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Disability pension as predictor of later use of benzodiazepines among benzodiazepine users

Abstract

The proportion of Norwegians on disability pensions has doubled since the 1980s. The Norwegian Government wants action to stimulate the working capacity in those disability pensioners who have the potential to work. Information on factors that may impair rehabilitation efforts, including the unfavourable use of benzodiazepines, may be useful in this context. A longitudinal design, including data on 40-42 year old participants in Norwegian health surveys (year 1985-89) linked to a prescription database (year 2004-06), was used to describe risk of long-term use of benzodiazepines among disability pension recipients. The study-population constituted benzodiazepine users at baseline.

More than half of those on disability pensions, 57% of all men and 65% of all women, retrieved benzodiazepine prescriptions 20 years later, a span covering a large part of the potential active workforce period. Further, the observed amount of benzodiazepines dispensed over a three year period indicated more than sporadic use; e.g. half of the female disability pensioners were dispensed an amount of benzodiazepines corresponding to the use of a daily dose every second day over a three year period (median 450 daily doses). The majority of those who was dispensed benzodiazepines, was dispensed opioids as well: half of all men and 3 out of four women. And last, being on a disability pension was a predictor of benzodiazepine use 20 years later.

In conclusion, this prospective study provides new information on the epidemiology of benzodiazepine use in disability pensioners. Our study suggests that benzodiazepines are extensively and unfavourably used among disability pensioners, and that disability

pension may have an independent effect on long-term use. Improved management of benzodiazepine use may be one alternative to get disability pensioners with the potential to work back into employment.

Key words: disability pension, benzodiazepines, long-term use, longitudinal studies, pharmacoepidemiology, prescription database, Norway

Background

Norwegians live comparatively long and healthy lives and workforce participation rates are very high (NOU, 2007). Still, Norway has a higher percentage of people on disability pensions than most other OECD countries (NOU, 2007). Eleven per cent of the working population (18-67 years) received a disability pension in Norway in 2006.

The increased number of disability pensioners constitutes both political and economical challenges, and the Norwegian Government has urged action to arrest the upward trend of people on disability pension.

When health is poor, being on a disability pension may be a positive alternative to being part of the active workforce. However, many disability pensioners feel that their situation is passive, unwanted and excludes them from the strong social and personal advantages associated with being a part of the workforce (Olsen, Kvåle, & Jentoft, 2005). In this context, efforts to get disability pensioners with the potential to work back into employment have been a part of the political agenda for the last decade.

In Norway, and other OECD countries, mental health disorders and musculoskeletal problems are the main reasons for claiming disability benefit (NOU, 2007). Benzodiazepines have anxiolytic, sedative, anticonvulsant and muscle-relaxant effects, so they are likely to be used by disability pensioners to deal with these problems (O'Brien, 2005). On the other hand, there may be non-medical reasons for use of benzodiazepines among disability pensioners, such as explanations related to socio-economic background. According to Bourdieu (1979), a person’s socio-economic background identifies a person’s position in social space, which in turn predisposes for the development of certain (habitual) behaviour. The intermediary link between the structural objective position and the individual subjective preferences, is the habitus, a set of durable and transposable dispositions. Moreover, people with similar habitus tend to cluster together in specific social fields. Thus, based on variables indicating position in social space, especially variables related to socio-economic status, one may expect to observe an overlap between disability pension and habits of unfavourable use of abusive drugs, such as benzodiazepines. This theoretical hypothesis is supported by empirical evidence from epidemiological studies which reveal the importance of social, non-medical and contextual determinants for being on a disability pension, as well as for the use of benzodiazepines (Blennow, Romelsjo, Leifman, Leifman, & Karlsson, 1994; Groenewegen, Leufkens, Spreeuwenberg, & Worm, 1999; Krokstad & Westin, 2004).

There are concerns about benzodiazepines because of their potential adverse effects, which include impaired cognitive function and psychomotor skills, unwanted sedation, as well as dependence and abuse problems associated with long-term use (Barker, Greenwood, Jackson, & Crowe, 2004; O'Brien, 2005). Because of this, benzodiazepines are only recommended for short-term use over a few weeks (Norwegian Board of Health Supervision, 2001). Furthermore, recommendations suggest that combined use with other potentially addictive drugs, such as opioids and carisoprodol, should be avoided (Norwegian Medicines Agency, 2008). Unfavourable use may be of particular concern in disability pensioners, as it adds yet another potential problem to the deterioration of people’s daily functioning.

We need to identify factors that may impair rehabilitation efforts. Within this context, information on any unfavourable use of benzodiazepines among disability pensioners may be useful. To the best of our knowledge, the epidemiology of drug-taking behaviours in general, and the use of benzodiazepines in particular, among disability pensioners are scarcely described in the literature.

We used a longitudinal design with data on 40-42 years old benzodiazepine users, who participated in Norwegian health surveys in 1985-1989, and we linked this information to data from a prescription database in 2004-2006. This allows us to describe aspects of use of benzodiazepines 20 years after baseline, a span covering a large part of the potential active work period. We described use of benzodiazepines 20 years later according to disability pension status at baseline. We also looked at dispensing of opioids and carisoprodol to those who were dispensed benzodiazepines. Finally, we evaluated disability pension as a predictor of use of benzodiazepines 20 years after baseline.

Material and methods

Health survey information on independent variables

The study population comprises attendants in population-based health surveys organised by the National Health Screening Service in Norway (The Health Surveys in Østfold 1985 and 1999 and in Aust-Agder 1986 and 1989). All inhabitants aged 40-42 years at the time of screening in the counties Østfold (1985 and 1988) and Aust-Agder (1986 and 1989) were invited to participate. The health surveys comprised a medical examination, as well as a self-administrated questionnaire covering different socio-demographic, health and lifestyle variables such as disability pension status, smoking, physical activity, alcohol use, use of analgesics, anxiolytics or hypnotics. Benzodiazepines represented 99% of all consumption of anxiolytics/hypnotics in the 1980s in Norway and therefore anxiolytic/hypnotic users will be referred to as benzodiazepine users (WHO Collaborating Centre for Drug Statistics Methodology, 2006).

Altogether 15,606 men and 14,748 women were invited to participate, of whom 7605 men and 8062 women attended both the medical examination and completed the question on use of anxiolytic or hypnotic drugs (response rate 48.7% and 54.7%, respectively). Further, we excluded from our study population individuals who died or emigrated from Norway (451 men and 326 women) before January 2004 (Figure 1). In a second step, we removed all those who received drugs reimbursed for cancer diseases (93 men and 80 women), as recommendations of short-term use of benzodiazepine in e.g. terminal palliative cancer care may apply to this group of patients. To study the use of benzodiazepines after 20 years, we excluded all those who were non-users at baseline. Altogether 416 of 7061 men and 1201 of 7656 women were defined as users of benzodiazepines at the baseline in 1985-89 according to this definition. These individuals were followed up with respect to dispensing of benzodiazepines, opioids and carisoprodol in 2004-2006.

In addition to disability status, several other factors at baseline, associated with the use of benzodiazepines, were included in our analysis; age, gender, alcohol consumption, smoking habits, marital status, physical activity, use of analgesics, and cardiovascular morbidity. Details from the questionnaire, from which the variables in our analysis are defined, are described elsewhere (Hartz, Lundesgaard, Tverdal, & Skurtveit, 2009).

Norwegian Prescription Database (NorPD) - information on dependent variables

Prescription data about benzodiazepines in 2004-2006 were taken from the NorPD which covers the entire nation (4.6 million inhabitants) (The Norwegian Prescription Database, 2008). NorPD contains information of all individuals who have received prescription drugs dispensed at pharmacies, whether these are publicly reimbursed or not. The drugs are classified according to the Anatomical Therapeutic Chemical (ATC) classification system (WHO Collaborating Centre for Drug Statistics Methodology, 2006). The data collected for our study were: patient's unique identifying number (encrypted), sex, age, the date of dispensing, and drug information (ATC-code, Defined Daily Dose (DDDs)). The code of reimbursement is also recorded and this can function as a proxy of diagnosis. Code §9.9 is dedicated to cancer diseases.

Prescription drugs are registered at dispensing using ATC classification codes. The Benzodiazepines were defined by the ATC-codes N05BA and N05CD, opioids by the ATC-code N02A and carisoprodol by the ATC-code M01BA02. Use was defined when an individual was dispensed at least 1 prescription during the study period 1 January 2004 - 31 December 2006. In addition, among benzodiazepine users, the amount of benzodiazepines dispensed during the same period was calculated in terms of total defined daily doses (DDDs). A DDD in clinical practice is defined as the assumed average maintenance dose per day for a drug used on its main indication in adults.
Data from the health surveys and NorPD were linked on the basis of the unique 11-digit identification number, assigned to all individuals living in Norway.

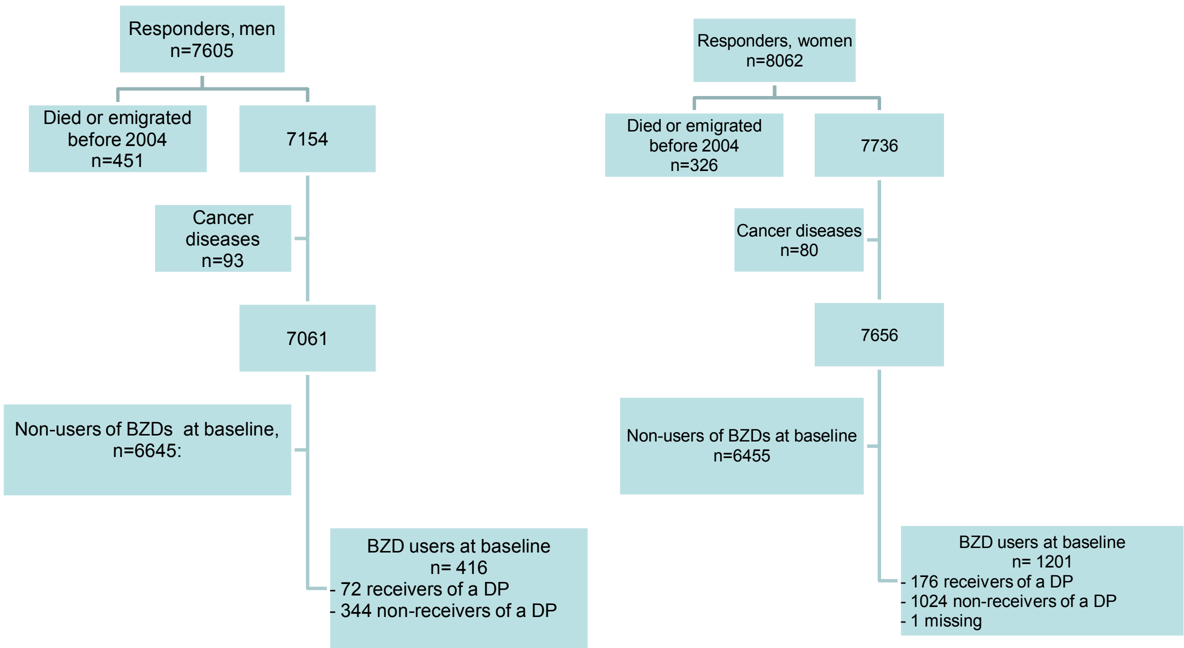
Statistics

Chi-square test was used to assess equality of proportions across the groups of drug use. Fisher's exact test was used when the expected count in cells was less than 5. Mann-Whitney test was used for variables with a skewed distribution (DDDs). Odds ratios (OR) were estimated with 95 % confidence intervals (CI) for prescriptions of benzodiazepines 20 years later. All analyses were done using SPSS 16.0 for Windows. Level of significance was set to $p<0.05$.

Ethical considerations

The study protocol was endorsed by the Regional Committee for Medical Research Ethics and the record-linkage was approved by the Norwegian Data Inspectorate. The study has been conducted fully in accordance with the World Medical Association Declaration of Helsinki.

Figure 1. Flow chart for the study population. Health surveys in Østfold and Aust-Agder (1985-89)



BZD = benzodiazepine
DP = Disability pension

Results

Characteristics of the study population at baseline (1985-1989)

In the subgroup of 40-42 year old individuals who reported using benzodiazepines at baseline; 17% (n=72) of all men and 15% (n=176) of all women also reported receiving a disability pension (Figure 1). Characteristics of the study population by disability pension status are shown in table 1. There was a higher prevalence of unmarried people and combined use of analgesic drugs at baseline among those who received a disability pension. Further, alcohol habits were different between the groups. Among women, there was also a higher prevalence of physically inactive individuals, and individuals with cardiovascular history among those on disability pensions.

Dispensing of prescription drugs 20 years later (2004-2006)

In both genders, the proportion who were dispensed at least one prescription of a benzodiazepine 20 years later was significantly higher among those who received a disability pension at baseline than those who didn't, 57 % versus 40% in men and 65 % versus 52% in women (Table 1).

Among females who were dispensed benzodiazepines 20 years later, opioid prescriptions were more commonly dispensed to those who received a disability pension at baseline than those who didn't, 72% versus 54%, respectively (Table 1). A smaller non-significant difference was seen in men. Of those who were dispensed benzodiazepine 20 years later, fewer were prescribed carisoprodol than opioids (Table 1).

The amount of benzodiazepines dispensed, in terms of median number of daily doses during 2004-2006, was significantly higher among females who received disability pensions, 450 (interquartile range (IQR) 150,1100) daily doses versus 134 (30,569) daily doses in non-receivers. In men, the amount of benzodiazepines dispensed did not differ according to disability status; males who received a disability pension were dispensed a median amount of 200 (60,885) daily doses compared to 204 (50,700) daily doses among the non-receivers.

Factors associated with dispensing of benzodiazepines 20 years later

After adjustment for lifestyle, health, and socio-economic variables the odds of being dispensed benzodiazepine prescriptions 20 years later was 55% higher in those who received disability pensions at baseline compared to non-receivers (OR 1.55 (95% CI, 1.15-2.08)).

Table 1.

Characteristics for benzodiazepine users aged 40–42 years when surveyed in 1985–1989. Use of prescription drugs 20 years later retrieved from the Norwegian prescription database in 2004–2006.

	Men			**Women**		
	Disability pension (1985–1989)			**Disability pension (1985–1989)**		
	Yes (*N* = 72) *n* (%)	**No (*N* = 344) *n* (%)**	***p***	**Yes (*N* = 176) *n* (%)**	**No (*N* = 1024) *n* (%)**	***p***
Baseline characteristics 1985–1989						
Alcohol habits						
Teetotallers	24 (34.3)	38 (11.1)		61 (35.5)	208 (20.7)	
Normal	44 (62.9)	260 (76.2)		107 (62.2)	740 (73.5)	
Problem drinkers	2 (2.9)	43 (12.6)	***	4 (2.3)	59 (5.9)	***
Smoking habits						
Current daily smokers	42 (58.3)	172 (50.0)		100 (56.8)	515 (50.3)	
Ex–smokers	18 (25.0)	95 (27.6)		39 (22.2)	242 (23.6)	
Non smokers	12 (16.7)	77 (22.4)	n.s.	37 (21.0)	267 (26.1)	n.s.
Seldom/never physically active	26 (36.1)	104 (30.2)	n.s	75 (42.6)	296 (28.9)	***
Unmarried	33 (45.8)	72 (20.9)	***	52 (29.5)	203 (19.8)	**
Cardiovascular history	16 (22.2)	46 (13.4)	n.s	35 (19.9)	91 (8.9)	***
Analgesic use	37 (51.4)	75 (21.8)	***	103 (58.5)	322 (31.4)	***
Prescription of drugs in 2004–2006						
Use[a] of benzodiazepines, (%)	41 (56.9)	138 (40.1)	**	115 (65.3)	537 (52.4)	**
of these; % use of opioids	21 (51.2)	66 (47.8)	n.s.	83 (72.2)	288 (53.6)	***
of these; % use of carisoprodol	7 (17.1)	10 (7.2)	n.s.	28 (24.3)	91 (16.9)	n.s.
of these; % use of carisoprodol and opioids	6 (14.6)	7 (5.1)	n.s.	23 (20.0)	68 (12.7)	*

*p-value < 0.05; **p-value < 0.01; ***p-value < 0.001; n.s., not significant; [a] use was defined as at least 1 prescription of benzodiazepine (ATC-group N05BA/N05CD) during the study period 2004–2006.

Discussion

In a cohort of 40-42 year olds benzodiazepine users, more than half were dispensed benzodiazepine prescriptions 20 later. Being on a disability pension was a predictor of benzodiazepine use. Further, the majority of those who were still dispensed benzodiazepines, were also dispensed opioids; half of all men and 3 out of four women.

The appropriateness of this benzodiazepine use cannot easily be assessed by measuring dispensing 20 years later. One prescription of a benzodiazepine is neither an outcome for long-term use, nor an addictive use pattern, and should be interpreted with caution. Information on drug use from two measuring points with a 20 year measurement interval, could cover individuals with a wide range of use patterns ranging from sporadic to daily use. Other studies, however, reveal that having once entered a cohort of benzodiazepine use, the probability of still being part of that cohort in the following years is consistently high in different populations (Isacson, 1997; Neutel, 2005).

Guidelines recommend only short-term use of benzodiazepines, up to 2-4 weeks, and they emphasize that combined use with opioids and carisoprodol is especially problematic from an addiction point of view (Norwegian Medicines Agency, 2008; Norwegian Board of Health Supervision, 2001). These recommendations are obviously being violated when dispensing of benzodiazepines and combined use with other potentially addictive drugs exists to the extent observed in our study. Use over a span covering a large part of the potential active working period may be especially worrisome in disability pensioners, as it can add yet another factor to the deterioration of people's daily functioning, help consolidate the disability situation.

To the best of our knowledge, no other study has investigated benzodiazepine use in general, and among disability pensioners in particular, over such a long period.
In our study we chose to focus on prescriptions of traditional benzodiazepines, because they have well known potential to cause addiction problems and other negative effects which interfere with people's daily functioning (Barker et al., 2004; O'Brien, 2005). Further, the observed amount of benzodiazepines dispensed over a three year period also indicates more than sporadic use; e.g. half of the female disability pensioners were dispensed an amount of benzodiazepines corresponding to the use of a daily dose every second day over a three year period (median 450 daily doses). By comparison, the median amount of benzodiazepines dispensed to the average 60 year old benzodiazepine user in Norway during the same period was 50 daily doses (IQR 13-230) (The Norwegian Prescription Database, 2008).

Among benzodiazepine users at baseline, disability pension predicted dispensing of benzodiazepines 20 years later. So being on a disability pension, as also shown in an earlier study, seems to have an impact both on initiation of benzodiazepine use in the first place, and on later use (Blennow et al., 1994; Hartz et al., 2009).
The increased risk of initiation and long-term use of benzodiazepines among disability pensioners may, on one hand, be explained by drug use as a proxy of mental illness, the precipitating reason for disability in the first place. Obviously, our evaluation of risk-factors of benzodiazepine use 20 years later has several limitations; even if many

potential confounders associated with prescription of benzodiazepines were registered and adjusted for in our analysis, not all possible confounders could be taken into account. For example, our analysis does not include information on the indication for benzodiazepine use in the first place.

On the other hand, irrespective of the precipitating cause of disability, it is reasonable to believe that being in a situation which merits receipt of a disability pension may itself bring about a number of psychological problems as a result of exclusion from the social and personal advantages associated with being a part of the workforce (Olsen et al., 2005). Drug treatment with benzodiazepines may be initiated and continued to relieve these symptoms. Also, our observation may be conceived as an overlap between the field of disability pension and the field unfavourable use of potentially additive drugs, in line with Bourdieu's theory of how individuals' habitus relates to people's position in social space as a predisposition for certain habits which cluster into specific fields (Bourdieu, 1979). In that respect, the study of the use of potentially addictive drugs in disability pensioners adds a contribution to the social science debate about reflexive individualization versus determination. Choices – for example related to the initiation as well as long-term use of potentially addictive drugs – can therefore be measured if they are structured according to classificatory variables. Although new classes are created in the reflexive modernity '… the personnel filling these class positions are typically determined by more particularistic, "ascribed" characteristics' (Lash, 1994, p. 134). The impact of socioeconomic status on the prescribing and use of drugs in general is well recognized (Leufkens & Urquhart, 1994). People end up in categories of 'winners' and 'losers', also today (Lash, 1994, p. 155), dependent on their individual biography – their habitus.

For investigating receipt of a disability pension as a factor associated with use of benzodiazepines 20 years later, a limitation of our study is the description of use of benzodiazepines according to self-reported disability status 20 years in the past. The proportion of people on a disability pension increases with age; e.g. in 2006 about 25% of all men and 37% of all women aged 60 years old in Norway received disability pensions, compared to 1-2% of the 40-42 year old participants in our study (NOU, 2007). An unknown number of the initially non-disabled 40-42 years old will have changed their disability status during this period. If so, the OR estimates as presented will be underestimated, and biased towards the null.

In conclusion, this prospective study provides new information on the epidemiology of benzodiazepine use in disability pensioners. The prospective design of the study gives no reason to suspect lack of internal validity of the estimated effects. Our study suggests that benzodiazepines are extensively used among disability pensioners, and that disability pension may have an independent effect on long-term use. Efforts to bring those with potential to work back into employment have been a part of the political agenda for the last decade. Improved management of benzodiazepine use may need to be one part of this effort.

Conflict of interest

None of the authors have any conflict of interests.

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