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The Benzodiazepine Dependence Questionnaire: Development, Reliability and Validity

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Background. A short self-report questionnaire was developed to assess dependence on benzodiazepines (BZDs), the Benzodiazepine Dependence Questionnaire (BDEPQ). The BDEPQ is the first scale to assess dependence on BZDs comprehensively, as all existing scales focus exclusively on withdrawal symptoms.

Method. To evaluate its internal consistency and construct validity, 302 regular BZD users were recruited from media advertisements and assessed on a number of measures. The BDEPQ was compared with measures of depression, anxiety, sleep quality, BZD withdrawal symptoms and neuroticism to assess its construct validity. A 3–4 month follow-up was conducted to assess the ability of the BDEPQ to predict changes in BZD consumption and future BZD withdrawal.

Results. The BDEPQ was found to have high internal consistency and to be relatively stable over the follow-up period. Three subscales were identified, each with good internal consistency and temporal stability. The BDEPQ was able to predict the severity of withdrawal symptoms.

Conclusion. The BDEPQ was found to be a reliable and valid self-report instrument for the assessment of BZD dependence in samples approximating the general population of people using BZDs.

There is a clear anomaly in the literature on benzodiazepine (BZD) dependence. While cautions about the dependence liability of these drugs have increased, there are no methods of assessing the broad construct of BZD dependence except the omnibus structured diagnostic interviews. Existing measures focus exclusively on withdrawal symptoms (Pecknold *et al*, 1982; Merz & Ballmer, 1983; Ashton, 1984; Petursson & Lader, 1984; Busto *et al*, 1989; Rickels *et al*, 1990; Tyrer *et al*, 1990). Golombok *et al* (1987) have shown that the severity of withdrawal symptoms reported do not predict longer term abstinence from BZDs. This finding, which is similar to the literature on alcohol dependence (e.g. Stockwell *et al*, 1983), suggests that relying on withdrawal as the sole indicator of dependence is not adequate and that a comprehensive measure of BZD dependence may also prove useful.

There are three reasons for developing a broader measure of BZD dependence. Firstly, such a measure may be able to predict the success of attempts to cease BZD use. Secondly, a broader measure may assist in the understanding of the subgroups of people who are BZD dependent and the underlying processes. Finally, there is a need for assessment devices to assist clinicians to withdraw those patients whose long-term BZD use is judged to be harmful. There are at least seven measures of BZD withdrawal in the literature (Pecknold *et al*, 1982; Merz & Ballmer, 1983; Ashton, 1984; Petursson & Lader, 1984; Busto *et al*, 1989; Rickels *et al*, 1990; Tyrer *et al*, 1990), so there is no need to duplicate this work in another scale. This article describes the development and validation of a self-report scale designed to assess the wider concept of BZD dependence (excluding symptoms of withdrawal) based on the World Health Organization dependence syndrome (Edwards *et al*, 1981).

Method

A self-report questionnaire measuring dependence on BZDs (BDEPQ) was developed using information gathered in a survey of 302 BZD users. Responses to the BDEPQ were compared with those on other measures to establish the construct validity of the new scale. Three to four months after the first survey, respondents were surveyed again to examine the BDEPQ's ability to predict changes in dose and withdrawal symptoms.

Survey methods

Volunteers who had used BZDs on at least seven occasions in the last three months were sought through announcements on radio and in newspapers.

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Some 369 calls were received, with 20 people seeking information about BZDs and refusing to participate, 17 who had not taken BZDs on at least seven occasions in the last four months, and 30 who gave wrong addresses or telephone numbers and could not be recontacted, leaving 302 to be surveyed. Participants were sent a package which included a personally addressed covering letter, the battery of questionnaires (see below), and a reply-paid return envelope. Reminder letters were sent to non-responders two weeks later. Of the 302 surveyed, 263 (88.6%) responded and were sent a letter of thanks and an instant scratch lottery ticket. Three to four months later a second survey of those who responded to the first survey was conducted using the same survey methods; 248 (94.3%) responded to the second survey. Unfortunately, not all those who responded returned completed questionnaires. The number of respondents with complete information for the first survey was 187 (70% of the 263 responders) and 170 (68.5%) in the second survey.

Sample description

Of the 263 who responded to the first survey, 56.2% were women, the average age was 61 (s.d. = 13), and 60.7% were married or living as if they were.

BZD use and dependence

The average number of months on BZDs was 96.9 (s.d. = 103). Using lower and higher estimates of the diazepam equivalence of the different BZDs taken by subjects, we calculated their current average BZD dose to be the equivalent of between 28 mg and 58 mg of diazepam per day (s.d. 49–98 mg, median 15–28 mg). Between 4% and 14% of the sample took the equivalent of more than 100 mg of diazepam per day.

When asked if they were dependent or addicted to their BZDs, 27.9% said "no", 12.6% said "maybe", 22.3% said "a little", and 32.7% said "a lot" or a great deal. The average score on the Benzodiazepine Withdrawal Symptom Questionnaire (BWSQ: Tyrer *et al*, 1990) was 5.27. This corresponds to five withdrawal symptoms of moderate severity. Twenty-four per cent of the sample reported that they had never experienced any of the withdrawal symptoms included in the BWSQ. The Composite International Diagnostic Interview (CIDI) drug section (World Health Organization, 1990) was administered over the telephone to the first 92 respondents. Twenty-six (28.3%) met either DSM–III–R or ICD–10 criteria for BZD dependence at some time in their lives, and 16 currently met one of either criteria.

Sample representativeness

Characteristics of the sample were compared with the characteristics of people using BZDs in the 1989–90 National Health Survey (Australian Bureau of Statistics, 1991). This sample is more socio-economically homogeneous than the population of BZD users estimated from the National Health Survey. Importantly, people taking BZDs more frequently and for longer are adequately represented in the present sample.

Other measures used

In addition to the pool of items from which the BDEPQ was developed participants were asked to complete the Eysenck Personality Questionnaire Neuroticism subscale (EPQ–N; Eysenck & Eysenck, 1975), the Beck Depression Inventory (BDI; Beck & Steer, 1987), the Beck Anxiety Inventory (BAI; Beck & Steer, 1990), the BWSQ, demographic questions, and additional items assessing patterns of BZD use. In addition, the second survey included the Pittsburgh Sleep Quality Index (PSQI; Buysse *et al*, 1989) as a measure of sleep disturbance.

Scale development methods

Items for the BDEPQ were written to reflect the conceptual bases of the scale described above. Items were then reviewed by clinicians experienced in dealing with long-term BZD users and piloted on people using BZDs who were in treatment for anxiety disorders. Fifty-one putative items were included in the first survey. Following Nunnally (1967), items with item total correlations lower than 0.4 were excluded. Principal components analysis with oblique rotation was used to establish a simple structure for the scale, and items with factor loadings of less than 0.4 were excluded. A 30-item scale resulted. The process of scale development is more fully discussed in Baillie (1996).

Scale description

The BDEPQ is a 30-item scale which asks respondents to think of their experiences with BZDs over the last month and rate their response to each item on a four-point Likert scale. Copies of the BDEPQ and a manual are available from the first author.

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Scale evaluation methods

The BDEPQ was developed using the responses to a pool of items of the 263 people who responded. The reliability of the BDEPQ was assessed using Cronbach's alpha and the test–retest correlation between BDEPQ scores from the first and second surveys. Validity was assessed by comparing BDEPQ scores with those on conceptually related and unrelated measures to give construct validity, by comparing BDEPQ scores from the first survey with indices of BZD use and BZD withdrawal symptoms to give predictive validity, and by comparing BDEPQ scores with diagnoses of BZD dependence made using the CIDI to give criterion validity.

Results

Reliability

The internal consistency of the 30-item BDEPQ was found to be high, with a coefficient alpha of 0.92. Test–retest reliability over the three to four months between the two surveys was also high ($r=0.88$).

Factor structure

A principal components analysis with oblique rotation was conducted; an oblique rotation was used because dimensions of dependence can be thought to be related. Three principal components accounted for 44.7% of the variance in responses to BDEPQ items. A five-component solution also passed the Scree test but was rejected because it was less parsimonious. Loadings for the 30 items on three principal components are shown in Table 1.

Items loading on the first component were not semantically similar but appeared to measure most aspects of the dependence syndrome. Thus, this component was labelled as general dependence. The second component was made up of items asking about urges and desires to take BZDs and pleasant effects from doing so. It was labelled pleasant effects. The belief of respondents in their ability to function without BZDs appeared to be measured by items loading on the third component and it was labelled perceived need.

Construct validity

Table 2 shows the relationship between scores on the 30-item BDEPQ and other measures included in the first battery. BDEPQ scores show a moderate relationship with other measures of aspects of BZD dependence, such as experiences of BZD withdrawal symptoms (BWSQ), diagnoses of BZD dependence from the CIDI, and global rating of dependence (SRD). However, BDEPQ scores were also related to measures of anxiety (BAI), depression (BDI), neuroticism (EPQ–N), and to a lesser extent sleep quality (PSQI). This could indicate that BDEPQ scores are contaminated by levels of these problems, that the dependence on BZDs is related to these constructs, or that the measures are related because they are all self-report questionnaires. BDEPQ scores show small correlations with indices of BZD use, such as diazepam-equivalent dose, the half-life of BZDs taken, the frequency of BZD use and the duration of BZD use.

Predictive validity

The predictive validity of the BDEPQ was measured by its ability to predict future BZD withdrawal symptoms and the success of future attempts to stop or reduce BZD use. One hundred and twelve of the sample had tried to stop or reduce their BZD consumption between the two waves of the study. BDEPQ scores from the first wave were moderately correlated ($r=0.53$; $P<0.05$) with the severity of withdrawal symptoms experienced in the next three to four months. This indicates that the BDEPQ score significantly predicted withdrawal symptoms that occurred in the following three to four months. However, this effect was not independent of the predictive properties of other measures taken at wave 1 ($R^2=0.585$; $F_{14;55}=5.54$; $P<0.05$). BDI, BWSQ, alcohol consumption, and BZD dose were independent predictors of severity of withdrawal when these variables and BDEPQ scores were simultaneously entered into a regression equation.

BDEPQ scores from wave 1 were related to BZD dose at wave 2 ($r=0.24$; $P<0.05$); this effect was not independent of other wave 1 measures. Regression analysis showed that independent predictors of BZD dose at wave 2 were dose, frequency of BZD use, duration of BZD use, and BZD half-life ($R^2=0.542$; $F_{14;127}=10.75$; $P<0.05$).

In summary, the BDEPQ was significantly related to severity of future withdrawal, and future doses of BZDs. These relationships were shared with other variables.

Criterion validity

Receiver operating characteristic (ROC) analysis was undertaken to assess the BDEPQ as a screening test for CIDI diagnoses of BZD

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Table 1
Factor loadings for each of the 34 items of the BDEPQ on three obliquely rotated principal components

Item	Principal components		
	I	II	III
1. In the last month, have you taken another sedative or tranquilliser as soon as the effects of the previous one began to wear off.	0.52	–	–
6. Have you tried to reduce the number of sedatives, tranquillisers or sleeping pills you take because they interfered with your life?	0.42	–	–
7. Have you found that you needed to take more tranquillisers, sedatives or sleeping pills to get the same effect in the last month compared with when you first took them?	0.50	–	–
10a. In the last month have you been worried that your doctor might not continue to prescribe the sedatives, tranquillisers or sleeping pills you are taking?	0.64	–	–
10b. How strong has this worry been?	0.65	–	–
14b. Have you taken another sedative, tranquilliser or sleeping pill to reduce these unpleasant after-effects?	0.50	–	–
15. In the last month have you taken sedatives, tranquillisers or sleeping pills against your doctor's advice or more frequently than recommended?	0.63	–	–
16. Are you concerned about the number of sedatives, tranquillisers or sleeping pills you have taken in the last month?	0.62	–	–
17. Have you taken more sedatives, tranquillisers or sleeping pills in one day or night than you planned to?	0.52	–	–
19. Have you taken sedatives, tranquillisers or sleeping pills for a longer period than you intended to when you started?	0.55	–	–
20a. Have you felt tense or anxious as your prescription for sedatives, tranquillisers or sleeping pills began to run out?	0.68	–	–
20b. How strong have these feelings been?	0.66	–	–
21a. Have you felt an urge or desire to take sedatives, tranquillisers or sleeping pills in the last month?	0.44	–	–
22. Have you taken sedatives, tranquillisers or sleeping pills in the last month when you did not really need them?	0.64	–	–
2. Have you taken sedatives, tranquillisers or sleeping pills in the last month because you like the way they make you feel?	–	0.45	–
13a. Have you experienced relief when you have taken sedatives, tranquillisers or sleeping pills in the last month?	–	0.72	–
13b. How strong is that relief?	–	0.70	–
18a. Have you found the effects of sedatives, tranquillisers or sleeping pills pleasant?	–	0.83	–
18b. How strong is the pleasant feeling?	–	0.84	–
21b. How strong is that urge or desire? (. . . to take sedatives, tranquilliers or sleeping pills in the last month)	–	0.47	–
3. In the last month, have you felt that you cannot face anything out of the ordinary without a sedative or tranquilliser?	–	–	−0.84
4. Do you feel that you cannot get through the day without the help of your sedatives or tranquillisers?	–	–	−0.74
5. Do you need to carry your sedatives or tranquillisers with you?	–	–	−0.40
8. Do you need to take sedatives or tranquillisers to deal with the problems in your life?	–	–	−0.65
9. Do you feel terrible if you do not take a sedative, tranquilliser or sleeping pill?	–	–	−0.61
11. Could you stop taking sedatives, tranquillisers or sleeping pills tomorrow without any difficulties?	–	–	−0.52
12. Do you count down the time until you can take your next sedative, tranquilliser or sleeping pill?	–	–	−0.44
23. I feel powerless to prevent myself taking a sedative or tranquilliser when I am anxious, uptight or unhappy?	–	–	−0.57
24. I would not be able to handle my problems unless I take a sedative or tranquilliser?	–	–	−0.78
25. I get so upset over small arguments that I need to take a sedative or tranquilliser?	–	–	−0.47
Eigenvalue	10.71	2.7	1.9
% variance	31.5	7.5	5.6

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Table 2
The correlation between scores on the Benzodiazepine Dependence Questionnaire (BDEPQ) and other measures

Construct	Measure	Correlation	*n*
Dependence	BWSQ	0.61	171
	SRD	0.51	184
	DSM–III–R	0.39	68
	ICD–10	0.37	68
Anxiety	BAI	0.56	179
Depression	BDI	0.50	187
Neuroticism	EPQ–N	0.48	181
Sleep quality	PSQI	0.28	135
BZD use	Diazepam-equivalent dose[1]	0.31	189
	Half-life[2]	0.04	182
	Frequency	−0.25	188
	Duration	0.06	188

1. High estimate of diazepam-equivalent dose of BZDs.
2. Dose-weighted average half-life of BZDs taken.
BWSQ, Benzodiazepine Withdrawal Questionnaire; SRD, Self-Rated Dependence; DSM–III-R, a current DSM–III–R diagnosis of benzodiazepine dependence made using the CIDI; ICD–10, a current ICD–10 diagnosis of benzodiazepine dependence made using the CIDI; BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; EPQ–N, Neuroticism scale of the Eysenck Personality Questionnaire; PSQI, Pittsburgh Sleep Quality Index.

dependence. The non-parametric methods described by Hanley & McNeil (1982, 1983) were used to calculate the area under the ROC curve (AUC) statistic and a 95% confidence interval (CI). For the 88 participants who completed the BDEPQ and CIDI via telephone interview, the AUC was 0.74, indicating that the BDEPQ can correctly discriminate people who would attain a CIDI diagnosis of BZD dependence in 74% of cases. The 95% CI around this estimate was 0.61 to 0.89, and as this interval does not include 0.5, the BDEPQ does significantly better than chance. A 2×2 table of classification was constructed for each BDEPQ score, χ^2 values were calculated for each score, and those scores which maximised χ^2 values were selected as optimal cut-off scores. Scores of 23 and 34 were equally efficient as cut-off scores. Choosing between the two would depend on the relative importance of correctly identifying people that would be dependent on BZD compared with the costs of false alarms.

Discussion

The results presented above indicate that the BDEPQ is a highly reliable scale with acceptable construct and predictive validity.

Reliability

The BDEPQ is highly internally consistent and shows consistent results over time, yet is able to predict changes in BZD use and BZD withdrawal symptoms. It also has an acceptable factor structure, and on all measures of reliability examined, the BDEPQ shows good results.

Validity

The relationship between BDEPQ scores and other measures of BZD dependence was moderate. Higher correlations were recorded between other self-report measures, while correlations with the CIDI diagnoses of DSM–III–R and ICD–10 BZD dependence were lower. While the BDEPQ has been shown to converge with measures of related constructs, correlations with self-report measures of anxiety and depression indicate that its divergence from unrelated constructs is only moderate.

The BDEPQ has a demonstrated ability to predict future withdrawal symptoms (assessed by the BWSQ) and the success of future attempts to reduce BZD use. These effects were not independent of other predictive factors. It may be more convenient to use the BDEPQ to predict future BZD use and withdrawal than to collect a battery of other measures.

Limitations and practical uses

The reliability and validity information presented in this paper support the use of the BDEPQ as a research instrument. The major limitation on the use of any instrument is the generalisability or representativeness of the sample in which the measure was developed. The BDEPQ can most reliably and validly be used in settings where those being assessed are similar to people in the development sample. The sample was more socio-economically homogeneous but had taken BZDs for longer and more frequently than the best estimates of the population of people taking BZDs in the Australian sample. The sample also includes some people who used a relatively high dose of BZDs, as can be seen in the average diazepam-equivalent daily dose of between 28 and 58 mg. On the basis of the generalisability or representativeness of the sample, there is some evidence for the use of the BDEPQ in settings where BZDs are prescribed (such as general practice) but do not specialise in BZD dependence, as it is these settings where patients are most likely to be similar to the

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present sample. This might include general medical settings or those where people are presenting with problems with sleep and/or anxiety.

The results of this study provide minimal information about the behaviour of the BDEPQ as a measure of BZD dependence in people with high to very high levels of this phenomenon. The ability of the BDEPQ to discriminate between high and very high levels of BZD dependence requires further research. People using BZDs in combination with other drugs, perhaps meeting criteria for polydrug dependence, and people requiring in-patient detoxification from BZDs, are probably outside the scope of the instrument in the absence of further research.

Because of the lack of face-to-face contact with subjects in this study, it is likely that the BDEPQ will be less valid and reliable where there are demand characteristics, such as legal sanctions, which may lead people to under- or overemphasise their BZD use.

Conclusion

The BDEPQ was found to be a reliable and valid self-report instrument for the assessment of BZD dependence in samples approximating the general population of people using BZDs. Its use in settings specialising in BZD dependence, and in particular with patients with diagnoses of polydrug misuse and/or dependence and in in-patient settings, requires further research.

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