CI)	OR=5.69 (4.73-6.86)		OR= 0.75 (0.63-0.88)	
rural	2193 (93.4)	1681 (71.4)	870 (79.0)	3004 (83.5)
urban	154 (6.6)	672 (28.6)	231 (21.0)	595 (16.5)
Form of cohabitation	p<0.0001		p<0.0001	
living alone	543 (22.7)	785 (32.9)	418 (37.3)	910 (24.9)
with partner only	1220 (51.0)	957 (40.1)	464 (41.4)	1713 (46.8)
with partner and children	400 (16.7)	397 (16.6)	112 (10.0)	685 (18.7)
other	230 (9.6)	248 (10.4)	126 (11.3)	352 (9.6)
Excessive alcohol use				
(OR; 95% CI)	OR=1.06 (0.92-1.21)		OR= 0.55 (0.46-0.66)	
yes	528 (22.5)	509 (21.6)	164 (14.9)	873 (24.3)
no	1817 (77.5)	1848 (78.4)	938 (85.1)	2727 (75.8)
Smoking				
(OR; 95% CI)	OR=0.60 (0.52-0.69)		OR= 0.78 (0.66-0.92)	
yes	428 (17.9)	642 (26.8)	214 (19.1)	856 (23.4)
no	1960 (82.1)	1754 (73.2)	905 (80.9)	2809 (76.6)
Exercising sports				
(OR; 95% CI)	OR=0.81 (0.71-0.91)		OR= 0.51 (0.44-0.60)	
yes	684 (28.7)	792 (33.2)	232 (20.8)	1244 (34.0)
no	1703 (71.3)	1590 (66.8)	881 (79.2)	2412 (66.0)
Health Locus of Control				
Internal (OR; 95% CI)	OR=0.48 (0.41-0.55)		OR= 0.73 (0.63-0.86)	
yes	1552 (69.9)	1937 (83.0)	766 (72.2)	2723 (78.0)
no	667 (30.1)	396 (17.0)	295 (27.8)	768 (22.0)
Health Locus of control				
External (OR; 95% CI)	OR=0.61 (0.54-0.68)		OR= 1.92 (1.66-2.22)	
yes	1059 (47.8)	1409 (60.1)	699 (66.2)	1769 (50.5)
no	1158 (52.2)	934 (39.9)	357 (33.8)	1735 (49.5)
Health Locus of Control				
Chance (OR; 95% CI)	OR=0.60 (0.53-0.67)		OR= 1.09 (0.94-1.26)	
yes	974 (47.0)	1326(59.8)	543 (55.2)	1757 (53.1)
no	1098 (53.0)	893 (40.2)	440 (44.8)	1551 (46.9)

Legend: * statistical test only for the comparison between users and non-users, because the sample was stratified on this variable; OR= odds ratio (Aalst versus Liège or users versus non-users); CI= confidence interval; n= number; p= p-value of the statistical test

Univariate comparisons between users of benzodiazepines and non-users

The right columns of table 2a show the associations between use of benzodiazepines and the other variables examined. In respondents who used benzodiazepines, more people were female, older, widowed, less educated, retired, living alone, had an insufficient income, lived in an

apartment, were from an urban area, did not smoke, showed no excessive alcohol use, did not exercise sports, or were member of the socialist health insurance. Benzodiazepine users also had a higher chance to have an external health locus of control, and a lower chance of an internal health locus of control. No association was found between benzodiazepine consumption and a chance oriented health locus of control.

As can be noted from table 2b (right columns), users of benzodiazepines reported a lower level of functioning on all MOS-SF36 health dimensions. Also, the prevalence of benzodiazepine use increased if physical, mental or central nervous system disorders were present.

Table 2b: Health functioning and morbidity: comparison between regions and between benzodiazepine users and non-users for the total sample (n=4800).

	REGION				USE OF BENZODIAZEPINES			
Variable	Aalst		Liège		Users		Non-users	
SF36 general health	p<0.0001				p<0.0001			
P 1-25	719	(30.6)	744	(31.4)	548	(49.5)	915	(25.4)
P 26-50	592	(25.2)	481	(20.3)	226	(20.4)	874	(23.5)
P 51-75	680	(29.0)	639	(27.0)	239	(21.6)	1080	(30.0)
P 76-100	355	(15.1)	503	(21.3)	95	(8.6)	763	(21.2)
SF36 physical functioning	p=0.0388				p<0.0001			
P 1-25	590	(24.9)	593	(25.1)	431	(39.1)	752	(20.7)
P 26-50	643	(27.2)	708	(30.0)	372	(33.8)	979	(27.0)
P 51-75	528	(22.3)	533	(22.6)	198	(18.0)	863	(23.8)
P 76-100	606	(25.6)	529	(22.4)	101	(9.2)	1034	(28.5)
SF36 social functioning	p<0.0001				p<0.0001			
P 1-25	608	(25.4)	795	(33.2)	512	(45.7)	891	(24.3)
P 26-100	1783	(74.6)	1596	(66.8)	609	(54.4)	2770	(75.7)
SF36 mental health	p<0.0001				p<0.0001			
P 1-25	379	(16.1)	827	(34.9)	508	(45.7)	698	(19.3)
P 26-50	601	(25.5)	736	(31.0)	334	(30.1)	1003	(27.7)
P 51-75	675	(28.6)	487	(20.5)	160	(14.4)	1002	(27.7)
P 76-100	705	(29.9)	323	(13.6)	109	(9.8)	919	(25.4)
SF36 role-physical	p=0.297				p<0.0001			
P 1-25	709	(30.4)	687	(29.0)	491	(44.7)	905	(25.1)
P 26-100	1626	(69.6)	1684	(71.0)	607	(55.3)	2703	(74.9)
SF36 role-emotional	p<0.0001							
P 1-25	574	(24.7)	794	(33.5)	483	(44.2)	885	(24.6)
P 26-100	1750	(75.3)	1573	(66.5)	609	(55.8)	2714	(75.4)
SF36 pain	p<0.0001				p<0.0001			
P 1-25	591	(24.7)	667	(36.2)	527	(47.1)	931	(25.4)
P 26-50	530	(22.1)	533	(22.2)	251	(22.4)	812	(22.1)
P 51-75	572	(23.9)	507	(21.2)	192	(17.1)	887	(24.2)
P 76-100	701	(29.3)	490	(20.4)	150	(13.4)	1041	(28.4)

	REGION				USE OF BENZODIAZEPINES			
Variable	Aalst		Liège		Users		Non-users	
SF36 vitality	p<0.0001				p<0.0001			
P 1-25	409	(17.3)	906	(38.1)	539	(48.5)	776	(21.4)
P 26-50	527	(22.3)	838	(35.3)	304	(27.3)	1061	(29.3)
P 51-75	566	(24.0)	401	(16.9)	169	(15.2)	798	(22.0)
P 76-100	860	(36.4)	232	(9.8)	100	(9.0)	992	(27.4)
Disorders physical								
OR (95% CI)	OR=0.58 (0.50-0.66)				OR=3.11 (2.55-3.80)			
one or more	1699	(70.9)	1941	(80.9)	997	(88.9)	2643	(71.9)
none	697	(29.1)	459	(19.1)	125	(11.1)	1031	(28.1)
Disorders mental								
OR (95% CI)	OR=0.88 (0.67-1.14)				OR= 6.49 (4.93-8.53)			
one or more	111	(4.6)	126	(5.3)	151	(13.5)	86	(2.3)
none	2285	(95.4)	2274	(94.8)	971	(86.5)	3588	(97.7)
Disorders central nervous system								
OR (95% CI)	OR=0.78 (0.64-0.94)				OR=1.93 (1.57-2.36)			
one or more	204	(8.5)	257	(10.7)	163	(14.5)	298	(8.1)
none	2192	(91.5)	2143	(89.3)	959	(85.5)	3376	(91.9)

Legend: OR=odds ratio; CI=confidence interval, P=percentile, p=p-value statistical test

Logistic regression analysis

To see which variables were independently related to the use of benzodiazepines, they were considered in a logistic regression analysis. First, the variable 'region', all other sociodemographic variables, and variables indicating health behaviours/attitudes were included in the analysis. The effect of region was still significant after controlling for these variables (table 3, left column). Next, the MOS-SF36 dimensions and self-reported physical, mental and central nervous system disorders were included (table 3, right column). The odds of using benzodiazepines compared to the odds of not using benzodiazepines significantly increased with being female; being older; not being employed; having an external health locus of control orientation; reporting mental disorders or physical disorders. On the other hand, the odds decreased with reporting better mental health and reporting more vitality. The association between region and use of benzodiazepines was no longer significant when morbidity variables were taken into account (table 3, right column).

Table 3: Results of logistic regression analysis (method enter) with use of benzodiazepines as the dependent variable: odds ratios and 95% confidence interval of variables included in the model without morbidity variables and variables included in the model with morbidity variables.

	Model without morbidity variables		Model with morbidity variables	
Variable	OR	95% CI	OR	95% CI
living in Liège (compared to Aalst)	1.45	1.22-1.72	1.00	0.81-1.24
female (compared to male)	1.64	1.37-1.95	1.48	1.22-1.80
age (increase of 1 year)	1.01	1.00-1.02	1.02	1.01-1.03
external HLC (compared to no)	1.01	1.00-1.02	1.02	1.01-1.03
not employed (compared to employed)	2.94	1.99-4.36	2.23	0.30-0.68
living at an appartment/studio/room (compared to living at a house)	1.20	0.95-1.53	1.30	1.00-1.70
civil state (compared to 'married')				
unmarried	0.94	0.64-1.37	0.97	0.64-1.46
legal divorce	1.01	0.69-1.49	0.90	0.59-1.38
actual divorce	1.42	0.82-2.44	1.05	0.56-1.95
widowed	1.12	0.85-1.47	1.01	0.75-1.36
education level (compared to none)				
primary education	1.17	1.14-1.20	1.25	0.98-1.58
lower secondary education	1.13	0.90-1.43	1.22	0.95-1.56
higher secondary education	1.08	0.80-1.44	1.14	0.83-1.56
higher education	1.44	1.04-2.00	1.47	1.03-2.11
insufficient income (compared to sufficient)	1.36	1.12-1.66	0.88	0.70-1.10
living in an urban area (compared to rural)	0.85	0.66-1.09	0.78	0.59-1.03
not living alone (compared to living alone)	0.86	0.66-1.11	0.83	0.90-1.59
insurance at SM (compared to CM)	1.26	1.08-1.48	1.16	0.97-1.39
excessive alcohol use (compared to no)	0.99	0.80-1.24	1.06	0.84-1.35
smoking (compared to no)	0.93	0.76-1.14	0.92	0.74-1.15
exercising sport (compared to no)	1.20	1.09-1.32	1.09	0.98-1.21
internal HLC (compared to no)	0.77	0.65-0.92	1.01	0.82-1.23
MOS-SF36:				
general health (compared to P0-24)				
P 25-49			0.74	0.58-0.95
P 50-74			0.96	0.73-1.25
P 75-100			0.81	0.57-1.16
physical functioning (compared to P0-24)				
P 25-49			1.05	0.83-1.32
P 50-74			1.09	0.80-1.48
P 75-100			0.87	0.59-1.27
Pain (compared to P0-24)				
P 25-49			0.96	0.75-1.22
P 50-74			1.03	0.78-1.23
P 75-100			0.90	0.66-1.23
social functioning P25-100 (compared to P0-24)			0.99	0.79-1.24
role physical P25-100 (compared to P0-24)			1.12	0.89-1.40
role emotional P25-100 (compared to P0-24)			0.81	0.66-1.01
mental health (compared to P0-24)				
P 25-49			0.72	0.58-0.91
P 50-74			0.46	0.34-0.61
P 75-100			0.41	0.29-0.57
Vitality (compared to P0-24)				
P 25-49			0.65	0.51-0.82
P 50-74			0.81	0.59-1.11
P 75-100			0.53	0.37-0.78

	Model without morbidity variables		Model with morbidity variables	
Variable	OR	95% CI	OR	95% CI
Physical disorders (compared to none)				
one			1.55	1.17-2.06
two			1.49	1.10-2.00
three or more			1.82	1.35-2.47
Mental disorders (compared to none)			4.44	3.16-6.25
Central Nervous System disorders (compared to none)		1.19	0.91-1.54	
-2*loglikelihood (chi-square)	4060.190		3520.286	

Legend: The reference category for each variable is cited between brackets. Age is included as a linear variable in the analysis. OR= odds ratio; CI= confidence interval; P=percentile.

Discussion

The study findings concerning differences between users of benzodiazepines and non-users on sociodemographic and health characteristics were comparable to the results from other studies (12-20). The fact that gender was still a significant predictor of benzodiazepine use after controlling for other variables confirmed the results of two other studies (13) (20), but was not in line with the results of a population survey in the Belgian province of East-Flanders (21). This might be due to discrepancies between both samples on other characteristics (e.g. age distribution) or between the study definitions of the dependent variable (actual use versus long-term daily use). Since the data of the current study were not collected in a representative sample, caution is needed in generalisation of the results to other populations. Another important limitation of the study is that we did not have any information on the characteristics of the physicians who prescribed benzodiazepines to the respondents. Indeed, since benzodiazepines as a rule can only be obtained by prescription, information on the prescribing physicians might improve the goodness of fit of the multivariate model for benzodiazepine use.

A highly significant discrepancy was found between Aalst and Liège for the consumption of benzodiazepines in general. It is not clear from these data whether patterns of benzodiazepine consumption in Liège differed from those in Aalst, because no information was available on the duration, frequency or dose of benzodiazepine use. In the survey of Pestiaux et al (2) in adult members of the socialist health insurance agency, a significantly higher tranquillizer consumption was found in Wallonia compared to Flanders for daily use, but not for use in general (daily or intermittent use).

The existing regional differences on sociodemographic variables (e.g. the degree of urbanisation), health-related behaviours and attitudes could

not explain the higher prevalence of benzodiazepine use in Liège. The odds ratio for the variable 'region' was still 1.45 after controlling for these variables (unadjusted odds ratio 1.54). However, when taking into account morbidity information the odds ratio dropped to 1.00.

Although detailed information was retrieved on the respondents' morbidity, its value is limited since it was based on self-reported data and the different measures showed some inconsistencies. It would be interesting to know to what degree the higher level of self-reported morbidity in Liège compared to Aalst relates to other health parameters, such as the formal diagnosis of a physician. However, no such information was available.

A simple conclusion could be that the regional differences in benzodiazepine use are completely justifiable because of differences in morbidity. Is this a correct analysis? Or, are both benzodiazepine prescriptions and reported psychosocial morbidity exponents of a difference in "culture" between the two regions? One hypothesis could be that the cultural acceptance of disease as a legitimation for social dysfunction (e.g. being unemployed not going to work because of distress) is different in both regions, with more complaints (more "morbidity") and more benzodiazepine use in Liège than in Aalst.

In order to understand the complexity of the phenomenon we hypothesise a conceptual framework. Figure 1 illustrates that social determinants may influence the physician, benzodiazepine prescription, the patient and morbidity-labelling. Moreover it illustrates the interaction between "morbidity" and "social determinants" as morbidity may contribute to a downward social mobility.

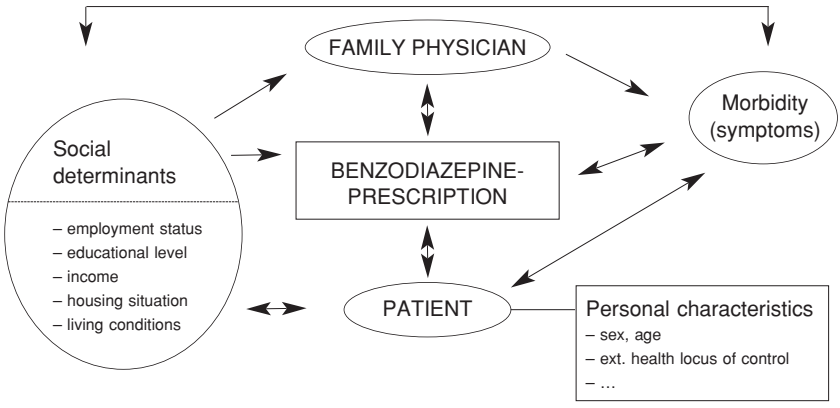

Fig 1: Conceptual framework for explanation of differences in benzodiazepine-use.

It is clear that the label “depression” will show up quicker when you are visiting a single mother, unemployed, with 2 hyperkinetic children living at the 14th floor in a social apartment, than when you visit a woman, living in a green area, with an interesting job, a nice husband and two brilliant children. So social conditions may “influence” diagnostic labelling. Lamberts (22) defines the “labelling” of a certain condition as a “disease” as one of the five characteristics of “family medicine” and emphasises the importance of “norms” and “values” for the labelling process. The figure also makes clear that prescription of benzodiazepines may have a “tranquillizing” effect on the consequences of social conditions (benzodiazepines tranquillise the symptoms and morbidity that are related to the social determinants and personal characteristics). From a societal perspective it could be very “adequate” that general practitioners in Liège prescribe more tranquillisers, taking into account the stressful social living conditions. So in a complex analysis all interactions should be carefully examined and the “effect” that regional differences disappear through introduction of morbidity, may obscure social inequities.

Conclusion

Differences in benzodiazepine use between Liège and Aalst are partly explained by differences in self-reported morbidity. Objective morbidity data and information on prescribers might give more insight in such regional differences.

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