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No gender differences in fatigue and functional limitations due to fatigue among patients with COPD

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This is the authors' version of the following article:

Kersti Theander and Mitra Unosson, No gender differences in fatigue and functional limitations due to fatigue among patients with COPD, 2011, Journal of Clinical Nursing, (20), 9-10, 1303-1310.

which has been published in final form at:

<http://dx.doi.org/10.1111/j.1365-2702.2010.03625.x>

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<http://eu.wiley.com/WileyCDA/Brand/id-35.html>

Postprint available at: Linköping University Electronic Press

<http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-67756>

**NO GENDER DIFFERENCES IN FATIGUE AND FUNCTIONAL LIMITATIONS
DUE TO FATIGUE AMONG PATIENTS WITH CHRONIC OBSTRUCTIVE
PULMONARY DISEASE**

ABSTRACT

Aims and objectives. To examine gender differences in experiences of fatigue and functional limitations due to fatigue in patients with chronic obstructive pulmonary disease and a comparison group.

Background. Fatigue is a major problem for patients with chronic obstructive pulmonary disease. The prevalence rate of chronic obstructive pulmonary disease in females is increasing and to our knowledge there are few studies reporting gender differences in one of their worst symptoms, fatigue and functional limitations due to fatigue.

Design. This study has a descriptive cross-sectional design.

Methods. Patients with chronic obstructive pulmonary disease (n = 345) and a comparison group of the same gender and age from the same region as the patients (n = 245) answered mailed questions about the frequency, duration and severity of fatigue and the Fatigue impact Scale.

Results. High frequency (≥ 20 days/month), long duration (≥ 6 hours/day) and great severity (one of my worst symptoms) of fatigue were experienced by 51%, 54% and 44% of the male patients with COPD, respectively, and 60%, 55% and 51% of the female patients with chronic obstructive pulmonary disease, respectively. The figures for the males from the comparison group were 14%, 24% and 17% and for the females 30%, 42% and 32%, respectively. There were no gender differences regarding fatigue (frequency, duration and severity) or functional limitations due to fatigue in the chronic obstructive pulmonary disease patients, while the differences between males and females from the comparison group were

statistically significant for frequency and severity of fatigue as well as functional limitation due to fatigue.

Conclusion. In the comparison group there were gender differences regarding fatigue, as well as functional limitations due to fatigue. This was not observed in the chronic obstructive pulmonary disease group.

Relevance to clinical practice. The results of this study suggest that nurses should not take for granted that female patients with chronic obstructive pulmonary disease experience more fatigue than men.

Key words: chronic obstructive pulmonary disease, fatigue, fatigue impact scale, gender, general population

INTRODUCTION

Traditionally, chronic obstructive pulmonary disease (COPD) has been a male disease. Its prevalence in females is increasing, however, and will continue to increase as more females started smoking after World War II (Mannino 2002). Since the year 2000 more females than males are dying in COPD (Mannino 2002), but seem to have better survival than males (de Torres *et al.* 2009). Several studies have reported gender differences in health status (de Torres *et al.* 2006, Di Marco *et al.* 2006, Laurin C 2007, Martinez *et al.* 2007). For patients with COPD, symptoms like dyspnea and fatigue are the most prominent symptoms influencing their health (Arnold *et al.* 2005, Belza *et al.* 2001, Yeh *et al.* 2004). Little attention has been paid to how gender differs in symptom experience, especially fatigue, and functional status for this group of patients. Also, in the light of the change in gender prevalence it might be important to consider gender-specific interventions for relieving symptoms and improving functional status.

Fatigue is one of the most common symptoms experienced by patients with COPD (Blinderman *et al.* 2009, Gift & Shepard 1999, Graydon & Ross 1995). In contrast to tiredness, fatigue is described as a subjective, abnormal or unusual experience often with no relation to activity or exertion (Piper 2003, Ream & Richardson 1996). When fatigue lasts for a month or more, it is considered to be chronic fatigue (Piper 2003). Patients experiencing fatigue have reported “feelings of abnormal tiredness, decreased physical performance, weakness and unusual need for rest, which was distinctly different from healthy persons” (p. 82) (Glaus *et al.* 1996).

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There are many definitions for fatigue, ranging from tiredness to exhaustion, but no single definition is generally accepted (Ream & Richardson 1996, Tiesinga *et al.* 1996). Ream (1996) described fatigue as a “subjective, unpleasant symptom that incorporates total body feelings, ranging from tiredness to exhaustion, creating an unrelenting overall condition, which interferes with individuals’ ability to function to their normal capacity” (p. 527). The North American Nursing Diagnosis Association (NANDA) defines fatigue as “an overwhelming sustained sense of exhaustion and decreased capacity for physical and mental work at usual level” (p. 133) (NANDA 2005). The symptom of fatigue is usually examined as a subjective experience and measured through self-reports on frequency, duration and severity (Dodd *et al.* 2001, Ferrans *et al.* 2005) as well as through its impact on cognitive, physical and psychosocial functioning (Fisk *et al.* 1994). From a nursing perspective, the focus is not only on the symptom of fatigue but also on how it affects daily functioning (Dodd *et al.* 2001).

The prevalence of fatigue, assessed as intensity or severity, is about 50% of patients with COPD (Theander *et al.* 2008, Walke *et al.* 2004). Recently the prevalence of fatigue among patients with severe COPD was found to be 71% (Blinderman *et al.* 2009). Among various symptoms such as shortness of breath and depression, fatigue has shown the greatest increase in severity over time (Walke *et al.* 2007).

Only a limited number of studies have evaluated gender differences in the experience of symptoms among patients with COPD. Studies have found that females with COPD report more dyspnoea than males, in both primary care and pulmonary outpatient settings, measured

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using the Medical Research Council (MRC) dyspnea scale (Dales *et al.* 2006) (de Torres *et al.* 2005, de Torres *et al.* 2006, Di Marco *et al.* 2006). For the second most prevalent symptom, fatigue, only one study has been found reporting on gender differences in patients with COPD. Gift and Shepard reported that females with severe COPD experience greater fatigue than males do (Gift & Shepard 1999). In that study fatigue was measured using the vitality subscale of the Medical outcomes survey Short Form 36 (SF-36) and by assessing frequency, intensity and distress of fatigue. The vitality subscale consists of four items; the frequency within the past 4 weeks that the person felt full of pep; had a lot of energy; felt worn out; and tired. For frequency, intensity and distress the patients were first asked if they had experienced a lack of energy during the past week. They were asked how often they felt this way (frequency), how severe it was (intensity), and how much it had distressed them (distress). These three items were scored on a five point numeric rating scale (Gift & Shepard 1999). However, in Gift and Shepard's study the females were younger than the males which could influence the results and fatigue was only reported during the preceding week.

In general population groups, females reported higher rates of symptoms than males did (van Wijk & Kolk 1997, Verbrugge 1985). Differences in childhood socialization and adolescence could be a reason for these differences. Childhood socialization regarding symptoms differs for boys and girls, which may underlie their adult symptom experience. Boys should be strong and not complain about symptom experiences (Verbrugge 1985). For experiences of fatigue in the general population there are contradictory results in gender differences. In a Dutch working population no associations were found between fatigue and gender (Bultmann *et al.* 2002), but in studies from Denmark, Germany and Norway, females experienced more

fatigue than males did (Loge *et al.* 1998, Schwarz *et al.* 2003, Watt *et al.* 2000). Therefore, a comparison between male and female patients with COPD is necessary.

Studies have reported that fatigue has a negative association with functional performance in patients with COPD (Breslin *et al.* 1998, Kapella *et al.* 2006, Leidy 1995, Reishtein 2005, Leidy, 1995). One of the studies indicated that females reported more functional difficulties than males did (Leidy & Traver 1995). A better knowledge of the differences between males and females could lead to a better understanding of the patients' situation, especially when planning for symptom management.

The hypothesis is that female patients with COPD experience fatigue as a more severe symptom, have more days of fatigue in a month, fatigue lasts for an entire day and has more impact on their functioning than among male patients.

The aim of this study was to examine gender differences in experiences of fatigue and functional limitations due to fatigue in patients with COPD and a comparison group.

METHODS

This study has employed a descriptive comparative design in order to describe differences between male and female patients with COPD and between males and females in a comparison group. The patient data from the Fatigue Impact Scale (FIS) in this study has previously been reported in a psychometric validation study (Theander *et*

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al. 2007), as has patient data from two pulmonary outpatients departments ($n = 151$) and a comparison group ($n = 95$) (Theander *et al.* 2008).

Patients

Patients were recruited from three pulmonary outpatient departments, two university hospitals and one district hospital ($n = 583$; 263 males and 320 females). All patients earlier diagnosed by a physician as having COPD, 75 years or younger and registered in the patient administrative system were included. Of these, 345 (59%) consented to participate. From the regional population register of the same region as the patients, 583 individuals of the same age and gender as the patients were randomly assigned to a comparison group. Of these 245 (42%) consented to participate. There were no statistically significant differences between respondents and non-respondents with regard to gender but the non-respondents among the patients with COPD were two years younger ($p < 0.05$). The non-respondents in the comparison group were three years older ($p < 0.005$), and were comprised of more males ($p < 0.05$).

Measures

Fatigue was assessed with structured questions about the frequency, duration and severity of fatigue (Fisk *et al.* 1994). The frequency of fatigue was scored from 0 = not a problem to 5 = problems every day. The duration of fatigue was scored from 0 = no experience to 3 = 12-24 hours/day. The severity of fatigue was scored from 0 = not a problem to 4 = my worst symptom.

Functional limitations due to fatigue were assessed using the Fatigue Impact Scale (FIS) (Fisk *et al.* 1994). The FIS is comprised of 40 items and assesses functional limitations due to fatigue in cognitive (10 items), physical (10 items) and psychosocial (20 items) dimensions. The participants rated the extent of fatigue that had caused them problems during the past month in relation to exemplar statements. The items are scored from 0 = no problem to 4 = extreme problem. Higher scores indicate more functional limitations due to fatigue. In this study, Cronbach's Alpha for the total scale of FIS for the patient group was .80 and for the comparison group .89. The FIS has been widely used in different patient groups (Björnsson *et al.* 2004) and has been found to discriminate between different groups of patients (Fisk *et al.* 1994). The participants also answered questions about age, gender, marital status, employment and support from another person in case of illness.

Procedure

The questionnaire, along with an inquiry, was mailed to the participants' homes. Returning the completed questionnaire was considered to represent consent to participate. All participants received written information about the study that participation was voluntary. The participants were asked to rate the degree to which fatigue had affected their cognitive, physical and psychosocial functioning the previous month, even if they had not experienced fatigue (Fisk *et al.* 1994). The questionnaire was mailed to the participants only once due to ethical considerations.

Ethics

The study was performed in accordance with the Declaration of Helsinki. The Research Ethics Committee at the Faculty of Health Sciences, Linköping University, Sweden approved the study. All data has been calculated at a group level.

Statistical analyses

Descriptive statistics are presented as frequencies and percentage or mean and SD.

Differences between groups were analyzed using chi-square for nominal data, the Mann Whitney U-test for ordinal data and Student's t-test for interval data (the FIS). The level of statistical significance was set at $p < 0.05$. Statistical analyses were conducted using SPSS 17.0.

RESULTS

Male patients with COPD were two years older and had a higher frequency of being married or cohabiting than female patients with COPD. In the comparison group there were no significant differences between males and females with regard to demographics and social data. Male patients with COPD were three years older and employed to a lower degree compared to the males in the comparison group. Female patients with COPD were three years older, married to a higher degree and employed to a lower degree compared to the females in the comparison group (Table 1).

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There were no statistically significant differences between male and female patients with COPD regarding frequency, duration and severity of fatigue. In the comparison group, female participants reported a higher frequency of fatigue and experienced fatigue as a more severe symptom compared to male participants (Table 2). Both males and females with COPD had a higher frequency, longer duration and experienced fatigue as a more severe symptom compared to the males and females in the comparison group. Almost half (51%) of the females with COPD reported that fatigue was one of their worst symptoms, or their worst symptom, and the males in the comparison group reported to 53% that fatigue severity was not a problem (Table 2).

There were no statistically significant differences between male and female patients with COPD regarding functional limitations due to fatigue. In the comparison group female participants reported a higher frequency of cognitive, physical and psychosocial limitations due to fatigue compared to male participants. Both male and female patients with COPD had more limitations due to fatigue on cognitive, physical and psychosocial functioning compared to males and females in the comparison group (Table 3).

DISCUSSION

This study did not support the hypothesis that female patients with COPD experience fatigue as a more severe symptom have more days of fatigue in a month, experience that the fatigue lasts longer during the course of a day and feel more impact on their functioning than do male patients with COPD. In the comparison group, as expected, the

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female participants reported fatigue as a more severe symptom, more days of fatigue and more functional limitations due to fatigue.

This study found no differences between male and female patients with COPD regarding fatigue (frequency, duration and severity) and functional limitations due to fatigue. Gift and Shepard (1999) reported that females with severe COPD experience greater fatigue than males do. Another study has recently reported no gender differences in experiences of fatigue (Al-shair *et al.* 2009). In that study age had a negative correlation with fatigue, with younger patients (< 65 years) experiencing more fatigue than older patients. The reason this study failed to report these differences might be that the male patients were older (by two years) and married or cohabiting to a higher degree than the female patients were. Being married or cohabiting has been reported to ease the experience of fatigue in the general population (Watt *et al.* 2000), which is not known in patients with COPD. In the patient group there was a difference in age for males and females, but the two year difference could hardly be of clinical importance. There are still unequivocal results on gender differences regarding fatigue and functional limitations due to fatigue.

Other symptoms such as dyspnea, (Dales *et al.* 2006, de Torres *et al.* 2005, de Torres *et al.* 2006) anxiety and depression (Arne *et al.* 2009, Di Marco *et al.* 2006) are reported to be at a higher level for female patients than for male patients with COPD. Some results also suggest that females are more susceptible to developing severe COPD than males are (Gan *et al.* 2006, Han *et al.* 2007). As results still are contradictory, future research is required to further examine gender differences in fatigue and functional limitations. It

seems that other factors could have an influence on the experience as well. Could biological function and characteristics of the individual and environment such as pulmonary function, co morbidity, living alone, social support and coping explain more about gender differences concerning fatigue and functional limitations due to fatigue?

This study supports previous findings that females in the general population experience more fatigue than males do (Loge *et al.* 1998, Schwarz *et al.* 2003, Watt *et al.* 2000). The female participants also had more functional limitations due to fatigue which might be explained by the different female role burden, such as stress in working and being responsible for home management. Many females apply self-care measures to prevent and decrease fatigue, but others are unable to employ helpful strategies (Libbus 1996). Further research on general population groups including relevant characteristics for gender differences such as education, social class, working and home management is needed.

As expected, both males and females with COPD experienced fatigue more frequently and severely as well as longer-lasting with more functional limitations compared to the males and females in the comparison group. That patients with COPD report more fatigue and functional limitations due to fatigue than a comparison group (Theander & Unosson 2004) is known, but we can now see that in mean values the differences between the males in the groups are higher than for the females. This needs to be investigated more. The differences in being married or cohabiting could have biased the results, and

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therefore more research is needed to explain how other sociodemographic factors influence the experience of fatigue and functional limitations due to fatigue.

As can be seen in Table 2, there could be a floor and ceiling effect in the question about severity of fatigue that could have influenced the results (Nunnally & Bernstein 1994). Males in the comparison group reported to 53% that fatigue is not a problem, whereas 44 51% of the female COPD patients reported fatigue as one of their worst symptoms or the worst symptom. This indicates that it is difficult to use the same questions for a patient group and a comparison group from the general population. To learn more about gender and disease-specific differences in fatigue and functional limitations due to fatigue, comparisons between other patient groups with chronic diseases could be valuable.

In this study an inclusion criterion was that the participants be aged 75 years or younger. When planning for interventions in patients with COPD, however age is of subordinate importance; more important is how they experience fatigue and how fatigue limits their functioning. Therefore in future research an exclusion criterion of age is not necessary.

In conclusion

No gender differences were found for fatigue (frequency, duration and severity) and functional limitations due to fatigue among patients with COPD. As expected, females in the comparison group reported more frequent and more severe fatigue and more functional limitations due to fatigue compared to males in the comparison group. In further research, severity of COPD and other sociodemographic and environmental

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factors should be included to obtain a better understanding of the differences among male and female patients with COPD who experience fatigue.

Implications for Practice

In the symptom management of fatigue in male and female patients with COPD, factors such as social, environmental, cultural and individual are to be considered in the assessment when planning for reducing the experience of fatigue.

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Table 1 Demographics and social data for male and female patients with COPD and a comparison group

	COPD group			Comparison group			Between male	Between female
	Male n = 150	Female n = 193	p	Male n = 99	Female n = 147	p	p	p
Age, mean age ($\pm$ SD)	65 (7.9)	63 (8.3)	0.01	62 (10.7)	60 (9.9)	0.06	0.02	0.01
Married/co-habiting, n (%)	108 (73%)	108 (57%)	<0.01	82 (83%)	105 (71%)	0.06	0.09	<0.01
Employment, n (%)	34 (22%)	37 (19%)	0.46	47 (48%)	83 (56%)	0.19	<0.01	<0.01
Support, n (%)	136 (92%)	168 (88%)	0.29	91 (92%)	132 (90%)	0.81	0.99	0.44
Chi-square								

Table 2 Frequency, duration and severity of fatigue among male and female patients with COPD and a comparison group

	COPD group			Comparison group			Between male	Between female
	Male n = 150	Female n = 193	p	Male n = 99	Female n = 147	p	p	p
Frequency of fatigue:			0.30			<0.01	<0.01	<0.01
Not a problem	16 (11)	23 (12)		36 (36)	35 (24)			
1-4 days	21 (14)	16 (8)		25 (25)	29 (20)			
5-9 days	20 (13)	12 (6)		12 (12)	22 (15)			
10-19 days	12 (8)	29 (15)		9 (9)	16 (11)			
20-29 days	9 (6)	20 (10)		3 (3)	14 (10)			
Every day	70 (46)	92 (50)		11(11)	29 (20)			
Duration of fatigue:			0.79			0.07	<0.01	<0.01
No experience	15 (10)	24 (12)		35 (35)	33 (22)			
< 6 hours/day	53 (35)	60 (32)		39 (39)	75 (51)			
6-12 hours/day	40 (27)	60 (32)		19 (19)	23 (16)			
12-24 hours/day	40 (27)	47 (24)		3 (3)	12 (8)			
Severity of fatigue:			0.63			<0.01	<0.01	<0.01
Not a problem	20 (13)	29 (15)		53 (53)	45 (31)			
One of my least severe symptoms	19 (13)	12 (6)		7 (7)	16 (11)			
One of my less severe symptoms	44 (29)	53 (27)		18 (18)	36 (24)			
One of my worst symptoms	43 (29)	79 (41)		13 (13)	32 (22)			
My worst symptom	22 (15)	20 (10)		4 (4)	15 (10)			

Mann Whitney U-test, values given as n (%).

Table 3 Functional limitations due to fatigue among male and female patients with COPD and a comparison group

	COPD group			Comparison group			Between male	Between female
	Male n = 150	Female n = 193	p	Male n = 99	Female n = 147	p	p	p
Functional limitations due to fatigue (FIS) (maxscore)								
Cognitive (40)	13.7 (10.4)	12.7 (9.9)	0.37	6.6 (8.3)	9.7 (10.6)	0.02	<0.01	<0.01
Physical (40)	21.0 (10.6)	20.0 (11.2)	0.40	6.7 (8.5)	9.1 (10.0)	0.05	<0.01	<0.01
Psychosocial (80)	32.5 (20.9)	33.0 (21.0)	0.83	12.0 (15.5)	16.9 (18.6)	0.03	<0.01	<0.01

Student's t-test, values given as mean (SD)