ORIGINAL ARTICLE

Health literacy and health behaviors in the Covid-19 Pandemic

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Abstract

COVID-19 pandemic has placed a heavy burden on healthcare systems and governments. Health literacy and health behaviors are recognized as strategic public health elements, but they have not received due attention during the pandemic. Health literacy and health behaviors are vital in slowing and controlling the COVID-19 outbreak. The purpose of this research is to examine the health literacy level and health behaviors of individuals in the COVID 19 epidemic. The sample of the study consists of individuals between the ages of 18-65 living in Ankara. An online questionnaire was applied to 384 people who agreed to participate in the research. TürkiyeHealth Literacy Scenario Scale was used to determine the health literacy level of individuals, and the Healthy Lifestyle Behaviors Scale was used to evaluate healthy lifestyle behaviors. As a result, a significant difference was found in the total health literacy scores of the individuals according to their healthy lifestyle, and the health literacy total scores of the individuals with a healthy lifestyle were found to be higher. It has been suggested to raise awareness about health literacy and healthy lifestyle and to raise awareness of the society.

Keywords: Covid-19, health literacy, healthy lifestyle

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Introduction

The new type of coronavirus (SARS-CoV-2), which started in Wuhan, China in December 2019 and affected the all world, with its high rate of transmission and mortality negatively affects not only our health, but also our all life in political, economic, psychological and social terms [1,2]. WHO officially declared COVID-19 as a pandemic in March 2020 and since then, apart from the great efforts of scientists to overcome the pandemic, many countries have adopted isolation and protection measures to contain the rapid spread of the pandemic [1]. Precautions include behavioral patterns that individuals are not accustomed to. Preventing the rapid spread of the virus, rather than the deterrent punishment practices of the rule makers, is through learning the way of transmission and spreading of each individual and breaking the chain of transmission of their own will [3]. As vaccination is still progressing at a slow pace and there is no specific treatment, it has become really important to adopt non-pharmacological public health interventions to slow virus transmission in the fight against COVID-19 [4-6]. At this point, health literacy become prominent. It is expressed that "health literacy" concept as the cognitive-social abilities and motivation levels to reach, understand and use the necessary information in order to protect and improve the health of the society [7]. At a time such as the COVID-19 pandemic, with full of uncertainties, information constantly changing and the world population needing rapid behavioral change to reduce the risks of disease transmission and spread, having an adequate level of health literacy has become more important than ever before [1,8,9].

Looking at the studies carried out in Türkiye, it is possible to say that the level of health literacy is insufficient and it has become a very important public health problem affecting many individuals in the country [10-13]. With the emergence of the COVID 19 pandemic, in addition to reflecting the correct information around the world, unfortunately, incomplete, incorrect and unscientific information has spread rapidly, causing the society to be more concerned. Health literacy requires individuals' knowledge and skills in acquiring, understanding and evaluating health information and services in order to make the right health decisions [14]. However, it is not enough to just read and understand health information in this period. Critical health literacy is needed. In times of crisis such as the COVID-19 pandemic, individuals should be ensured to conduct a risk analysis properly and then develop appropriate behaviors instead of being excessively panicked or ignoring the problem [15]. During the COVID-19 pandemic, it has been observed that societies with low health literacy levels are much more affected by infectious diseases due to lack of information. Many studies have proven that low health literacy causes difficulties in understanding the health disease process, increases hospitalization rates and the cost of health services, prevents medication adherence, affects quality of life, and creates an obstacle to self-care [16,17].

What people do is as important as what they know. This pandemic has shown us the importance of the concept of health behavior as well as health literacy. Health behavior has been defined as the whole of the behaviors that an individual believes and does in order to protect, develop, maintain and protect his/her health [18]. Health behavior is a person's existing health-related actions and is shaped by the person's past experiences, social factors, cultural characteristics, and interactions with the environment. If the individual describes herself as healthy, she will tend to protect this situation or if she feels any health problem, she will take various activities to solve it. Being healthy for the individual is an indispensable element for increasing the quality of life. The individual can increase this quality with his own behavior. The individual, who turns to behavior for the state of being healthy, will adopt the above-mentioned factors in his mental process and will reveal the most appropriate behavior for himself.

Health literacy and healthy behaviors are an important key to preventive medicine and a way to achieve greater justice and equity in society as a long-term measure [19]. In the studies it was found that health literacy is an important predictor of awareness of the disease and the adoption of protective behaviors during the Covid-19 pandemic [20].

The aim of this study is to examine the relationship between health literacy and health behaviors of individuals during the pandemic. Thus, it is aimed to provide guidance on how to design effective health education interventions.

Materials and Methods

This study was planned as a cross-sectional field study in order to evaluate the relationship between health literacy levels and health behaviors of adults living in Ankara during the pandemic. The population of the study consists of a total of 4,381,435 individuals between the ages of 18-65 living in the central districts of Ankara, based on the TSI 2021 data. The sample of the study was determined as 384 individuals with a 5% deviation at the 95% confidence level. 384 individuals included in the sampling were selected by convenience sampling method, one of the non-probability sampling methods [21,22].

In the study, a questionnaire consisting of 3 parts was applied to the participants. In the first part of the questionnaire, there are 5 questions about demographic information and socio-economic status, 2 questions about general health status and use of health services, and 8 questions about the diagnosis and precautions of Covid-19. In the second part, "TürkiyeHealth Literacy Scenario Scale" was used to determine the health literacy level of individuals, and in the last part, "Healthy Lifestyle Composite Scale" was used to evaluate healthy behaviors.

The Health Literacy Scenario Scale, which was created and validated by the Ministry of Health, consists of four scenarios with sixteen questions. The scenarios evaluate the process of accessing, understanding, evaluating and using/application of health-related information in the dimensions of treatment-service, protection from diseases, and health promotion. Five statements are included for each question. One of these statements is correct and is rated "5". Two statements are partially true; that is, it contains incomplete information. These statements were scored as "+2" and "+3". Two statements are completely wrong and score "-5". The highest score that can be obtained from each question is "+10"; the lowest score can be "-10". In this case, the highest score that can be obtained from each

scenario is "+30"; the lowest score is "-30". The total score that can be obtained from the four scenarios can be "+120" and the lowest score can be "-120". The first questions of each scenario were knowledge questions and were evaluated separately. In this case, the total score of the knowledge questions can be "+40" at the highest and "-40" at the lowest [23].

Healthy Lifestyle Composite Scale consists of 5 indicators selected by Adams, Katz, and Shenson (2016) from the Behavioral Risk Factors Surveillance System by considering the "Healthy People 2020" targets [24]. These indicators are smoking, fruit and vegetable consumption, physical activity, excessive alcohol consumption and adequate sleep. The "ideal" behaviors were scored as 1 and summed to obtain a composite measure total from the 5 selected indicators. Accordingly, the total scale score can vary between 0 and 5, and the participants whose scale scores are calculated as 4 and 5 are considered to have healthy behaviors [25].

The data of the research was collected by the online survey method created through Google forms between April-May 2021. Inclusion criteria for the study were determined by being between the ages of 18-65, living in the central districts of Ankara and being literate were determined. Questionnaires were sent to 384 individuals through the researchers' social networks, it was stated that the participation was voluntary and they were informed about the purpose of the study. The surveys take between 20-25 minutes to complete.

Statistical analysis of the data was carried out in SPSS 22 package program. While the dependent variable of the study was determined as the score obtained from the health literacy scenario scale, the independent variables were accepted as demographic characteristics, socio-economic status, health status indicators, attitudes related to the diagnosis and precautions of Covid-19, and healthy behaviors. The health literacy scenario scale score was calculated and evaluated with mean and standard deviation. The normality of scale score was evaluated with the Kolmogorov-Smirnov Test. Since scale scores do not provide parametric assumptions, in order to determine the relationships between health literacy score

averages and independent variables, Mann Whitney U Test and Kruskal Wallis Analysis were performed. The statistical significance level in the evaluations was accepted as p<0.05.

This study was evaluated by Başkent University Social and Human Sciences and Art Research Board with the letter dated March 31, 2021 and numbered 17162298.600-99 and it was determined that there was no harm in doing it.

Results

The distribution of 348 individuals participating in the study according to some descriptive characteristics is shown in Table 1. The mean age of the participants was 28.02±8.50 years; 75.5% are women. When the socio-economic status of the participants is examined; It was determined

that 75.7% had at least a bachelor's degree and 55.6% had a monthly household income of more than 5,441 Turkish Liras (poverty line according to TSI March 2021 data).

While 84.5% of the participants rated their general health as good, 30.8% stated that they first applied to a state hospital when they needed health care. 65.5% of the individuals participating in the study were not diagnosed with Covid-19 as of April-May 2021. 68.3% of the participants declared that they lived in an urban area during the pandemic. 84.8% of the participants stated that they paid attention to the social distance rules, 90.5% of the hygiene rules and 82.7% of the participants stated that they used properly masks.

Table 1. Distribution of participants according to some descriptive characteristics

	Frequency	Percentage
Gender		
Female	290	75,5
Male	94	23,8
Education		
High school and below	94	24,3
Bachelor's degree and above	290	75,7
Household income		
< 5.440 Turkish Liras	170	44,3
> 5.441 Turkish Liras	214	55,6
Self-rated health		
Good	325	84,5
Not good	60	15,5
First health care provider		
Family health center	114	29,7
State hospital	118	30,8
University hospital	35	9,1
Private hospital	114	29,7
Diagnosis of Covid-19		
Yes	132	34,5
No	252	65,5
Living place in the pandemic		
Urban	262	68,3
Rural	122	31,7
Compliance with social isolation rules		
Yes	326	84,8
No	58	15,2
Compliance with hygiene rules		
Yes	348	90,5
No	36	9,5
Wearing mask properly		
Yes	318	82,7
No	66	17,3

The healthy behaviors of the participants according to the Healthy Lifestyle Composite Scale are shown in Table 2. As can be seen in Table 2, the participants have ideal behaviors related to healthy behaviors in terms of not drinking excessively with 93.7% and sleeping at least 7 hours a day with 85.6%. When evaluated in total, it can be said that 40.8% of the participants have healthy behaviors with a score of 4 and above.

Table 3 shows the descriptive statistics of the participants' Health Literacy Scenario Scale sub-dimensions and total scores. As seen in the table, the total health literacy scores range from -28 to 80, with an average of 37.7±27.2.

Table 4 shows the mean scores obtained from the Health Literacy Scenario Scale according to some characteristics of the participants. As seen in the table, the average score of the Health Literacy Scenario Scale is higher for women, those who have at least a bachelor's degree, those who are not diagnosed with Covid-19, those who live in urban areas during the pandemic, those who pay attention to social isolation, those who follow hygiene rules, those who use masks and those who have a healthy lifestyle (p<0.05).

Table 2. Distribution of participants by healthy behaviors

	Frequency	Percentage
Non-smokers	205	53,5
Those who do not drink excessively	360	93,7
Those who exercise regularly	93	24,3
Those who consume 5 servings of fruit and vegetables a day	226	58,8
Those who sleep at least 7 hours a day	329	85,6
Those with a healthy lifestyle (≥4 points)	157	40,8

Table 3. Descriptive statistics of the Health Literacy Scenario Scale (N=384)

	Minimum	Maximum	Mean	Standard deviation
Knowledge	-13	20	10,25	7,30
Access	-20	20	11,30	9,16
Understanding	-20	20	9,53	9,33
Evaluation	-13	20	8,64	7,64
Use	-20	20	8,27	9,59
Total	-28	80	37,76	27,20

Discussion

This study was conducted to determine the healthy behaviors of individuals and their effects on health literacy during the pandemic period. In the study, healthy behaviors and health literacy levels of individuals between the ages of 18-65 living in the central districts of Ankara and selected by convenience sampling method were examined.

40.8% of 384 participants have healthy behaviors according to the Healthy Lifestyle Composite Scale. Among the five basic indicators in the scale, it was determined that the most common habits of the participants were adequate sleep (85.6%) and not consuming excessive alcohol (93.7%). It has also been demonstrated in previous large-scale studies that individuals living in Türkiyedo not have sleep and alcohol problems in terms of healthy behaviors. According to TSI 2019 data, 74.4% of Türkiye's population has never used alcohol in their lifetime. WHO statistics on healthy lifestyle habits also show that alcohol consumption in Türkiyeis at a very low level. On the other hand, it was determined that only 24% of the participants exercised regularly. According to WHO and EUROSTAT, 88.2% of Türkiye's population does not exercise at all. According to the Chronic Diseases Risk Factors Survey in Türkiye, 87% of women and 77% of men do not do enough physical activity.

Table 4. Mean scores of Health Literacy Scenario Scale according to some characteristics of the participants

		Mean ± SD	p
Gender	Female	41,98±24,49	0,000*
	Male	24,33±30,98	
Education	High school and below	24,59±26,79	0,000*
	Bachelor's degree and above	42,61±25,26	
Living place in the pandemic	Urban	40,51±26,66	0,008*
	Rural	31,82±27,91	
Diagnosis of Covid-19	Yes	27,08±26,20	0,000*
	No	43,38±26,07	
Compliance with social isolation rules	Yes	39,98±26,44	0,003*
	No	25,30±28,36	
Compliance with hygiene rules	Yes	39,94±26,23	0,000*
	No	16,92±27,91	
Wearing mask properly	Yes	39,96±26,63	0,004*
	No	27,18±27,71	
Healthy behaviors	Non-healthy lifestyle	31,50±27,86	0,000*
	Healthy lifestyle	46,81±23,52	

*p<0,05

Studies showing that the limitations brought by the pandemic period also increase physical inactivity in the community should not be ignored [26-28].

Average Health Literacy Scenario Scale score of 384 individuals was determined as 37.7±27.2. Compared to the study in which the scale was developed [23] and other studies using this scale in Türkiye[29-31], this average score is quite low. The lower level of health literacy in the study may be related to the fact that the samples of other studies were predominantly composed of students. On the other hand, the only common point in studies in Türkiyein which the level of health literacy is determined with different scales in the general population [10,32-35] is that our level of health literacy is generally insufficient.

The results of the research showed that women, those who have at least a bachelor's degree, those who are not diagnosed with Covid-19, those who live in urban areas during the pandemic period, those who pay attention to social isolation, those who follow hygiene rules, those who use masks and those who have a healthy lifestyle, have obtained higher score from Health Literacy Scenario Scale. There are many cross-sectional studies supporting the finding that women have a higher level of health literacy [36-38]. The positive relationship between general literacy and health literacy has also been proven by many studies in the literature [38,39]. The relationship between compliance with Covid-19 measures and health literacy is as expected, and it is similar to the results of some international studies [19,20,40]. Although the cross-sectional design of the study does not allow to solve the cause-effect relationships, the high level of health literacy of those who have healthy lifestyle habits is enough to think that the relationship between the two concepts is a bidirectional paradox. The high health literacy scores of individuals with healthy behaviors are also compatible with previous studies [35,41-43].

It would be correct to evaluate the results of the research with some limitations. The cross-sectional design of the study only reveals the relationships between the variables, not the cause-effect relationship. Since the data collection tool used in the study is based on personal statement, it should not be ignored that the answers may be biased. Since convenience sampling method was used in the study, generalization of the results may lead to wrong evaluations. In addition, the "Healthy Lifestyle Composite Scale", which was used as a data collection tool in the research, also has limitations. The sleep duration indicator in the scale does not take into account individual differences in sleep needs. There is no doubt that the pandemic period has also changed healthy lifestyle habits.

Conclusion

The most important results of this study, which was carried out between April and May 2021 in order to determine the relationship between health literacy and health behaviors of individuals during the Covid-19 pandemic period, can be evaluated as follows. First of all, the health literacy levels of the individuals participating in the study are very low. Inadequate health literacy of the population during an epidemic may lead to irrational use of health services by preventing the correct perception of risks and reducing judgment. In efforts to prevent the spread of epidemics, the importance of individuals' health behaviors and health literacy should be taken into account, and multidisciplinary teams, including health communication and public health professionals, should be established in this direction. The second important result of the study is that individuals who comply with the preventive measures related to the pandemic have higher health literacy levels. In this process, it can be suggested that health professionals consider health literacy as a part of pandemic management. Finally, individuals with more healthy lifestyle habits were found to have higher health literacy levels. Considering that the most successful countries in the management of the pandemic are those that attach the necessary importance to preventive medicine [44,45], it is once again remarkable how essential it is to raise the health literacy level of the society and to improve health behaviors. Taking into account that the Covid-19 pandemic is not the only one we have experienced, urgent health education interventions for health literacy and health behaviors are needed.

References

1. Cangussú LR, Barros IRP, Botelho Filho CAL, Sampaio Filho JDR, Lopes MR. COVID-19 and health literacy: The yell of a silent epidemic amidst the pandemic. Rev Assoc Med Bras (1992). 2020;66;31-3. doi: 10.1590/1806-9282.66.S2.31

2. WHO director-general's statement on IHR emergency committee on novel coronavirus (2019-nCoV). World Health Organization. 2020. Available: https://www.who.int/director-general/speeches/detail/who-director-general-s-statement-on-ihr-emergency-committee-on-novel-coronavirus-(2019-ncov).

3. Bahadır MC. The covid 19 outbreak and the importance of health literacy (in Turkish). SOYD. 2020;1(2):31-7. doi: 10.54247/SOYD.2020.12.

4. Cowling BJ, Ali ST, Ng TWY, Tsang TK, Li JCM, Fon MW, et al. Impact assessment of non-pharmaceutical interventions against coronavirus disease 2019 and influenza in Hong Kong: An observational study. Lancet Public Health. 2020;5:279-88. doi: 10.1016/S2468-2667(20)30090-6.

5. Iezadi S, Azami-Aghdash S, Ghiasi A, Rezapour A, Pourasghari H, Pashazadeh F, et al. Effectiveness of the non-pharmaceutical public health interventions against COVID-19; a protocol of a systematic review and realist review. PLoS ONE. 2020;15(9):239554. doi: 10.1371/journal.pone.0239554.

6. Zamir M, Shah Z, Nadeem F, Memood A, Alrabaiah H, Kumam P. Non Pharmaceutical Interventions for Optimal Control of COVID-19. Comput Methods Programs Biomed. 2020;196:105642. doi: 10.1016/j.cmpb.2020.105642.

7. Kickbusch I, Pelikan J, Apfel F, Tsouros A. (EDS). Health literacy: The solid facts, regional office for Europe, Copenhagen. World Health Organization. 2013.

8. Paakkari L, Okan O. Covid-19: Health literacy is an underestimated problem. Lancet Public Health. 2020;5:249–50. doi: 10.1016/S2468-2667(20)30086-4.

9. Sentell T, Vamos S, Okan O. Interdisciplinary perspectives on health literacy research around the world: More important than ever in a time of COVID-19. Int J Environ Res Public Health. 2020;17:3010. doi: 10.3390/ijerph17093010.

10. Tanrıover Durusu M, Yıldırım HH, Ready Demıray FN, Cakır B, Kalın E. Türkiyehealth literacy survey (in Turkish). Ankara: Sağlık-Sen Yayınları; 2014. 25p.

11. Ozkan S, Dikmen AU, Tuzun H, Karakaya K. Prevalence and determiners of health literacy in Türkiye. The European Journal of Public Health. 2016;26:175-2.

12. Abacigil F, Harlak H, Okyay P, Kiraz DE, Gursoy Turan S, Saruhan G, et al. Validity and reliability of the Turkish version of the European Health Literacy Survey Questionnaire. Health Promot Int. 2019;34(4):658-67. doi: 10.1093/heapro/day020.

13. Aygun O, Cerim S. The relationship between general health behaviors and general health literacy levels in the Turkish population. Health Promot Int. 2020. doi: 10.1093/heapro/daaa151.

14. Institute of Medicine (IOM). Health literacy: A prescription to end confusion, Washington: The National Academies Press. 2004. doi: 10.17226/10883.

15. Norman CD, Skinner HA. eHealth literacy: Essential skills for consumer health in a networked world. J Med Internet Res. 2006;8(2):9. doi: 10.2196/jmir.8.2.e9.

16. Bostock S, Steptoe A. Association between low functional health literacy and mortality in older adults: Longitudinal cohort study. BMJ. 2012;344:1602. doi: 10.1136/bmj.e1602.

17. Parnell TA, Stichler JF, Barton AJ, Loan LA, Boyle DK, Allen PE. A concept analysis of health literacy. Nurs Forum. 2019;54(3):315-27. doi: 10.1111/nuf.12331

18. Pender NJ, Murdaugh CL, Parsons MA. Health promotion in nursing practice. 4th ed. Upper Saddle River, NJ: Prentice Hall; 2002.

19. Silva MJ, Santos P. The Impact of health literacy on knowledge and attitudes towards preventive strategies against Covid-19: A cross-sectional study. Int J Environ Res Public Health. 2021;18:5421. doi: 10.3390/ijerph18105421.

20. Wong JYH, Wai AKC, Zhao S, Yip F, Lee JJ, Wong CKH, et al. Association of individual health literacy with preventive behaviors and family well-being during covid-19 pandemic: mediating role of family information sharing. Int J Environ Res Public Health. 2020;17(23):8838. doi: 10.3390/ijerph17238838.

21. Lemeshow S, Hosmer DW, Klar J, Lwanga SK, World Health Organization. Adequacy of sample size in health studies. Chichester: Wiley; 1990.

22. Neuman LW. Social research methods (in Turkish). 4. Basım. İstanbul: Yayın odası; 2010.

23. Okyay P, Abacigil F. Turkish health litreacy scales reliability and validity study (in Turkish). 1. Baskı Ankara: Anıl Matbaa; 2016. 1-104p.

24. Adams ML, Katz DL, Shenson D. A healthy lifestyle composite measure: Significance and potential uses. Prev Med. 2016;84: 41-7. doi: 10.1016/j.ypmed.2015.12.005.

25. Yilmaz F, Caglayan C. The effects of healthy lifestyle on the quality of life among elderly (in Turkish). TAHUD. 2016;20(4). doi: 10.15511/tahd.16.04129.

26. Ozturk O, Bayraktar D. In the dawn of the pandemics: COVID-19 and physical inactivity (in Turkish). İKÇUSBFD. 2020;5(2):143-6.

27. Pinto AJ, Dunstan DW, Owen N, Bonfá E, Gualano B. Combating physical inactivity during the Covid-19 pandemic. Nat Rev Rheumatol. 2020;16(7):347-8. doi: 10.1038/s41584-020-0427-z.

28. Ricci F, Izzicupo P, Moscucci F, Sciomer S, Maffei S, Di Baldassarre A, et al. Recommendations for physical inactivity and sedentary behavior during the coronavirus disease (Covid-19) pandemic. Frontiers in public health. 2020;8:199. doi: 10.3389/fpubh.2020.00199.

29. Muslu L, Kolutek R. Childhood cancers and health literacy (in Turkish). Güncel Pediatri. 2018;16(3):117-32.

30. Cokluk ST, Dagli SC. Health literacy intervention study: The example of the faculty of pharmacy and education (in Turkish). 3. International 21. National Public Health Congress. 2019.

31. Simsek T. Determination of health literacy levels of high school students in Kayseri and detecting affecting factors (in Turkish). SBED. 2019;2(1):43-52.

32. Berberoglu U, Ozturk O, Inci MB, Ekerbicer HC. Evaluation of the health literacy status among individuals aged 18-65 registered in a family health center (in Turkish). STD. 2018;8(3):575-81. doi: 10.31832/smj.453846.

33. Deniz S. Assessment of health literacy level in Akçadağ, Malatya (in Turkish) Phd thesis. Fırat Universiy, HS ABD. 2018.

34. Yakar B, Gomleksiz M, Pirincci E. Health literacy levels and affecting factors of patients who applied to a university hospital polyclinic (in Turkish). Euras J Fam Med. 2019;8(1):27-35. doi: 10.33880/ejfm.2019080104.

35. Peksoy Kaya S, Kaplan S. Evaluating the relationship between nursing students' awareness of the COVID-19 pandemic and health behaviors with health literacy (in Turkish), HEAD, 2020;17(4):304-11. doi: 10.5222/HEAD.2020.01112.

36. Akcilek E. Examinatıon of health literacy and quality of life in university students (in Turkish), İstanbul Medipol University SBE, Master's thesis. İstanbul. 2017.

37. Zhan F, Or PP, Chung JW. How different health literacy dimensions' influences health and well-being among men and women: The mediating role of health behaviors. Health Expect. 2021;24(2):617-27. doi: 10.1111/hex.13208.

38. Van Der Heide I, Wang J, Droomers M, Spreeuwenberg P, Rademakers J, Uiters E. The relationship between health, education, and health literacy: Results from the Dutch adult literacy and life skills survey. J Health Commun. 2013;18(1):172-84. doi: 10.1080/10810730.2013.825668.

39. Liu YB, Liu L, Li YF, Chen YL. Relationship between health literacy, health-related behaviors and health status: A survey of elderly Chinese. Int J Environ Res Public Health. 2015;12(8):9714-9725. doi: 10.3390/ijerph120809714.

40. Gautam V, Dileepan S, Rustagi N, Mittal A, Patel M, Shafi S, et. al. Health literacy, preventive COVID 19 behavior and adherence to chronic disease treatment during lockdown among patients registered at primary health facility in urban Jodhpur, Rajasthan. Diabetes Metab Syndr. 2021;15:205-11. doi: 10.1016/j.dsx.2020.12.023.

41. Sezer C, Amarat M. The relationship of health literacy with healthy lifestyle behaviors (in Turkish). 2. Uluslararası 12. Ulusal Sağlık ve Hastane İdaresi Kongresi. 2018;1811-3. doi: 10.37989/gumussagbil.905512

42. Arıkan A. The effect of health literacy level on healthy lifestyle behaviors: A research among university students (in Turkish), Master's thesis, Ankara. 2020.

43. Do BN, Nguyen PA, Pham KM, Nguyen HC, Nguyen MH, Tran CQ, et. al. Determinants of health literacy and its associations with health-related behaviors, depression among the older people with and without suspected COVID-19 symptoms: A multi-institutional study. Front Public Health. 2020;8:581746. doi: 10.3389/fpubh.2020.581746

44. World Health Organization. Infection prevention and control of epidemic-and pandemic-prone acute respiratory diseases in health care: WHO

interim guidelines (No. WHO/CDS/EPR/2007.6). Geneva: World Health Organization. 2007.

45. Gibney E. Whose coronavirus strategy worked best? Scientists hunt most effective policies. Nature. 2020;581(7806):15-7. doi: 10.1038/d41586-020-01248-1.