Prevalence of Turkish Ministry of Health e-Nabız application usage and the factors affecting its use

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ABSTRACT

Objective: In this study, the frequency of using the e-Nabız application and the factors affecting its use were studied among adults living in a district of northern Turkey.

Materials and Methods: In this cross-sectional study, the sample (n:555, N:9264) was selected from those who applied, for any reason, to the only hospital in the district between March 1 and December 31, 2020. Data were collected by an online questionnaire (10 February–29 March 2021). Ethical permissions were obtained from the Ministry of Health, Republic of Turkey and the Marmara University, School of Medicine Clinical Researches Ethics Committee (05.02.2021/09.2021.70). All the participants gave informed consent.

Results: Among 458 participants, the response rate was 82.5% and 59.4% of the respondents were female. The median age was 44.0 years (44.7±13.7; range: 19–72). 57.4% of the females and 69.4% of the males had registered for the application (p: 0.006), and 56.6% of the females and 68.8% of the males had used e-Nabız (p: 0.011). The males, aged 26–45, with high school and above education levels, working in the public sector with a good monthly income, were the group with the highest usage of e-Nabız (respectively p: 0.001, p: 0.001, p: 0.001, and p: 0.001). Current health status did not affect the usage of e-Nabız (p:0.144).

Conclusion: We can promote environmentally friendly usage by enhancing health literacy through e-Nabız and securely storing personal health records. Therefore, educational sessions can be organized to inform citizens about the services provided by e-Nabız.

Keywords: Digital health applications, e-Health applications, Electronic medical records, Health information technologies

1. INTRODUCTION

An outbreak of an epidemic related to a new virus strain from the coronavirus family was reported in Wuhan, the capital of China's Hubei province, in December of 2019. On February 11, 2020, the World Health Organization (WHO) officially named this new coronavirus disease-19 (COVID-19) and expressed its concerns that the virus would spread worldwide. As a matter of fact, the COVID-19 infection spread rapidly worldwide, and WHO declared a "pandemic" on March 11, 2020 [1]. More than 767 million people have been infected with the disease, and almost 7 million people have died since the onset of the pandemic as of July 12, 2023 [2].

The COVID-19 pandemic presented challenges to people forced to change daily habits and take precautions in all areas. During this time, when we had to adapt old habits to different ways, the new possibilities offered by information technologies allowed us to digitize processes faster than ever before. All information processing was able to continue at the same speed without physical contact by using mobile phones, computers, and tablets. Some have argued that pandemic accelerated the digitalization process [3].

During the pandemic, healthcare resources were mobilized largely to focus on the treatment of patients infected by COVID-19. Hospital environments were considered unsafe for patients without COVID-19 due to the risks of nosocomial infections due to COVID-19 and they were avoided admission to hospitals for medical care except for emergency admissions. Hospitals in many countries responded to the health care needs of people with mild illnesses or diseases through telemedicine systems [4]. According to 45 responses from 24 countries, 68% of screening programs were suspended, 73% of magnetic resonance

imaging procedures were postponed, and telemedicine was preferred at a rate of 71% depending on accessibility [5].

e-Nabız is a personal, digital, health record system that can manage all health information regardless of where your examinations, analyses, and treatments are performed and which provides patient and provider access to consolidated medical histories through a single source [6].

Turkish Ministry of Health has a telemedicine system named e-Nabız with 7/24 access to radiology images on the web, reports regarding these images, tele-consultation services between radiologists, evaluation of medical images, and reports in terms of quality, and sharing them with citizens via the e-Nabız application [7]. Mobile applications appear to accelerate the processes of benefiting from health services, such as making appointments, displaying test results, and choosing a physician, while differentiating business processes from physical boundaries [8]. Health administrators think that the inclusion of citizens in the provision of health services via the e-Nabız, will also increase health literacy and improve the sustainability of health services [9].

e-Nabız was launched on January 1, 2015 as a personal medical recording system managed directly by the citizens. With the e-Nabız, patients can enter their medical data such as blood pressure and glucose level, personal data such as heart rate and number of steps via smart devices (if any), and their health profiles, and they can view this information comparatively. Individuals can authorize physicians or health institution, at home or abroad to access their medical records, including diagnoses, prescriptions, medical images, etc. It is anticipated that when physicians can easily access their patients' health histories, the number of repeat examinations, diagnostic tests, or medical images may be reduced. Thus, individuals will be prevented from losing time for repeated services, and the economic interests of individuals and their health insurance will be protected [10-12].

This study aimed to investigate the prevalence of e-Nabız application use by adults living in a town (Gümüşhacıköy) in the north of Turkey during the pandemic, as well as the factors affecting their usage. Gümüşhacıköy was selected as a sample of northern Turkey.

The total population, which was 26,000 in 2008, continues to decline over the years. According to 2023 Turkish Statistical Institute data, the population of the town is 22,121 and 50.9% of this population are females [13,14].

2. MATERIALS and METHODS

This study was a cross-sectional study. The population of the study consisted of males and females, aged 18 and over, who applied at least once to the only state hospital of the town for any reason, between March 1 and December 31, 2020 (n=9264). The list of patients who applied was obtained from the Chief Physician's Office of Gümüşhacıköy State Hospital. The minimum sample size to represent the district was calculated as 370 people in OpenEPI, with a 95% confidence interval, and

the sample size was expanded to 555 (370x1.5) assuming that the probability of not responding was 50%. The study sample was selected from the population by gender and age groups, stratified and a systematic sampling method was applied (Table I). Study permissions were obtained from the Republic of Turkish Ministry of Health, General Directorate of Health Services and from the State Hospital's Health Directorate. The study was approved by the Marmara University, School of Medicine Clinical Research Ethics Committee (protocol date and approval number: 05.02.2021/ 09.2021.70). Participants in the sample were reached online, informed consent was obtained, and data was collected via on online questionnaire between February 10, 2021 and March 29, 2021. During the data collection process, participants were reached by sending links via their hospital appointment or communication phone numbers. Illiterate or technologically inexperienced participants filled out the survey with the help of their caregivers. [12].

Table I. Distribution of participants reached in the sample by strata

Sex	Age Groups	Total Population		Sample Size(n)
		Size (n)	Distribution (%)	
Female	18-25	831	8.97	50
	26-35	1191	12.86	71
	36-45	1127	12.17	67
	46-55	1252	13.51	75
	56-65	1379	14.89	83
Male	18-25	375	4.05	22
	26-35	581	6.27	35
	36-45	643	6.94	39
	46-55	792	8.55	48
	56-65	1093	11.79	65
Total		9264	100.00	555

The online questionnaire consisted of two parts; where the first part included the socio-demographic characteristics of the participants (8 questions) and the second part included questions about awareness, use and satisfaction with the e-Nabız (15 questions) [12].

Statistical Analysis

The data of the study were analysed by the researcher using SPSS, through Kolmogorov-Smirnov test, Student's t test, Mann-Whitney U test and X^2 test. $p<0.05$ was accepted as the statistical significance level.

3. RESULTS

During the study, data were collected by reaching 458 out of 555 people (a response rate of 82.5%). Of the participants, 59.4% were female (n:272). The median age of participants was 44.0 years (range:19–72). The median age of the females was 42.0 (range:19–68, n:272), and the median age of the males was 48.0 years (range:19–72, n:186) (p= 0.002).

Table II. Distribution of socio-demographic characteristics of participants by sex

Socio-demographic characteristics	Sex				Total		
	Female		Male				p
	n	%	n	%	n	%	
Age groups (year)							
<25	29	10.7	12	6,5	41	9.0	
26-35	67	24.6	31	16.7	98	21.4	0.054*
36-45	58	21.3	39	21.0	97	21.2	
46-55	47	17.3	38	20.4	85	18.6	
55+	71	26.1	66	35.5	137	29.9	
Education							
Illiterate/Literate/PrimarySchool	58	21.3	6	3.2	64	14.0	
							0.001*
Secondary School	39	14.3	25	13.4	64	14.0	
High School	68	25.0	67	36.0	135	29.5	
University/Postgraduate/PhD	107	39.3	88	47.3	195	42.6	
Marital status							
Married	201	73.9	153	82.3	354	77.3	
Single	54	19.9	31	16.7	85	18.6	0.013*
Divorced/widowed	17	6.3	2	1.1	19	4.1	
Income							
Low	18	6.6	15	8.1	33	7.2	
Middle	155	57.0	101	54.3	256	55.9	0.775*
High	99	36.4	70	37.6	169	36.9	
Employment status							
Public sector	89	32.7	93	50.0	182	39.7	
Private sector	20	7.4	35	18.8	55	12.0	0.001*
Retired	16	5.9	46	24.7	62	13.5	
Unemployed	9	3.3	6	3.2	15	3.3	

*Pearson Chi-Square Test

Socio-demographic characteristics affecting e-Nabız registration

It was determined that 69.4% of the male participants were registered at the e-Nabız, which was higher than the registration rate of female participants (57.4%) (p:0.012). While, 83.7% of the participants in the 26-45 age group were registered with the e-Nabız, only 41.6% of those aged 55 and above were registered (p:0.001). University graduates in the study group were registered to the e-Nabız at the highest rate (81.5%), while only 20.3% of the illiterate/literate/primary school graduates were registered (p:0.001). It was determined that 74% of those with high income and 54.5% of those with low income were registered to the e-Nabız (p:0.001).

Public sector employees were registered at the e-Nabız (91.2%) at a much higher rate than the other employment groups (p:0.001). The 44.9% majority of the females declared that they were housewives, and only 33.6% of them were registered at the e-Nabız (p:0.0001) (Table III).

Table III. Distribution of e-Nabız application registration by socio-demographic characteristics

Being registered to e-Nabız					Total		
	Yes		No				P
	n	%	n	%	n	%	
Sex							
Female	156	57.4	116	42.6	272	100.0	**0.012***
Male	129	69.4	57	30.6	186	100.0	
Age Groups (year)							
<25	20	48.8	21	51.2	41	100.0	
26-35	82	83.7	16	16.3	98	100.0	
36-45	76	78.4	21	21.6	97	100.0	**0.001***
46-55	50	58.8	35	41.2	85	100.0	
55+	57	41.6	80	58.4	137	100.0	
Education							
Illiterate/Literate/Primary School	13	20.3	51	79.7	64	100.0	
Secondary School	26	40.6	38	59.4	64	100.0	
High School	87	64.4	48	35.6	135	100.0	**0.001***
University/Postgraduate/PhD	159	81.5	36	18.5	195	100.0	
Marital status							
Married	224	63.3	130	36.7	354	100.0	
Single	51	60.0	34	40.0	85	100.0	0.586*
Divorced/widowed	10	52.6	9	47.4	19	100.0	
Income							
Low	18	54.5	15	45.5	33	100.0	
Middle	142	55.5	114	44.5	256	100.0	**0.001***
High	125	74.0	44	26.0	169	100.0	
Employment status							
Publicsector	166	91.2	16	8.8	182	100.0	
Privatesector	27	49.1	28	50.9	55	100.0	
Retired	37	59.7	25	40.3	62	100.0	**0.001***
Unemployed	4	26.7	11	73.3	15	100.0	
Student	10	45.5	12	54.5	22	100.0	
Housewife	41	33.6	81	66.4	122	100.0	
Health status							
Healthy	82	59.4	56	40.6	138	100.0	
Occasional,non-serious health problem	108	68.4	50	31.6	158	100.0	0.141*
Chronic diseases	95	58.6	67	41.4	162	100.0	
Total	**285**	**62.2**	**173**	**37.8**	**458**	**100.0**	

*Pearson Chi-Square Test
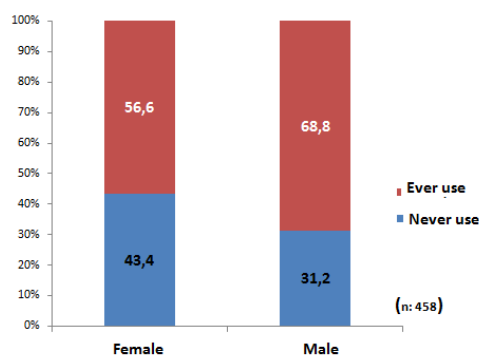
Prevalence of e-Nabız usage by participants

Among all participants, 61.6% declared that they have used the e-Nabız; 56.6% of the females and 68.8% of the males have used it (:0.008,Table IV, Figure 1). Of those who said they had used the e-Nabız, 80.5% stated that they could use it by themselves without assistance, and the results were similar for the females

and males (p:0.765). Also, 88.6% of those using the e-Nabız were using it via smart phones, and the results were similar for the males and females (p:1.000). However, half of the users (54.9%) stated that they rarely use it (p:0.934, Table IV).

Table IV. Distribution of e-Nabız use by sex

Sex					Total		
	Female		Male				p
	n	%	n	%	n	%	
e-Nabız system usage							
Never use	118	43,4	58	31,2	176	38,4	
Use	154	56,6	128	68.8	282	61.6	0.008*
Management of e-Nabız (n:282)							0.765*
Use by themself	125	81,2	102	79.7	227	80.5	
Use with support	29	18,8	26	20.3	55	19.5	
How e-Nabız is used (n:280)							1.000*
By computer	17	11,2	15	11.7	32	11.4	
By smartphone	135	88,8	113	88.3	248	88.6	
Frequency of e-Nabız Use (n:277)							0.934*
Rarely	83	55,3	69	54,3	152	54,9	
Once a month	39	26,0	35	27,6	74	26,7	
Once a week	16	10,7	15	11,8	31	11,2	
Every few days	12	8.0	8	6,33	20	7,2	
Total	272	100.0	186	100.0	458	100.0	

Pearson Chi-Square Test

Figure 1. Prevalence of e-Nabız use by sex

Socio-Demographic characteristics affecting the use of the e-Nabız

Participants in the 26-45 age group used e-Nabız the most (82.7%), while only 41% of those aged 55 and above used it (p:0.001). The participants who graduated from university used e-Nabız more (81.5%), while only 18.8% of illiterate/literate/elementary school graduates used it (p:0.001). High-income participants (73.4%) used the e-Nabız more than the others (p:0.001). When employment status is considered, e-Nabız usage (90.1%) by public employees was found to be much higher than the others. The 44.9% majority of female participants declared that they were housewives, and only 33.6% of this group declared that they had used the e-Nabız (p:0.001). e-Nabız usage was found to be similar among marital status and health subgroups (p:0.386 and p:0.144 respectively, Table V).

Table V. Distribution of e-Nabız usage by socio-demographic characteristics

Use of The e-Nabız System					
	Yes		No		p
	n	%	n	%	
Age groups (Year)					
<25	20	48.8	21	51.2	
26-35	81	**82.7**	17	17.3	**0.001***
36-45	75	**77.3**	22	22.7	
46-55	50	58.8	35	41.2	
55+	56	40.9	81	59.1	
Education					
Illiterate/Literate/Primary School	12	18.8	52	81.3	
Secondary School	26	40.6	38	59.4	**0.001***
High School	85	63.0	50	37.0	
University/Postgraduate/PhD	159	81.5	36	18.5	
Marital status					
Married	222	62.7	132	37.3	
Single	51	60.0	34	40.0	**0.386***
Divorced/widowed	9	47.4	10	52.6	
Income					
Low	17	51.5	16	48.5	
Middle	141	55.1	115	44.9	**0.001***
High	124	73.4	45	26.6	
Employment status					
Publicsector	164	90.1	18	9.9	
Privatesector	27	49.1	28	50.9	
Retired	36	58.1	26	419	**0.001***
Unemployed	4	26.7	11	73.3	
Student	10	45.5	12	54.5	
Housewife	41	33.6	81	66.4	
Health status					
Healthy	81	58.7	57	41.3	
Occasional,non-serious Health problem	107	67.7	51	32.3	**0.144***
Chronic diseases	94	58.0	68	42.0	
Total	282	100.0	176	100.0	

Pearson Chi-Square Test

Level of e-Nabız awareness

In this study, 81.7% of participants stated that they had heard about the e-Nabız. While, the majority of males stated that they had heard about the system, three out of every four females in the study stated that they had heard about it (p:0.001). Participants heard about e-Nabız mostly from public health service announcements on television and from social media (45.4%, 40%, p:0.002, p:0.014 respectively).

TableVI. Distribution of e-Nabız Awareness by Sex

	Sex				Total		
	Female		Male				p
	n	%	n	%	n	%	
Heard of e-Nabız							
Yes	203	74.6	171	91.9	374	81.7	
No	69	25.4	15	8.1	84	18.3	**0.001***
Source of Information							
Social Media(Facebook,Twitter. etc.), Web							
Yes	96	35.3	87	46.8	183	40.0	**0.014***
No	176	64.7	99	53.2	275	60.0	
Public Spot							
Yes	107	39.3	101	54.3	208	45.4	**0.002***
No	165	60.7	85	45.7	240	54.6	
Newspaper							
Yes	20	7.4	19	10.2	39	8.5	0.364*
No	252	92.6	167	89.8	419	91.5	
Television, radio etc.							
Yes	68	25.0	58	31.2	126	27.5	0.177*
No	204	75.0	128	68.8	332	72.5	
Friends							
Yes	77	28.3	53	28.5	130	28.4	1.000*
No	195	71.7	133	71.5	328	71.6	
Family							
Yes	4	1.5	1	0.5	5	1.1	*
No	268	98.5	185	99.5	453	98.9	
Total	**272**	**100.0**	**186**	**100.0**	**458**	**100.0**	

*Pearson Chi-Square Test

4. DISCUSSION

In this study, it was aimed to reveal the usage status and factors affecting the use of e-Nabız by adults living in a town in the northern Turkey during the pandemic period, when the importance and necessity of e-Nabız became more prominent. Data were successfully collected online from 458 individuals selected with a stratified sample, composed of 59.4% females and 40.6% males with a total response rate of 82.5%.

Although, the vast majority of participants (81.7%) were aware of e-Nabız, we found that a remarkable percentage of participants (18.3%) know nothing about e-Nabız. When the findings of the study were compared with the literature, it was observed that they were similar to other study findings [15-18]. In most studies, we see that almost all participants are aware of e-Nabız.

The educational level variable seems to be a determining factor in the awareness of digital health practices and that participants with higher educational levels have more knowledge about the e-Nabız than those with lower educational levels [16,19].

In our study, participants stated that they heard about the e-Nabız mostly from public service advertisements, followed by social media (40.0%), friends (27.4%), and information sources (27.5%) such as television and radio. In a master's thesis on e-Nabız and e-Health literacy, it was reported that nearly half of those who were aware of the e-Nabız application, heard about it from social media and the internet [16].

We found that the majority of participants (81.7%) did not reflect their knowledge about e-Nabız at a similar rate. Only slightly more than half (61.6%) of respondents use the e-Nabız system. Our study differs from other studies regarding the usage of e-Nabız system [12,17,20-22]. The reason for the difference may be due to the fact that the study was conducted in a region of northern Turkey and that e-Nabız was needed more in 2021 and during the pandemic period.

In our study, we found that 38.4% of participants never used e-Nabız, and that more than half (54.9%) of those who claimed to use it only used it rarely. In a study conducted by Demir with 422 university students, 88% had never used e-Nabız, and 5.7% used it rarely [12]. In the announcement of the e-Nabız application, the success rate was not achieved in terms of the application's content and usage frequency, but there was a small difference in usage. In Demir's study, participants may use e-Nabız less because they were relatively healthier and were in a younger age group.

In the current study, we found that the 26 – to 45-year-old group used the e-Nabız the most, and that those aged 55 and older used it less. As participants grew older, their independent usage rates decreased, and they needed more assistance from others. It was determined that older people tended to use information technology less than younger people, and there were differences between those born or raised with information technology tools compared to those who were not [23,25].

According to this study, males significantly indicated that they used e-Nabız more (males: 68%, females: 56%). This may be due to the high educational levels of male participants. In a study of 409 participants, 53.7% of the females and 38.3% of the males used e-Nabız [17]. The reason for this difference in our study was that the distribution of e-Nabız needs was not overlapping due to the level of education and chronic diseases.

In our study, we found that those with higher educational levels had more knowledge about e-Nabız and used it more. Our study supported literary data showing a positive relationship between education levels and e-Nabız usage [16,17,20]. This may be the reason why individuals with a higher level of education follow developments closely and gain new knowledge and skills as a result of their approaches to seeking information.

We found that almost all participants working in the public sector used e-Nabız, while others used much less. This can be explained by the fact that public sector employees are more trained and more familiar with using systems such as computers, smartphones, etc. due to their work. In the Kıraç and Yılmaz study, 38.1% did not work anywhere, 41.6% worked in the private sector, and 20.3% in the public sector [17].

In our study, those with higher incomes used e-Nabız more than others. Buying a computer or other device for access to the internet requires money, and it is difficult for low-income individuals who cannot own such devices to have the available technology and necessary skills [26, 27].

In our study, 49.3% of participants who used e-Nabız stated that they used it to make or cancel appointments in healthcare centers; 14.6% said that they used it to view their health history to evaluate and interpret services received from the health care organizations they visited; and a very few said that they were using it to record blood pressure, blood sugar levels, heart rate, and weight information by adding data or sharing health data with health professionals in other institutions. [12,15,17,18,20,22] The findings of our study were similar to other study findings in this regard.

Limitation

A limitation of our findings is that the study excludes sicker, less educated, poorer, more distant groups, etc., who did not apply to the hospital during the study duration. We suggest that our findings be evaluated in this context.

Conclusion

The majority of participants in this study were knowledgeable about the e-Nabız, which became more important during the pandemic period, but higher educated male public employees and those aged between 26 and 45 use the e-Nabız at a higher rate than other age and employment groups. People who use the e-Nabız mostly use it to access their health record and to make or cancel appointments. Training activities can be planned for other services offered by the e-Nabız explaining how citizens can benefit from the e-Nabız. Increasing health literacy, creating a useful medical record, and keeping the personal medical records of citizens in a safe environment by developing the e-Nabız can increase the use of this health application. In order to increase the use of e-Nabız and improve health literacy, e-Nabız training can be added to the training given to patients and their relatives in healthcare institutions. Further research is needed involving individuals with different socio-demographic characteristics.

Compliance with Ethical Standards

Ethical approval: This study was approved by the Marmara University Faculty of Medicine Clinical Research Ethics Committee (The protocol date and code: 05.02.2021/ 09.2021.70). The study adhered to the principles of the Helsinki Declaration.

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