

ORIGINAL ARTICLE

Relationship between Self-Efficacy, Fatigue and Health-Related Quality of Life among Patients with Chronic Illness: A Cross-Sectional Study

Zamzaliza Abdul Mulud¹, Norfidah Mohamad¹, Nur Farhanah Sanusi², Siti Najiah Johari³, Noraini Hashim¹

¹ Centre for Nursing Studies, Faculty of Health Sciences, Universiti Teknologi MARA, Puncak Alam Campus, Selangor, Malaysia.

² Hospital Tengku Ampuan Jemaah, Jalan Hospital, 45200 Sabak Bernam, Selangor, Malaysia

³ Emergency Department, Columbia Asia Hospital, Lot 33107 Jalan Suakasih, 43200 Cheras, Selangor, Malaysia

ABSTRACT

Introduction: Chronic illnesses such as coronary heart disease, hypertension and diabetes mellitus are the main causes of death worldwide. Additionally, previous research has discovered that fatigue commonly associated with chronic illness impairs this population's health-related quality of life (HRQoL), and self-efficacy is critical for self-management. Thus, this study aimed to investigate the association between fatigue and self-efficacy with HRQoL in patients with chronic illness. **Methods:** We conducted quantitative cross-sectional research using a sample of 160 patients from a public hospital in Klang Valley, Malaysia. Self-efficacy, fatigue, and HRQoL were assessed using a self-administered questionnaire that included the Self-Efficacy Questionnaire and the Functional Assessment of Chronic Illness Therapy – Fatigue Scale (FACIT-F), respectively. **Results:** The mean overall score for HRQoL is 79.91 (SD=13.67), fatigue is 35.28 (SD=7.44), whereas the mean self-efficacy score is 37.93 (SD=9.17). There is a positive correlation between HRQoL with fatigue ($r = 0.810$, $p < 0.001$) and self-efficacy ($r = 0.66$, $p < 0.001$). Multiple regression analysis found that sociodemographic characteristics (age, gender, income levels and living area), fatigue and self-efficacy explained 69.5% of variances in HRQoL. Meanwhile, income levels, fatigue and self-efficacy were significant predictors for HRQoL. **Conclusion:** Fatigue and self-efficacy are among the factors that influence HRQoL among patients with chronic illness. The findings indicated that health practitioners should develop a systematic intervention to prevent fatigue, promote patients' self-efficacy and HRQoL.

Malaysian Journal of Medicine and Health Sciences (2022) 18(SUPP15): 221-226. doi:10.47836/mjmhs18.s15.30

Keywords: Chronic illness, Fatigue, Health-related quality of life, Self-efficacy, Self-management

Corresponding Author:

Zamzaliza Abdul Mulud, PhD
Email: zamzaliza@uitm.edu.my
Tel: +603 3258 4305

INTRODUCTION

Chronic illnesses can be defined as diseases that last a year or more and need ongoing medical care, impede daily activities, or both (1). Adults aged 45 to 64 years old are more likely to have at least two chronic diseases, which is referred to as multimorbidity (2). Additionally, the prevalence of chronic illness among individuals aged 65 to 84 years has surged to 64.9 percent, and more than 80 percent of older persons aged 85 and over suffer from chronic disease (3).

Globally, chronic illnesses are a health threat. Each year, 15 million individuals in low- and middle-income nations between 30 and 69 die prematurely from chronic disease (4). The Malaysia Health Systems Research

reported that chronic illnesses such as diabetes mellitus, hypertension, and coronary artery disease are on the rise in Malaysia and are one of the significant causes of mortality (5). In addition, The Malaysian Burden of Disease and Injury Study findings, released in 2017 by the Institute for Public Health, identified hypertension, diabetes mellitus, smoking, a high body mass index, high cholesterol as the leading causes of disability-adjusted life years and fatalities (6). Furthermore, fatigue associated with chronic illness contributes to functional impairment and is often reported by patients as the most challenging aspect of chronic illness (7). Thus, it implies that these chronic illnesses are associated with a high rate of morbidity and mortality and can have a negative impact on the physical, mental, and HRQoL of chronically ill patients.

Quality of life (QoL) and HRQoL have been used synonymously (8). However, HRQoL is a distinct aspect of overall QoL. HRQoL is defined as the way a medical disease or its treatment impairs an individual's normal or

expected physical, emotional, and social well-being (9). The goal of measuring HRQoL is to objectively evaluate the way a disease can affect patients' lives and how they cope with it. These assessments may be beneficial as baseline and outcome measurements and should serve as a foundation for determining the impact of changes in a patient's HRQoL. A recent study by Aung et al. (10) discovered that chronic care delivered consistently over time can improve patients' health conditions and benefit them, hence improving their HRQoL.

Self-efficacy is the way people believe they can perform specific behaviours to accomplish individual goals (11). Patients' perceptions of their overall self-efficacy affect their physical, emotional, and social HRQoL (12). A seminal work related to self-efficacy by Albert Bandura (13) explains that individuals with a strong sense of self-efficacy exert more significant effort and persist longer in their actions than individuals with a low sense of self-efficacy. A recent study indicated that greater levels of diabetes management self-efficacy are linked with improved psychological well-being and social interactions in individuals with type 2 diabetes mellitus (12). Thus, it indicated that self-efficacy is essential in coping with a chronic condition's challenges and demands for a better HRQoL.

Past studies related to HRQoL and self-efficacy were conducted among patients with multimorbidity in England (14) and children with chronic illness and medical complexity in the USA (15). These studies reported that self-efficacy is an essential predictor of HRQoL. The increasing trend of chronic diseases in Malaysia (5) requires effective interventions to improve self-efficacy and self-management of the disease. Thus, severe complications could be prevented and improve patients' overall HRQoL. However, there is scarce information about the association between self-efficacy, fatigue and HRQoL among patients with chronic illness in Malaysia. The literature review found that a previous study conducted in Malaysia focused specifically on HRQoL and self-efficacy among patients with diabetes (16). Therefore, this study aimed to investigate the factors associated with HRQoL in patients living with chronic illness. The research questions that guided this study are 1) What are the HRQoL, fatigue and self-efficacy levels in patients with chronic illness? 2) What are the differences in the level of HRQoL by age, gender, income, education and living area? 3) Does self-efficacy and fatigue associated with HRQoL? 3) Does fatigue, self-efficacy and sociodemographic data predict HRQoL in patients with chronic illness?

MATERIALS AND METHODS

Study design and study setting

A quantitative, cross-sectional study was conducted to investigate the levels of self-efficacy, fatigue and HRQoL and its associated factors among patients (n=160) with

chronic illness attending outpatient and specialist clinics in a public hospital located in Klang Valley, Malaysia. The data collection period was from January to March 2020. We used a non-probability, purposive sampling technique to recruit the participants in this study. In this study, purposive sampling is achieved by selecting non-randomly a sample of patients with a chronic illness that reflects a cross-section of the population (17). Patients attending outpatient and specialist clinics that fulfilled the inclusion criteria were invited to participate in this study. The respondents' three main inclusion criteria were; aged 18 and above, being diagnosed with chronic illness by physicians, such as diabetes mellitus, hypertension and coronary artery disease, for at least one year or more and being able to read and understand Malay and English. Patients with psychiatric history and cognitive impairment stated in their medical records were excluded. The sample size was calculated using G*Power 3.1 software. Since we used multiple regression analysis to answer the research question, we did the calculation appropriately to prevent a small sample size from the skewed result. The minimum sample size required for six independent variables (age, gender, monthly income, living area, fatigue, self-efficacy) to detect a medium effect of 0.15, with a power of 95% and significant levels at 0.05, is 146. However, we managed to recruit 160 samples in our final data collection.

Instruments

A self-administered questionnaire that consists of three parts was used for data collection. In the first part of the questionnaire, five questions were asked about the participants' sociodemographic characteristics (age, gender, educational level, income level, living area). The age group was divided into two groups; less than 60-year old and more than 60-year old, reflecting on adult and older adult definitions. Income levels are also divided into two groups; <less than RM2000 and >RM2000, based on the Malaysian income category.

Next, the HRQoL and fatigue were operationalised using the Functional Assessment of Chronic Illness Therapy – Fatigue Scale (FACIT-F). The FACIT-F was developed based on The Functional Assessment of Cancer Therapy (FACT) scale by Cella et al. in 1997 (18). FACIT-F comprises 27 items measured HRQoL and 13 items for fatigue with a five-point Likert scale ranging from 0 to 4. There are four subscales in FACIT: F referring to HRQoL, which are functional, emotional, physical, social or family well-being. The final score in the FACIT-F for HRQoL ranged from 0 to 108, with higher scores indicating a better HRQoL. In addition, for the fatigue scale, the score ranged from 0 to 52, with a higher score reflecting less fatigue (19). The FACIT-F has been tested and validated in various diseases, treatments, and condition (18). In this current study, the internal consistency reliability of the FACIT-F was at acceptable levels with an α value of 0.85.

Then, the Self-Efficacy Questionnaire was utilised to assess self-efficacy. There are ten items on the questionnaire, each with a seven-point Likert scale ranging from 0 to 6. The questionnaire's final score goes from 0 to 60. A high score suggests increased self-efficacy and the ability to maintain functional gains (20). Chiarotto et al. (20) found in a previous study that the Self-Efficacy Questionnaire had good construct validity. Internal consistency reliability for this scale in this current study was high, with an α value of 0.93.

Ethical approval

Ethical approvals for this study were granted by the UiTM Research Ethics Committee (600-IRMI (5/1/6)) and the Medical Research Ethical Committee, Malaysia (NMRR-19-3526-51538 (IIR)).

Statistical analysis

Complete data were analysed using the IBM Statistical Package for the Social Sciences (SPSS) for Windows version 23.0. The descriptive analysis method (frequency, percentage, mean and standard deviation) was computed to examine the sociodemographic variables, the levels of fatigue, self-efficacy and HRQoL among patients with a chronic illness. Then analyses such as independent t-test and Pearson's correlation coefficient were used. These analyses aimed to determine the significant difference and association between HRQoL with sociodemographic characteristics, fatigue and self-efficacy. A p-value less than 0.05 is deemed significant. We used multiple regression analysis to determine whether fatigue, self-efficacy, and sociodemographic data predict HRQoL in patients with chronic illness. Variables with p values less than 0.25 in preliminary analyses were included in the final regression test. Four sociodemographic variables, fatigue and self-efficacy, fulfilled this criterion. Then, the variance inflation factor (VIF) and Tolerance values were in an acceptable range (VIF = 0.97, Tolerance 1.03), so multicollinearity was not an issue in this regression analysis.

RESULTS

Demographic characteristics

Table I presents the sociodemographic characteristics of participants in this study ($n=160$). The participants were predominantly 60 years and above (53.7%) and female (53.1%). Fifty-three per cent of the participants completed tertiary education with a monthly income of less than RM2000 (80.6%). The majority of the respondents live in rural areas (88.1%).

HRQoL, fatigue and self-efficacy levels

Overall, the total mean score for HRQoL was 79.91 (SD= 13.67). The mean score for the physical well-being subscale was 19.57 (SD= 4.44), and the social/family well-being score was 18.03 (SD=4.67). In addition, the mean score for emotional and functional well-being were 16.09 (SD=3.78) and 19.23 (SD=4.51),

Table I: Sociodemographic characteristics of Patients with Chronic Illness

Variables	Frequency (%)
Age	
< 60 year old	74 (46.3)
> 60 year old	86 (53.7)
Gender	
Female	85 (53.1)
Male	75 (46.9)
Highest Education	
Secondary	74 (46.3)
Tertiary	86 (53.7)
Monthly Income	
<RM2000	129 (80.6)
>RM2000	31 (19.4)
Living Area	
Rural	141 (88.1)
Suburban	19 (11.9)

respectively. Meanwhile, the mean score for the fatigue subscale was 35.28 (SD=7.44), and self-efficacy was 37.93 (SD=9.17), respectively.

Factors associated with HRQoL in patients with chronic illness

The independent t-test analysis results found a significant difference in HRQoL in age ($t(158) = 3.42, p = 0.001$). Patients aged less than 60 years old reported higher levels of HRQoL ($M = 76.77, SD = 13.66$) compared to the older group category ($M = 69.59, SD = 12.85$). Another variable that showed significant result is monthly income ($t(158) = -2.51, p = 0.01$) with those rated RM2000 and above reported higher levels of HRQoL ($M = 78.35, SD = 10.73$) compared to those with lower income level ($M = 71.60, SD = 14.00$). However, no significant differences in HRQoL were found in gender, levels of education and living area.

Next, Pearson correlation coefficient was computed between self-efficacy, fatigue and HRQoL. Result indicated that there was a strong positive correlation between HRQoL with fatigue ($r = 0.81, n = 160, p < 0.001$) and self-efficacy ($r = 0.63, n = 160, p < 0.001$). Self-efficacy also displayed strong positive correlation with other subscales of HRQoL as shown in Table II.

Predictors for HRQoL

We used multiple linear regression analysis to determine the predictors for HRQoL in patients with chronic illness. Four sociodemographic variables with a p-value less than 0.25 in bivariate analyses and self efficacy were included. As shown in Table III, results indicated that the model explained 69.5% of the variance and the model was a significant predictor for HRQoL ($F(6, 159) = 58.20, p < 0.001, R^2 = 0.69$). Variables that predict HRQoL among patients with chronic illness were

Table II: Correlation between Fatigues, Self-Efficacy and Health-related Quality of Life

Variables and Subscales	1	2	3	4	5	6	7
1 Self-efficacy	1						
2 Health-related QoL	0.63*	1					
3 Physical well being	0.55*	0.76*	1				
4 Functional well being	0.65*	0.84*	0.47*	1			
5 Social/family well being	0.33*	0.76*	0.36*	0.56*	1		
6 Emotional well being	0.57*	0.79*	0.56*	0.58*	0.42*	1	
7 Fatigue scale	0.71*	0.81*	0.59*	0.73*	0.53*	0.71*	1

*Significant at $p < 0.05$ **Table III: Regression analysis summary for sociodemographic variables, fatigue, self-efficacy predicting health-related quality of life**

Variables	B	95% CI	β	t	p
Age	-1.06	-3.66, 1.50	-0.04	-0.82	0.41
Gender	0.99	-1.51, 3.49	-0.04	0.78	0.44
Monthly income	4.24	1.16, 7.33	0.12	2.72	0.007*
Living area	-1.59	-5.34, 2.16	-0.04	-0.84	0.40
Fatigue	1.27	1.04, 1.51	0.69	10.70	<0.001*
Self-efficacy	0.22	0.32, 0.41	0.15	2.31	0.02*

Reference group for age, gender, monthly income and living area were age less than 60 years old, female, income <RM2000, and living in the rural area.

Abbreviation : B = unstandardized beta , CI = confident interval, β = standardized betaNote $R^2 = 0.53$ * Significant at $p < 0.05$

income levels ($\beta = 0.12$, $p=0.007$), fatigue ($\beta = 0.69$, $p<0.001$) and self-efficacy ($\beta = 0.15$, $p=0.02$).

DISCUSSION

As the prevalence of patients with chronic disease is increasing, understanding the factors that contribute to improving HRQoL is vital for this population. A previous study discovered that poor HRQoL in patients with chronic illness is correlated with a higher risk of hospital readmission (21). However, to our knowledge, there are few studies available that investigated the predictors of HRQoL among patients with chronic illness in Malaysia. Thus, the primary purpose of this study was to determine the association between fatigue, self-efficacy and HRQoL among patients with chronic illness attending an outpatient and specialist clinic in a secondary hospital in Malaysia.

Levels of HRQoL

Hundred and sixty patients with chronic illness participated in this study. The HRQoL was measured using the sum score of four subscales in the FACIT-F. Compared with previous data using the same scale, the HRQoL among patients in this study was higher than those with cancer (22) but lower than the general population (23). The HRQoL differences can be observed in types of illness such as diabetes mellitus, hypertension and coronary artery diseases because of the presentation and severity of their symptoms. Most non-communicable diseases such as hypertension and diabetes mellitus present with more manageable symptoms (24) compared to other conditions such as cancer or arthritis. Thus, explaining why patients with chronic illness reported high levels of HRQoL compared

to cancer and arthritis.

Factors associated with HRQoL

Results indicated significant differences in HRQoL by sociodemographic factors such as age and income levels. Adult patients with chronic illness reported a higher HRQoL than older patients. Recent studies conducted among patients with chronic heart failure (25), chronic diseases (24) and end-stage renal failure (26) found that older patients were prone to have a poor HRQoL than the younger population. Compared to older patients, adult patients are exposed to various information related to diseases and improved health literacy (27). Thus they have better formal and informal support and resources for disease management. A systematic review among patients with lung cancer reported that support, formal or informal is a vital attribute of HRQoL (28).

Besides that, patients with lower income levels are more likely to experience poor HRQoL than those in higher-income populations. A study related to HRQoL among patients with chronic kidney disease reported a similar finding (26). Currently, 2.8 million households in Malaysia are categorised as B40 with a monthly income of less than RM4360 (29). Despite several government programmes to assist low-income populations, having a steady income and secure financial means remains advantageous. Factors such as accessibility for skills and information, better and quality healthcare and transportation are among the reported benefits of having better income levels, thus associated with better HRQoL (25). However, as Malaysian progress towards a developed nation, the income gap and accessibility to quality healthcare for all are the main focus. For example, in budget 2019, the government introduced the National Health Protection Fund and the Healthcare Protection Scheme to assist the B40 group (29) in health-related matters.

Fatigue and self-efficacy as a predictor for HRQoL

Bivariate and multiple regression analysis found that fatigue and self-efficacy are associated and significant predictors for HRQoL. In this study, fatigue was operationalised using the FACIT-F scale. Findings indicated that patients with chronic illness reported a higher fatigue level than the general population (23). Previous studies also agree that fatigue is higher among patients with chronic diseases than those without

them (30,31). However, concerning fatigue associated with chronic illness, the prevalence is not significantly associated with disease-specific symptoms. For example, higher blood glucose levels in patients with type 2 diabetes mellitus are not a significant predictor of fatigue in this population (30). However, fatigue might impair various domains in patients' lives, including lack of physical activities and sleep disturbances, thus affecting their overall HRQoL (22).

Self-efficacy was significant in bivariate and multiple regression analyses. Since chronic diseases such as diabetes mellitus and hypertension require effective self-management, self-efficacy is vital to achieving the desired outcomes of the treatment. In this study, patients with high levels of self-efficacy demonstrated better HRQoL. A similar finding was reported among patients with multimorbidity in England (14) and Germany (32). High self-efficacy contributes to better self-care management of the disease, thus will enhance their overall HRQoL. Therefore, health care professionals play an essential role in supporting and strengthening patients' self-care management to improve their confidence levels. Educational programs that cover topics like medications adherence, prevention of complications, follow up treatment are among the strategies that can benefit patients with chronic diseases.

However, it is essential to acknowledge the limitation of this study. Since it was conducted using a cross-sectional study, the progression of the HRQoL cannot be observed as HRQoL is a dynamic concept and will change over time. For example, a previous study found that HRQoL is high in the first year of coronary artery diseases treatment but declined after five years (33). Thus, a longitudinal study is proposed to investigate the trajectory of HRQoL over time. In addition, since the population of this study was patients with chronic illness, caution should be taken when generalising the findings to other diseases and conditions.

CONCLUSION

In conclusion, income levels, fatigue, and self-efficacy in patients with chronic illness predicted HRQoL. Age, gender and living area were not significantly predicted HRQoL. Patients with high-income levels, low fatigue and high self-efficacy are more likely to report better HRQoL. Nurses and other health care professionals should incorporate programs or activities that can enhance self-efficacy and reduce fatigue so that the HRQoL among patients with chronic illness can be improved.

ACKNOWLEDGEMENT

We would like to express our gratitude to all individuals directly or indirectly involved and who contributed to all stages of this study.

REFERENCES

1. Rafii F, Fatemi NS, Danielson E, Johansson CM, Modanloo M. Compliance to treatment in patients with chronic illness: A concept exploration. *Iran J Nurs Midwifery Res.* 2014;19(2):159.
2. Johnston MC, Crilly M, Black C, Prescott GJ, Mercer SW. Defining and measuring multimorbidity: a systematic review of systematic reviews. *Eur J Public Health.* 2019;29(1):182–9. doi: 10.1093/eurpub/cky098
3. Divo MJ, Martinez CH, Mannino DM. Ageing and the epidemiology of multimorbidity. *Eur Respir J.* 2014;44(4):1055–68. doi: 10.1183/09031936.00059814
4. Noncommunicable diseases. [cited 2021 Nov 25]. Available from: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
5. Ministry of Health Malaysia. Malaysia Health Systems Research Report. Minist Heal Malaysia. 2016;(March):1–180.
6. National Institute of Health. Malaysian Burden of Disease and Injury Study 2009-2014 [Internet]. 2017. 2–29 p. Available from: <http://iku.moh.gov.my/images/IKU/Document/REPORT/BOD/BOD2009-2014.pdf>
7. Goertz, Y.M.J., Braamse, A.M.J., Spruit, M.A. et al. Fatigue in patients with chronic disease: results from the population-based Lifelines Cohort Study. *Sci Rep*; 2021: 11, 20977. doi:10.1038/s41598-021-00337-z
8. Karimi M, Brazier J. Health, Health, Health-Related Quality of Life, and Quality of Life: What is the Difference? *Pharmacoeconomics.* 2016;34(7):645–9. doi: 10.1007/s40273-016-0389-9
9. Moreiras-Plaza M, Blanco-García R, Cossio-Aranibar CR, Rodriguez-Goyanes G. Assessment of health-related quality of life: the cinderella of peritoneal dialysis? *Int J Nephrol.*;2011:1–8. doi: 10.4061/2011/528685
10. Aung E, Donald M, Williams GM, Coll JR, Doi SAR. Influence of patient-assessed quality of chronic illness care and patient activation on health-related quality of life. *Int J Qual Heal care J Int Soc Qual Heal Care.* 2016;28(3):306–10. doi: 10.1093/intqhc/mzw023
11. Cramm JM, Strating MMH, Roebroeck ME, Nieboer AP. The Importance of General Self-Efficacy for the Quality of Life of Adolescents with Chronic Conditions *Soc Indic Res.* 2013;113(1):551–61. doi: 10.1007/s11205-012-0110-0
12. Rak A, Raina R, Suh TT, Krishnappa V, Dariusz J, Sidoti CW, et al. Palliative care for patients with end-stage renal disease: approach to treatment that aims to improve quality of life and relieve suffering for patients (and families) with chronic illnesses *Clin Kidney J.* 2017;10(1):68–73. doi: 10.1093/ckj/sfw105
13. Bandura A. Self-efficacy: toward a unifying theory of

- behavioral change. *Psychol Rev.* 1977;84(2):191–215. doi: 10.1037//0033-295x.84.2.191
14. Peters M, Potter CM, Kelly L, Fitzpatrick R. Self-efficacy and health-related quality of life: a cross-sectional study of primary care patients with multimorbidity *Health Qual Life Outcomes.* 2019;17(1). doi: 10.1186/s12955-019-1103-3
15. Bravo L, Killelea MK, Reyes BL, Santos KMB, Torres V, Huang CC, et al. Self-Management, Self-Efficacy, and Health-Related Quality of Life in Children With Chronic Illness and Medical Complexity. *J Pediatr Heal Care.* 2020 Jul 1;34(4):304–14. doi: 10.1016/j.pedhc.2019.11.009
16. Devarajoo C, Chinna K. Depression, distress and self-efficacy: The impact on diabetes self-care practices. *PLoS ONE.* 2017; 12(3). doi: 10.1371/journal.pone.0175096
17. Lavrakas, P. J. *Encyclopedia of survey research methods*, vol. 0, Sage Publications, Inc., Thousand Oaks, CA, 2008. doi: 10.4135/9781412963947
18. Webster K, Cella D, Yost K. The Functional Assessment of Chronic Illness Therapy (FACIT) Measurement System: properties, applications, and interpretation. *Health Qual Life Outcomes.* 2003;1:79. doi: 10.1186/1477-7525-1-79
19. Chung H, Eek D, Krogh C, Blowfield M, Meyers O, Eyre TA. Functional Assessment of Chronic Illness Therapy-Fatigue Scale (FACIT-Fatigue): Cognitive Debriefing in Patients with Chronic Lymphocytic Leukemia (CLL). *Blood.* 2019 Nov 13;134(Supplement_1):4777–4777. doi: 10.1182/blood-2019-122849
20. Chiarotto A, Falla D, Polli A, Monticone M. Validity and responsiveness of the pain self-efficacy questionnaire in patients with neck pain disorders. *J Orthop Sports Phys Ther.* 2018;48(3):204–16. doi: 10.2519/jospt.2018.7605
21. Hutchinson A, Rasekaba TM, Graco M, Berlowitz DJ, Hawthorne G, Lim WK. Relationship between health-related quality of life, and acute care readmissions and survival in older adults with chronic illness. *Health Qual Life Outcomes.* 2013;11(1). doi: 10.1186/1477-7525-11-136
22. Al Maqbali M, Hughes C, Gracey J, Rankin J, Hacker E, Dunwoody L. Psychometric Properties of the Arabic Version of the Functional Assessment of Chronic Illnesses Therapy–Fatigue in Arabic Cancer Patients. *J Pain Symptom Manage.* 2020;59(1):130–138.e2. doi: 10.1016/j.jpainsymman.2019.10.008
23. Montan I, Luwe B, Cella D, Mehnert A, Hinz A. General Population Norms for the Functional Assessment of Chronic Illness Therapy (FACIT)-Fatigue Scale. *Value Heal.* 2018;21(11):1313–21. doi: 10.1016/j.jval.2018.03.013
24. Siboni FS, Alimoradi Z, Atashi V, Alipour M, Khatooni M. Quality of Life in Different Chronic Diseases and Its Related Factors. *Int J Prev Med.* 2019;10(1):65. doi: 10.4103/ijpvm.IJPVM_429_17
25. Comín-Colet J, Anguita M, Formiga F, Almenar L, Crespo-Leiro MG, Manzano L, et al. Health-related Quality of Life of Patients With Chronic Systolic Heart Failure in Spain: Results of the VIDA-IC Study. *Rev Esp Cardiol.* 2016 Mar 1;69(3):256–71. doi: 10.1016/j.rec.2015.07.030
26. Joshi U, Subedi R, Poudel P, Ghimire PR, Panta S, Sigdel MR. Assessment of quality of life in patients undergoing hemodialysis using WHOQOL-BREF questionnaire: a multicenter study. *Int J Nephrol Renovasc Dis.* 2017;10:195–203. doi: 10.2147/IJNRD.S136522
27. Ozdemir H, Alper Z, Uncu Y, Bilgel N. Health literacy among adults: a study from Turkey. *Health Educ Res.* 2010;25(3):464–77. doi: 10.1093/her/cyp068
28. Luszczynska A, Pawlowska I, Cieslak R, Knoll N, Scholz U. Social support and quality of life among lung cancer patients: a systematic review. *Psychooncology.* 2013;22(10):2160–8. doi: 10.1002/pon.3218
29. Rahman MA, Sani NS, Hamdan R, Othman ZA, Bakar AA. A clustering approach to identify multidimensional poverty indicators for the bottom 40 percent group. *PLoS One.* 2021;1–25. doi: 10.1371/journal.pone.0255312
30. Goertz YMJ, Braamse AMJ, Spruit MA, Janssen DJA, Ebadi Z, Van Herck M, et al. Fatigue in patients with chronic disease: results from the population-based Lifelines Cohort Study. *Sci Reports* 2021 111. 2021;11(1):1–12. doi: 10.1038/s41598-021-00337-z
31. Goertz YMJ, Spruit MA, Van 't Hul AJ, Peters JB, Van Herck M, Nakken N, et al. Fatigue is highly prevalent in patients with COPD and correlates poorly with the degree of airflow limitation. *Ther Adv Respir Dis.* 2019;13. doi: 10.1177/1753466619878128
32. Freund T, Gensichen J, Goetz K, Szecsenyi J, Mahler C. Evaluating self-efficacy for managing chronic disease: psychometric properties of the six-item Self-Efficacy Scale in Germany. *J Eval Clin Pract.* 2013;19(1):39–43. doi: 10.1111/j.1365-2753.2011.01764.x
33. Sajobi TT, Wang M, Awosoga O, Santana M, Southern D, Liang Z, et al. Trajectories of Health-Related Quality of Life in Coronary Artery Disease. *Circ Cardiovasc Qual Outcomes.* 2018;11(3). doi: 10.1161/CIRCOUTCOMES.117.003661