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Quality of life in patients with diabetes – limited activity hinders women more

Квалитет живота код пацијената са дијабетесом – ограничење покретљивости штети највише женама

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SUMMARY

Introduction/Objective Diabetes mellitus and its chronic complications impair quality of life when compared to the one of the general population. The objective of this study was to determine the prevalence of > 14 unhealthy days per month among the patients with diabetes in Serbia and to determine the association of the socio-demographic characteristics and health characteristics with the total of > 14 unhealthy days.

Methods Serbian version of a generic self-administered questionnaire from Centers for Disease Control and Prevention (CDC-HRQOL-4) was used for data collection in all three levels of care.

Results The study involved 4898 patients with diabetes, 2283 (46.6%) men and 2611 (53.4%) women. Overall mean age was 57.3 ± 12.2 years with over one fifth (23.2 %) were younger than 50 years. Multivariate logistic regression analyses indicated that age > 65 (OR:1.575, 95%CI 1.100-2.256), being a woman (OR: 1.287, 95% CI 1.042-1.588), lower education (OR: 1.383, 95%CI 1.091–1.754), felt depressed ≥ 14 days (OR: 3.689, 95% CI 2.221–6.128), felt anxious ≥ 14 days (OR: 1.749, 95% CI 1.113–2.749), poor sleep ≥ 14 days (OR:2.161, 95%CI 1.569–2.988), fair or poor self-rated health ≥ 14 days (OR: 4.322, 95%CI 3.474–5.376) were associated with unhealthy days ≥ 14 days. The strongest negative association was observed between limited physical activity ≥ 14 days and a decrease in the quality of life of people with diabetes (OR: 22.176, 95%CI 10.971–44.824).

Conclusion This study highlights association between impaired quality of life in patients with diabetes and physical activity limitations. Limited physical activity is the factor with the greatest negative impact on the quality of life particularly in older, less educated women with diabetes.

Keywords: diabetes mellitus; health-related quality of life; unhealthy days; sex differences

САЖЕТАК

Увод /Циљ Дијабетес мелитус и његове хроничне компликације снижавају квалитет живота пацијентима у поређењу са општом популацијом. Циљ овог истраживања је било одређивање преваленце > 14 нездравих дана код пацијената са дијабетесом у Србији и одређивање социо-демографских карактеристика и здравствених карактеристика уопште са > 14 нездравих дана.

Методи Српска верзија упитника Центра за контролу и превенцију болести (*CDC-HRQOL*-4) коришћена је за прикупљање података на сва три нивоа здравствене заштите.

Резултати Студија је обухватила 4898 пацијената са дијабетесом, од чега 2283 (46.6%) мушкараца и 2611 (53.4%) жена. Просечна укупна старост је била 57.3 ± 12.2 година са више од једне петине (23.2 %) млађих од 50 година. Мултиваријантном логистичком регресијом показано је да узраст > 65 (*OR*:1.575, 95%*CI* 1.100–2.256), бити жена, (*OR*: 1.287, 95%*CI* 1.042–1.588), бити нижег образовног нивоа (*OR*: 1.383, 95%*CI* 1.091–1.754), бити депресиван ≥ 14 дана (*OR*: 3.689, 95% *CI* 2.221–6.128), бити анксиозан ≥ 14 дана (*OR*: 1.749, 95% *CI* 1.113–2.749), лоше спавати ≥ 14 дана (*OR*:2.161, 95%*CI* 1.569–2.988), бити осредњег или лошег здравља по сопственој оцени ≥ 14 дана (*OR*: 4.322, 95%*CI* 3.474–5.376) су били удружени са нездравим данима трајања ≥ 14 дана. Најјача негативна удруженст показана је између ограничене физичке активности ≥14 дана и смањења квалитета живота код пацијената са дијабетесом (*OR*: 22.176, 95%*CI* 10.971–44.824).

Закључак Наше истраживање баца светлост на удруженост сниженог квалитета живота код пацијената са дијабетесом и ограничене физичке активности. Ограничена физичка активност је фактор највећег негативног утицаја на квалитет живота посебно старији, оних нижег образовног нивоа и жена са дијабетесом.

Кључне речи: дијабетес мелитус; квалитет живота, нездрави дани, полне разлике

INTRODUCTION

Diabetes mellitus (DM) is a chronic, non-communicable disease associated with micro and macrovascular complications with a notable impact on health-related quality of life.

Diabetes affects general health and wellbeing from various aspects including functional disability and mortality. The epidemic of obesity in the world contributes to the increase in the number of patients with diabetes mellitus which becomes an increasing global health burden. According to 2021 International Diabetes Federation atlas [1], the burden of the disease keeps growing with some 537 million people suffering from diabetes worldwide and the highest increase expected to be seen in Africa (134%), followed by Middle East and North Africa (87%) and South-East Asia (68%) where currently 24 million, 73 million and 90 million of inhabitants have diabetes, respectively. Europe with its mere 61 million in 2021 and the 13% increase to 69 million in 2045 seems tolerable, however, the complications and the still unrecognized burden of women with gestational diabetes and their offspring, long term, where comprehensive data are lacking. According latest Institute of Public Health of Serbia "Dr Milan Jovanović Batut" report [2], 12.4% of people in Serbia have diabetes with 8.1% being aware of it and receiving treatment, while others who are unaware remain untreated. Diabetes is the fifth leading cause of morbidity and mortality in Serbia, with 90% of the patients having Type 2 diabetes (T2DM) and the majority are aged 40–59 years. Quality of life (QoL) and Health-related quality of life (HRQoL) could be used to assess the impact of medical conditions on patients' life and as a useful measure for policy-making and economic setting [3, 4, 5]. Diabetes mellitus impairs the quality of life of patients. Socio-demographic factors, physical and mental health influence on HRQoL (Health-Related Quality of Life) in patients with diabetes mellitus. Being a woman has been shown associated with lower QoL, as women report a higher impact of diabetes on their daily lives and also influenced by lower educational level, duration of symptoms, adherence with prescribed treatment [4, 6–10]. Although global data might seem conflicting [11], the consensus are considered needed on on which aspects of HRQoL should be measured in people with T2DM [11–14], while depression is gaining traction [5, 9, 15, 16, 17].

The aim of this study was to determine the prevalence of > 14 unhealthy days per month among the patients with diabetes in Serbia treated in outpatient care in the health care institutions in the public health care system. We also aimed to determine the association of the socio-demographic characteristics and health characteristics with a total of > 14 unhealthy days.

METHODS

The cross-sectional survey was conducted between January 2011 and December 2011. The 5500 questionnaires were offered to patients with diabetes who reported in outpatient healthcare settings in Serbia, during the investigated period. Of the total number, 602 respondents did not want or were unable to complete the questionnaire. The study included 4898 patients with diabetes mellitus from the urban and rural areas. Data was collected by Centers for Disease Control and Prevention questionnaire (CDC-HRQoL-4). The questionnaire was modified and translated to Serbian following the standard World Health Organization method translated to Serbian and previously published[18]. Participation in the research was voluntary. Research aims were introduced to participants both verbally and in the written form. Anonymity, confidentiality, and privacy of data were also explained in verbal and in written form and all data were guaranteed to be used only for research purposes. We considered that all of the participants who filled out and returned the questionnaires after receiving all needed information gave their consent for the research. Participants, who agreed to participate, filled in on paper questionnaire in the waiting room. All patients who visited their physician in the outpatient healthcare setting in Serbia were asked to participate in the study. The participants who were illiterate, did not speak Serbian fluently, or had mental or physical inability to understand or fill in the questionnaire were excluded from the study. The study was approved by the Ethical Committee of the Clinical Center of Serbia (Nr 1856/21, December 16, 2010).

Informed consent was obtained from all subjects involved in the study. Written informed consent has been obtained from the patient(s) to publish this paper.

The outcome variable in our study was ''having≥14 unhealthy days in the past month''. The CDC- HRQoL-4 questionnaire examines the total number of physically unhealthy days, mentally unhealthy days, and days with limitation in physical activity in the past 30 days. These numbers are added together in order to obtain the ''unhealthy days index- UHD''. UHD is commonly presented as a binary variable (<14 unhealthy days and ≥14 unhealthy days) [19, 20].

Categorical data were expressed as numbers (%). Numerical variables (mentally, physically, activity limitations, total unhealthy, pain limitation, felt depressed, anxious, had poor sleep, and felt healthy days) were tested for normality and were presented as mean, median (25^{th} and 75^{th} percentile). Univariate logistic regression was used, with ≥ 14 total unhealthy days during the previous 30 days as dependent variables as previously suggested[21]. Socio-demographic independent variables in logistic regression were: age (3 categories: < 45 years, 45–65 years, and > 65 years), education (lower- elementary and high school and higher-college), and place of residence (big town, small town, and rural area). Among QoL independent variables: self-rated health (fair and poor), mentally, physically, activity limitations, total unhealthy days, pain limitation, felt depressed, anxious, poor sleep, and healthy days were used. Variables with $p < 0.05$ were included in multivariate logistic regression. The level of significance was set at 0.05. Statistical analysis was performed using the IBM SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, NY, USA).

RESULTS

Among 4898 patients with diabetes mellitus, 2283 (46.6%) were men and 2611 (53.4%) were women. The mean age was 57.3±12.2 years. More than a fifth of participants (23.2 %)

were younger than 50 years. Most of them, (71.5%) had lower education level and 28.5% had secondary, college or university education.

Among all the patients with diabetes, 2756 (56.8%) self-reported their health as fair or poor. More than 14 unhealthy days, during the previous 30 days, reported 44.9% of patients (Table 1).

Means and medians of mentally, physically, activity limitations days and ≥14 total unhealthy days were higher for women older than 50 years and patients with lower educations. There were 6.2 activity limitations days in men vs 6.7 in women. Days of activity limitations were doubled in the group of 50 and more years of age (3.9 vs 7.3). The persons with lower education level have 7.5 activity limitations days, whereas patients with higher education level were limited active 4.1 days (Table 2).

Means and medians of pain limitation, felt depressed, anxious, had poor sleep days were higher for women, older than 50 years and patients with lower educations. Even 10 poor sleep days were in the group with lower education level. The participants in the same group have the greatest number of days that felt anxious (9.2) or depressed (8.4) as well as days with limited activity (6.7) caused by pain. Mean and median for felt healthy days were higher in men, < 50 years, and with higher education (Table 3).

Age, being a woman, being of lower education, duration of symptoms, activity and pain limitation, felt depressed, felt anxious, poor sleep and fair poor self-rated health were associated with≥14 unhealthy days in univariate logistic regression (Table 4). Therapy compliance, place of residence was not statistically significantly associated with ≥ 14 unhealthy days (Table 4).

Multivariate logistic regression analyses indicated that age > 65 OR 1.575 (95 CI 1.100–2.256), being a woman OR 1.287 (95%CI 1.042–1.588), lower education 1.383 (95%CI 1.091–1.754), felt depressed ≥ 14 days OR 3.689 (95%CI 2.221–6.128), felt anxious ≥ 14 days OR 1.749 (95%CI 1.113–2.749), poor sleep ≥ 14 days OR 2.161 (95%CI 1.569–2.988), fair poor

self-rated health ≥ 14 days OR 4.322 95% (95% CI 3.474–5.376) were associated with unhealthy days ≥ 14 days. The strongest negative association was observed between limited physical activity ≥ 14 days and unhealthy days ≥ 14 days with OR 22.176 (95%CI 10.971–44.824) (Table 5, Figure 1).

DISCUSSION

There were a large number of studies that evaluated the effect of diabetes on quality of life, and most of them have shown that socio-demographic characteristics such as being a woman and being older are associated with lower quality of life [4, 6, 7, 8, 11, 17, 22–25]. Our results showed that older age and lower education level were statistically significant with fair and poor self-rated health and mentally, physically, activity limitations, total unhealthy days, pain limitation, felt depressed, anxious, and had poor sleep (≥ 14 days).

In our study women felt more anxious and had poor sleep days. The participants in the group with < 8 years of education had 9.2 days in which they felt anxious and 8.4 days felt depressed. Depression, in turn, degrades overall quality of life in an interplay of lack of physical exercise, smoking, unhealthy diet, stressful life events and cultural difference in perception of illness [5, 7, 9, 10, 14–17]. Still, at least for women, the solution can be found within the women's heart programs and centers worldwide [26, 27, 28], while the Serbian model [28] is currently the only one offering independent Clinics that actually encompass all four levels of prevention – from primary to quaternary – that can mitigate effects of diabetes in women of all ages and, practically, covering all IDF-defined [1] forms of diabetes.

In our study, 26.2% of participants had more than 14 days with sleep difficulties. The participants in the group with lower education had 10 days of poor sleep, while participants with higher education levels had six days with sleep deprivation. Patients older than 50 years had 10 days with difficulties with sleep, but younger than 50 years had five days with sleep

impairment. Sleep deprivation in turn leads to anxiety and consequent depression.

Among all the patients in our study, 23.7% had ≥ 14 physically unhealthy days and 18.4% reported ≥ 14 activity limitation days. Therapy compliance, place of residence, urban or rural, was not statistically significantly associated with total unhealthy days.

Our participants could not have regular activity 6.7 days in the past month due to pain, which is rather in accord with findings of other authors [4, 5, 8, 29] as neuropathy has a significant negative impact on quality of life, the key variable with a negative impact on life quality was activity limitations more than 14 days per month, with OR 22.17 (**Figure 1**),

In support of our research is the fact that only a few studies have addressed the magnitude of the impact of individual factors on the quality of life of patients with diabetes. Previous studies in the Serbian population investigated different aspects, confirm HRQoL lowered in presence of angina, heart failure and retinopathy [6, 30], however, global consensus is required on HRQoL [13, 14, 16, 17]. Harnessing power of new technologies in mitigating effects of T2DM and motivating patients is sorely needed to improve long-term outcomes of the most underserved, as women are [16, 28] taking in consideration their well-described low inclusion in clinical trials and registries, requiring more detailed sex-specific research [28] which will elucidate better both the burden of disease and optimal prevention management strategies both nationally in Serbia, as internationally with targeted research agenda with alike-patient populations.

The limitations of this study were the use of the general instrument for assessing the QoL of the patients with diabetes, lack of information regarding the type of diabetes, duration of diabetes, and the presence of complications. Another limitation is the cross-sectional design as it does not allow the establishment of the causal relationship between the variables. The strength of the study is the number of participants, and the place of recruitment, as it allowed us to include the diverse population of patients with diabetes, and not only patients treated in

hospitals.

CONCLUSION

For many years, the reason for the impaired quality of life of patients with diabetes has been insulin therapy and chronic complications of diabetes. Thanks to improved insulin formulations and almost painless application, lower incidence of macro- and micro-vascular complications due to significantly improved glycemic control, limited physical activity has become the factor with the greatest negative impact on the quality of life of patients with diabetes. In addition, older age, lower educational level, particularly in women, with a significant restriction on their daily activities contributes to feelings of dissatisfaction and poor quality of life in the diabetic population. Health promotion and therapeutic strategies including physical activity to increase independence, self-esteem, and better quality of life for the patient with diabetes are needed.

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Conflicts of interest: None declared.

REFERENCES

1. International Diabetes Federation. IDF Diabetes Atlas, 10th edn. . https://www.diabetesatlas.org (2021). Accessed Aug 6, 2023 2023.
2. Institut za javno zdravlje "Dr Milan Jovanović Batut" REPUBLIKA SRBIJA: ODABRANI ZDRAVSTVENI POKAZATELJI ZA 2021. GODINU. https://www.batut.org.rs/download/publikacije/Odabrani%20zdravstveni%20pokazatelji%202021.pdf (2022). Accessed Aug 6, 2023 2023.
3. Zimmermann IR, Silva MT, Galvao TF, Pereira MG. Health-related quality of life and self-reported long-term conditions: a population-based survey. Braz J Psychiatry. 2017;39(1):62-8. [DOI: 10.1590/1516-4446-2015-1853]
4. Anillo Arrieta LA, Flórez Lozano KC, Tuesca Molina R, Acosta Vergara T, Rodríguez Acosta S, Aschner P, et al. Glycemic status and health-related quality of life (HRQOL) in populations at risk of diabetes in two Latin American cities. Qual Life Res. 2023;32(8):2361-73. [DOI: 10.1007/s11136-023-03398-x]
5. Carter N, Li J, Xu M, Li L, Fan X, Zhu S, et al. Health-related quality of life of people with type 2 diabetes and its associated factors at a tertiary care clinic in Ningbo, China: A cross-sectional study. Endocrinol Diabetes Metab. 2022;5(5):e353. [DOI: 10.1002/edm2.353]
6. Stojanović M, Cvetanović G, Anđelković Apostolović M, Stojanović D, Rančić N. Impact of socio-demographic characteristics and long-term complications on quality of life in patients with diabetes mellitus. Cent Eur J Public Health. 2018;26(2):104-10. [DOI: 10.21101/cejph.a5022]
7. Homady A, Albasheer O, Bajawi A, Hamdi S, Awaf A, Madkhali T, et al. Health-related Quality of Life among Type 2 Diabetes Patients in Southern Province of Saudi Arabia using WHOQOL-BREF: A Cross-section Study. Curr Diabetes Rev. 2023;19(7):e211222212099. [DOI: 10.2174/1573399819666221221160136]
8. Alowayesh MS, Aljunid SM, Aladsani A, Alessa T, Alattar A, Alroudhan D. Health-related quality of life of Kuwaiti adults living with diabetes. Front Public Health. 2023;11:1085928. [DOI: 10.3389/fpubh.2023.1085928]
9. Deom Tardif A, Gogovor A, Guay-Bélanger S, Audet D, Parent N, Gaudreau A, et al. Integration of sex and gender in a continuing professional development course on diabetes and depression: a mixed methods feasibility study. BMJ Open. 2022;12(4):e050890. [DOI: 10.1136/bmjopen-2021-050890]
10. Mohamed BA, Mahfouz MS, Badr MF. Physical activity and its associated factors in females with type 2 diabetes in Riyadh, Saudi Arabia. PLoS One. 2020;15(10):e0239905. [DOI: 10.1371/journal.pone.0239905]
11. Azulay RS, Lago D, Santos GAS, Tavares MDG, Rodrigues V, Magalhaês M, et al. Relationship among health-related quality of life and global ancestry, clinical and socioeconomic factors in type 1 diabetes in an admixed Brazilian population. Sci Rep. 2022;12(1):11060. [DOI: 10.1038/s41598-022-15138-1]
12. Langendoen-Gort M, Groeneveld L, Prinsen CAC, Beulens JW, Elders PJM, Halperin I, et al. Patient-reported outcome measures for assessing health-related quality of life in people with type 2 diabetes: A systematic review. Rev Endocr Metab Disord. 2022;23(5):931-77. [DOI: 10.1007/s11154-022-09734-9]
13. Terwee CB, Elders PJM, Blom MT, Beulens JW, Rolandsson O, Rogge AA, et al. Patient-reported outcomes for people with diabetes: what and how to measure? A narrative review. Diabetologia. 2023;66(8):1357-77. [DOI: 10.1007/s00125-023-05926-3]
14. Teli M, Thato R, Rias YA. Predicting Factors of Health-Related Quality of Life Among Adults With Type 2 Diabetes: A Systematic Review. SAGE Open Nurs. 2023;9:23779608231185921. [DOI: 10.1177/23779608231185921]
15. Shetty A, Afroz A, Ali L, Siddiquea BN, Sumanta M, Billah B. Health-related quality of life among people with type 2 diabetes mellitus - A multicentre study in Bangladesh. Diabetes Metab Syndr. 2021;15(5):102255. [DOI: 10.1016/j.dsx.2021.102255]
16. Yaagoob E, Hunter S, Chan S. The effectiveness of social media intervention in people with diabetes: An integrative review. J Clin Nurs. 2023;32(11-12):2419-32. [DOI: 10.1111/jocn.16354]
17. Alfian SD, Annisa N, Iskandarsyah A, Perwitasari DA, Denig P, Hak E, Abdulah R. Emotional Distress is Associated with Lower Health-Related Quality of Life Among Patients with Diabetes Using Antihypertensive and/or Antihyperlipidemic Medications: A Multicenter Study in Indonesia. Ther Clin Risk Manag. 2021;17:1333-42. [DOI: 10.2147/tcrm.S329694]
18. Bjelović M, Babić T, Dragicević I, Corac A, Goran T. The Burden of Gastroesophageal Reflux Disease on Patients' Daily Lives: A Cross-Sectional Study Conducted in a Primary Care Setting in Serbia. Srp Arh Celok Lek. 2015;143(11-12):676-80. [DOI: 10.2298/sarh1512676b]
19. Hassan MK, Joshi AV, Madhavan SS, Amonkar MM. Obesity and health-related quality of life: a cross-sectional analysis of the US population. Int J Obes Relat Metab Disord. 2003;27(10):1227-32. [DOI: 10.1038/sj.ijo.0802396]

20. Cavlak U, Yagci N, Bas Aslan U, Ekici G. A new tool measuring health-related quality of life (HRQOL): the effects of musculoskeletal pain in a group of older Turkish people. Arch Gerontol Geriatr. 2009;49(2):298-303. [DOI: 10.1016/j.archger.2008.11.002]
21. Slabaugh SL, Shah M, Zack M, Happe L, Cordier T, Havens E, et al. Leveraging Health-Related Quality of Life in Population Health Management: The Case for Healthy Days. Popul Health Manag. 2017;20(1):13-22. [DOI: 10.1089/pop.2015.0162]
22. Velázquez-López L, Alva-Santana D, Ocaña-Patiño A, Peña JE, Goycochea-Robles MV. Increased body fat, physical inactivity, and hypertension are associated with poor quality of life in patients with type 2 diabetes. Cir Cir. 2023;91(2):171-8. [DOI: 10.24875/ciru.21000441]
23. Oyewole OO, Odusan O, Oladunni Ale A, Sodeinde KJ. Effect of short-term glycemic control and physical activity on health-related quality of life among type 2 diabetes receiving care in a tertiary health facility in Ogun State, Nigeria: a cross-sectional study. Pan Afr Med J. 2023;44:47. [DOI: 10.11604/pamj.2023.44.47.35680]
24. Arditi C, Zanchi A, Peytremann-Bridevaux I. Health status and quality of life in patients with diabetes in Switzerland. Prim Care Diabetes. 2019;13(3):233-41. [DOI: 10.1016/j.pcd.2018.11.016]
25. Negash Z, Tadiwos A, Urgessa EM, Gebretekle GB, Abebe E, Fentie AM. Insulin injection practice and health related quality of life among individuals with diabetes at Tikur Anbessa Specialized Hospital, Ethiopia: a cross-sectional study. Health Qual Life Outcomes. 2023;21(1):38. [DOI: 10.1186/s12955-023-02123-z]
26. Lundberg GP, Mehta LS, Sanghani RM, Patel HN, Aggarwal NR, Aggarwal NT, et al. Heart Centers for Women: Historical Perspective on Formation and Future Strategies to Reduce Cardiovascular Disease. Circulation. 2018;138(11):1155-65. [DOI: 10.1161/circulationaha.118.035351]
27. Gulati M, Hendry C, Parapid B, Mulvagh SL. Why We Need Specialised Centres for Women's Hearts: Changing the Face of Cardiovascular Care for Women. Eur Cardiol. 2021;16:e52. [DOI: 10.15420/ecr.2021.49]
28. Parapid B, Kanjuh V, Kostić V, Polovina S, Dinić M, Lončar Z, et al. Women's Health in Serbia - Past, Present, and Future. Srpski Arhiv za Celokupno Lekarstvo. 2021;149(11-12):745-54. [DOI: https://doi.org/10.2298/SARH211208105P]
29. Tian S, Wang R, Qian M, Liu L, Shao Z, Wu C, Sun J. The association between diabetes mellitus and HRQoL of older people in Shanghai. BMC Geriatr. 2021;21(1):626. [DOI: 10.1186/s12877-021-02590-3]
30. Lalić NM, Lalić K, Jotić A, Stanojević D, Živojinović D, Janićijević A, Parkin C. The Impact of Structured Self-Monitoring of Blood Glucose Combined With Intensive Education on HbA1c Levels, Hospitalizations, and Quality-of-Life Parameters in Insulin-Treated Patients With Diabetes at Primary Care in Serbia: The Multicenter SPA-EDU Study. J Diabetes Sci Technol. 2017;11(4):746-52. [DOI: 10.1177/1932296816681323]

Table 1. Self-rated health and unhealthy days

Variables	n (%)
Self-rated health (fair or poor)	2756 (56.8%)
≥ 14 mentally unhealthy days	751 (19)
≥ 14 physically unhealthy days	932 (23.7)
≥ 14 total unhealthy days	1620 (44.9)
≥ 14 activity limitation days	726 (18.4)
≥ 14 days limited by pain	632 (15.8)
≥ 14 days felt depressed	776 (20.1)
≥ 14 days felt anxious	865 (22.6)
≥ 14 days had difficulty with sleep	1003 (26.2)
≥ 14 days felt healthy	1016 (29)

Table 2. Mentally, physically, activity limitation and total unhealthy days by socio-demographic characteristics

Socio-demographic characteristics		Mentally unhealthy days		Physically unhealthy days		Total unhealthy days		Activity limitation days	
		mean	med (25th–75th)	mean	med (25th–75th)	mean	med (25th–75th)	mean	med (25th–75th)
Sex	Men	6.5	4 (0–10)	7.7	5 (0–10)	12.2	10 (2–20)	6.2	3 (0–10)
	Women	7.6	5 (0–10)	8.8	7 (2–15)	13.9	12 (3–25)	6.7	4 (0–10)
Age	< 50	5.1	3 (0–8)	5.5	3 (0–10)	9.4	6 (0–15)	3.9	0 (0–5)
	50 or more	7.7	5 (0–10)	9.1	7 (2–15)	14.2	12 (4–25)	7.3	5 (0–10)
Education	≤ 8 years	7.9	5 (0–10)	9.3	7 (2–15)	14.3	14 (4–25)	7.5	5 (0–10)
	> 8 years	5.2	2 (0–10)	5.9	4 (0–10)	10.0	7 (0–17)	4.1	0 (0–5)

Table 3. Pain limitation, felt depressed, anxious, had poor sleep and felt healthy days by sex, age, education

Socio-demographic characteristics		Pain limitation (days)		Felt depressed (days)		Felt anxious (days)		Had poor sleep (days)		Felt healthy (days)	
		mean	med (25th–75th)	mean	med (25th–75th)	mean	med (25th–75th)	mean	med (25th–75th)	mean	med (25th–75th)
Sex	Men	5.6	2 (0–10)	6.9	5 (0–10)	8.1	5 (2–10)	8.9	7 (3–12)	9.6	7 (0–18)
	Women	6.3	3 (0–10)	8.2	5 (1–10)	8.9	7 (2–10)	9.8	8 (3–15)	8.2	5 (0–15)
Age	< 50	3.4	0 (0–5)	5.6	3 (0–10)	6.7	5 (0–10)	7.5	5 (2–10)	11.8	10 (2–20)
	Over 50	6.7	4 (0–10)	8.2	5 (1–10)	9.1	7 (2–13)	9.9	8 (3–15)	8	5 (0–15)
Education	lower	6.7	4 (0–10)	8.4	5 (1–10)	9.2	7 (2–14)	10	10 (3–15)	7.9	5 (0–15)
	higher	3.9	0 (0–5)	5.7	3 (0–10)	6.8	5 (1–10)	7.7	6 (2–10)	11.2	10 (2–20)

Table 4. Univariate logistic regression with ≥ 14 total unhealthy days as the dependent variable

Variables	p	OR	95% CIfor EXP(B)	
			Lower	Upper
Age	< 0.001			
Age category 45–65 years	< 0.001	1.880	1.540	2.295
Age category > 65 years	< 0.001	3.539	2.830	4.425
Women	< 0.001	1.319	1.156	1.505
Education (lower)	< 0.001	2.138	1.837	2.487
Duration of symptoms (months)	< 0.001	1.003	1.002	1.004
Therapy compliance	0.203	1.433	0.824	2.492
Place of residence	0.110			
Small town	0.083	1.138	0.983	1.317
Rural area	0.743	0.965	0.777	1.197
Activity limitation ≥ 14 days	< 0.001	71.374	44.370	114.813
Pain limitation ≥ 14 days	< 0.001	20.237	14.720	27.821
Felt depressed ≥ 14 days	< 0.001	24.395	17.980	33.098
Felt anxious ≥ 14 days	< 0.001	15.438	12.083	19.724
Poor sleep ≥ 14 days	< 0.001	9.963	8.135	12.201
Fair poor self-rated health ≥ 14 days	< 0.001	9.201	7.857	10.776

Table 5. Multivariate logistic regression with ≥14 total unhealthy days as dependent variable.

Variables	p	OR	95% CI for OR	
			Lower	Upper
Age	0.015			
Age category 45–65 years	0.436	1.134	0.826	1.558
Age category > 65 years	0.013	1.575	1.100	2.256
Sex (women)	0.019	1.287	1.042	1.588
Education (lower)	0.007	1.383	1.091	1.754
Duration of symptoms (months)	0.065	1.002	1.000	1.003
Activity ≥ 14 days	< 0.001	22.176	10.971	44.824
Pain limitation ≥ 14 days	0.094	1.537	0.930	2.539
Felt depressed ≥ 14 days	< 0.001	3.689	2.221	6.128
Felt anxious ≥ 14 days	0.015	1.749	1.113	2.749
Poor sleep ≥ 14 days	< 0.001	2.161	1.563	2.988
Fair poor self-rated health 14 days	< 0.001	4.322	3.474	5.376

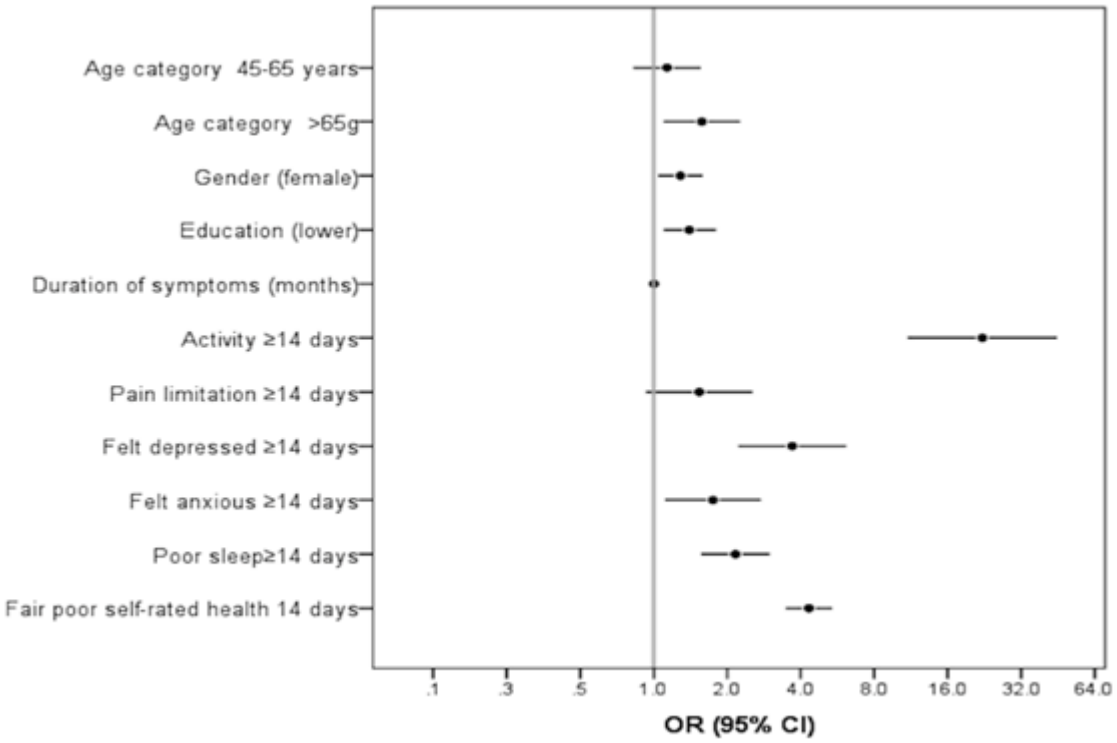

Figure 1. Multivariate logistic regression with ≥ 14 total unhealthy days as depended variable

