Mood and anxiety disorders, the association with presenteeism in employed members of a general population sample

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SUMMARY. **Aims** – The term "presenteeism" is used to describe workers who are present in the workforce, but who are not functioning at full capacity. The objective of the study was to describe the impact of mood and anxiety disorders on presenteeism in a population sample. **Methods** – Random digit dialing was used to select a sample of n= 3345 subjects between the ages of 18 and 64. A computer assisted telephone interview that included the *Mini Neuropsychiatric Diagnostic Interview* (MINI), the *Stanford Presenteeism Scale* 6 (SPS-6) and a pharmacoepidemiology module was administered. **Results** – Among subjects with comorbid mood and anxiety disorders 75.0% reported interference with their work compared with only 13.3% of subjects without mood or anxiety disorders. Mood and anxiety disorders were associated with lower presenteeism ratings. Regression analysis uncovered a significant gender by anxiety disorder interaction, indicating that the effect of anxiety disorders was greater in men than women. **Conclusions** – This is the first study to report the impact of mental disorders on presenteeism in a general population sample. The results confirm that the problem of presenteeism is not restricted to specific occupational groups, but is instead a widespread problem in the general population.

Declaration of Interest: This study was funded by the Alberta Depression Initiative through the Institute of Health Economics (www.ihe.ab.ca). Dr. Esposito was supported by an International Resident Fellowship from the University of Calgary. Dr. Patten is a Health Scholar with the Alberta Heritage Foundation for Medical Research and a Fellow with the Institute of Health Economics. Dr. Wang is a New Investigator with the Canadian Institutes for Health Research.

KEY WORDS: depressive disorders, anxiety disorders, cross-sectional studies, employment.

Received 04.11.2006 – Final version received 12.03.2007 – Accepted on 20.03.2007.

BACKGROUND

Workforce productivity can be influenced by a variety of factors, both directly (e.g. occupational environment, inability to seek out or retain a job) and indirectly (e.g. workers' health) (Ettner *et al.*, 1997). Decrements in health-related productivity can manifest as increased absenteeism or lower presenteeism (Koopman *et al.*, 2002). Presenteeism is the situation in which employees are physically present in their jobs but they experience decreased productivity and below-normal work quality (Koopman *et al.*, 2002). The association between employees' medical conditions and lowered productivity has been a focus of previous studies conducted in specific occupational settings. (Greenberg *et al.*, 1999; Burton *et al.*, 2004). Wittchen *et al.* (1999) examined workplace productivity in a sample of community volunteers with Social Phobia, comparing these to a control group with herpetic diseases. Social Phobia, was found to be associated with a considerable decrease in general work productivity due to illness-related emotional problems. Panic disorder and Generalized anxiety have also been associated with work impairment (Greenberg *et al.*, 1993; Katerndahl & Realini, 1997; Kennedy *et al.*, 2002; Kessler *et al.*, 2001; Klerman *et al.*, 1991; Rubin *et al.*, 2000). It has been suggested that major depression may have a greater impact on job performance than that of many other common chronic conditions (e.g. arthritis, back problems, diabetes and hypertension) (Badamgarav *et al.*, 2003).

A recent economic analysis reported that depression is the risk factor predicting the largest medical cost increase for employers (Goetzel *et al.*, 2002; Paykel, 2006). Annual health care costs were found to be 70% higher for depressed workers than for their non-depressed collea-

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gues (Goetzel *et al.*, 2002). Moreover it has been shown that treating depression can be a cost-effective way of improving the productivity of depressed individuals who are working and can assist employees with maintaining their employment (Elinson *et al.*, 2004). A large proportion of patients improve from medications, psychotherapy or a combination of the two (Goldberg, 2006) and there is evidence that consequent productivity improvement may offset the cost of the treatment (Goetzel *et al.*, 2002).

Most community studies that have examined the association of mental disorders with work impairment have used rating scales that contain global rating items for workplace impairment. For example, the *National Comorbidity Survey Replication used the Sheehan Disability Scale*, which includes three items rated on a scale of 1 to 10. The wording of the relevant item is: "During the time in the past 12 months when your [symptoms] were most severe, how much did this interfere with your ability to work?" Other popular scales include the WHO DAS II and the SF-36, which can provide ratings of role functioning, but are not specifically designed to assess the concept of presenteeism. The WHO DAS II for example includes several items that relate to productivity ("how much difficulty did you have in getting all the work done that you need to do?"), but does not fully embrace the concept of presenteeism referred to by Koopman as "active engagement with work."

The objective of the study was to estimate the impact of mood and anxiety disorders on presenteeism and also to describe the relationship between these disorders, workforce participation and pharmacological treatment. To our knowledge, this is the first study to provide an epidemiological description of the extent of presenteeism in a general population sample.

METHODS

Sample selection

Alberta is a Canadian province with a population of 3.3 million residents, dispersed over an area of 661,190 km^2. By comparison, Italy has a population of nearly 60 million, and occupies 301,230 km^2. Telephone survey methods were the most feasible strategy for obtaining a representative sample in a geographically dispersed population such as this one. Approximately 2/3 of the Alberta population resides in two approximately equally sized cites: Edmonton and Calgary. The sampling procedure employed in this study was therefore stratified so that approximately 1/3 of the sample would come from each of these cities, with the balance coming from remaining rural areas. The population targeted by the study was adult Albertans; the sampling frame was household residents between the ages of 18 and 64 with a residential telephone line.

Data collection

Data collection was carried out by the population survey unit of the Quality, Safety and Health Information (QSHI) portfolio in the Calgary Health Region (www.calgaryhealthregion.ca). A listing of provincial residential telephone numbers is maintained and updated by the survey unit. A random sample of these numbers was selected for use in the survey. The last digit of these residential numbers was randomly substituted to increase coverage of phone numbers not listed in telephone directories. The purpose of the random digit dialing approach was to avoid selection bias that might be introduced if telephone directories were used as a sampling frame. Selection bias could occur in a telephone survey sampling from telephone listings if households with unlisted numbers had different characteristics than those with listed numbers.

When a household was reached, a pseudo-random procedure, the "last birthday method" was used to randomly select a single subject from the household. Telephones that were not answered were called back, and as many as nine call-backs were made in an effort to reach all sampled households. To avoid bias that might result if the sample was skewed by occupational status, these calls were distributed over working hours, evening and weekends.

Measures

The *Mini Neuropsychiatric Interview* (MINI), a brief diagnostic interview (Lecubier *et al.*, 1997; Sheehan *et al.*, 1997), was used as an indicator for Major Depression and several common anxiety disorders. The MINI produces period prevalence estimates covering variable periods of time, depending on the disorder under assessment. For major depressive episodes, past 14 day prevalence is assessed (essentially, point prevalence for this disorder). Lifetime Panic Disorder was also assessed. For dysthymia the prevalence period covers the preceding 2 years. For Agoraphobia and Social Phobia the prevalence period was 1 month. For Generalized Anxiety Disorder, the MINI produces 6-month period prevalence estimates. In keeping with the original goal of the MINI as a case-finding tool for primary care, the development process

emphasized sensitivity over specificity. Since it has been shown that differences between the results of different survey instruments often relate to means of assessing "clinical significance" (Narrow *et al.*, 2002), we incorporated an interference item into the interview: asking subjects whether their psychiatric symptoms interfered with their life. Interference with life is one of four clinical significance criteria explored by Narrow *et al.*, (Narrow *et al.*, 2002) in an effort to explain prevalence differences arising from two American psychiatric epidemiological surveys. Experience with use of clinical significance criteria in association with brief instruments employed in telephone surveys has shown it to be useful for prevalence estimation (http://www.phac-aspc.gc.ca/publicat/cdic-mcc/27-3/pdf/cdic273-1e.pdf) using brief instruments. More detailed diagnostic instruments include similar clinical significance probes, but they are not included in the MINI, probably because of the emphasis that the MINI places on sensitivity as opposed to specificity. Mood disorders were considered clinically significant if subjects reported "a lot" of interference with their life. Subjects not reporting a lot of interference were considered subthreshold cases of depression. This interference criterion was not required for a diagnosis of anxiety disorder. For analysis, we divided mental disorders into two groups: mood disorders and anxiety disorders.

A measurement scale was used to assess presenteeism: the Stanford Presenteeism Scale 6 (SPS-6). This scale is a shortened version of the Stanford Presenteeism Scale 32 (SPS-32), which has been developed to assess presenteeism in occupations that center on cognitive tasks. The scale embodies a concept of presenteeism that emphasizes cognitive, emotional and behavioural engagement with work. It includes a focus on work process (avoiding distractions) and work outcome (completing work). Koopman et al. (2002) reported that the SPS-6 had high internal consistency: Cronbach's ± __of 0.80. These authors also provided evidence of its construct validity. The SPS-6 scale is not applicable to non-working subjects, including those who are on sick leave or disability. The administration of the scale was also preceded by a screening question which asked whether the respondent had experienced any interference with their work due to a health condition. Subjects denying any interference were not administered the SPS-6.

A pharmacoepidemiology module was also included in the interview. This module operated with a cyclical interview structure, initially asking about medications taken for the treatment of broadly defined relevant symptoms ("Do you currently take any prescription medications for anxiety, depression, stress, energy levels, sleeping, pain management, fibromyalgia or migraine headaches?"), and then looping through each disclosed medication with a series of items inquiring about the number and size of tablets, reasons for use of the medication and duration of use.

Interviewers working on the project were experienced telephone interviewers, and data collection was preceded by a series of training sessions incorporating both didactic instruction and practice. The project was approved by the University of Calgary Conjoint Health Research Ethics Board.

Data Analysis

Most of the study's objectives involved comparing subgroups within the study sample. For such comparisons, unweighted statistical procedures were used. However, for several estimates, the intention was to make population inference. For such estimates, sampling weights were used. Sampling weights were calculated to account for design effects inherent in the study's methodological procedures. For example, the probability of selection into the study was greater for residents of households with a small number of people dwelling in them. When an individual is selected from a household, for example, with two eligible residents there is a 50% chance of selection whereas if there are four eligible residents the probability is only 25%. Also, households with more phones lines were more likely to be selected. Sampling weights were calculated to offset these effects, and also to reflect the slightly different probability of selection from the three sampling regions. Finally, a post-stratification adjustment was then made to ensure that any imbalances between the age and gender distribution of the sample and the provincial population were brought into alignment. All of the analyses were conducted using STATA version 9 (Stata, 2005).

Prior to using parametric statistical tests, the distribution of SPS-6 scores was examined using graphical displays. The distribution of scores were found to be normally distributed. The equality of variance was also evaluated before t-tests or analysis of variance were used. We used Bartlett's test to evaluate the equality of variance. When there was evidence of inequality of variance, t-tests for unequal variance were used. When Bartlett's test was not significant, standard t-test were used. When independent variables had more than one category, analysis of variance (ANOVA) was used. As an extension to the above analyses, linear regressions were used to assess the association between disorders and SPS-score with adjustment for covariates.

RESULTS

Sample characteristics

In total, 18113 telephone numbers were called. More than half of these were disqualified from the sampling frame for various reasons, e.g. business numbers, fax machines etc. There were 7497 calls that successfully reached eligible households. At the household level, there were 3443 refusals (45.9%). Of the 4054 households from which subjects could be selected, there were 635 individual refusals (15.7%), for an individual level response rate of 84.3%. Our view is that the individual-level response rate is more meaningful for assessing vulnerability to selection bias because individual subject characteristics are more probably more directly related to the propensity to participate in research than are household characteristics. Nevertheless, if the number of completed interviews is divided by the total number of households contacted, the response rate would be 46%. Of the 3419 consenting subjects, interviews were completed in all but 25 (0.7%), so that 3394 interviews were completed. After checks for data completeness and accuracy, 45 additional records were removed from the data set because of concerns about data quality. The final analysis included data collected from the remaining 3345 subjects. The unweighted sample included 1345 (40.2%) men and 2000 (59.8%) women.

Overall 259 (7.7%) respondents had one or more mood disorder according to the MINI. As expected, mood disorders were more common in women (8.3%) than in men (5.1%) and among widowed, separated or divorced subjects (12.5%) than in never married (8.5%) or married/living in common law (5.5%). Anxiety disorders were reported by 287 (8.6%) respondents and the same demographic pattern was found.

Workforce

At the time of the interview 357 subjects were retired, on maternity leave, on sick leave, on social assistance or disabled. These respondents were non-participants in the workforce. Overall, 2988 (89.3%) respondents were in the workforce. Among these 2128 (71.2%) had worked in the month preceding the interview. In the latter group, 417 (19.6%) reported interference with their work due to health conditions. This group was administered the SPS-6. Their mean presenteeism score was 19.8 (SD 4.3). This was slightly lower than the mean score of 23 reported by Koopman *et al.* The probable reason was that our study excluded respondents who reported having no health conditions that affected their work, whereas the Koopman *et al.* study excluded only 11 respondents who had no health problems at all.

Mood Disorders

Mood disorders occurring in the absence of anxiety disorders were uncommon. Only 41 respondents (1.2%) reported mood disorder without a comorbid anxiety disorder. Among these respondents 36 (83.7%) were workforce participants and among those, 24 (66.6%) worked in the month preceding the interview. Fourteen subjects (58.3%) were at work in the past month and reported that health problems interfered with their work. The remaining respondents, despite having a mood disorder that interfered with their life "a lot" did not report interference with their work. The latter group of subjects (n=14) were administered the *Stanford Presenteeism Scale-6*. The mean score for the SPS-6 in subjects with "pure" mood disorder was 15.9 (SD 3.5).

There were 225 (6.7%) respondents with subthreshold mood disorders. Among these, 195 (86.6%) were workforce participants, 151 (77.4%) of these worked in the past month and 79 (52.3%) of the latter group reported interference at work and were administered the SPS-6. The mean score of this group of subjects was 18.4 (SD 4.0).

Anxiety Disorders

Among respondents with anxiety disorders, but without comorbid mood disorder, 228 (88.4%) were in the workforce and 155 (68.0%) worked in the past month. Of these 51 (32.9%) reporting interference with their work and were administered the SPS-6. The mean score among these subjects was 18.6 (SD 3.6).

Co-morbidity: Mood and Anxiety Disorders

We separated people with comorbid mood and anxiety disorders into two groups. The first group included 141 (4.2%) respondents who reported mood or anxiety disorders, including endorsement of the clinical significance criterion. Among these, 102 (72.3%) were workforce participants, 60 (58.8%) worked in the past month and 45 (75%) of these qualified for administration of the SPS-6. Their mean score was 16.4 (SD 4.1). The second group consisted of 117 (3.5%) subjects reporting comorbidity for anxiety and mood disorders, but at a subthreshold level. In this group, 81 (69.2%) were in the workforce, 77 (95.1%) worked in the preceding month and 44 (57.1%) reported interference with their work and were admini-

stered the SPS-6. The mean score for this group of subjects was 18.5 (SD 4.2).

No disorder

There were 2693 (80.5%) subjects that, at the time of the interview, did not have any of the evaluated mood or anxiety disorders. A proviso here is that the MINI does not provide comprehensive coverage of all disorders. Among the, 2440 (90.6%) disorder-negative workforce participants, 1748 (71.6%) reported working in the month preceding their interview. Among those with no disorder who were working, 233 (13.3%) respondents reported the presence of interference due to a health condition at work and consequently were administered the SPS-6. The mean score in this group of participants was 21.1 (SD 4.0).

The mean SPS-6 score of people with mood, anxiety or comorbidity disorders differed significantly from the no-disorder group (Table I). A linear regression analysis adjusting for age, gender, marital status and education confirmed that the associations were not due to confounding by these variables. A significant gender by anxiety disorder interaction indicated that the effect of anxiety disorders on the mean presenteeism score was greater in men than in women (Table II).

Table I. – *Mean SPS-6 Scores in Relation to MINI Diagnoses.*

	Subjects reporting interference at work (%)	SPS	t-statistic	Degrees of freedom	P value*
Mood Disorders	58.3	15.9	4.8	245	<0.001
Subthreshold Mood Disorders	52.3	18.4	5.3	310	<0.001
Anxiety disorder	32.9	19.6	2.6	282	0.0109
Comorbid Mood and Anxiety Disorders	75.0	16.4	7.3	276	<0.001
Comorbidity Subthreshold Disorders	57.1	18.5	4.0	275	0.0001

*All compare to the mean score of people without any mood or anxiety disorders

Table II. – *Linear Regression Analysis. Effect of Disorder on Mean SPS-6 Scores with Adjustment for Age, Sex, Education and Marital Status.*

	Regression Coefficient	p value
Mood Disorders	-3.8	<0.001
Anxiety disorder	-4.1	<0.001
Comorbidity	5.1	<0.001
Any anxiety disorder x gender*	2.5	0.004
Marital status x education****	2.6	0.003

*referent group female **referent group single ***referent group post secondary degree

Antidepressant use

The prevalence of antidepressant use among respondents with a mood disorder was 36.6%. There was a higher prevalence of antidepressant use among respondents that did not work in the past month (83.3%), than among those who worked (20.8%). In the latter group, respondents who were taking antidepressants had a mean SPS-6 score of 17.0, while those that were not taking any antidepressants had a mean score of 15.6. The difference between these two mean scores was not statistically significant.

Among respondents with a diagnosis of any anxiety disorder but without a mood disorder the prevalence of antidepressant use was 23.2%. There was a higher prevalence of antidepressant use among subjects that did not work in the past month (33.3%), than among those who worked (20.0%). Among the latter group, respondents that were using antidepressants had a mean SPS-6 score of 16.7, while those who were not taking any antidepressants had a mean score of 17.7.

DISCUSSION

Mood and anxiety disorders are associated with workplace absences (Dewa *et al.*, 2000) and the symptoms of mood and anxiety disorders tend to cause global impairment in functioning. While previous studies have shown an association between mental disorders and functioning in specific occupational settings and between disorders and self-rated interference or difficulty at work, this is the first study to show that community residents with mood and anxiety disorders have lower presenteeism scores than those without these disorders. This study is the first to describe the extent of presenteeism using a validated measure in a community sample. The SPS concept of pre-

senteeim is a contemporary measure of engagement with work that is closely linked with productivity in the cognitive realm. These results are consistent with the important role that mood and anxiety disorders play in contributing to workplace problems. The magnitude of difference in mean SPS ratings between the respondents with or without detected disorders was comparable to the difference observed in Koopman *et al.*'s SPS validation study between respondents who reported that they had or did not have a work or non-work related disability. In the Koopman *et al.* study, the mean SPS rating in the 10% of subjects reporting that they had a disability was 21, whereas it was 16 in people with mood disorders, with or without anxiety disorders in this study. This latter category includes approximately 5% of the population, so a sizable impact on productivity seems likely.

The SPS-6 ratings collected in our study had borderline acceptable internal consistency (Cronbach's ± α of 0.6). This is less than the 0.8 reported by the developers of the scale in their initial work. Future research is needed to determine whether this lowered internal consistency was due to the mode of administration (telephone versus mailed) or because of its use in a general population sample instead of an occupational setting.

Telephone interviews need to be brief, so a screening question was included in the interview in order to avoid administration of the SPS-6 to subjects who had no health related impairments of any kind. Subjects with mood and anxiety disorders were more likely to report that they had interference due to a health condition, and were therefore more likely to be administered the SPS-6. Among those who were administered the SPS-6, mean presenteeism scores were lower in respondents with these conditions. A surprising result is that a substantial proportion of subjects meeting criteria for a mood or anxiety disorder (which in our study included an indication that their symptoms interfered with their life "a lot"), reported neither interference nor diminished functioning at their work. The finding is consistent, however, with that reported by Kessler *et al.* (2003), in their description of major depression data from the National comorbidity Study Replication (NCS-R) using the *Sheehan Disability Scale*. These authors found that functioning in the social sphere was more dramatically affected than occupational functioning. Notably, their analysis was based on the single *Sheehan Disability Scale* item for interference at work.

As described above, the literature suggests that workplace programs to address mental illness may help businesses to increase their productivity. Our study highlights the general importance of management of these conditions since significantly lower levels of workplace functioning were evident even in this general population sample. Mood disorders were associated with the lowest presenteeism ratings (indicating the highest levels of impairment). Comorbidity frequently occurred, and was associated with a higher frequency of reported interference. The proportion of subjects reporting work interference was lowest in subjects without a disorder, higher in subjects with anxiety disorders, higher yet in those with mood disorders, and the highest frequency of reported interference was found in subjects with comorbid mood and anxiety disorders. We found slightly (and non-significantly) higher SPS-6 scores among respondents with anxiety disorders who were not taking antidepressants. This almost certainly reflects the severity of their disorder (confounding by severity) rather than a negative impact of treatment. An effect of this nature was not seen in the mood disorder group. The respondents in this group who were taking antidepressants had a higher mean SPS-6 score than those not taking antidepressants, but this difference also did not attain statistical significance. However, this observation is consistent with previous literature that patients improve with medication use, and consistent with the idea cost offsets in productivity may exist (Goetzel *et al.*, 2002).

The telephone sample may not have been entirely representative of the population. Diminished representativeness may have resulted from the relatively high frequency of household non-response and refusal. However, a more likely source of selection bias would have been individual refusal, and this occurred much less frequently (approximately 15%). Also, brief measures of mental disorders and presenteeism were used in the study, and bias may have been introduced as a result of measurement error. However, such bias would probably be towards the null, and therefore do not challenge the validity of the results presented here, except that the magnitude of differences between the study groups may have been underestimated. The SPS measures perceived (as opposed to objectively evaluated) workplace performance, so it is possible that mood and anxiety disorders may have altered perceptions to a greater degree than actual performance. However, the SPS does seem to address the issue of performance in a more substantive way than other commonly used scales, which simply refer to "difficulty" or "interference" and do not seem to fully embrace the concept of presenteeism as a measure of engagement at work. Whereas an association between mood and anxiety disorders and presenteeism has been demonstrated, the data are cross-sectional, and it is not possible to determine whether the disorders were responsible for the decrements in workplace functioning, or whether some

other factor, such as occupational stress, may have resulted in both changes. Despite this interpretive caution, the role of mood and anxiety disorders as determinants of workplace functioning appears to be substantial.

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