Original Article

Factors Affecting Fatigue in Older Adults Receiving Home-Based Healthcare

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Abstract

Background. Both fatigue and depression are common health problems in ageing.
Aim. To explore the effect of depressive symptomatology on the presence of fatigue in home-care patients aged 65 years old and over.
Methodology. A cross-sectional study was conducted on three "Help at Home" programs in the region of Crete, Greece. The sample consisted of 300 beneficiaries' elders. Depressive symptomatology was assessed using the Greek version of the BECK Depression Inventory scale (BECK DI) and the presence of fatigue was assessed by the Modified Fatigue Impact Scale (MFIS).
Results. The majority of the participants were female (55.3%), mean age was 78.3 ± 7.4 years, 43% were aged >80 years old and 11.3% were bedridden. Fatigue incidence (MFIS score>46) was 58.7%. Depression was significantly associated with higher rates of fatigue (betas=0.687, p<0.001). Also, fatigue was respectively increased as the number of chronic diseases increased (p =0.031).
Conclusions. Depression is independently associated with fatigue and thus health professionals caring for older people should be suspected of the presence of depression whether fatigue is expressed as a complaint.

Keywords: ageing, home-based care, comorbidity, depression, fatigue, chronic disease.

Introduction

It is widely accepted, that fatigue is a common health problem in ageing. In general, is defined as 'an unpleasant physical, cognitive and emotional symptom described as a tiredness not relieved by common strategies that restore energy' (Mota & Pimenta, 2006). Clinically, fatigue is experienced as tiredness, exhaustion, weakness, lack of energy by patients. Its aetiology is different among patients; thus, clinicians should identify its causes before designing interventions. Its detrimental manifestations affect the physical, psychological, mental, and social aspects of the human being

(Yu, Lee & Man, 2010; Zengarini et al., 2015). Epidemiological studies have demonstrated that its prevalence ranges from 27% to 50% worldwide (Yu, Lee & Man, 2010). Specifically, 24% of patients with depression report fatigue as the main problem, with an average duration of 3.3 years. But, when depression is the main diagnosis, fatigue occurs at higher rates (73-97%) (Egerton, 2013). On the other hand, depression is also a common health disorder among seniors. Particularly, its prevalence ranges from 8.9 to 62.16% in the community and 42.4 to72% in the clinical setting (Avasthi & Grover, 2018). Depression is largely underdiagnosed and untreated among the elderly (Avasthi & Grover, 2018) because depressive symptoms are usually considered normal during ageing, or considered a common response to social withdrawal, chronic problems, and loss of independence (Mental health for older adults, 2017).

It has been suggested that fatigue is strongly associated with depression among elder adults with chronic diseases. More specifically, recent studies have shown that fatigue is associated with reduced functionality (cognitive and physical) in patients with respiratory diseases (Arikan et al., 2015) and with multiple sclerosis (Pittion-Vouyovitch et al., 2006). Fatigue is also a progressive symptom in cancer patients (Giacalone et al., 2013). It has also been reported that gender and increased age also play an important role in the presence of fatigue (Ferentinos et al., 2011). Moreover, fatigue is a result of the severity of the symptoms of the disease itself especially in people with complications (Avlund, Rantanen & Schroll, 2007). Given that home care patients experienced higher prevalence rates of geriatric syndromes in Greece, only a few studies have investigated the association between fatigue and depression. Particularly, a Cretan Aging Cohort study involved 402 people aged 60–100 years, assessed the self-reported fatigue in dementia and frailty patients in primary care (Panagiotakis et al., 2018). Another study elaborated 40 clinical Parkinson patients and 26 controls concluded that depression is a principal factor for fatigue (Katsarou et al., 2007). To our best knowledge, no study was performed on elderly people receiving home-based healthcare exploring the true figures of this association.

Consequently, the purpose of this study was to investigate the impact of depressive symptomatology on fatigue including individual characteristics in the elderly who received home-based care.

Methods- ***Study design and Participants :*** This cross-sectional study was conducted in three home-care settings “Help at Home” in 4 months on the island of Crete, Greece. A convenience-sampling study recruited 523 registered older adults aged 65 years old and over, beneficiaries of these home care programs. These programs are designed to provide health and social care to their registered members, mainly with a disadvantaged social status and poor family support. Following an invitation by the local municipal authorities, a total of 300 willing participated older adults completed the screening questionnaires and were involved in the statistical analysis (response rate 57.3%).

Measurements: The scales used were fulfilling all the criteria for obtaining reliable measures in academic research. Depression was assessed with the Greek version of Beck’s Depression Inventory (BDI) (Beck, Steer & Carbin, 1998), composed of 21 items about how the participant has been feeling in the last week. Each question had a set of at least four possible responses (0 - 3), ranging in intensity (0 - 63). A score between 0 - 9 indicates low depression; 10 -18 medium; 19 - 29 high and, a score >30 is indicative of severe depression. The inventory has been standardized and validated for use in the Greek population (Cronbach $\alpha = 0.84$) (Fountoulakis et al., 2003). Fatigue was assessed using the Modified Fatigue Impact Scale (MFIS) (Fisk et al., 1994). The validated version in Greek patients with multiple sclerosis (Bakalidou et al., 2014) was used. MFIS measures the level of fatigue by having individuals’ self-rate the likelihood of dozing during three different subscales: physical, cognitive, and psychosocial scale, corresponding to the total score of MFIS. All items (21 questions, 5-point Likert type, ranging 0-84), are scaled so that higher scores indicate greater fatigue. Fatigue is defined by the cut-off criterion (46+) following the suggestions of Veauthier and his colleagues (2011). A medical history of the participants was also recorded and obtained, included: mental disorders (dementia, cognitive decline, delirium, etc.); cardiovascular diseases (arrhythmia, heart failure, coronary artery disease, etc.), and diabetes mellitus. Comorbidity was defined as the coexistence of two or more chronic diseases. Demographic data were also recorded including gender, age, bedridden and, weight, height (body mass index, BMI) were also recorded.

Ethics: This study is part of the clinical nursing interventions in the community of the Department of Nursing of the Hellenic Mediterranean University and therefore meets the ethical approval by the Scientific Council. Practically, after receiving written permission from the Municipal Authorities, all participants gave their informed consent after a detailed briefing by the researchers for the purpose and procedures of the study, while underlining that their participation was voluntary.

Statistical analysis: The distributions of frequencies, descriptive and other characteristics of the elderly were assessed calculating the percentage distributions and differences using 95% confidence intervals (95% CI). The intervals were calculated using bootstrap techniques. Analysis of variance was used along with Levene homogeneity control and x^2 test when was appropriate to explore the levels of fatigue and depression between males and females. Finally, multiple linear regression (two model analyses) was applied to assess the effect of independent variables (depression, age, gender, multimorbidity, etc.) on fatigue after adjusting for confounding effects. P-value <0.05 was considered statistically significant.

Results

Participants' characteristics: Table 1 shows the main characteristics of the 300 participants. Most of them were female (55.3%), mean age was 78.3 ± 7.4 years, 43% were aged >80 years old, 11.3% were bedridden. The prevalence of moderate and severe depression was 35.3% and 21.3%, respectively.

Also, the prevalence of mental disorders was 3% (excluded depression), cardiovascular diseases 5%, diabetes mellitus 28%, and hypertension 42%. Chronic diseases did not differ concerning gender, although 41.3% of patients were presented with 1 disease and 18.7% with 2 or more chronic diseases.

Differences between males and females regarding depression and fatigue: Depression (29.5 vs 31.1, p=0.238) and fatigue (45.4 vs 47.1, p=0.177) did not significantly differ between males and females. It was also found no significant differences between males and females with regards to three subscales of fatigue (Table 2).

Assessment of fatigue in patients with comorbidities: Fatigue incidence (46+) was 58.7% and was not correlated to gender (beta=0.026, p=0.53) and comorbidity (beta=0.03, p=0.475) (Table 3). However, the correlation was shown in the presence of fatigue and comorbidity in their linear relationship. In particular, the prevalence of fatigue was significantly higher in people with 2+ diseases (66.1%) compare to people with one disease (62.9%) and 58.8% in people without the disease (p-trend=0.031) (Figure 1).

Assessment of fatigue dependency by the presence of depression: The dependence of fatigue on depression symptomatology in combination with various other characteristics of the patients are presented in Table 3. In practice, it is expressed whether depression affects fatigue at the observation level taking into account other characteristics. The assessment is carried out in two stages (models): In the first, the relationship of fatigue dependence on the characteristics of the patient is checked, while in the second the depression scale entered the analysis. Analyses of fatigue and its three subscales showed that depression is significantly associated with fatigue (beta=0.687, p<0.001). Specifically, physical (beta=0.552, p<0.001), cognitive (beta=0.709, p<0.001) and psychosocial (beta=0.415, p<0.001). However, no association was found between age and fatigue after adjusting for independent variables (2nd model).

Table 1. Demographic data of the study participants (n=300)

	N (*mean ± SD)*	%
Gender		
Male	134	44.7
Female	166	55.3
Age (years)	78.3±7.4 (61-100)	
60-69	38	12.7
70-79	133	44.3
80+	129	43.0
BMI, kg/m^2	27.2±3.3 (17.9 - 59.1)	
normal	52	17.3
overweight	209	69.7
obese	39	13.0
Physical condition		
Bedridden	34	11.3
Self-cared	266	88.7
Most common chronic diseases		
Mental disorders	10	3.3
CVDs	16	5.3
Diabetes	84	28.0
Hypertension	128	42.7
Comorbidity		
None	120	40
1	124	41.3
2+	56	18.7
Depression (Beck DI)		
normal	71	23.7
mild	59	19.7
moderate	106	35.3
severe	64	21.3
Fatigue (FSIS)		
<45	124	41.3
46+	176	58.7

***Notes**: Mental disorders include: anxiety disorder, dementia, psychosis; Cardiovascular diseases (CVDs) include: coronary heart disease, heart failure and arrythmias*

Table 2. Levels scales and prevalence of symptoms of depression and fatigue

	Total	Male	Female	
	mean ± standard deviation			p-value
Depression (Beck DI)	30.4±11,3	29.5±12.2	31.1±10.6	0.238
Fatigue (MFIS)	46.3±11.0	45.4±12.2	47.1±9.9	0.177
Physical	20.7±4.7	20.3±5.2	21.0±4.2	0.206
Cognitive	21.3±6.1	20.9±6.6	21.7±5.7	0.245
Psychosocial	4.3±1.5	4.2±1.6	4.4±1.4	0.230

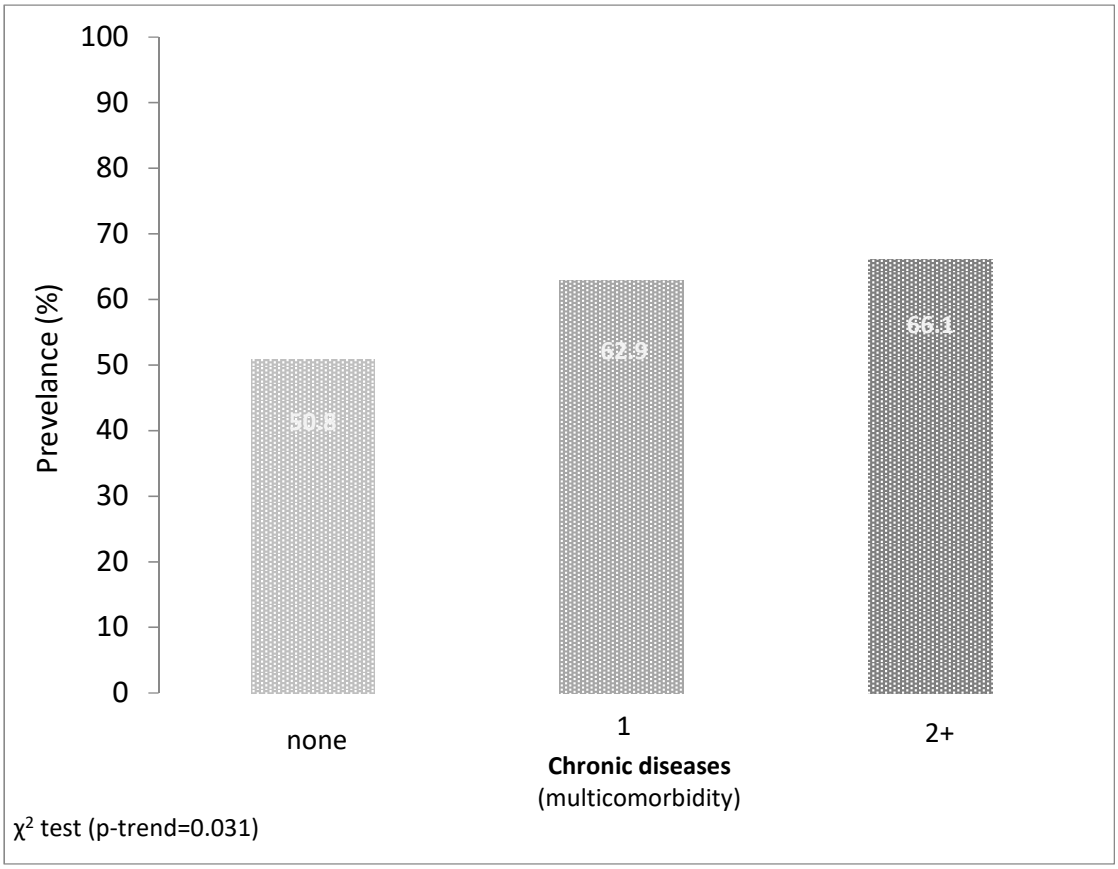
Abbreviations: MFIS: Modified Fatigue Impact Scale; Beck DI: Beck Depression Inventory
Methods: Gender variance analysis test (heterogeneity was tested with Levene test).

Table 3. Factors affecting fatigue.

	Modified Fatigue Impact Scale MFIS					
	1st model			2nd model		
Independent variables	**betas**	**t**	**p-values**	**betas**	**t**	**p-values**
Gender	0.064	1.12	0.264	0.026	0.63	0.530
Age	0.132	2 .26	0.025	0.057	1.33	0.184
BMI	-0.105	- 1.83	0.068	-0.011	-0.26	0.794
Bedridden	0.049	0.83	0.408	0.014	0 .33	0.740
Comorbidity (2+)	0.074	1.29	0.198	0.030	0.72	0.475
Beck Depression Inventory	-	-	-	0.687	16.19	<0.001
R2	0.045			0.496		
R2 adjusted	0.029			0.486		

***Methods**: Hierarchical multiple linear regression analysis. Categorical variables: gender (1: male, 2: female), disabled (1: yes, 2: no), multimorbidity (1: none, 2: one, 3: two or more chronic conditions).*

Figure 1. Prevalence of the fatigue (MFIS 46+) with respect to multimorbidity



Discussion

To our best knowledge, this is the first study in Greek nursing literature aiming to assess the relation between fatigue and depressive symptomatology in older adults receiving home care. Our data analysis revealed a strong association between fatigue and depression, suggesting that depressive symptomatology is independently associated with increasing fatigue (trend linear). We also found that fatigue (MFIS 46+) was more frequent in older adults with 2 or more chronic diseases.

The main finding of the present study was that the increasing symptomatology of depression was related to increased fatigue. In agreement with our findings, previous studies where depressive symptomatology (Soyuer & Şenol, 2011) or identified psychological disorders were predictors of fatigue (Wijeratne, Hickie & Brodaty, 2007). Similar findings by Chen, Chong & Tsang (2007) indicated that fatigue was common in both elderly's with major depression as well as those with clinically significant non-major depression. This association was documented several years ago in psychiatric patients with chronic fatigue reporting that depression, physical or sleep disturbances, and stress were the most important psychopathological problems. The relationship was even attributed to derangement of the pituitary-hypothalamic-adrenal axis since a subgroup of patients with this derangement was associated with low blood cortisol values. However, it was highlighted that fatigue could either be a sign of atypical depression or a remaining symptom of depression in chronic situations (Hickie et al., 1990). On the other hand, both fatigue and depression are common conditions in cancer patients with adverse outcomes on the patients' quality of life (Giacalone et al., 2013). Similar findings identifying the relationship between depression and fatigue were reported in multiple sclerosis patients. In particular, it is stressed that fatigue - not depression symptomatology - is the sole indicator of disease deterioration, even though both conditions occur in a high percentage of patients (Kroencke, Lynch & Denney, 2000;

Salehpoor, Rezaei & Hosseininezhad, 2014). In contrast to our results, a study conducted in New Zealand did not find a correlation between fatigue and depression in a sample of 5950 seniors with a mean age of 81.3 ± 7.1 years. Possible explanations for this correlation were due to the increased age of the sample and the family strengthening and support (Barak et al., 2020).

Interestingly, we found that 58.7% of the seniors in our study identified with fatigue. In general, the prevalence of fatigue varies among kinds of diseases and patients' characteristics especially those receiving home care. Indeed, a study by Soyuer & Şenol (2011) in independent older living in a rest home presented 40.3% fatigue. In the same line, a recent study investigating fatigue in a sample of community-dwelling older adults with diabetes (Kim & Son, 2019) found 48.8%, while in the general population in primary care the frequency of fatigue was found 27.4% (Wijeratne, Hickie & Brodaty, 2007).

More importantly, the present study showed a strong association between fatigue and comorbidity, suggesting that older adults with two or more diseases experienced higher rates of fatigue. Finding from a recent systematic review pointed out that fatigue was the most commonly made complaint among seniors, most likely due to a higher rate of ineffective therapy or due to doctors neglecting the medical condition (Wallensten et al, 2019). Likewise, both comorbidity and psychological factors (i.e depression, sleep quality, diet, social support) were found to be predictors of fatigue (Kim & Son, 2019). Notably, fatigue was also linked to anxiety and stress in patients experiencing chronic diseases, either for psychological or physical reasons, such as disability, being bedridden due to chronic diseases (stroke, cancer, etc.) (Azzolino et al., 2020). In the same context, fatigue is largely occurred due to reduced exhalation effort resulting from breathing difficulties in patients with obstructive pulmonary diseases (Goërtz et al., 2018). Another possible explanation for the high percentage of fatigue is that, the higher prevalence of chronic pain relating to diseases such as rheumatoid arthritis, low back pain syndrome, and osteoarthritis (Bergman et al., 2009; Pope, 2020; Snekkevik et al., 2014).

Study limitations: Despite the useful findings this study has certain limitations. First, fatigue is defined based on subjective individual experience rather than objective laboratory measurements. Secondly, elderly patients find it hard to understand the difference between fatigue and tiredness, thus leading to inaccuracies in our analysis. Another potential limitation of this study is that chronic diseases were recorded based on patients' medical history, and may not represent the underlying disease precisely. In addition, the cross-section design can describe the associations and not the causality between variables. Hence, we are not able to know whether depression came before fatigue or vice-versa. Finally, comorbidity was defined by the number of medical conditions and not using a validated and formulated index such as *Charlson Comorbidity Index.*

Conclusions: Our data analysis suggests that depression is independently associated with fatigue, suggesting that depression is a risk factor of a high probability of having fatigue in our aged home-based sample. It is crucially important, therefore, health care professionals caring for older people should suspect that any complaint involving fatigue may be a sign of the onset of depression and thus, both fatigue and depression should be routinely assessed in clinical practice. Conspicuously, these measurements alert clinicians and home care nurses to timely detect these age-related situations and consequently to effectively intervene for their management.

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References

Arikan, H., Savci, S., Calik-Kutukcu, E., Vardar-Yagli, N., Saglam, M., Inal-Ince, D., & Coplu, L. (2015). The relationship between cough-specific quality of life and abdominal muscle endurance, fatigue, and depression in patients with COPD. *International journal of chronic obstructive pulmonary disease*, 10, 1829.

Avasthi, A., & Grover, S. (2018). Clinical practice guidelines for the management of depression in the elderly. *Indian journal of psychiatry*, 60(Suppl 3), S341.

Avlund, K., Rantanen, T., & Schroll, M. (2007). Factors underlying tiredness in older adults. *Aging Clinical and Experimental Research*, 19(1), 16–25.

Azzolino, D., Arosio, B., Marzetti, E., Calvani, R., & Cesari, M. (2020). Nutritional status as a mediator of fatigue and its underlying mechanisms in older people. *Nutrients*, 12(2), 444. https://doi.org/10.3390/nu12020444

Bakalidou, D., Voumvourakis, K., Tsourti, Z., Papageorgiou, E., Poulios, A., & Giannopoulos, S. (2014). Validity and reliability of the Greek version of the Modified Fatigue Impact Scale in multiple

sclerosis patients. *International Journal of Rehabilitation Research*, *37*(3), 271–276.

Barak, Y., Leitch, S., Greco, P., & Glue, P. P. (2020). Fatigue, sleep and depression: An exploratory interRAI study of older adults. *Psychiatry Research*, 284, 112772. https://doi.org/10.1016/j.psychres.2020.112772

Beck, A. T., Steer, R. A., & Carbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review*, 8(1), 77–100.

Bergman, M. J., Shahouri, S. S., Shaver, T. S., Anderson, J. D., Weidensaul, D. N., Busch, R. E., Wang, S., & Wolfe, F. (2009). Is fatigue an inflammatory variable in rheumatoid arthritis (Ra)? Analyses of fatigue in ra, osteoarthritis, and fibromyalgia. *The Journal of Rheumatology*, *36*(12), 2788–2794.

Chen, C. S., Chong, M. Y., & Tsang, H. Y. (2007). Clinically significant non-major depression in a community-dwelling elderly population: epidemiological findings. *International Journal of Geriatric Psychiatry: A journal of the psychiatry of late life and allied sciences*, *22*(6), 557-562.

Ferentinos, P., Kontaxakis, V. P., Havaki-Kontaxaki, B. J., Dikeos, D., Papadimitriou, G. N., & Lykouras, L. (2011). Fatigue in female patients with major depression: the effect of comorbid anxiety disorders. *Psychiatrike= Psychiatriki*, *22*(4), 320-329.

Fisk, J. D., Pontefract, A., Ritvo, P. G., Archibald, C. J., & Murray, T. J. (1994). The impact of fatigue on patients with multiple sclerosis. *Canadian Journal of Neurological Sciences / Journal Canadien Des Sciences Neurologiques*, *21*(1), 9–14.

Fountoulakis, K. N., Iacovides, A., Kleanthous, S., Samolis, S., Gougoulias, K., St Kaprinis, G., & Bech, P. (2003). The greek translation of the symptoms rating scale for depression and anxiety: Preliminary results of the validation study. *BMC Psychiatry*, *3*(1), 21. https://doi.org/10.1186/1471-244X-3-21

Giacalone, A., Quitadamo, D., Zanet, E., Berretta, M., Spina, M., & Tirelli, U. (2013). Cancer-related fatigue in the elderly. *Supportive Care in Cancer*, *21*(10), 2899–2911.

Goërtz, Y. M. J., Looijmans, M., Prins, J. B., Janssen, D. J. A., Thong, M. S. Y., Peters, J. B., Burtin, C., Meertens-Kerris, Y., Coors, A., Muris, J. W. M., Sprangers, M. A. G., Wouters, E. F. M., Vercoulen, J. H., & Spruit, M. A. (2018). Fatigue in patients with chronic obstructive pulmonary disease: Protocol of the Dutch multicentre, longitudinal, observational *FAntasTIGUE* study. *BMJ Open*, *8*(4), e021745. https://doi.org/10.1136/bmjopen-2018-021745

Hickie, I., Lloyd, A., Wakefield, D., & Parker, G. (1990). The psychiatric status of patients with the chronic fatigue syndrome. *British Journal of Psychiatry*, *156*(4), 534–540.

Katsarou, Z., Bostantjopoulou, S., Hatzizisi, O., Giza, E., Soler-Cardona, A., & Kyriazis, G. (2007). Immune factors or depression? Fatigue correlates in Parkinson's disease. *Revista de neurologia*, 45(12), 725-728.

Kim, H., & Son, H. (2019). Fatigue-related factors for community-dwelling older adults with diabetes: A theory-guided multi-dimensional approach using the dynamic biopsychosocial model. *International Journal of Environmental Research and Public Health*, *16*(22), 4502. https://doi.org/10.3390/ijerph16224502

Kroencke, D. C., Lynch, S. G., & Denney, D. R. (2000). Fatigue in multiple sclerosis: Relationship to depression, disability, and disease pattern. *Multiple Sclerosis Journal*, *6*(2), 131–136.

Mental health for older adults (2017, Dec 12). World Health Organization. Retrieved from https://www.who.int/news-room/fact-sheets/detail/mental-health-of-older-adults

Mota, D. D. C. F., & Pimenta, C. A. M. (2006). Self-report instruments for fatigue assessment: A systematic review. *Research and Theory for Nursing Practice*, *20*(1), 49–78.

Panagiotakis, S. H., Simos, P., Zaganas, I., Basta, M., Perysinaki, G. S., Fountoulakis, N., Giaka, M., Kapetanaki, S., Koutentaki, I., Bertsias, A., Duijker, G., Scarmeas, N., Tziraki, C., Lionis, C., Vgontzas, A., & Boumpas, D. T. (2018). Self-reported fatigue as a risk index for dementia diagnosis. *European Geriatric Medicine*, *9*(2), 211–217.

Pittion-Vouyovitch, S., Debouverie, M., Guillemin, F., Vandenberghe, N., Anxionnat, R., & Vespignani, H. (2006). Fatigue in multiple sclerosis is related to disability, depression and quality of life. *Journal of the Neurological Sciences*, *243*(1–2), 39–45.

Pope, J. E. (2020). Management of fatigue in rheumatoid arthritis. *RMD Open*, *6*(1), e001084. https://doi.org/10.1136/rmdopen-2019-001084

Salehpoor, G., Rezaei, S., & Hosseininezhad, M. (2014). Quality of life in multiple sclerosis (MS) and role of fatigue, depression, anxiety, and stress: A bicenter study from north of Iran. *Iranian journal of nursing and midwifery research*, *19*(6), 593.

Snekkevik, H., Eriksen, H. R., Tangen, T., Chalder, T., & Reme, S. E. (2014). Fatigue and depression in sick-listed chronic low back pain patients: Fatigue and low back pain. *Pain Medicine*, *15*(7), 1163–1170.

Soyuer, F., & Şenol, V. (2011). Functional outcome and depression in the elderly with or without fatigue. *Archives of Gerontology and Geriatrics*, *53*(2), e164-e167.

Egerton, T. (2013). Self-reported aging-related fatigue: A concept description and its relevance to physical therapist practice. *Physical Therapy*, *93*(10), 1403–1413.

Veauthier, C., Radbruch, H., Gaede, G., Pfueller, C., Dörr, J., Bellmann-Strobl, J., Wernecke, K.-D.,

Zipp, F., Paul, F., & Sieb, J. (2011). Fatigue in multiple sclerosis is closely related to sleep disorders: A polysomnographic cross-sectional study. *Multiple Sclerosis Journal*, *17*(5), 613–622.

Wallensten, J., Åsberg, M., Wiklander, M., & Nager, A. (2019). Role of rehabilitation in chronic stress-induced exhaustion disorder: A narrative review. *Journal of Rehabilitation Medicine*, *51*(5), 331–342.

Wijeratne, C., Hickie, I., & Brodaty, H. (2007). The characteristics of fatigue in an older primary care sample. *Journal of Psychosomatic Research*, *62*(2), 153–158.

Yu, D. S. F., Lee, D. T. F., & Man, N. W. (2010). Fatigue among older people: A review of the research literature. *International Journal of Nursing Studies*, *47*(2), 216–228.

Zengarini, E., Ruggiero, C., Pérez-Zepeda, M. U., Hoogendijk, E. O., Vellas, B., Mecocci, P., & Cesari, M. (2015). Fatigue: Relevance and implications in the aging population. *Experimental Gerontology*, *70*, 78–83.