USE OF PRESCRIBED MEDICATION AT WORK IN EMPLOYEES WITH CHRONIC ILLNESS

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Published in: Occupational Medicine, 2007, 57; 480-487.

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Running Title: Factors associated with medication use at work

Main text word count: 3000

ABSTRACT

Background: This study examined factors associated with the use of prescribed medication at work.

Methods: Questionnaire survey of employees with diagnosed chronic illnesses from four UK organisations. Data was collected on type of chronic illness, health status, health beliefs, work limitations, occupational health support, GP and line manager support. Data was analysed using Univariate logistic regression.

Results: 1474 employees with chronic illness participated. Medication use at work (yes v no) was predicted by age, pain, diagnosis of heart disease, medication use at home, benefit of prescribed medication to health, ease of using medication at work, practical support from families and practical and emotional support from GP and line manager. In a multivariate logistic regression model, medication use at work was predicted by medication use at home and ease of using medication at work only.

Conclusions: The ease of taking medication at work was found to be a key predictor of medication use at work, suggesting occupational health may play a vital role in findings ways to support employees in their usage of medication. This may be for example by providing help and guidance in storing medication at work and encouraging employees to disclose medication use to employers and managers where necessary. Occupational health services can help create a workplace culture that places a high value on health, educating staff on the value of looking after their health and the benefits of following advice.

Abstract word count: 225

Key words: chronic illness, medication use, support, workplace intervention

INTRODUCTION

As the incidence of chronic illnesses increases, the number of prescriptions for medication has increased sharply (1-5). Evidence suggests that use of medication and adherence relies heavily on patients and the health services (6). Although certain patient characteristics are associated with medication use (7 8), it is now understood that social and psychological variables are among the most significant factors that influence medication use, such as physician-patient communication, illness perceptions, health beliefs and support from GPs, families and significant others (9 10). However, for many patients, the majority of their day-to-day use and management of medication takes place at work (11). Most research in this area has not considered the effect of work-related factors on medication use.

It is possible that medication use at work is influenced by work-related social and psychological variables, such as work limitations, line manager support and the opportunity to take prescribed medication at work. Some evidence suggests that for workers managing anxiety and depression, the work environment plays a pivotal role in their medication use and adherence (1-5). For example, Haslam et al (1-3) found that side effects of psychotropic medication for those with anxiety and depression interfered with work performance and non-compliance was reported to be widespread. Lack of information and workplace support was also associated with non-compliance. Haslam et al (2) argued that lack of compliance can present a serious health and safety risk in the workplace in terms of not only increasing the risk of further health deterioration, but also the' knock-on' effects this may have on sickness absence, presenteeism and work productivity. Further research is needed to explore whether

these factors are isolated to medication use for anxiety and depression, or extend to other illnesses. Specifically, work-related factors associated with prescribed medication use at work among employees with chronic illness are of importance given the increasing prevalence and enduring nature of chronic illnesses (5). This study aimed to examine the role of workplace support, GP support, health perceptions of medication use at work and the influence of work performance on medication use at work among employees with chronic illness.

METHODS

Participants were employees from four organisations across three sectors: local government, transport and manufacturing (two companies). To ensure anonymity, employees were randomly sent a questionnaire through their occupational health departments. We approached all employees in the two manufacturing companies (5,000 employees), and randomly selected 1:3 employees in the local government (employing 21,000 employees) and 1:2 employees in the transport organisation (employing 12,000 employees). Completed questionnaires were returned directly to the research team. To monitor overall response rates, the questionnaire asked all employees, independent of their health status for demographic and job-related details. Employees managing a chronic illness were asked additional questions about their health and work.

The questionnaire asked participants to report any medically diagnosed chronic illness currently experienced, and to indicate which primary condition (if more than one was listed) *most* affected their work. This measure is consistent with other self-report

measures of chronic illness (11,15,16). A total of 17 different groups of chronic illnesses were identified from the sample. Nine illnesses were clearly identified: asthma, irritable bowel syndrome, diabetes, migraine, thyroid disease, inflammatory bowel disease, multiple sclerosis, chronic fatigue syndrome, epilepsy, HIV and hepatitis (B and C). For depression and anxiety, participants were grouped if they reported either depression, anxiety or a combination of both. The International Classification of Diseases (17) was used to classify the following illnesses: Musculoskeletal pain consisted of participants reporting pain anywhere along the musculoskeletal system (e.g. back, shoulders, neck, arms, elbows, wrist, and lower limbs). Heart disease included myocardial infarction, angina, heart failure, stroke and hypertension. For cancer, participants were included if they reported any type of cancer. Eye problems included glaucoma, sensory neuropathy and blepharitis. Reproductive and gynaecological problems included endometriosis and menstruation problems. For arthritis and rheumatism, participants were included if they reported any form of arthritis, spondylitis and fibromyalgia. A further group was classified as 'Other', which represented smaller numbers of reported other chronic illness. Employees were also asked how long they had their illness (years).

Prescribed medication use at home and at work was assessed by a modified version of the illness symptoms Self-Management Behaviours Scale (19; 20). Participants were asked to rate how closely they were following their doctor's advice in taking prescribed medication related to their chronic illness at home and at work (two items). Responses were measured on a 10 point Likert scale ("Not closely" to "Very closely") and had an internal consistency of $\alpha = .84$. Based on the same scale (19), participants were also asked to rate how beneficial they felt it was to their health to take

medication at work (one item, measured on a 10-point-Likert scale from "Not beneficial at all" to "Very beneficial"). They were also asked if it was easy for them to take medication at work (yes, no).

Health status was assessed by a modified version of the pain severity scale (two items, $\alpha = .66$); fatigue (one item) and health distress (4 items, $\alpha = .89$). All items were taken from the MOS survey of health status (18), and measured on a five-point Likert scale. A mean score was calculated for the health distress scale. Severity of symptoms (one item) was also measured (mild to severe).

The Work Limitations Questionnaire (21) was used to assess the degree to which employees' symptoms of chronic illness interfered with specific aspects of job performance. The questionnaire asks employees to rate on a five point Likert scale, their level of difficulty (or ability) to perform 25 specific job demands corresponding to four scales: time management (five items, $\alpha = .88$), physical demands (six items, $\alpha = .90$); mental interpersonal (nine items, $\alpha = .92$) and output demands (five items, $\alpha = .94$). A total scale score was calculated to indicate overall work limitation, where a higher score indicated more work limitation (21).

Support consisted of two forms of workplace support: practical (giving information, help and advice) and emotional support (sympathy and understanding). These were measured with four items each, representing support received from line manager, occupational health, family and GP in the management of chronic illness. Items were measured on a five-point Likert scale ("No support" to "A great deal of support") and

had an internal consistency of α= .83 (line manager) α= .81 (occupational health), α= .88 (family) and α= .87 (GP).

Data were collected on age (years), sex, tenure (length of employment, years), employment status (part/full-time) and education (none, GCSE, AS level A level or equivalent, degree, higher degree).

Correlations were computed for all variables. Those which significantly correlated with the medication use at work were subjected to logistic regression analysis to examine their association with medication use at work (as the distribution of responses showed high relative frequencies of minimum and maximum scores indicating that participants were either likely to take medication or not, scores 1-5 were dichotomised into 'no' and scores 6-10 were dichotomised into 'yes'). For analyses, age was classified as 18-30, 31-43, 44-56 and 57-69. A score of 1 was given if a chronic illness was present and a score of 0 if any other illness was present. Those proven to be significant predictors at $p<0.001$ (Bonferroni correction) were entered into a multiple logistic regression analysis to identify the strongest predictors.

A review of each organisation's policy in medication use showed the transport organisation required employees to disclose medication use for health and safety reasons. Therefore, to control for organisational differences in medication policies, each organisation was entered as a covariate in step 1 of the analyses using dummy coding (1 = organisation with medication policy, 0 = all other organisations).
Ethical approval was granted by The Institute of Work, Health & Organisations, University of Nottingham,local ethics committee..

RESULTS

1474 participants reported at least one chronic illness giving a response rate of 28% for completed returned questionnaires. The remaining sample did not report a chronic illness and were excluded from further analysis.

Table 1 reports demographic and illness-related variables. This was compared with data obtained from each organisation's human resources department (non-responders). Participants with chronic illnesses did not significantly differ from their respective colleagues in terms of gender and occupational status (all $p>.05$). However, those reporting heart disease and arthritis and rheumatism were significantly older than non-responders ($p<.05$). Across organisations, musculoskeletal pain was the most reported condition. For administration and manufacturing A organisations, arthritis and rheumatism was the second most prevalent condition. For transport and manufacturing B, asthma was the second most reported condition. Across the sample, 85% (n=1256) reported using prescribed medication at work related to their primary chronic illness affecting work. Table 2 reports the means and standard deviations for medication use at home and at work and were compared between the chronic illness groups using multivariate analysis of co-variance (MANCOVA). Illness group was entered as the independent variable. Age, gender, organisation, education, severity of illness and length of time managing an illness were entered as covariates. A Bonferroni corrected alpha level of $p\leq.0.001$ was accepted as statistically significant. MANCOVA revealed a significant main effect between groups [$F(1, 16) = 4.45$; $p<0.001$]. Tukeys post hoc analyses showed those with musculoskeletal pain were less likely to use medication both at work and at home than all other groups ($p<0.001$). No other significant group differences were found. There was a significant

main effect within-group [F(1, 1112) = 163.14; p<0.001], indicating that medication behaviour significantly differed between home and work. T-tests revealed those with arthritis, asthma, musculoskeletal pain, depression and anxiety, diabetes, migraine and irritable bowel syndrome were more likely to take medication at home than at work (all ps<0.001).

Table 3 shows the correlations between the outcome variable 'medication use at work' and all other variables. The correlations range from r = 0.01 to r =0.60; indicating no highly significant problems with multicollinearity.. The adjusted odds ratios of predictors for medication use at work are presented in Table 4. For demographic and illness-related variables, only age and pain were related to medication use at work (p<0.001). Participants with diagnosed heart disease were more likely to use medication at work and those with diagnosed musculoskeletal pain and depression and anxiety were less likely to use medication at work compared with other chronic illnesses. The use of medication at home increased the likelihood of medication use at work and the easy use of medication at work was also predictive of medication use at work. The perceived benefit of prescribed medication to health was also associated with medication use at work. In terms of support, instrumental support from line manager, GP and from family were associated with medication use at work. Support from occupational health was not associated with medication use at work. Work-limitation was also not associated with medication use at work. The variables associated with medication use at work were then entered into a multiple logistic regression model. A Bonferroni corrected alpha level of p≤0.001 was accepted as statistically significant.

Table I: Distribution of chronic illness and demographic details across participants (n= 1474)

	n	(%)	*M*	SD
Age (years)			46.2	9.1
Tenure (years)			13.4	9.9
Length of time managing a chronic illness (years)			11.2	10.4
Gender				
Male	*640*	(43)		
Female	*834*	(57)		
Education				
None	*252*	(18)		
GCSE or equivalent	*439*	(31)		
AS level or equivalent	*38*	(3)		
A level of equivalent	*246*	(17)		
Degree	*354*	(25)		
Higher degree	*103*	(7)		
Employment status				
Full time	*1055*	(72)		
Part time	*403*	(28)		
Chronic illness				
Musculoskeletal pain	*324*	(22)		
Arthritis & rheumatism	*192*	(13)		
Asthma	*174*	(12)		
Depression & anxiety	*152*	(10)		
Irritable bowel syndrome	*115*	(8)		
Heart disease	*96*	(7)		
Diabetes	*91*	(6)		
Migraine	*80*	(5)		
Thyroid disease	*51*	(4)		
Inflammatory bowel disease	*43*	(3)		
Cancer	*25*	(2)		
Reproductive & gynaecological	*17*	(1)		
Multiple Sclerosis	*17*	(1)		
Eye problems	*16*	(1)		
Chronic fatigue syndrome	*16*	(1)		
HIV & hepatitis	*16*	(1)		
Epilepsy	*14*	(1)		
Other[+]	*35*	(2)		
Severity				
Mild	*708*	(49)		
Moderate	*482*	(34)		
Severe	*245*	(17)		
Presence of pain	*944*	(64)		
Severity of pain				
Mild	*229*	(23)		
Moderate	*427*	(43)		
Severe	*349*	(35)		
Fatigue	*1094*	(74)		
Illness distress score			1.9	1.3
Medication use at home	*1347*	(93)		
Medication use at work	*1256*	(85)		

Table 5 shows the multivariate model of significant predictors (χ^2 =18.24, df=2; p<0.01). The final model (sensitivity 63% and specificity 95%) accurately classified 89% of the cases. In the final model, only medication use at home and ease of taking medication at work predicted medication use at work.

Table II: Comparison of medication use across participants

	Medication use at work			Medication use at home			Paired t-test
	Mean	(SD)	*p* value	Mean	SD	*p* value	*p* value
Musculoskeletal pain	6.73	(3.12)	<0.001*	7.73	(2.79)	<0.001*	<0.001
Arthritis & rheumatism	7.87	(2.73)		8.65	(2.18)		<0.001
Asthma	8.14	(2.46)		8.70	(2.04)		<0.001
Depression & anxiety	7.66	(3.01)		8.71	(2.30)		<0.001
Irritable bowel syndrome	7.64	(2.73)		8.59	(2.02)		<0.001
Heart disease	9.00	(2.03)		9.58	(1.40)		0.02
Diabetes	8.11	(2.56)		8.85	(1.87)		<0.001
Migraine	7.90	(2.66)		8.71	(2.14)		<0.001
Thyroid disease	9.06	(1.54)		9.47	(1.51)		0.05
Inflammatory bowel disease	8.56	(2.40)		8.78	(2.09)		0.11
Cancer	8.41	(2.80)		9.52	(1.93)		0.14
Reproductive & gynaecological	8.80	(1.54)		9.15	(1.40)		0.17
Multiple Sclerosis	7.67	(3.06)		8.00	(2.79)		0.58
Eye problems	8.73	(1.72)		9.23	(1.36)		0.42
Chronic fatigue syndrome	9.43	(1.78)		9.67	(1.70)		0.35
HIV & hepatitis	8.46	(1.61)		9.29	(1.31)		0.19
Epilepsy	9.78	(1.55)		9.82	(1.40)		0.35

*Between group comparisons: musculoskeletal pain significantly differed from all other groups

Table III: Correlations among the key variables

Variables	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
1. Gender[a]	-	-	-																	
2. Age			-.04	-																
3. Tenure			-0.19**	0.46**	-															
4. Education level			0.00	-.15*	-0.18*	-														
5. working hours			0.45**	0.11*	-0.09	-0.16*	-													
6. Medication use at work[c]			0.05	0.11*	0.03	0.05	0.05	-												
7. Ease of medication use at work[d]			0.04	-0.05	-0.03	0.08	0.06	0.28**	-											
8. Medication beneficial to health			0.08	0.13*	-0.01	0.01	0.04	0.38**	0.12*	-										
9. Medication use at home			0.06	0.16*	0.07	0.04	0.06	0.60**	0.12*	0.48**	-									
10. Illness severity			0.05	0.04	0.04	-0.21**	0.03	-0.05	-0.15*	-0.01	0.03	-								
11. Pain severity			0.08	0.03	0.13*	-0.11*	0.04	-0.13*	-0.12*	-0.12*	-0.10*	0.37**	-							
12. Fatigue			0.14*	-0.04*	0.02	-0.08	0.04	-0.08	-0.08	-0.32	-0.05	0.27**	0.22**	-						
13. Health-related distress			0.01	-0.05	0.05	-0.08	-0.05	0.43**	-0.17*	-0.05	-0.05	0.36**	0.33**	0.44**	-					
14. Work limitation			0.08	-0.01	0.09*	-0.17*	0.02	-0.17*	-0.13*	-0.13*	-0.05	0.27**	0.30**	0.36**	0.43**	-				
15. Instrumental line manager support			0.16*	0.10*	-0/01	-0.01	0.12*	0.18*	0.11*	0.15*	0.15*	0.01	-0.01	-0.03	-0.10*	-0.02	-			
16. Instrumental occupational health support			-0.10*	0.01	0.07	-0.09	-0.07	0.09*	0.03	0.05	0.07	0.01	-0.02	-0.03	-0.04	-0.03	0.38**	-		
17. Instrumental family support			0.07	-0.02	0.02	-0.11*	0.06	0.17*	0.08	0.16*	0.16*	0.06	0.04	-0.01	-0.02	0.03	0.28**	0.17*	-	
18. Instrumental GP support			0.02	0.09*	0.05	-0.16**	0.06	0.19*	0.06	0.24**	0.22**	0.05	-0.06	0.01	-0.03	-0.01	0.24**	0.27**	0.39**	-

*p<0.05, **p<0.01. [a]Gender: 0 = male, 1 = female; [c]part-time; [c]Dichotomised data; [d]Transformed using log transformation

Table IV: Univariate logistic regression model of predictors of prescribed medication use at work (n=1474)

Variable	*Odds Ratio (95% CI)	*P* value
Age group (years)		
18-30	1	
31-43	1.24 (0.72-2.16)	ns
44-56	1.77 (1.04-3.02)	<0.01
57-69	2.04 (1.05-3.94)	<0.001
Heart	4.19 (1.67-10.49)	<0.01
Musculoskeletal pain	0.38 (0.27 - 0.52)	<0.001
Depression & anxiety	0.59 (0.35 - 0.98)	<0.001
Pain		
Mild	1.73 (1.07 - 2.80)	<0.001
Moderate	1.24 (0.74 - 2.07)	<0.05
Severe	1	
Ease of taking medication at work	1.56 (1.50 - 1.64)	<0.001
Using medication at home	2.06 (1.88 - 2.27)	<0.001
Medication beneficial to health	1.37 (1.30 - 1.45)	<0.001
Instrumental support:		
Line manager	1.28 (1.14 - 1.43)	<0.001
Family	1.29 (1.15 - 1.46)	<0.001
General practitioner	1.95 (1.43 - 2.65).	<0.001

*Controlled for type of organisation

Table V: Multivariate logistic regression model of predictors of prescribed medication use at work

Variable	*Odds Ratio (95% CI)	*P* value
Using medication at home	7.26 (4.42-8.83)	<0.001
Ease of taking medication at work	1.45 (1.08-1.64).	<0.001

*Controlled for age and type of organisation

DISCUSSION

Our study found that medication use at work was predicted by medication use at home and the ease of using medication at work. About 85% of respondents with a chronic illness reported using medication at work. This high level of usage, combined with the increasing prevalence of chronic illness in the workplace as we face an ageing workforce (22), highlights the need to better understand medication use at work.

Medication use by illness group showed that employees with heart disease were more likely to use medication at work, and employees with arthritis, asthma, depression and anxiety, diabetes, migraine and irritable bowel syndrome were more likely to take medication at home than at work (tables 2 and 4). In particular, those with musculoskeletal pain and depression and anxiety were less likely to use medication at work compared with all other groups (table 4). Certain factors associated with musculoskeletal pain, depression and anxiety but not measured in this study, may help to explain the low use of medication by these groups. For example, the stigma associated with depression and anxiety or the possible side effects of psychotropic medication use on work performance may deter employees from taking their

medication (1-3). However, it seems more probable that for these illnesses medication may be required once or twice a day and therefore outside of working hours.

Our findings on predictors of medication use are in line with other studies on medication use and adherence (7 8), revealing participants' age, severity of pain and the perception that prescribed medication use is beneficial to health independently predicted medication use at work. In our study, those with mild pain were more likely to use medication than those with severe pain, perhaps indicating those using medication for pain control are therefore more likely to report lower pain than those who are not. This highlights the importance of reinforcing the benefits of medication use for those who are prescribed medication. While this may initially fall within the remit of a GP prescribing the medication, primary care providers often have limited contact time with the individual; which is often not sufficient for attitude change should an individual be sceptical or place a low value on the beneficial properties of medication. Organisations on the other hand could play a vital role in this behaviour changing process, through ensuring there is a culture that places a high value on health.

In addition, both emotional and practical support from participants' GP and line manager independently predicted medication use at work. Our results are consistent with previous research in that support (practical and emotional) strongly relate to medication use and other self-managing behaviours (9-11), and extends those findings by indicating the importance of support in the use of medication at work.

Our final multiple model suggests that using medication at home and the ease of using medication at work were the most parsimonious predictors of using medication at work. Although GP support was the strongest independent predictor of support relating to medication use at work, it was not retained in our final model, suggesting its' influence was absorbed by using medication at home. Although employees were more likely to use medication at work if the work environment facilitated the use of medication i.e. made it easy for employees to take medication, support from occupational health did not predict medication use at work. However, it is not known from the current study, whether occupational health services made the facilitation of medication use easier for employees. For example, implementing a secure box or fridge for medications or providing a private room for employees to take medication; or by creating a culture of workplace health that encourages employees to manage their illness. Many of these activities may be undertaken by and implemented by both management and occupational health services.

A review of each organisations' policy on medication use at work revealed only one organisation had a policy which required employees to disclose medication use for health and safety reasons. However, as the influence of organisational policies was controlled for in the analyses, further research is required to understand organisational practices for medication use at work, particularly to what extent certain policies and practices encourage or deter employees in taking their medication at work, and whether lack of medication use have negative physical or psychological health outcomes such as pain, fatigue and stress. Further longitudinal intervention-based studies are needed to delineate this relationship.

While we achieved a below average response rate for mailed surveys of this type (12,13), discussions with organisational stakeholders indicate that response rates for questionnaires outside of annual employee surveys are in the region of 27-31% due to survey fatigue (14). Survey fatigue is an increasing problem faced by researchers conducting organisational based research, despite usage of response-inducing techniques (14). As the study relied entirely on self-report data in identifying those with chronic illnesses, this may have resulted in under-reporting of chronic illnesses, leading to a somewhat lower response rate, or an under-representation of those not adhering to medication use. It is also not possible to know whether employees felt uncomfortable in completing a questionnaire about their illness at work, or felt their illness posed no problem at work or simply chose not to fill it in due to lack of time. Nevertheless, demographic comparisons between responders and non-responders indicated no serious problems with response bias.

Further longitudinal research using clinical populations is required to understand what factors encourage or deter prescribed medication use at work. Such studies can capture information on medication use compliance, changes in medication use, employment status and support and the fluctuations of physical, social and psychological correlates. Such information can help occupational health professionals design, implement and evaluate appropriate intervention strategies in medication use and management to help promote such employees' well-being and minimise subsequent sickness absence. The focus of this study is worthy of further attention not only from a research perspective but also from the point of collaboration between healthcare professionals and industries.

Implications for clinical practice: The ease of taking medication at work was found to be a key predictor of medication use at work, suggesting occupational health may play a vital role in findings ways to support employees in their usage of medication. For example, by providing help and guidance in storing medication at work and encouraging employees to disclose medication use to employers and managers where necessary. Occupational health staff also play an important role in working with employees and their line managers and team, to manage possible side effects of medication and their possible impact on work performance and safety. The workplace is an ideal environment in which to influence and educate individuals on the value of medication and the benefits illness self-management can accrue. Occupational health services can help create a workplace culture that places a high value on health, educating staff on the value of looking after their health and the benefits of following advice given, and work closely with GPs to increase medication compliance. With greater opportunity of contact with individuals, and a number of mediums through which to shape behaviour change (e.g. posters, emails, one-to-ones), occupational health professionals are well positioned to enhance medication use at work.

KEY POINTS

- Work-related factors associated with prescribed medication use at work among employees with chronic illness are of importance given the increasing prevalence of chronic illnesses.

- Employees are more likely to use prescribed medication at work if they take medication at home and if it is easy for them to take medication at work.

- Occupational health services should adopt an active role in supporting employees in managing medication use at work and ensure that they are aware of the benefits of taking medication for their illness.

ACKNOWLEDGEMENTS

This work was supported by a grant from the European Social Fund. We thank Amanda Griffiths, Sara Cox and Stavroula Leka for their suggestions at the initial design of the study. We also thank participating organisations for access.

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