Relationship between Health Literacy, Self-Efficacy, Health Perception and Perceived Service Quality in Patients with Chronic Disease

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ABSTRACT

Objective: The present study aimed to investigate the relationship between health literacy, self-efficacy, health perception, and perceived service quality in patients with chronic diseases who applied to primary healthcare services. **Materials and Methods:** Seven hundred and eighty-two (495 female, mean age; 55.39±18.39 years) participants with chronic diseases were included. Health literacy and health perception were evaluated using Turkish Health Literacy Scale-32 (THLS-32), and Health Perception Scale (HPS), respectively. Self-Efficacy Scale on Chronic Diseases (SESCD) was used to assess self-efficiency level and SERVPERF scale was assess the perceived service quality. **Results:** There were significant relationships between THLS-32, age, SERVPERF, and SESCD (p<0.05). HPS was significantly correlated with age, the number of chronic diseases, and SERVPERF (p<0.05). THLS-32, HPS, age, and the number of chronic diseases explained a significant amount of variance in all subscales of SESCD (p<0.05), describing 9.7% to 16.5% of the adjusted R^2. Health literacy, health perception, age, and the number of chronic diseases explained a significant amount of variance in all subscales of SERVPERF (p<0.05), describing 4.4% to 8.1% of the adjusted R^2. **Conclusion:** This study found that health literacy, age, and the number of chronic diseases were predictors of self-efficacy; in addition, health literacy, health perception, age, and the number of chronic diseases were predictors of perceived service quality in patients with chronic diseases. Age and number of chronic diseases are non-modifiable factors for the level of self-efficacy and perceived service quality whereas health literacy can be improved.

Keywords: Health Literacy, Health Perception, Primary Care, Self-Efficacy, Service Quality.

Kronik Hastalığı olan Hastalarda Sağlık Okuryazarlığı, Öz-Etkililik, Sağlık Algısı ve Algılanan Hizmet Kalitesi İlişki

ÖZ

Amaç: Bu çalışmada birinci basamak sağlık hizmetlerine başvuran kronik hastalığı olan hastalarda sağlık okuryazarlığı, öz-etkililik, sağlık algısı ve algılanan hizmet kalitesi arasındaki ilişkinin belirlenmesi amaçlanmıştır. **Gereç ve Yöntem:** Çalışmaya kronik hastalığı olan 782 (495 kadın, ortalama yaş; 55,39±18,39) katılımcı dâhil edildi. Sağlık okuryazarlığı ve sağlık algısı sırasıyla Türkiye Sağlık Okuryazarlığı Ölçeği (TSOY-32) ve Sağlık Algısı Ölçeği (SAÖ) kullanılarak değerlendirilmiştir. Öz-etkililik düzeyini değerlendirmek için Kronik Hastalıklarda Öz-Etkililik Ölçeği (KHÖEÖ), algılanan hizmet kalitesini değerlendirmek için SERVPERF ölçeği kullanıldı. **Bulgular:** TSOY-32, yaş, SERVPERF ve KHÖEÖ arasında anlamlı ilişki vardı (p<0,05). SAÖ, yaş, kronik hastalık sayısı ve SERVPERF ile anlamlı korelasyon gösterdi (p<0,05). TSOY-32, SAÖ, yaş ve kronik hastalık sayısı, düzeltilmiş R^2'nin %9,7 ile %16,5'ini tanımlayarak KHÖEÖ'nin tüm alt ölçeklerinde önemli miktarda varyansı açıklamıştır (p<0,05). Sağlık okuryazarlığı, sağlık algısı, yaş ve kronik hastalık sayısı, düzeltilmiş R^2'nin %4,4 ile %8,1'ini tanımlayarak SERVPERF'in tüm alt ölçeklerinde önemli miktarda varyansı açıkladı (p<0,05). **Sonuç:** Bu çalışmada, kronik hastalığı olan hastalarda sağlık okuryazarlığı, yaş ve kronik hastalık sayısının öz-etkililiğin prediktörleri; sağlık okuryazarlığı, sağlık algısı, yaş ve kronik hastalık sayısının algılanan hizmet kalitesinin prediktörleri olduğu bulundu. Yaş ve kronik hastalık sayısı, öz-etkililik düzeyi ve algılanan hizmet kalitesi için değiştirilemez faktörlerken, sağlık okuryazarlığı geliştirilebilir bir faktördür.

Anahtar Kelimeler: Sağlık Okuryazarlığı, Sağlık Algısı, Birinci Basamak, Öz Etkililik, Hizmet Kalitesi.

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INTRODUCTION

Health literacy, defined as "the degree to which individuals can obtain, process and understand basic health information and services needed to make appropriate health decisions", plays an important role in the self-management of chronic diseases (Ratzan & Parker 2006; Mackey, Doody, Werner, & Fullen, 2016). Inadequate health literacy results in difficulties in comprehension of health information, limited knowledge of diseases, and lower medication adherence (Huang, Pecanac, & Shiyanbola, 2020; Schönfeld, Pfisterer-Heise, & Bergelt, 2021). Low health literacy contributes to poor health, high risk of mortality, insufficient and ineffective use of healthcare, increased hospitalization, increased costs, and health disparities (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). Besides, the management of chronic diseases becomes much more difficult in case of low health literacy accompanied by cognitive changes occurring as a result of aging (Mahmoodi, Hassanzadeh, & Rahimi, 2021).

Patients with a chronic disease, no matter the type, needs some skills to manage the disease (Anekwe & Rahkovsky, 2018). Self-efficacy and self-perceived health are closely associated with coping with chronic conditions and successful self-management of these conditions (Ebrahimi Belil, Alhani, Ebadi, & Kazemnejad, 2018; Peters, Potter, Kelly, & Fitzpatrick, 2019). Self-efficacy is a mediator between knowledge and self-care (Wu, Hsieh, Lin, & Tsai, 2016); higher levels of health literacy might lead to positive behavior in acting on health-related information. On the other hand, Paul et al. (2016) pointed out that there is a strong association between self-perceived health and satisfaction with healthcare services (Paul, Hakobyan, & Valtonen, 2016). Previous studies pointed out that higher levels of health literacy resulted in higher levels of trust in physicians and the healthcare system (Rodríguez et al., 2013; White, Osborn, Gebretsadik, Kripalani, & Rothman, 2013). A recent systematic review extended the findings further and concluded that patients having low health literacy perceive that the health care system is not cooperative, while patients with a high level of health literacy have high expectations about the quality, which the health care system might not be able to provide (Bertram, Brandt, Hansen, & Svendsen, 2021).

Collaboration and co-responsibility between healthcare professionals and patients with chronic diseases are vital for primary healthcare services (Comino et al., 2012). Therefore, identifying the link between health literacy, self-efficacy, health perception and perceived service quality in primary care patients with chronic disease may foster an understanding of how literacy skills in health are influenced by patient-related factors and which interventions should be performed. The present study aimed to investigate the relationship between health literacy, self-efficacy, health perception, and perceived service quality, and the effect of these concepts on each other in patients with chronic diseases who applied to primary healthcare service.

MATERIALS AND METHODS

Study type

This cross-sectional study was conducted in the family health center located in Istanbul, between October 2021 to November 2021.

Study group

Participants with chronic disease, who received health services at a family health center located in Istanbul were recruited. The eligibility criteria were as follows: (1) aged over 18 years; (2) having at least one chronic disease diagnosed by a physician; (3) ability to read and write in Turkish; (4) able to follow simple instructions; (5) no pathology in visual ability and hearing; and (6) voluntary participation in the study. The exclusion criteria were as follows: (1) having any communication problem that might affect the evaluation process, (2) being on medication such as sedatives and hypnotics, antidepressants, and benzodiazepines, (3) being a health professional, and (4) not having internet access, computer, or smartphone.

The sample size was calculated by using G*Power 3.1.9.2 sample size calculation program. The calculations were based on a small effect size ($\rho|$=0.1), an alpha level of 0.05, a 95% confidence interval, and the desired power of 80%. These parameters generate a sample size of at least 782 participants. Therefore, total of 800 participants were invited to study.

Data collection was carried out via an e-survey due to the COVID-19 pandemic. The online survey had an introductory page explaining the purpose of the research, the identity and affiliations of the researchers, details of what participation would entail, and confirmation of ethical approval by the ethics committee. All participants answered "yes" to the question, "Do you agree to participate in the survey?" Thus, all participants have provided voluntary consent to participate.

Procedures

Identifying information about the participants such as age, sex, education, number of chronic diseases, social security, working status, and satisfaction level of the patient in healthcare was investigated.

Turkish Health Literacy Scale-32 (THLS-32) is a scale used to assess health literacy level and is based on the conceptual framework developed by European Health Literacy Consortium. It consists of 32 items, two subscales (treatment and service, protection from diseases, and improvement of health), and four information processes related to decision-making and applications in health (access, understanding, making a decision, and using/applying). Total score ranges from 0 to 50, higher scores indicate better health literacy (Okyay, Abacıgil, & Harlak, 2016; Sørensen et al., 2015).

Health Perception Scale (HPS) is a 15-items and 4-dimensions (control of center, self-awareness, certainty, and importance of health) scale used to assess health perception level. It is a five-point Likert-type scale. Six items of the scale are positive and 9 items are negative expressions. Total score ranges from 15 to 75, higher scores indicate better health perception (Diamond, Becker, Arenson, Chambers, & Rosenthal, 2007, Kadioglu & Yildiz, 2012).

Self-Efficacy Scale on Chronic Diseases (SESCD) is a 30-items scale used to assess self-efficiency levels in patients with chronic disease. The scale consists of ten subscales. The average score of a subscale is obtained by summing up the scores the participant gets from each item in that subscale and by dividing the number of items in the subscale. The subscale score below 7 indicates that strategies and problem-solving are necessary to be reevaluated to prevent failure, but a score of 7 or above indicates that the self-efficacy level about the disease is high and the patient can manage the situation (Ceyhan & Ünsal 2017; Lorig, Stewart, Ritter, González, Laurent, & Lynch, 1996).

The SERVPERF Scale is a 15-items and 5-dimensions (tangibles, reliability, responsiveness, assurance, and empathy) scale used to assess the perceived service quality. It is a five-point Likert-type scale. Each subscale score can be calculated separately, and the total score is the sum of subscale scores. The average score of a subscale is obtained by summing up the scores the individual gets from each item in that subscale and by dividing the number of items in the subscale. Higher scores indicate higher service quality perception (Cronin & Taylor 1992; Akdere, Top, & Tekingündüz, 2018).

Statistical analysis
Statistical Package for Social Science (SPSS) version 21.0 for Windows software (SPSS, Inc., Chicago, IL, USA) was used for all statistical analyses. The Kolmogorov–Smirnov test was used to assess the distribution of data. The level of significance considered was $p<0.05$. Descriptive statistics, including frequency, the percentage for nominal variables, and mean and standard deviation for continuous variables were calculated. Spearman correlation analysis was used to explore the relationship between THLS-32, HPS, SESCD, and SERVPERF in patients with chronic diseases. Standard linear regression analyses were conducted to identify factors contributing to self-efficacy and perceived service quality.

Ethical considerations
Ethical approval was obtained from the İstanbul Kent University Health Sciences Research and Publication Ethical Board (Date: 28.09.2021, Number: 2021-07) and conducted in conformity with the Declaration of Helsinki. Verbal and written explanations were provided to participants about the study, and each provided informed consent. Permissions for use the scales were obtained before starting study.

RESULTS
Eight hundred participants with chronic diseases were screened for possible inclusion. Eighteen participants were excluded for various reasons; 782 (495 female, mean age; 55.39±18.39 years) participants with chronic diseases were included in the study. The sociodemographic and health-related data of participants are shown in Table 1. A total of 702 participants have one chronic disease, 72 participants have two chronic diseases and 8 participants have three chronic diseases. The most common three chronic diseases are cardiovascular diseases, metabolic diseases, and respiratory diseases among the participants. The SESCD subscales scores were lower than 7 points, except for coping with asthma and managing depression/control subscales (Table 1).

Table 1. Sociodemographic data and health-related characteristics of participants (n=782).

Parameters		n (%)
Age (years), mean±SD [min-max]		55.39±18.39 [20-92]
Sex	Female	495 (63.3)
	Male	287 (36.7)
Education (years), mean±SD [min-max]		9.79±4.79 [5-22]
Marriage status	Single	135 (17.3)
	Married	535 (68.4)
	Widow	110 (14.1)
	Divorce	2 (0.2)
Number of chronic diseases, mean±SD [min-max]		1.11±0.34 [1-3]
Social security	Absent	199 (25.4)
	Social security institution	455 (58.2)
	Retirement fund	110 (14.1)
	Social security organization for artisans and the self-employed	18 (2.3)
Working status	Yes	421 (53.8)
	No	211 (27)
	Retired	150 (19.2)
Patient satisfaction in healthcare, mean±SD [min-max]		7.55±1.42 [2-10]
THLS-32, mean±SD [min-max]		29.61±6.32[10-49]

Table 1. (Continue) Sociodemographic data and health-related characteristics of participants (n=782).

Parameters		n (%)
HPS, mean±SD [min-max]		39.82±3.63 [31-60]
SESCD, mean±SD [min-max]	Doing sports regularly	6.96±1.82 [1-10]
	Getting information about the disease	6.92±1.83 [1-10]
	Getting help from society, family and friends	6.99±1.69 [1-10]
	Communication with doctor	6.99±1.64 [1-10]
	General disease management	6.99±1.61 [1-10]
	Doing housework	6.93±1.66 [1-10]
	Social/ recreation activities	6.96±1.63 [1-10]
	Coping with the symptoms	6.99±1.61 [1-10]
	Coping with asthma	7.01±1.78 [1-10]
	Managing depression/control	7.00±1.60 [1-10]
SERVPERF, mean±SD [min-max]	Tangibles	3.66±0.79 [1-5]
	Reliability	3.73±0.68 [1-5]
	Responsiveness	3.70±0.65 [1-5]
	Assurance	3.69±0.70 [1-5]
	Empathy	3.73±0.67 [1-5]

HPS: Health Perception Scale, SESCD: Self-Efficacy Scale on Chronic Diseases, THLS-32: Turkish Health Literacy Scale-32. Data are expressed as mean±standard deviation [minimum-maximum] and number (percentage).

Table 2. The relationship between health literacy, health perception, perceived service quality, and self-efficacy of participants (n=782).

Variables	Age	Number of chronic diseases	THLS-32	HPS	Tangibles	Reliability	Responsiveness	Assurance	Empathy
THLS-32	-0.30 (0.001)**	-0.03 (0.37)	1	-0.06 (0.06)	0.19 (0.001)**	0.22 (0.001)**	0.27 (0.001)**	0.27 (0.001)**	0.19 (0.001)**
HPS	0.08 (0.02)*	0.11 (0.002)**	-0.06 (0.06)	1	-0.19 (0.001)**	-0.10 (0.003)**	-0.16 (0.001)**	-0.13 (0.001)**	-0.17 (0.001)**
SERVPERF									
Tangibles	-0.14 (0.001)**	0.11 (0.002)**	0.19 (0.001)**	-0.19 (0.001)**	1	0.50 (0.001)**	0.43 (0.001)**	0.43 (0.001)**	0.41 (0.001)**
Reliability	-0.06 (0.10)	-0.008 (0.82)	0.22 (0.001)**	-0.10 (0.003)**	0.50 (0.001)**	1	0.60 (0.001)**	0.45 (0.001)**	0.43 (0.001)**
Responsiveness	-0.05 (0.10)	0.04 (0.19)	0.27 (0.001)**	-0.16 (0.001)**	0.43 (0.001)**	0.60 (0.001)**	1	0.57 (0.001)**	0.45 (0.001)**
Assurance	-0.06 (0.06)	-0.02 (0.49)	0.27 (0.001)**	-0.13 (0.001)**	0.43 (0.001)**	0.45 (0.001)**	0.57 (0.001)**	1	0.60 (0.001)**
Empathy	-0.10 (0.007)**	-0.05 (0.15)	0.19 (0.001)**	-0.17 (0.001)**	0.41 (0.001)**	0.43 (0.001)**	0.45 (0.001)**	0.60 (0.001)**	1
SESCD									
Doing sports regularly	-0.30 (0.001)**	0.10 (0.003)**	0.28 (0.001)**	-0.04 (0.25)	-0.22 (0.001)**	-0.08 (0.01)*	-0.04 (0.22)	-0.11 (0.002)**	-0.16 (0.001)**
Getting information about the disease	-0.36 (0.001)**	-0.11 (0.003)**	0.31 (0.001)**	-0.03 (0.36)	-0.12 (0.001)**	-0.03 (0.37)	0.008 (0.82)	-0.04 (0.17)	-0.10 (0.003)**
Getting help from society, family and friends	-0.34 (0.001)**	-0.11 (0.001)**	0.27 (0.001)**	0.002 (0.96)	-0.17 (0.001)**	-0.06 (0.08)	-0.05 (0.12)	-0.06 (0.06)	-0.11 (0.001)**
Communication with doctor	-0.32 (0.001)**	-0.10 (0.005)**	0.28 (0.001)**	0.01 (0.60)	-0.20 (0.001)**	-0.07 (0.01)*	-0.04 (0.21)	-0.06 (0.06)	-0.15 (0.001)**
General disease management	-0.31 (0.001)**	0.10 (0.003)**	0.27 (0.001)**	-0.03 (0.39)	-0.19 (0.001)**	-0.04 (0.21)	-0.03 (0.38)	-0.06 (0.06)	-0.14 (0.001)**
Doing housework	-0.29 (0.001)**	-0.06 (0.05)	0.23 (0.001)**	-0.01 (0.76)	-0.18 (0.001)**	-0.05 (0.14)	-0.01 (0.76)	-0.06 (0.06)	-0.12 (0.001)**
Social/ recreation activities	-0.30 (0.001)**	0.10 (0.003)**	0.23 (0.001)**	-0.006 (0.86)	-0.20 (0.001)**	-0.06 (0.07)	-0.05 (0.12)	-0.10 (0.003)**	-0.15 (0.001)**
Coping with the symptoms	-0.31 (0.001)**	-0.11 (0.002)**	0.25 (0.001)**	-0.02 (0.57)	-0.20 (0.001)**	-0.05 (0.12)	-0.03 (0.27)	-0.10 (0.003)**	-0.15 (0.001)**
Coping with asthma	-0.28 (0.001)**	-0.08 (0.02)*	0.24 (0.001)**	-0.01 (0.65)	-0.18 (0.001)**	-0.05 (0.10)	-0.04 (0.21)	-0.09 (0.007)**	-0.12 (0.001)**
Managing depression/control	-0.30 (0.001)**	-0.08 (0.02)*	0.24 (0.001)**	-0.004 (0.91)	-0.20 (0.001)**	-0.03 (0.27)	-0.03 (0.35)	-0.09 (0.007)**	-0.15 (0.001)**

HPS: Health Perception Scale, SESCD: Self-Efficacy Scale on Chronic Diseases, THLS-32: Turkish Health Literacy Scale-32. Spearman correlation test **$p<0.01$; *$p<0.05$. Data are expressed as rho(p).

There were significant relationships between health literacy, age, perceived service quality, and chronic disease self-efficacy. In addition, health perception was significantly correlated with age, the number of chronic diseases, and perceived service quality

(p<0.05). The only tangibles and empathy subscales of the SERVPERF scale were significantly correlated with health literacy, health perception, and all components of the Self-efficacy Scale for Chronic Diseases (p<0.05) (Table 2).

Table 3. Multivariable linear regression analyses of predictors of the self-efficacy.

Models	Standardized Coefficients B	Standard Error	Non-standardized Coefficients Beta	ANOVA				
				t	P	F	p	Adjusted R²
(Constant)→ F1	9.487	0.775		12.242	0.000**			
THLS-32→ F1	0.050	0.010	0175	5.013	0.000**			
HPS → F1	-0.061	0.017	-0.121	-3.644	0.000**	35.715	0.000**	0.155
Age → F1	-0.027	0.004	-0.272	-7.419	0.000**			
Number of Chronic Diseases→ F1	-0.093	0.184	-0.018	-0.505	0.614			
(Constant) → F2	8.115	0.777		10.445	0.000**			
THLS-32→ F2	0.056	0.010	0.192	5.545	0.000**			
HPS → F2	-0.028	0.017	-0.056	-1.688	0.092	38.421	0.000**	0.165
Age→ F2	-0.029	0.004	-0.290	-7.973	0.000**			
Number of Chronic Diseases→ F2	-0.100	0.184	-0.019	-0.545	0.586			
(Constant) → F3	7.689	0.718		10.702	0.000**			
THLS-32→ F3	0.045	0.009	0.169	4.836	0.000**			
HPS → F3	-0.010	0.015	-0.022	-0.674	0.501	36.363	0.000**	0.158
Age→ F3	-0.028	0.003	-0.306	-8.362	0.000**			
Number of Chronic Diseases→ F3	-0.047	0.170	-0.010	-0.276	0.783			
(Constant) → F4	6.916	0.698		9.911	0.000**			
THLS-32→ F4	0.051	0.009	0.198	5.668	0.000**			
HPS → F4	0.003	0.015	0.006	0.184	0.854	35.650	0.000**	0.155
Age→ F4	-0.024	0.003	-0.271	-7.394	0.000**			
Number of Chronic Diseases→ F4	-0.186	0.165	-0.039	-1.125	0.261			
(Constant)→ F5	8.236	0.689		11.957	0.000**			
THLS-32→ F5	0.046	0.009	0.182	5.176	0.000**			
HPS → F5	-0.032	0.015	-0.071	-2.129	0.034*	33.178	0.000**	0.146
Age→ F5	-0.024	0.003	-0.272	-7.388	0.000**			
Number of Chronic Diseases→ F5	-0.027	0.163	-0.006	-0.167	0.868			
(Constant)→ F6	8.046	0.731		11.001	0.000**			
THLS-32→ F6	0.033	0.009	0.126	3.507	0.000**			
HPS → F6	-0.024	0.016	-0.053	-1.536	0.125	20.930	0.000**	0.097
Age→ F6	-0.022	0.003	-0.247	-6.516	0.000**			
Number of Chronic Diseases→ F6	0.093	0.173	0.019	0.536	0.592			
(Constant)→ F7	8.092	0.711		11.380	0.000**			
THLS-32→ F7	0.034	0.009	0.133	3.725	0.000**			
HPS → F7	-0.018	0.015	-0.040	-1.164	0.245	25.466	0.000**	0.116
Age→ F7	-0.023	0.003	-0.261	-6.969	0.000**			
Number of Chronic Diseases→ F7	-0.132	0.169	-0.028	-0.783	0.434			
(Constant) → F8	8.401	0.695		12.089	0.000**			
THLS-32→ F8	0.035	0.009	0.139	3.922	0.000**			
HPS → F8	-0.025	0.015	-0.056	-1.649	0.099	29.256	0.000**	0.131
Age→ F8	-0.025	0.003	-0.280	-7.540	0.000**			
Number of Chronic Diseases→ F8	-0.096	0.165	-0.021	-0.585	0.559			
(Constant) → F9	8.967	0.781		11.484	0.000**			
THLS-32→ F9	0.035	0.010	0.123	3.440	0.001**			
HPS → F9	-0.040	0.017	-0.082	-2.405	0.016*	23.126	0.000**	0.107
Age→ F9	-0.024	0.004	-0.250	-6.646	0.000**			
Number of Chronic Diseases→ F9	-0.024	0.185	-0.005	-0.132	0.895			
(Constant)→ F10	8.010	0.698		11.472	0.000**			
THLS-32→ F10	0,035	0.009	0.140	3.901	0.000**			
HPS → F10	-0,020	0.015	-0.045	-1.328	0.185	24.603	0.000**	0.113
Age→ F10	-0,023	0.003	-0.259	-6.903	0.000**			
Number of Chronic Diseases→F10	-0,001	0.166	0.000	-0.008	0.994			

**p<0.01; *p<0.05.

F1: Doing sports regularly; F2: Getting information about the disease; F3: Getting help from society, family and friends; F4: Communication with doctor; F5: General disease management; F6: Doing housework; F7: Social/ recreational activities; F8: Coping with the symptoms; F9: Coping with asthma; F10: Managing depression/control.

The multivariable linear regression models predicting performance in all subscales of the Chronic Diseases Self-Efficacy Scale were statistically significant (p<0.05), describing 9.7% to 16.5% of the adjusted R^2. Health literacy, health perception, age, and the number of chronic diseases were independent variables in doing sports regularly, general disease management, and coping with asthma models (Table 3).

In addition, health literacy, age, and the number of chronic diseases were independent variables in getting information about the disease, getting help from society, family and friends, communicating with the doctor, doing housework, social/ recreation activities, coping with the symptoms, and managing depression/control models (Table 3).

The multivariable linear regression models predicting performance in all subscales of the SERVPERF scale were statistically significant (p<0.05), describing 4.4% to 8.1% of the adjusted R^2. Health literacy, health perception, age, and the number of chronic diseases were independent variables in doing sports regularly, general disease management, and coping with asthma models. In addition, health literacy and health perception were independent variables in the tangibles, reliability, responsiveness, assurance, and empathy models (Table 4).

Table 4. Multivariable linear regression analyses of predictors of the perceived service quality.

Models	Non-Standardized Coefficients		Standardized Coefficients	t	P	ANOVA		Adjusted R^2
	B	Standard Error	Beta			F	p	
(Constant) → Tangibles	5.054	0.355		14.237	0.000**	13.378	0.000	0.065
THLS-32→ Tangibles	0.015	0.005	0.121	3.303	0.001**			
HPS→ Tangibles	-0.039	0.008	-0.180	-5.146	0.000**			
Age → Tangibles	-0.003	0.002	-0.072	-1.864	0.063			
Number of Chronic Diseases→ Tangibles	-0.093	0.084	-0.041	-1.107	0.269			
(Constant) → Reliability	4.356	0.311		14.017	0.000**	8.841	0.000**	0.044
THLS-32→ Reliability	0.016	0.004	0.148	3.987	0.000**			
HPS → Reliability	-0.027	0.007	-0.140	-3.962	0.000**			
Age→ Reliability	0.000	0.001	-0.007	-0.179	0.858			
Number of Chronic Diseases → Reliability	-0.024	0.074	-0.012	-0.323	0.746			
(Constant) → Responsiveness	4.585	0.290		15.811	0.000**	17.117	0.000**	0.081
THLS-32→ Responsiveness	0.019	0.004	0.184	5.068	0.000**			
HPS → Responsiveness	-0.039	0.006	-0.214	-6.187	0.000**			
Age→ Responsiveness	0.000	0.001	-0.006	-0.145	0.885			
Number of Chronic Diseases → Responsiveness	0.098	0.069	0.052	1.422	0.156			
(Constant) → Assurance	4.495	0.315		14.289	0.000**	15.003	0.000**	0.072
THLS-32→ Assurance	0.021	0,004	0.184	5.041	0.000**			
HPS → Assurance	-0.037	0.007	-0.190	-5.452	0.000**			
Age→ Assurance	0.000	0.001	-0.013	-0.327	0.744			
Number of Chronic Diseases → Assurance	0.082	0.075	0.041	1.105	0.270			
(Constant) → Empathy	5.064	0.299		16.941	0.000**	15.097	0.000**	0.072
THLS-32→ Empathy	0.013	0.004	0.126	3.437	0.001**			
HPS → Empathy	-0.042	0.006	-0.227	-6.509	0.000**			
Age→ Empathy	-0.001	0.001	-0.039	-1.005	0.315			
Number of Chronic Diseases → Empathy	0.019	0.071	0.010	0.267	0.790			

**p<0.01, *p<0.05

DISCUSSION

The present study aimed to investigate the relationship between health literacy, self-efficacy, health perception, and perceived service quality, and the effect of these concepts on each other in patients with chronic diseases who applied to primary healthcare service. The findings showed that health literacy was related to age, perceived service quality, and chronic disease self-efficacy in patients with chronic diseases. Health literacy, age, and the number of chronic diseases were independent variables of self-efficacy, while health literacy, health perception, age, and the number of chronic diseases were independent variables of perceived service quality.

Patients with chronic diseases are expected to gradually be able to manage their health. This is because it was determined that the probability of individuals with inadequate health literacy being hospitalized was much higher compared to individuals with adequate health literacy (Fan, Yang, & Zhang, 2021) and that there was a relationship between limited health literacy and mortality rates in the older adults (Bostock & Steptoe 2012). Associations with higher rates of limited health literacy included older age, lower educational level, lower income, perceived poor health, and lack of access to the Internet (Protheroe et al., 2017). In addition, the most disadvantaged groups were women and older people (≥40 years of age) because of their lower levels of education in the Turkish population (Bilgel, Sarkut, Bilgel, & Ozcakir, 2017). Age and gender are non-modifiable risk factors, but

personalized patient education might engage, encourage, and empower patients in participating in their health care and leading to better outcomes in older adults (Bhattad & Pacifico 2022). Non-written visual materials might be considered as a temporary solution to improve health literacy in populations with low literacy.

Self-efficacy is a mediator between knowledge and self-care (Wu et al., 2016). Present findings showed that age, the number of chronic diseases, health literacy, and health perception were effective on self-efficacy and explained its 9.7% to 16.5%. Individuals with low self-efficacy are continuously faced with problems, while those with high self-efficacy focus on improving health-related intentions and behaviors (Sheeran et al., 2016). However, patients with high self-efficacy usually have a desire to translate health knowledge into health-related outcomes (Bandura, 2004; Sheeran et al., 2016). A recent study pointed out that self-efficacy in patients with chronic conditions can be improved by enhancing traditional education and boosting self-efficacy; thus leading to an increase in treatment adherence (Farley, 2020). Therefore, patients, especially older patients with several chronic diseases should be taught to use effective methods to increase their self-efficacy, and their self-confidence should be supported.

A high level of trust in the health care system and service quality were important for most patients (Gilson, 2006). Present findings showed that health literacy, health perception, age, and the number of chronic diseases were effective on perceived service quality and explained its 4.4% to 8.1%. In addition, it was determined that the services provided by primary healthcare service met the patient expectations at a moderate level in the present study. While the lowest level of perceived service quality was found in tangibles (physical entities), the highest level of perceived service quality was determined in the reliability and empathy dimensions. Existing literature mostly reported that a positive association between the level of health literacy and the level of trust in the healthcare system has been shown (Brennan et al., 2013; Rodríguez et al., 2013; White et al. 2013). However, high literacy and low literacy have different challenges. Having low health literacy can lead to the perception that the health system is not cooperative while having low health literacy can lead to high expectations about service quality, which the healthcare system cannot meet (Bertram et al., 2021). As a result of both, the perceived service quality might be negatively affected. Therefore, the service quality provided in primary healthcare service should be evaluated together with the health literacy level of patients and the results should be used as a data source in all kinds of planning in health services.

This study has some limitations that should be highlighted. First, this study has a cross-sectional study design that resulted in the identification of several associations between variables, although it was not possible to determine the causal relationships. Second, other factors that can affect self-efficacy and perceived service quality, such as type of chronic disease, sex, and socioeconomic status were not taken into account. Finally, all participants in this study were patients with chronic disease in primary care; therefore, the generalization of our results is limited. A future study evaluating the relationship between health literacy, self-efficacy, health perception, and perceived service quality in different patient populations is necessary.

CONCLUSION

This study found that age, the number of chronic diseases, health literacy, health perception, self-efficacy, and perceived service quality were associated. Health literacy, age, and the number of chronic diseases were predictors of self-efficacy; in addition, health literacy, health perception, age, and the number of chronic diseases were predictors of perceived service quality in patients with chronic diseases. Age and the number of chronic diseases are non-modifiable factors for the level of self-efficacy and perceived service quality whereas health literacy can be improved. Therefore, the level of health literacy should be closely monitored in older patients with several chronic diseases patients and effective methods and strategies should be taught to increase their self-efficacy via a multidisciplinary approach

Conflict of Interest
The authors declare no potential conflicts of interest concerning the research, authorship and/or publication of this article.

Author Contributions
Plan, design: CÇY, DY, TB; **Material, methods, and data collection:** CÇY, DY, TB, DD; **Data analysis and comments:** CÇY, DY, TB, DD; **Writing and corrections:** CÇY, DY, TB, DD.

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