Characteristics of current benzodiazepine users as indicators of differences in physical and mental health

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Abstract
The relationship between characteristics of benzodiazepine exposure and health-status was examined in order to investigate risk profiles of benzodiazepine users.
In the only pharmacy of a Dutch community of 13,500 inhabitants, all current benzodiazepine users that presented with a benzodiazepine prescription in November 1994 were invited to participate.
On the basis of the RAND-36 questionnaire, summary scores for both physical and mental health were calculated, the Physical Component Summary (PCS) and the Mental Component Summary (MCS). After dichotomization with a cut-off point indicating seriously impaired health and after the combination of the PCS and MCS, four different categories of health status could be identified. We used logistic regression to study the relation between these four different groups with respect to benzodiazepine exposure.
In total a group of 360 current benzodiazepine users was studied. Results showed that almost one-third of the participants had no significant impaired health; this group was further classified as reference group. We classified three other groups: one with physical problems (31%), one with mental problems (18%), and one with a combination of the two (22%). Multivariate analysis showed differences in risk factors for an impaired health status. The group with impaired physical health was associated with self-reported indication for muscle relaxation, hypnotic use, and a high CDS (Chronic Disease Score). The group with impaired mental health was associated with more frequent consulting of a mental health care specialist and with a low sense of self-efficacy. The group with both impaired physical as well as mental health was associated with a higher incidence of widowhood, a lower sense of self-efficacy, a high CDS, using benzodiazepines more than prescribed, and reporting depression as reason for their benzodiazepine use.
In particular, two groups need critical examination: a group of apparently healthy users with long-term benzodiazepine use; and a frail group with impaired physical and mental health and using a higher dose than prescribed.
Patient counseling and management of these four groups can be tailored to the specific needs of each group.

Introduction

Today, the most widely prescribed medications for insomnia, stress and anxiety are benzodiazepines, one of the most commonly used classes of drugs in the world. Benzodiazepine use has been the subject of continual discussion for many years both in the primary care setting and in terms of public health policy. The main issues are widespread use, (needless) long-term use, and a series of side effects [1-3]. Side effects include memory problems, tolerance to the sedative effect of the drug and dependence, characterized primarily by withdrawal symptoms after discontinuing use. Many studies have provided insight into the personal and usage characteristics of different types of benzodiazepine users. However, few studies have addressed the relation between benzodiazepine use and health-related quality of life [4-6]. Studies, which have examined health characteristics of benzodiazepine users, have all shown higher scores for either physical or mental morbidity in benzodiazepine users than in the general population [4-11]. A limitation of most of the reports studying the relationship between benzodiazepine use and health status was their reliance on less valid drug data sources such as medical records or patient recall of drug consumption. Thus, those reports have to contend with incomplete records or lack of recall by the patient [12 13]. Other studies are based on subsets of the user population [14]. The setting of this study was a pharmacy with a complete database of all drug prescriptions filled in a distinct region. Information on benzodiazepine use was generated form automated records of dispensed prescriptions, assuming that prescribed use approximates actual benzodiazepine use. Advantages for pharmacoepidemiologic studies with Dutch pharmacy data are their completeness with respect to prescription drugs for ambulatory patients. Furthermore, multiple physicians will often treat patients with multiple morbidity, while their prescription history is gathered at only one location, the pharmacy [15].

The aim of the present study was to identify the risk profiles of three groups of benzodiazepine users with different health characteristics as compared to a group of benzodiazepine users with unimpaired health [16 17]. Therefore, this cross-sectional study of current benzodiazepine users investigated the relationship between characteristics of benzodiazepine exposure and health-status categories of benzodiazepine users, which were identified through two summary scores of the RAND-36 (PCS and MCS) [18 19]. The PCS and MCS have been earlier used as reliable screening tools for both physical as well as mental disease [19].

Material and methods

Participants and procedure
Data was obtained from individuals living in a distinct district of approximately 13,500 inhabitants in the north-west of the Netherlands. During November 1994, all current benzodiazepine users in the area that presented with a request for a benzodiazepine prescription in the single local pharmacy (the study location) were invited to participate in the study. Informed consent was collected in the pharmacy. Current users were defined as adults (18 years and older) with a history of at least 1 earlier benzodiazepine prescription in the year before they were requested to participate (as recorded in the pharmacy

data). Immediately after consent, participants were visited at home by research assistants and they were asked to complete a self-administered questionnaire. Participants could either complete the questionnaire in private or consult the research assistant only regarding the specific meaning of the wording of the questionnaire. Completed questionnaires were collected the same day.

Physical health (PCS) and mental health (MCS) summary scores

This study used the previously tested and validated Dutch version of the 36-item Health Survey (RAND-36) [20]. The RAND-36 (similar in content to SF-36) is a generic instrument, measuring a broad spectrum of function, disability and distress and consists of eight subscales [21 22]. Nearly 85 per cent of the reliable variance in the eight RAND-36 scales is accounted for by both physical and mental components of health [18]. The eight RAND-36 scales were aggregated in two summary scores of either physical or mental health: the Physical (PCS) and Mental (MCS) Component Summary Measures. This was done according to the method described by Ware et al. [18]. The PCS and MCS were constructed and scored to achieve a reduction from an eight-scale profile to two summary measures without substantial loss of information, a very large increase in the number of levels defined, smaller confidence intervals as well as the elimination of both floor and ceiling effects [18].

The PCS incorporates the physical components of the RAND36-scales (physical functioning, role-physical, bodily pain and general health) and is an indicator of physical health. The MCS incorporates the mental components (vitality, social functioning, role-emotional and mental health) and is an indicator of mental health. Three RAND36-scales (Physical Functioning, Role Limitations Physical, Bodily Pain) correlate most highly with the physical component. The mental component correlates most highly with the Mental Health, Role Limitations Emotional, and Social Functioning scales [18].

In the present study, we have chosen to dichotomize both PCS and MCS in order to discriminate between those benzodiazepine users with serious physical or mental problems. At the time of the study, only US norm data were available. Calculated summaries were dichotomized using a cut-off point of 46, which represents an indication of serious physical and mental problems in the general population. By setting a conservative cut-off point with a higher contrast, a low chance of persons being falsely classified as not healthy has been reduced [18]. After dichotomization, the following four groups of subjects were identified: a group without reported physical or mental impairment (both PCS and MCS >46); a group of physically impaired subjects (PCS <47 and MCS >46); a group of mentally impaired subjects (PCS >46 and MCS <47); and a group of both physically and mentally impaired subjects (both PCS and MCS <47).

Benzodiazepine exposure

In the Netherlands, benzodiazepines can only be obtained in a pharmacy by a prescription. Benzodiazepine prescriptions, complete with information on daily dose and duration of use, were dispensed in the study location with a maximum day's supply of 30 days. Benzodiazepines were defined according to the following Anatomical Therapeutic and Chemical (ATC) classification system codes: N05BA (anxiolytics), N05CD (hypnotics), and N05CF and N05CG (benzodiazepine-related hypnotics) [23]. Current use was defined as any benzodiazepine use in the year preceding inclusion. In order to investigate prior benzodiazepine use, automated pharmacy prescription data were collected for all participants over a period of six years before inclusion. Years of use were defined as consecutive retrospective years with any prevalence of benzodiazepine use. Benzodiapine usage characteristics such as number of different benzodiazepines, number of prescriptions, daily dosage, characteristics of switching and duration of use were generated over the period of 12 months before inclusion. The average dose was calculated as the average number of Daily Defined Dose (DDD) equivalents per usage day [24]. Switching to another individual benzodiazepine was assessed on the fifth ATC level (subgroup of chemical substance).

Covariate measures

Information was collected about the dispensing of antidepressants, promethazine, neuroleptics, and analgesics in 12 months before inclusion.

As an indicator of chronic disease, the Chronic Disease Score (CDS) was calculated according to the method of Von Korff [25]. The CDS is a combined score taking into account prescriptions from various drug classes as a proxy for chronic somatic morbidity and is measured with drug prescription data. The more prescriptions in different classes, the more chronic morbidity is assumed. The score has been validated in several studies [25 26]. In this study, the CDS score was measured on basis of the complete pharmacy data of the one-year interval preceding inclusion. Benzodiazepines and other psychotropic drugs are not included in the CDS. Categories of CDS start with CDS = 0, i.e. patients without chronic morbidity and has no theoretical maximum.

Furthermore, the self-report questionnaire addressed questions on the following characteristics: age, gender, family status, education, employment, health service utilization (contacts with mental health specialists), self-reported compliance, and reasons for benzodiazepine use (such as stress). In our definition of stress, we have applied a collection of self-reported reasons such as calming down and minor tranquilizing. In addition, a generalized self-efficacy scale was included to investigate coping behavior. For this purpose, a Dutch translation of Schwarzer's 10-item Measurement of Perceived Self-Efficacy was used [27]. On each item a score of 1 to 4 can be chosen, leading to a possible minimum score of 10 and a maximum of 40.

Statistical analysis

We analyzed the data using the SPSS for Windows, Release 6.1 (SPSS Inc., Chicago, USA). Information on both dependent and covariate variables was entered into a logistic regression model. In this model the group of subjects with no physical or mental impairment was selected as reference category. All information on both benzodiazepine use and covariates in the period of 12 months before inclusion was analyzed to identify all possible risk factors for health

impairment. In this model, perceived self-efficacy was entered as a continuous variable.

Results

In total a group of 360 out of 444 current benzodiazepine users completed the questionnaire. The response rate was 81 per cent. The majority of users were female (74%). The mean age of the group was high: 61 years (SD 15; median: 62 years; 25th percentile: 50 years; 75th percentile: 73 years).

Information about benzodiazepine use was collected both by patient self-report and pharmacy data. Only a small group (15%) used benzodiazepines for less than one year. The majority was long-term users for over five years (61%). Prescribed benzodiazepine dosage was on average low, since half of the study population (47%) had received less than 0.75 DDD equivalents during the year preceding inclusion. Of the various self-reported reasons for using a benzodiazepine the two most important ones (the respondents could describe several) were insomnia (cited by 80% of the respondents) and stress (70%). Other reasons for benzodiazepine use were anxiety (33%), depression (28%), and pain complaints associated with the indication for muscle relaxation (34%).

Prevalence of chronic disease was estimated by calculation of the Chronic Disease Score (CDS). Mean CDS was 2.5 (SD 2.9; median: 1; 25th percentile: 0; 75th percentile: 4), indicating a high variance.

As a measure of patient self-esteem and competence, the results of the generalized self-efficacy scale of Schwarzer were calculated. A mean score of 29.9 (SD 5.9; median: 30; 25th percentile: 26; 75th percentile: 34) was observed.

Health-related quality of life was scored by the RAND-36 questionnaire. On the basis of this list two summary measures for both physical and mental health were calculated. For PCS a mean score of 43.5 (range 11-67) was found, for MCS the mean score was 46 (range 14-66). After dichotomization with a cut-off point of 46 and combination of the values of both PCS and MCS, four different categories of health status could be identified (Table 1). Because of missing data on the subscale level of the RAND-36 questionnaire, summary scores could be calculated for 278 (77%) of the subjects. Three out of ten subjects had no reduced health status (30%). Another three had only reduced physical health (31%). Approximately two out of ten subjects had only reduced mental health (18%). And the last two out of ten subjects had both physically and mentally impaired health (22%). In Table 2, a complete overview of characteristics of benzodiazepine use and covariates is presented for the four subsets.

We have attributed logistic regression modelling to investigate the association between each of the three groups with impaired health as compared to the group with unimpaired health with respect to both benzodiazepine characteristics and covariate variables. For this purpose, the group of benzodiazepine users without significantly impaired health was taken as the reference group (odds ratio of 1.0). The results of logistic regression modeling are shown in Table 3. As compared to the reference group, in the group with only impaired physical health an odds ratio significantly deviating from 1 was observed for the following covariates: the use of benzodiazepine hypnotics, a history of antidepressant and analgesic use, a relatively high number of benzodiazepine prescriptions (7 to 12 prescriptions) over the year preceding inclusion, a high CDS score (>5), and muscle relaxation as the perceived reason for benzodiazepine use. As compared to the reference group, for the group with impaired mental health an association was observed with a low self-efficacy score and consultation of a mental health care specialist. In comparison to the reference group, the third group of benzodiazepine users - those with both impaired physical as well as impaired mental health – had an association with more widowhood, a lower self-efficacy score, a length of use of 31 to 180 days during the year preceding inclusion, a high CDS score (>5), self-reported use of benzodiazepines more than prescribed, and depression as the self-reported indication for use of benzodiazepines.

Prior years of benzodiazepine use as indicator of long-term use were not associated with any of the three groups with impaired health. Neither were gender and age.

Discussion

In order to identify specific risk factors associated with health-status categories in benzodiazepine users, we have classified health-related quality of life into four distinct subgroups of health. These four groups could be identified on the basis of two summary scores for physical (PCS) and mental (MCS) health, with a conservatively defined cut-off point indicating seriously impaired mental or physical health. Specific characteristics of both benzodiazepine use as well as covariates were found to be associated with the different health categories. No association was observed with either gender or age or with an indicator of long-term benzodiazepine use (years of benzodiazepine use). The response rate was high (81%). No evidence for selection bias was found on basis of the age and gender distribution of non-responders. The unique set-

Table 1 *Classification in four categories of health on basis of both physical and mental component summary measures: health status in current benzodiazepine users (N=278)*

Health Status		*n*	*%*
No impaired health:	PCS & MCS > 46	83	29.9
Impaired health:			
Reduced physical health	PCS <47	86	30.9
Reduced mental health	MCS <47	49	17.6
Reduced physical & mental health	PCS & MCS <47	60	21.6

Table 2 *Univariate characteristics of four subsets of current benzodiazepine (BZD) users (N=278)*

Characteristics		No impaired health		Reduced physical health		Reduced mental health		Reduced physical and mental health	
		n	%	n	%	n	%	n	%
Gender	Male	24	28,9%	23	26,7%	13	26,5%	14	23,3%
	Female	59	71,1%	63	73,3%	36	73,5%	46	76,7%
Age (years)	18-54	34	41,0%	13	15,1%	34	69,4%	27	45,0%
	55-74	35	42,2%	49	57,0%	13	26,5%	23	38,3%
	>74	14	16,9%	24	27,9%	2	4,1%	10	16,7%
Family status	Widowed	13	15,7%	26	30,2%	5	10,2%	19	31,7%
	Non-widowed	70	84,3%	60	69,8%	44	89,8%	41	68,3%
Education	Primary school	21	25,3%	41	47,7%	6	12,2%	15	25,0%
	Higher education	62	74,7%	45	52,3%	43	87,8%	45	75,0%
Perceived Self-efficacy	10-20	1	1,3%	1	1,2%	1	2,1%	8	14,0%
(Schwarzer)	21-30	23	30,7%	35	42,2%	37	77,1%	30	52,6%
	31-40	51	68,0%	47	56,6%	10	20,8%	19	33,3%
Dosage of BZD	0-0.74	41	49,4%	38	44,2%	22	44,9%	25	41,7%
(DDD equivalents)	0.75-1.24	38	45,8%	38	44,2%	19	38,8%	24	40,0%
	>1.24	4	4,8%	10	11,6%	8	16,3%	11	18,3%
Episodes of BZD use	1	39	47,0%	55	64,0%	33	67,3%	38	63,3%
	>1	44	53,0%	31	36,0%	16	32,7%	22	36,7%
BZD use 12 months	0-30	8	9,6%	3	3,5%	13	26,5%	7	11,7%
before inclusion (days)	31-180	26	31,3%	23	26,7%	15	30,6%	12	20,0%
	>180	49	59,0%	60	69,8%	21	42,9%	41	68,3%
Number of BZD	1					1	2,0%	2	3,3%
prescriptions	2-6	28	33,7%	11	12,8%	20	40,8%	12	20,0%
	7-12	30	36,1%	30	34,9%	12	24,5%	16	26,7%
	>12	25	30,1%	45	52,3%	16	32,7%	30	50,0%
Switching of BZD	Yes	9	10,8%	11	12,8%	9	18,4%	14	23,3%
	No	74	89,2%	75	87,2%	40	81,6%	46	76,7%
BZD classification	Hypnotic	41	49,4%	58	67,4%	22	44,9%	27	45,0%
	Anxiolytic	42	50,6%	28	32,6%	27	55,1%	33	55,0%
Antidepressant use	Yes	5	6,0%	21	24,4%	6	12,2%	14	23,3%
	No	78	94,0%	65	75,6%	43	87,8%	46	76,7%
Analgesic use	Yes	15	18,1%	36	41,9%	10	20,4%	27	45,0%
	No	68	81,9%	50	58,1%	39	79,6%	33	55,0%
Chronic Disease Score	0	31	37,3%	22	25,6%	29	59,2%	19	31,7%
(CDS)	1-2	29	34,9%	18	20,9%	12	24,5%	13	21,7%
	3-4	18	21,7%	12	14,0%	3	6,1%	8	13,3%
	>4	5	6,0%	34	39,5%	5	10,2%	20	33,3%
Prior use of BZD (years)	1	8	9,6%	9	10,5%	20	40,8%	6	10,0%
	2-3	10	12,0%	8	9,3%	5	10,2%	9	15,0%
	4-5	14	16,9%	6	7,0%	3	6,1%	12	20,0%
	>5	51	61,4%	63	73,3%	21	42,9%	33	55,0%
Self-reported compliance	Use more than prescribed	6	7,2%	10	11,8%	8	16,3%	17	28,8%
	Use same or less than prescribed	77	92,8%	75	88,2%	41	83,7%	42	71,2%
Perceived reason for BZD use	Stress	54	65,1%	52	60,5%	46	93,9%	47	78,3%
	Depression	13	15,7%	16	18,6%	24	49,0%	27	45,0%
	Muscle relaxation	21	25,3%	27	31,4%	18	36,7%	32	53,3%
Contact with psychiatrist or other mental health care specialist	Yes	5	6,2%	13	15,3%	15	30,6%	17	32,1%
	No	76	93,8%	72	84,7%	34	69,4%	36	67,9%

ting of the study provided a single pharmacy with a virtually complete database of all drug prescriptions in the region, covering the complete general population, and with patient self-reported data on their health status and quality of life.

An important feature of the present study is that it is one of the first to combine both physical and mental health characteristics [4 6 7 11]. Earlier reports have mostly dealt with physical and mental problems separately. Marino reported an association of benzodiaz-

Table 3 *Association between characteristics of current benzodiazepine (BZD) users and physical and mental component summary measures (logistic regression analysis)*

		Reduced physical vs unimpaired health OR (95%CI)		Reduced mental vs unimpaired health OR (95%CI)		Reduced physical & mental vs unimpaired health OR (95%CI)	
Gender	Female	0.42(0.12-1.55)		1.59(0.27-9.26)		0.26(0.03-2.21)	
Age (years)	55-74	2.34(0.61-8.97)		3.57(0.55-23.41)		6.57(0.67-64.10)	
	>74	3.42(0.54-21.75)		0.18(0.00-16.16)		4.69(0.24-90.85)	
Family status	Widowed	2.73(0.55-13.58)		7.20(0.50-103.85)		18.27(1.99-167.94)	*
Education	Primary school	0.83(0.22-3.18)		0.11(0.01-1.08)		0.11(0.01-1.23)	
Perceived self-efficacy (Schwarzer)	(continuous)	0.97(0.87-1.07)		0.74(0.63-0.87)	*	0.66(0.52-0.84)	*
Dosage of BZD (DDD equivalents)	0.75-1.24	0.35(0.11-1.13)		1.14(0.28-4.70)		0.71(0.10-4.81)	
	>1.24	4.81(0.55-41.88)		4.87(0.39-60.37)		5.26(0.29-96.79)	
Episodes of BZD use	> 1	1.17(0.25-5.35)		0.18(0.02-1.52)		1.32(0.11-15.15)	
BZD use 12 months before inclusion (days)	31-180	1.72(0.17-17.66)		0.19(0.02-2.41)		0.01(0.00-0.61)	
	>180	1.14(0.08-16.24)		0.50(0.02-16.31)		0.06(0.00-7.19)	*
Number of BZD prescriptions	7- 12	7.74(1.02-58.47)	*	0.40(0.03-6.12)		2.04(0.05-84.58)	
	>12	6.59(0.56-76.77)		0.36(0.01-10.69)		1.87(0.04-97.30)	
Switching of BZD		2.65(0.46-15.07)		1.61(0.15-17.73)		0.88(0.07-10.96)	
BZD classification	Hypnotic	4.61(1.33-15.96)	*	1.98(0.36-10.75)		0.64(0.11-3.68)	
Antidepressant use		16.83(2.61-108.48)	*	0.56(0.07-4.32)		10.50(0.48-228.35)	
Analgesic use		4.72(1.45-15.46)	*	2.56(0.03- 9.50)		6.32(0.79-50.67)	
Chronic Disease Score (CDS)	1-2	0.98(0.29-3.33)		0.27(0.04-1.80)		3.82(0.38-38.39)	
	3-4	0.36(0.08-1.06)		0.11(0.01-1.30)		1.10(0.08-14.43)	
	>4	20.66(3.08-138.53)	*	0.30(0.02-4.34)		84.27(3.38-2101.61)	*
Prior use of BZD (years)	2-3	1.17(0.10-13.68)		0.53(0.03-9.50)		5.19(0.09-311.30)	
	4-5	0.24(0.02-2.83)		0.08(0.00-1.26)		7.11(0.13-397.30)	
	>5	1.49(0.20-10.92)		0.20(0.02-1.55)		8.73(0.17-439.67)	
Self-reported compliance	More than prescribed	1.07(0.20-5.67)		0.72(0.08-6.87)		18.43(1.78-190.72)	*
Perceived reason for BZD use	Stress	0.17(0.04-0.67)	*	6.50(0.56-74.98)		0.86(0.08-9.00)	
	Depression	1.41(0.29-6.80)		3.78(0.80-3.78)		10.77(1.26-91.9)	*
	Muscle relaxation	3.88(1.09-13.84)	*	0.96(0.21-4.45)		5.56(0.81-38.28)	
Contact with psychiatrist or other mental health care specialist	Yes	3.39(0.50-22.97)		11.40(1.20-107.88) *		5.45(0.46-64.42)	

* = 95% confidence interval different from 1

epine use with gender and psychiatric morbidity. Somatic symptoms were not considered a risk factor [11]. Rodrigo et al. reported high levels of emotional stress and also reported an association with depression [6]. Mant et al. reported a significant association with benzodiazepine use and diagnosis of either insomnia or anxiety [7]. Olfson and Pincus described the discrepancy between recognized use and perceived indication [10].

Levels of physical and mental problems in this study were comparable to earlier findings in benzodiazepine users, although in many reports the percentage of persons without reported health problems is much lower [6 7]. This might be related to differences in definition or to differences between diagnosis and patient self-reporting.

The finding that one-third of the benzodiazepine users reported exclusively physical problems evokes the image of a benzodiazepine user in need of care for a physical condition. In this subgroup, an association was found between impaired physical health and self-reported indication for muscle relaxation (in about one-third of the users in this subgroup), the use of hypnotics, and a high CDS score as indicator of chronic disease. The use of hypnotics and a high CDS score might be the result of prescribing benzodiazepines in patients with chronic somatic disease. The mean CDS of 2.5 in this study indicates multiple somatic morbidity within a vast majority of the user population. In another retrospective study in a group of 6.921 patients in the same community a clear association was found between use of benzodiazepines

and chronic somatic disease [28]. Sleeping difficulties may be the secondary manifestation of the somatic disease. In this subgroup, no association was found between impaired physical health and apparent psychological complaints such as stress. In contrast, an association was observed between impaired physical health and a history of antidepressant use in a period of twelve months before.

The subgroup with impaired mental health was associated with more frequent consulting of a mental health care specialist and with a low sense of self-efficacy. A low sense of self-efficacy is associated with anxiety, helplessness and depression. A strong sense is related to better health, higher achievement, and more social integration. In contrast to the previous subgroup of physically impaired health, these associations might indicate a group of users who might be relatively less efficacious in coping with their problems.

The last subgroup of participants with both impaired physical as well as mental health was associated with a higher incidence of widowhood, a lower sense of self-efficacy, a higher level of chronic disease, using benzodiazepine more than prescribed, and reporting depression as reason for benzodiazepine use. Both Swartz et al. and Badia et al. found the use of benzodiazepines among depressed patients [29 30]. It is well known that co-prescribing of benzodiazepines for depressive disorders is widespread [6 31]. Moreover, many patients with depression have comorbid anxiety disorders [32]. The last group with - those both impaired physical and mental

health - represents a specific group with a frail condition, characterized by a relatively low capability to cope with their problems, by multimorbidity, as well as polypharmacy.

Interestingly, long-term benzodiazepine use in itself was not a factor significantly associated with either of the groups with an impaired health status. Of the users without impaired health, 61 per cent had used benzodiazepines for over five years. On basis of the current results, we cannot conclude whether this is the result of effective therapy for recurrent illness or the absence of any indication for benzodiazepine use.

Future studies should examine whether benzodiazepine dependency is associated with this group and whether benzodiazepine dependency itself is not necessarily associated with impaired health-related quality of life.

In our study, we have clearly observed that benzodiazepine users have a wide range of health-related quality of life. The vast majority, about 70 per cent, was impaired in one or more domains of health status. To facilitate patient targeting in this population, we have identified four distinct groups of subjects on the basis of well-defined health summary scores. These four groups demonstrated clear differences in risk factors for impaired health. By this method, counseling and management can be tailored to the specific needs of each group. In our opinion, two groups in particular require further study and attention: the group of not significantly impaired, apparent healthy users with long-term benzodiazepine use; and the frail group with both impaired physical and mental health and using a higher dose of benzodiazepines than prescribed.

Acknowledgement

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