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PREVALENCE AND RELATED FACTORS OF LIMITED HEALTH LITERACY IN PATIENTS WITH CHRONIC MUSCULOSKELETAL DISEASES

ORIGINAL ARTICLE

ABSTRACT

Purpose: Not knowing the dimensions of inadequate health literacy is an important public health issue not just for healthcare professionals but all population. It is, therefore, necessary to ensure that politicians see this as an investment and to encourage service to productive resources. It is important to be aware of limited health literacy to develop new and different strategies. The aim of this study was to determine the prevalence of limited health literacy and to examine the relationship between health readiness and socio-demographic characteristics in patients with chronic musculoskeletal disorders.

Methods: A total of 423 patients who have different chronic musculoskeletal disorders were recruited into the study. The level of health literacy was measured using Rapid Estimate of Adult Literacy in Medicine and Newest Vital Sign instruments. The cognitive level of participants was estimated using Mini-Mental Status Examination Test.

Results: Approximately 17.3 percent of participants assessed using Rapid Estimate of Adult Literacy in Medicine had limited health literacy. More than 27.2 percent of participants evaluated using the Newest Vital Sign had limited literacy and lower numeracy skills.

Conclusion: Limited health literacy and numeracy skills are common in patients who have different chronic musculoskeletal disorders. It is associated with older age, lower level of education, and lower cognitive level. Healthcare literacy can be improved with various strategies in health services, and more successful outcomes can be obtained in treatment.

Key Words: Health Care; Health Literacy; Musculoskeletal Diseases.

KRONİK KAS-İSKELET SİSTEMİ HASTALIĞI OLAN HASTALARDA YETERSİZ SAĞLIK OKURYAZARLIĞININ YAYGINLIĞI VE İLİŞKİLİ FAKTÖRLER

ARAŞTIRMA MAKALESİ

ÖZ

Amaç: Yetersiz sağlık okuryazarlığının boyutlarının bilinmemesi, sadece sağlık çalışanları için değil tüm toplum için önemli bir halk sağlığı sorunudur. Bu yüzden politikacıların bunu bir yatırım olarak görmesini sağlamak ve etkin kaynaklara hizmeti teşvik etmek gerekmektedir. Yeni ve farklı stratejiler geliştirmek için yetersiz sağlık okuryazarlığının farkında olmak önemlidir. Bu çalışmanın amacı, yetersiz sağlık okuryazarlığı yaygınlığını belirlemek ve sağlık okuryazarlığının kronik kas-iskelet hastalıkları olan hastalarda sosyodemografik özellikler ile ilişkisini incelemektir.

Yöntem: Çalışmaya çeşitli kronik kas-iskelet sistemi hastalıkları olan 423 hasta alındı. Sağlık okuryazarlığı düzeyi Tıpta Yetişkin Okuryazarlığı Hızlı Tahmini ve En Yeni Yaşamsal Bulgu anketleri kullanılarak ölçüldü. Katılımcıların bilişsel düzeyi Mini Mental Durum Değerlendirme Testi ile belirlendi.

Sonuçlar: Tıpta Yetişkin Okuryazarlığı Hızlı Tahmini ile değerlendirilen hastaların yaklaşık % 17,3'ünde yetersiz sağlık okur yazarlığı olduğu belirlendi. En Yeni Yaşamsal Bulgu anketi kullanılarak değerlendirilen hastaların % 27,2'den fazlasında yetersiz sağlık okuryazarlığı ve düşük aritmetik beceriler olduğu bulundu.

Tartışma: Kronik kas-iskelet sistemi hastalıkları olan kişilerde yetersiz sağlık okuryazarlığı ve aritmetik beceriler yaygındır. Bu durum ileri yaş, düşük eğitim düzeyi ve düşük bilişsel düzeyi ile ilişkilidir. Sağlık hizmetlerinde çeşitli stratejiler ile sağlık okuryazarlığı geliştirilerek tedavide daha başarılı sonuçlar elde edilebilir.

Anahtar Kelimeler: Sağlık Okuryazarlığı; Sağlık Hizmetleri; Kas-İskelet Hastalıkları.

INTRODUCTION

Health literacy (HL) can be defined as the ability to obtain, process, and understand health information, and use that information to make appropriate decisions about personal health and follow instructions for treatment. It encompasses three different levels: functional, communicative, and critical HL (1). It has been increasingly recognized that HL is an important determinant of health. Limited HL has been independently associated with the lower use of preventive health services (2), increased clinic attendance (3) and hospitalization rates (4), poorer health status (5), higher health care costs (6), and increased mortality (7). Additionally, limited HL was associated with higher probability of having a long-term illness and higher likelihood of having a condition that would keep the individual from working (8). Knowing the extent of limited HL in a population will assist the policy makers in making and keeping it as a priority investment, planning for effective resource and service allocation for improving HL, and measuring the strengths and limitations of current HL promoting strategies. It is also crucial for practitioners to manage their patients. There are a limited number of studies regarding the prevalence of limited HL in patients with chronic musculoskeletal disease (3,9-14). Estimated prevalence of limited HL varies from seven to 42 percent, due to the differences in study designs, characteristics of the population studied, and assessment tools. Most of these studies were conducted on western or developed countries, where the illiteracy rate was believed to be low. On the other hand, these studies dealt predominantly with one component of the functional HL and reading ability, defined by Parker and colleagues (15). To the best of our knowledge, in Turkey, there are no published studies that have examined the prevalence of limited HL in patients with chronic musculoskeletal diseases. In the present study, we aimed to report on the prevalence of limited HL and to describe its association with socio-demographic characteristics in patients with chronic musculoskeletal diseases. Our hypothesis was limited HL has an association with socio-demographic characteristics. Our findings are intended to provide an initial prevalence of the limited HL to inform the development of future studies in this patient group.

METHODS

This cross-sectional descriptive study was conducted at the Physical Therapy and Rehabilitation Department of Baskent University Hospital between November 2015 and July 2016. Before the beginning of the study, we calculated that we needed a minimum of 385 participants to estimate the prevalence of limited HL with 95% confidence, assuming an expected prevalence of 20 percent, with a precision of four percent. The sample size was increased by 10 percent to allow for participant dropout, giving a total number of 423.

Inclusion criteria for this study were referred from a physician with the diagnosis of musculoskeletal diseases and suffered for at least six months, and the native language of the patients should be Turkish. Participants were excluded from this study if they demonstrated any of the following; younger than 18 years, sight or hearing impairments, health professionals, and Mini-Mental Status Examination (MMSE) Test score 23 or less (16). Approval was obtained from the Baskent University Ethics Committee (KA12/214). Written informed consent was obtained from all participants.

The data of this study were collected using three instruments. The MMSE test and other all tools applied by face to face method. The first is a form addressing socio-demographic, such as age, gender, and the highest years of education completed, and clinical information of the participants.

The second instrument was the Rapid Estimate of Adult Literacy in Medicine (REALM). It has been translated into Turkish, and its repeatability has been established by Ozdemir et al. (17). The REALM is a screening instrument to assess an adult's ability to read and pronounce common medical words and lay terms for body parts and illnesses. It consists of 66 words, arranged in order of complexity by the number of syllables and pronunciation difficulty, starting with simple one-syllable words and ending with multi-syllable words. The REALM scores range from 0 to 66 based on the total number of correctly pronounced words, with higher scores indicating greater HL. The score classifies HL into four reading levels, which are reported as grade levels: 0 to 18 (the third grade), 19 to 44 (the fourth to sixth grade), 45 to 60 (the seventh to eighth grade), and

61 to 66 (the ninth grade) (18). For the study purposes, patients with a score of 60 or less on the REALM were considered to have limited HL.

The third instrument was the Newest Vital Sign (NVS). It has also been translated into Turkish, and its repeatability has been established by Ozdemir et al. (17). The NVS is a screening tool to assess both literacy and numeracy skills of an adult. It is a nutrition label on an ice cream container with six questions. Zero or answer correctly indicates low HL likely, two or three correct answers shows the possibility of low HL, and four or more correct responses indicates adequate HL (19). In the present study, patients with a score of zero or 1 on the NVS were considered to have limited HL. All research instruments were administered to the participants by the same author according to standard instructions for each tool. After one week, the REALM and the NVS instruments were re-administered to a randomly selected subgroup of 45 participants to re-establish the reliability of the questionnaires.

Statistical Analysis

Statistical analyses were carried out using the IBM SPSS Statistics for Windows version 20.0, (IBM Corp, Armonk, USA). Demographic and clinical characteristics of the participants were described by mean and standard deviations (SD) or frequen-

cies and percentages according to the type of the variable. The reliability was evaluated using intra-class correlation coefficients (ICC) with a two-way random-effects model and the 95 percent confidence interval (95% CI) for the ICC, and Bland and Altman method for assessing agreement (20). The mean difference between the two assessments, 95 percent limits of agreement as the mean difference 1.96 (SD), and the percentage of differences lies between ± 1.96 SDdiff were calculated. The ICC values were interpreted as excellent reliability ≥ 0.80 , moderate reliability 0.60 to 0.79 , and questionable reliability < 0.60 (21). The association between the socio-demographic and clinical characteristics of patients and the scores generated by the HL instruments was evaluated using the stepwise multiple linear regression methods. The comparison of means was made using independent t-test. All tests were performed as two-sided. A p value of less than 0.05 was taken to indicate statistical significance.

RESULTS

A total of 423 patients participated in the study. The mean age of the participants was 48.7 ± 15.4 years. Female participants consisted 60.5 percent of the study group. The mean highest years of edu-

Table 1: Demographic and Clinical Characteristics of the Study Population (n= 423).

Characteristics	Mean \pm SD
Age (years)	48.71 \pm 15.40
Gender - Female, n (%)	256 (60.5)
Highest Years of Education Completed (years)	12.90 \pm 4.31
MMSE Score	27.10 \pm 2.23
Diagnosis	n (%)
Thoracic, Thoracolumbar, and Lumbosacral Intervertebral Disc Diseases	118 (27.9)
Cervical Disc Diseases	60 (14.2)
Shoulder Soft Tissue Diseases	81 (19.1)
Knee Osteoarthritis	76 (18.0)
Disease of Patella	30 (7.1)
Soft Tissue Diseases	36 (8.5)
Enthesopathy Mono	18 (4.3)
Neuropathies	3 (0.7)
Rheumatoid Arthritis	1 (0.2)

MMSE: Mini-Mental Status Examination.

Table 2: Results for Between Days Repeatability of the Rapid Estimate of Adult Literacy in Medicine and the Newest Vital Sign, Intraclass Correlation Coefficient, and Bland and Altman Tests (n= 45).

Variables	ICC (95% CI)	Bland and Altman Tests			
		ddiff	SDdiff	95% LOA	% of Differences Lies between ± 1.96 SDdiff
REALM	96 (92-98)	0.51	1.51	-2.45-3.47	95.6
NVS	93 (88-96)	0.51	0.89	-1.23-2.25	97.8

ICC: Intraclass correlation coefficient, REALM: Rapid Estimate of Adult Literacy in Medicine, NVS: Newest Vital Sign, ddiff: the mean of differences between two assessments, SDdiff: the standard deviation of differences between two estimates, 95% LOA: $ddiff \pm 1.96 \times SDdiff$.

education completed was 12.9 ± 4.3 years (Table 1).

The ICC value was 96 (95% CI: 92-98) for the REALM and 93 (95% CI: 88-96) for the NVS. The mean of the differences between two assessments was 0.51 (95% CI: -2.07-1.03) for the REALM and 0.51 (95% CI: -1.26-0.24) for the NVS. Percentage of differences lay between ± 1.96 SDdiff was 95.6 for the REALM and 97.8 for the NVS (Table 2).

In the entire sample, the mean scores of REALM and NVS were 62.9 ± 4.9 and 3.0 ± 2.0 , respectively. The prevalence of limited HL measured by REALM and NVS was 17.3% (95% CI: 13.9-21.2) and 27.2% (95% CI: 23.2-31.6), respectively. Pearson's chi-square test revealed that there was an association between all age groups and the limited HL prevalence determined by the REALM ($p=0.009$) and the NVS ($p=0.001$, Table 3).

The highest years of education completed was the single significant variable in the stepwise multiple regression analysis with the independent vari-

ables of the MMSE score, gender, age group, and the highest years of education completed, and could explain 29.8% of the variance in the REALM score ($\beta=0.546$, $p=0.001$). As the level of education increased, the degree of HL measured with REALM also increased. The MMSE score ($\beta=0.357$, $p=0.001$), age group ($\beta=-0.268$, $p=0.001$), and the highest years of education completed ($\beta=0.231$, $p=0.001$) could explain 42.2% of the variance in the NVS score ($F=101.9$, $p=0.001$). As the MMSE score and the level of education increased, the level of HL measured with NVS also increased. On the contrary, as the age group increased, the level of HL measured with NVS decreased.

DISCUSSION

The current study investigated the prevalence of low HL in a sample of patients with chronic musculoskeletal diseases and examined the associations with socio-demographic characteristics. Both HL

Table 3: Limited Health Literacy Prevalence by Ages and Gender.

Age group (years)	n	Limited HL prevalence determined by the REALM n (%)	Limited HL prevalence determined by the NVS n (%)
18-24	32	4 (12.5)	1 (3.1)
25-44	133	12 (9.0)	24 (18.0)
45-64	189	40 (21.2)	55 (29.1)
>65	69	17 (24.6)	35 (50.7)
p[†]		0.006*	0.001*
Gender			
Female	256	46 (18.0)	77 (30.1)
Male	167	27 (16.2)	38 (22.8)
p[†]		0.632	0.098

* $p < 0.05$. [†]p: Pearson's Chi-square test. HL: Health Literacy, REALM: Rapid Estimate of Adult Literacy in Medicine; NVS: Newest Vital Sign.

instruments showed good repeatability and agreement between observations. Approximately two in 10 (17.3%) participants assessed by the REALM had limited HL. More than 2.5 in 10 (27.2%) of participants assessed by the NVS had limited literacy and numeracy skills. Limitations in HL and numeracy were associated with older age, lower level of education, and lower cognitive level.

To our knowledge, this is the first study of HL which is not limited to a particular musculoskeletal patient population. In contrast to the majority of previous research, we used two different HL assessment instruments by re-establishing their repeatability. The ICC and Bland and Altman tests showed that both instruments had an excellent reliability and agreement for assessing HL. A previous study has also yielded the similar results (17). Therefore, we can conclude that both of them can be used across settings and population samples. The prevalence of limited HL found by NVS was more than 1.5 as high as the one found by REALM. This finding is supported by the previous studies which used the same HL assessment tools and expected since the REALM is a word recognition test and measures patients' ability to read and pronounce medical words (22,23). The REALM does not measure reading comprehension or interpretation of the individual words (18). On the contrary, the NVS measures not only reading skills but also reading comprehension and calculating skills (19). In this study, the prevalence of limited HL measured by REALM and NVS was found to be 17.3% and 27.2%, respectively. In a previous study conducted in a family medicine setting in Turkey, Ozdemir et al. (17) showed that the prevalence of limited HL measured by REALM and NVS was 41.3% and 71.9% respectively. In their study, the cut-off value for NVS was different from the one we used. Moreover, all above-mentioned prevalence rates are crude estimates. Consequently, we could not compare our results with theirs. In Turkey, there are no previous studies to evaluate the prevalence of the limited HL in patients with musculoskeletal diseases. However, in the international medical literature concerning the prevalence of limited HL, there are a few studies on this topic. In these studies, low HL rates measured with the REALM varied 10% to 20% (24). Our estimate is consistent with

the results of these studies. Our findings revealed that limited HL was more prevalent among older adults. The finding may be a result of the cohort effect. When we consider the high prevalence of low HL among those who have an older age, lower level of education, and lower cognitive level, we suggest simplifying the health care delivery system and making complete, relevant information more accessible to this group of patients and their family member. Additionally, health education must be a priority of public health policy. In the conceptual model proposed by Paasche and Wolf (25), age, gender, the level of education reached, occupation, and income are the most important determinants of HL level. In this study, our data revealed that the highest years of education completed was the single significant predictor for HL level measured by REALM. In the regression equation, the coefficient of the highest years of education completed on HL was 0.546, which indicates that each one year increase in the highest years of education completed, participants score measured by REALM will increase 0.546 points. The highest years of education completed, with a coefficient of 0.231, was the third strongest predictor for HL level measured by NVS. Based on these findings, we can suggest that the highest years of education completed is a powerful predictor of the one's reading ability rather than numeracy. However, here it should be noted that the reading ability is related to numerical ability (26).

Cognitive level and age were the first and second strongest predictors of HL level measured by NVS. These variables accounted for 38.2% variability in the level of HL. The results of previous studies conducted among older adults revealed that cognitive function was strongly associated with an adequate HL (27-30). Likewise, the inverse association between age and HL was consistent in other studies of HL (30). Our study design did not permit us to discern whether HL declines with age or cognitive function.

Our study has several limitations. First, the study was conducted in just one clinic. Therefore, our findings cannot be generalized to all patients with chronic musculoskeletal diseases. Secondly, in the current study, we focused primarily on the reading and numerical ability of the participants as with

the many previous studies. Therefore, we did not gain insight into all three levels of HL. Finally, we could say the educational level of the patients was high for Turkish socio-demographical standards. If the patient's educational attainment was low (e.g. below seven years) the results of the study changed dramatically. Communicative and critical HL assessment, as well as functional HL assessment, and HL should be investigated to other regions of Turkey with different socio-demographical characteristics should also be addressed in future studies.

In conclusion, limited HL and numeracy skills are common in patients with chronic musculoskeletal diseases and were associated with older age, lower level of education, and lower cognitive level. For patients with chronic musculoskeletal diseases who have low HL and numeracy skills, additional efforts should be included in the delivery of health-care to improve rehabilitation outcomes.

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REFERENCES

- Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int.* 2000;15(3):259-67.
- White S, Chen J, Atchison R. Relationship of preventive health practices and health literacy: a national study. *Am J Health Behav.* 2008;32(3):227-42.
- Gordon MM, Hampson R, Capell HA, Madhok R. Illiteracy in rheumatoid arthritis patients as determined by the Rapid Estimate of Adult Literacy in Medicine (REALM) score. *Rheumatology.* 2002;41(7):750-4.
- Baker DW, Gazmararian JA, Williams MV, Scott T, Parker RM, Green D, et al. Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *Am J Public Health.* 2002;92(8):1278-83.
- Wolf MS, Gazmararian JA, Baker DW. Health literacy and functional health status among older adults. *Arch Intern Med.* 2005;165(17):1946-52.
- Howard DH, Gazmararian JA, Parker RM. The impact of low health literacy on the medical costs of Medicare managed care enrollees. *Am J Med.* 2005;118(4):371-7.
- Baker DW, Wolf MS, Feinglass J, Thompson JA, Gazmararian JA, Huang J. Health literacy and mortality among elderly persons. *Arch Intern Med.* 2007;167(14):1503-9.
- Sentell TL, Halpin HA. Importance of adult literacy in understanding health disparities. *J Gen Intern Med.* 2006;21(8):862-6.
- Pincus T, Sokka T, Swearingen C, Swearingen T, Daltroy L, Davis T. Analysis of a rapid estimate of adult literacy in medicine (REALM) and education level in patients with rheumatic diseases. *Arthritis Rheum.* 2000;43(suppl):s109.
- Buchbinder R, Hall S, Youd JM. Functional health literacy of patients with rheumatoid arthritis attending a community-based rheumatology practice. *J Rheumatol.* 2006;33(5):879-86.
- Kim SH. Health literacy and functional health status in Korean older adults. *J Clin Nurs.* 2009;18(16):2337-43.
- Rudd RE, Blanch DC, Gall V, Chibnik LB, Wright EA, Reichmann W, et al. A randomized controlled trial of an intervention to reduce low literacy barriers in inflammatory arthritis management. *Patient Educ Couns.* 2009;75(3):334-9.
- Swearingen CJ, McCollum L, Daltroy LH, Pincus T, Dewalt DA, Davis TC. Screening for low literacy in a rheumatology setting: more than 10% of patients cannot read "cartilage," "diagnosis," "rheumatologist," or "symptom". *J Clin Rheumatol.* 2010;16(8):359-64.
- Hirsh JM, Boyle DJ, Collier DH, Oxenfeld AJ, Nash A, Quinzanos I, et al. Limited health literacy is a common finding in a public health hospital's rheumatology clinic and is predictive of disease severity. *J Clin Rheumatol.* 2011;17(5):236-41.
- Parker RM, Baker DW, Williams MV, Nurss JR. The test of functional health literacy in adults: A new instrument for measuring patients' literacy skills. *J Gen Intern Med.* 1995;10(10):537-41.
- Güngen C, Ertan T, Eker E, Yasar R, Engin F. Reliability and validity of the standardized mini mental state examination in the diagnosis of mild dementia in Turkish population. *Turk Psikiyatri Dergisi.* 2002;13(4):273-81.
- Ozdemir H, Alper Z, Uncu Y, Bilgel N. Health literacy among adults: a study from Turkey. *Health Educ Res.* 2010;25(3):464-77.
- Davis TC, Long SW, Jackson RH, Mayeaux EJ, George RB, Murphy PW, et al. Rapid estimate of adult literacy in medicine: a shortened screening instrument. *Fam Med.* 1993;25(6):391-5.
- Weiss BD, Maysm MZ, Martz W, Castro KM, DeWalt DA, Pignone MP, et al. Quick assessment of literacy in primary care: the newest vital sign. *Ann Fam Med.* 2005;3(6):514-22.
- Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. *Lancet.* 1986;1(8476):307-10.
- Richman J, Makrides L, Prince B. Research methodology and applied statistics, Part 3: measurement procedures in research. *Physiother Can.* 1980;32(4):253-7.
- Sahm LJ, Wolf MS, Curtis LM, McCarthy S. Prevalence of limited health literacy among Irish adults. *J Health Commun.* 2012;17(Suppl 3):s100-8.
- Barber MN, Staples M, Osborne RH, Clerehan R, Elder C, Buchbinder R. Up to a quarter of the Australian population may have suboptimal health literacy depending upon the measurement tool: Results from a population-based survey. *Health Promot Int.* 2009;24(3):252-61.
- Bhat AA. Literacy in arthritis: Dissertation Abstracts International: Section B. The Sciences and Engineering. 2008;69:2262.
- Paasche-Orlow MK, Wolf MS. The causal pathways linking health literacy to health outcomes. *Am J Health Behav.* 2007;31(Suppl 1):s19-26.
- Fite G. Reading and math. What is the connection? A short review of the literature. *Kansas Science Teacher.* 2002;14:7-11.
- Levinthal BR, Morrow DG, Tu W, Wu J, Murray MD. Cognition and health literacy in patients with hypertension. *J Gen Intern Med.* 2008;23(8):1172-6.
- Downey LV, Zun LS. Assessing adult health literacy in urban health care settings. *J Natl Med Assoc.* 2008;100(11):1204-8.
- Federman AD, Sano M, Wolf MS, Siu AL, Halm EA. Health literacy and cognitive performance in older adults. *J Am Geriatr Soc.* 2009;57(8):1475-80.
- Baker DW, Gazmararian JA, Sudano J, Patterson M. The association between age and health literacy among elderly persons. *J Gerontol B Psychol Sci Soc Sci.* 2000;55(6):368-74.