Electronic Health Literacy among Students of Humanistic Science Faculties of Tanta University

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Abstract

Background: Electronic health literacy is the skills that required to find, understand, and use electronic health sources , these skills can be improve health status between university students .**Aim of the study:** To assess electronic health literacy among students of humanistic science faculties of Tanta university. **Study design: -** A descriptive study design was used**. Study settings:-** This study was conducted in humanistic science faculties at Tanta University. **Study subjects: -** A stratified and systematic random sample techniques were be used to choose 827 from the previous settings. **Tools of data collection**: - A structured questionnaire sheet was be used in this study. It consisted of three parts: **Part (I):** Socio-demographic characteristics and health history of the student**, Part (II):** Student knowledge about electronic health literacy, and **Part (III):** Electronic Health Literacy Questionnaire (e-HLQ). **Results: -** It was founded that more than one half (56 %) of the studied students had good e-health literacy level. Meanwhile, 44% of them had poor e-health literacy level. **Conclusion: -** The result concluded that slightly more than one third of them had high level of knowledge about electronic health literacy and exhibited poor e-health literacy level. **Recommendations:-** This result recommended that initiating program of e-health literacy for university students. In which them may be given clinical practices on the electronic health information resources available online.

Key words: Electronic Health Literacy, Humanistic Science Faculties and University students.

Introduction

Health literacy (HL) is described as a person's ability to get and understand knowledge for maintaining and improving health, adapted to both personal and systemic contexts. This includes the social resources and personal characteristics required for people and societies to obtain, understand, evaluate, and apply information and facilities for making decisions about their health. **(Hasannejadasl, Roumen, Smit, Dekker, & Fijten, 2022).**

Electronic Health Literacy (e-HL) is a new concept that refers to "the ability to recognize and explain a health problem, to recognize, appraise, and apply digital health information and technologies in the social, cultural and situational frame and to use the knowledge to deal with the health problem." It is based on health literacy within the information technology framework (**Kristjánsdóttir, Welander, Stenström, Castor, & Kristensson, 2023).**

Electronic health literacy is affected by a wide range of characteristics, for example age, grade level, parental education, and socioeconomic status. Information about health-related behaviors, financial situation, chronic disease, and previous hospital admission are additional potential factors. For instance, just as basic literacy levels rise with age and grade, so does the capacity to locate health information online through e-health literacy. (**Park, 2019).**

University students are forming a wider variety of social and personal relationships, compared to earlier in their academic careers. They are also becoming more independent of their parents, responsible for their education, facing a variety of conflicts, and dealing with health issues particular to the learning process. Therefore, raising university students' health literacy will improve both their own health and the health of society as a whole in the years of their future employment **(Yokoyama et al., 2023).**

University age refers to the age range between 18 and 25 years old, during which people continue higher education at colleges or universities. Students in this age frequently face the challenges of adulthood, including adjusting to their newfound freedom and responsibilities. They are preparing for their future occupations, face intellectual challenges, social interactions, and personal growth that shape their identities and desires. This stage is marked by self-awareness, self-discovery, and a wide range of experiences that support their general growth and maturation **(Mastora, Panagopoulou, & Raikou, 2020).**

Community health nurses (CHNs) contribute significantly to raising health literacy. They can assess the individual's level of knowledge regarding a problem or illness, as well as the health literacy abilities. The insertion of health literacy in all settings of care and at any time will facilitate the achievement of optimal health outcomes and client involvement, empowerment, and activation. They have a crucial role in informing students with health information and promotion. In addition to being their primary

competency, they also promote clients' health (**Abdoh, 2022).**

Significance of the study

Focusing on health literacy at an early age can lead to positive health effects and behaviors later in life, particularly among university students. So, increasing electronic health literacy level and health education at this stage are very important to encourage healthy promotion behaviors to improve their health and prevent health problems Meanwhile, there are a few studies on health literacy in Egypt have been conducted particularly among university students. Thus, the aim of this study was to assess level of electronic health literacy among students of humanistic science faculties of Tanta University.

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Research question

What is the level of electronic health literacy among students of humanistic science faculties of Tanta University?

Subjects and Method

Study design: - Descriptive study design was used in the study.

Study settings: - This study was conducted at humanistic science faculties in Tanta University. The number of humanistic science faculties in Tanta University are six faculties (Faculty of Education, Faculty of Specific Education, Faculty of Physical Education, Faculty of Commerce, Faculty of Arts, and Faculty of Law). Two faculties were selected randomly using simple random sample technique: (Faculty of Arts and Faculty of Physical Education).

Study subjects: - Students were selected from the previous settings using stratified and systematic random sample techniques. Five percent (5%) of students from each faculty from second to fourth grade during the academic year 2023/2024 were included in the study. The first grade was excluded as their exact number is unknown. The number of students that included in the study was 827 (157 students from faculty of Physical Education and 670 students from faculty of Arts).

Study tools

A structured questionnaire sheet was used in this study to collect the necessary data. It consisted of three parts.

Part (I): Socio-demographic characteristics and health history of the student

It included sociodemographic data as: age, sex, grade, name of faculty, level of fathers'& mothers' education, fathers'& mothers' job, place of residence and family income. Also, it included data regard health history as: history of chronic disease, smoking, and routine checkup.

Part (II): Student knowledge about electronic health literacy

This part was developed by the researcher based on literature review **(Akhtar & Ajmal, 2022).** It included 7 questions about students' knowledge about electronic health literacy as: definition, benefits, and fields of electronic health literacy, electronic health platforms and applications, electronic health applications in Egypt, students'

applications of electronic health literacy, and their sources of information about electronic health.

Scoring system

Each question of the knowledge was scored as "zero" for an incorrect answer or a "don't know", and "one" for the correct answer. Total score was 17, all scores were summed up, converted into percent, and classified as:

- **Low level of knowledge**: < 60% (0-9) from the total score.
- **Moderate level knowledge**: 60 - ≤75% (10-13) from the total score.
- **High level knowledge**: >75% (14-17) from the total score.

Part (III): Electronic Health Literacy Questionnaire (e-HLQ):

Electronic Health Literacy Questionnaire (e-HLQ) that was developed by **Kayser et al., (2018)**. It was adapted by the researcher in this study to assess electronic health literacy. The e-HLQ consisted of 35 items in seven domains including, one: The use technology to process health information (5 items). Two: the understand of health concepts and language (5 items). Three: the ability to actively engage with digital services (5 items). Four: Feeling safe and in control (5 items). Five: The motivated to engage with digital services (5 items). Six: Access to digital services that work (6 items). Seven: The digital services that suit individual needs (4 items).

Scoring system

All items were rated on a three Likert scales as following: disagree (0), neutral (1) and agree (2). Total score was range from 0 to 70, all scores was summed up, converted into percent, and classified as follows:

- Poor e-health literacy level: < 60% (0- 41) from the total score.
- Good e-health literacy level: ≥60 % (42-70) from the total score.

Method

Obtaining approval

An official permission letter was obtained before conducting the study, from the Dean of Faculty of Nursing Tanta University to the Deans of Faculties that were included in the study to obtain their permissions to collect data from selected settings.

Ethical considerations

- Consent of the Scientific Research Ethical Committee of the Faculty of Nursing was obtained with code number (280-7-2023).
- An informed consent was obtained from the chosen students to participate in this study after providing appropriate explanation about the purpose and benefits of the study at the beginning of the questionnaire.
- Each participant was informed that he/she has the right to withdraw from the study at any time he/she wanted.
- Nature of the study was not causing any harm or pain for the entire sample.
- Confidentiality and privacy were put into consideration regarding the data collected.

Developing the tools of data collection

- Parts (I and II) of the study tool were developed by the researcher based on literature review.
- Part III of study tool were translated into Arabic.

- The study tools were tested for content validity by a jury of five expertise in the field of Community Health Nursing, Faculty of Nursing in Tanta University before conducting the study.

A pilot study

A pilot study was carried out by the researcher on 10% (83 university students) of the subjects for testing the tool for its clarity, applicability and identify obstacles that may be encountered with the researcher during data collection. Accordingly, the necessary modifications were done. Those students were excluded from the study sample.

Reliability of the study tools was done by Cronbach's Alpha test and it was found to be (0.893) for the study tool. For knowledge (0.856) and for electronic health literacy questionnaire (e-HLQ) (0.882).

6- Actual study

- The data were collected by the researcher over a period of six months starting from October 2023 to the end of March 2024.
- The study students were asked to fill the questionnaire according to the schedule of their lectures and sessions by online Google form.
- The average time spent for each student to fill the questionnaire was 20 minutes.

Statistical analysis

- The data were organized, tabulated and statistically analyzed using statistical package for social studies (SPSS) version 23. The mean, standard deviation and range were calculated for quantitative data. For categorical variables numbers and percent were calculated. Comparison was done using chi-square test (χ^2). Pearson's correlation coefficient (r) was used to identify correlation between variables. A significance was adopted at $P<0.05$ for interpretation of results of tests of significance (*). Also, highly significant was adopted at $P<0.01$ for interpretation of results of tests of significance (**).

Results

Table (I): Represents the studied students' distribution according to their socio-demographic characteristics . The table shows that, slightly less than half (49.3%) of the studied students were in the age group 18-≤20 years and nearby two- thirds (65.4%) of them were females. Additionally, the table shows that (47.6% and 39.9%) of studied students' fathers 'and mothers' education respectively had university and post university education. The majority (89%) of students' fathers studied were working compared to (39.2%) of their mothers.

Regarding the place of residence, slightly more than one half (50.4%) of the studied students were from urban areas. Slightly more than two-thirds (67%) had enough income.

Table (II): Represents the studied students' distribution according to their health history. This table illustrates that the majority (86.3% and 93%) of the studied students respectively did not suffer from any chronic disease and did not smoke, only 7.6 % were suffering from anemia. However, less than three

quarters (71.7%) did not perform routine checkup.

Figure (1): Represents the studied students' distribution according to their sources of information about electronic health literacy. The figure represents that more than three-quarters (78.2%) of the studied students used social media to find information about electronic health followed by less than two-thirds (63.6%) used web pages, then electronic health application (59.5%), more than one-half (56.2%) used books, journal and magazine, articles. On the other side, 31.1% of them did not use any source to find electronic health information.

Figure (2): Represents the studied students' distribution according to their levels of knowledge about electronic health literacy. The figure shows that, 38.3% of the studied students had low level of knowledge and slightly more than one third (35.4%) of them had high level of knowledge. While slightly more than one quarter (26.2%) had moderate level of knowledge.

Figure (3): Represents the studied students' distribution according to their levels of electronic health literacy. The figure shows that, more than one half (56 %) of the studied students had good e-health literacy level. Meanwhile, 44% of them had poor e-health literacy level.

Table (III): Represents the relation between studied students' socio-demographic characteristics and their levels of knowledge about electronic health literacy. The table reveals that, there was a highly statistically significant relation between level of knowledge and socio-demographic characteristics of the studied students including academic year, age, level of mother education, and place of resistance (χ^2 =19.203, 21.603, 19.439, and 21.327), ($p<0.01$**). Also, a statistically significant relation was found between level of knowledge sex, level of father education, and father's occupation (χ^2=6.192, 16.592, and 6.428), ($p<0.05$*). Meanwhile, there was no statistically significant relation between the level of knowledge and other socio-demographic characteristics including working in health field, mother's occupation, and family income (χ^2=3.555, 3.882, and 4.103).

Table (IV): Represents the relation between studied students' socio-demographic characteristics and their levels of electronic health literacy. The table reveals that, there was a highly statistically significant relation between levels of electronic health literacy and socio - demographic characteristics including academic year, level of father education, and place of residence (χ^2=10.817, 21.375, and 8.217), ($p<0.01$**). Additionally, a statistically significant relation was found between levels of electronic health literacy and age (χ^2=7.466), ($p<0.05$*). Meanwhile there was no statistically significant relation between their levels of electronic health literacy and others socio - demographic variables including sex, level of mother education, father's and mother's occupation, working in health field, and family income

(χ^2=0.32 , 3.832, 0.819, 1.040 and 4.442).

Table (V): Relation between students' routine medical checkup and electronic health literacy levels. The table reveals that, there was a statistically significant relation between students' routine medical checkup (χ^2=7.619) and their levels of electronic health literacy (**p<0.05*).**

Table (VI): Represents the relation between students' knowledge about electronic health literacy and electronic health literacy levels. The table reveals that, there was a highly statistically significant relation between levels of students' knowledge about electronic health literacy (χ^2=129.766) and their levels of electronic health literacy at (**p<0.01**).**

Table (VII): Represents the relation between sources of the studied students' knowledge about electronic health and their levels of electronic health literacy. The table shows that, there was a highly statistically significant relation between all sources of the studied students 'knowledge about electronic health including (social media, books, journal and magazine articles web page, and electronic health application) (χ^2=47.909, 15.262, 40.141, and 74.567) and their levels of electronic health literacy (p<0.01**).

Table (VIII): Represents correlation between age of the studied students, total knowledge score and total e- health literacy score. The table reveals that, age of the studied students was negatively and statistically significantly correlated with their total knowledge and total e- health literacy score. On the other hand, total knowledge score was positively and statistically significantly correlated with total e-health literacy score.

Table (I): The studied students' distribution according to their socio-demographic characteristics

Students' socio-demographic characteristics	The studied students (n=827)	
	No	%
Name of faculty		
Faculty of Art	**670**	**81.0**
Faculty of Physical Education	**157**	**19.0**
Academic year		
Second level	**264**	**31.9**
Third level	**251**	**30.4**
Forth level	**312**	**37.7**
Age in years		
18-20	**408**	**49.3**
21-22	**352**	**42.6**
23-25	**67**	**8.1**
Sex		
Male	**286**	**34.6**
Female	**541**	**65.4**
level of fathers' education		
Illiterate or reading and writing	**48**	**5.8**
Elementary education	**111**	**13.4**
Secondary education	**274**	**33.1**
University and post university education	**394**	**47.6**
level of mothers' education		
Illiterate or reading and writing	**60**	**7.2**
Elementary education	**114**	**13.8**
Secondary education	**323**	**39.1**
University and post university education	**330**	**39.9**
Fathers' occupation		
Work	**736**	**89.0**
Not work	**91**	**11.0**
Mothers' occupation		
Work	**324**	**39.2**
Housewife	**503**	**60.8**
Place of residence		
Rural	**410**	**49.6**
Urban	**417**	**50.4**
Family income		
Enough	**554**	**67.0**
Not enough	**138**	**16.7**
Enough and save	**135**	**16.3**

Table (II): The studied students' distribution according to their health history

Health history	The studied students (n=827)	
	No	%
# Suffering from any chronic diseases		
Don't suffer any chronic diseases	**714**	**86.3**
Hypertension	**25**	**3.0**
Heart disease	**20**	**2.4**
Joint and bone diseases	**42**	**5.1**
Autoimmune diseases	**29**	**3.5**
Diabetes	**16**	**1.9**
Kidney diseases	**16**	**1.9**
Anemia	**63**	**7.6**
Other diseases	**28**	**3.4**
Smoking		
Yes	**58**	**7.0**
No	**769**	**93.0**
Performing routine checkup		
Don't perform a routine checkup	**593**	**71.7**
Every six months	**98**	**11.9**
Every year	**136**	**16.4**

More than one disease was allowed.

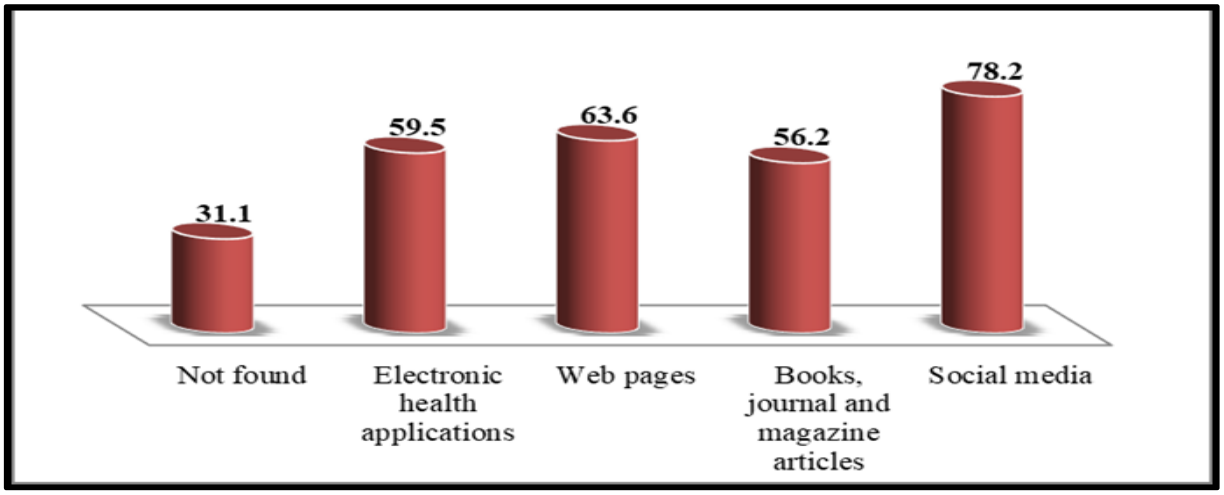

Figure (1): The studied students' distribution according to their sources of information about electronic health literacy

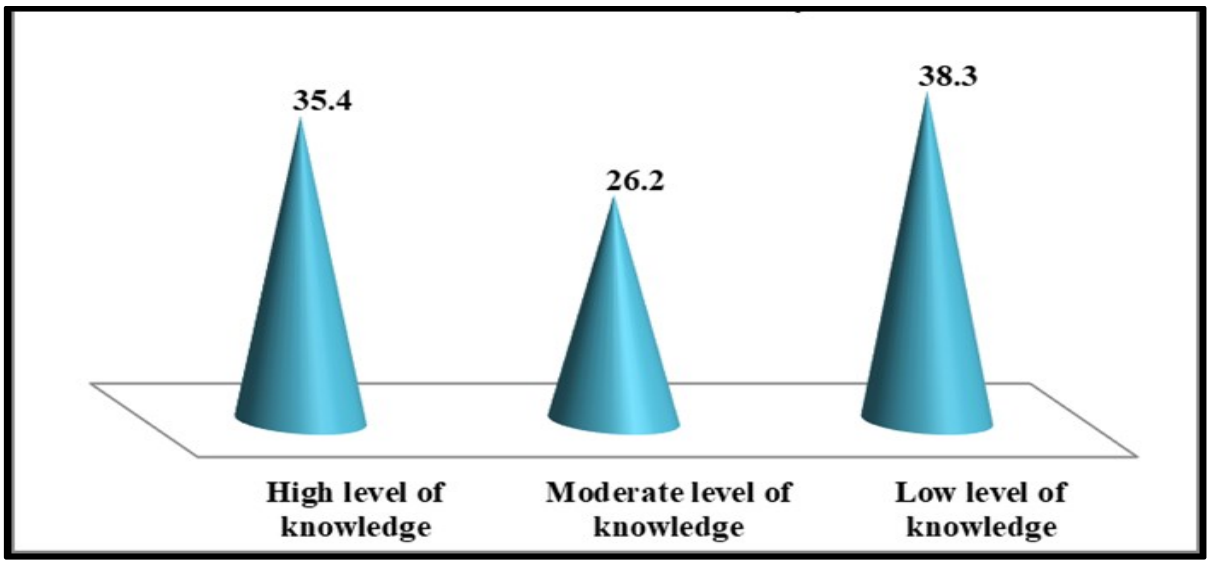

Figure (2): The studied students' distribution according to their levels of knowledge about electronic health literacy

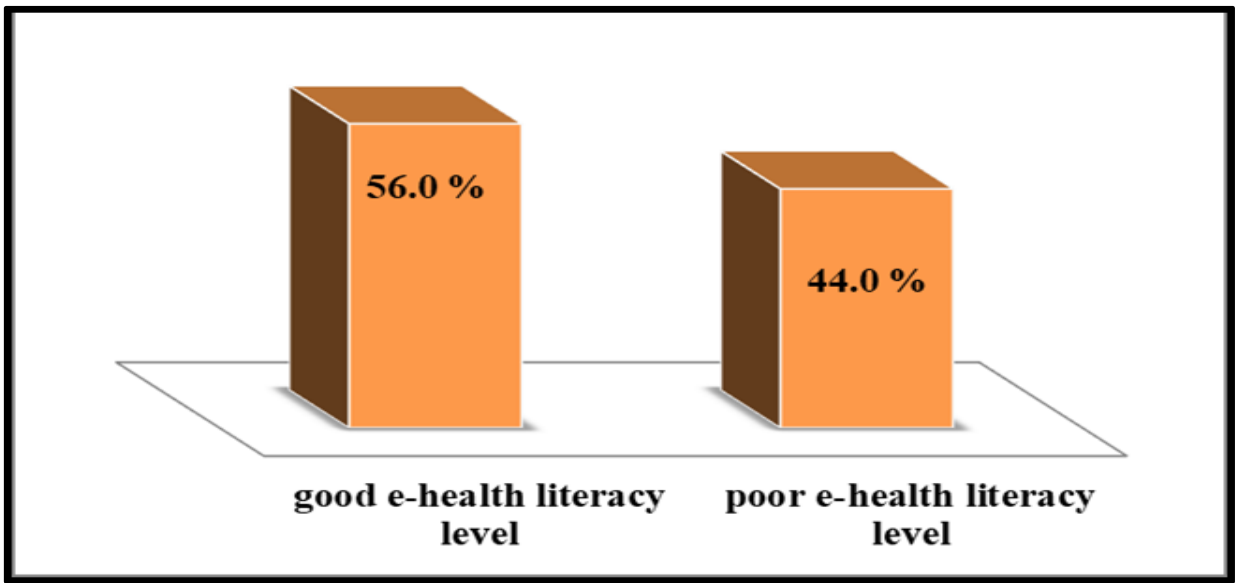

Figure (3): The studied students' distribution according to their levels of electronic health literacy

Table (III): Relation between studied students' socio-demographic characteristics and their levels of knowledge about electronic health literacy

Socio-demographic characteristics	The studied students (n=827)						χ^2 P
	Levels of knowledge						
	Lowknowledge (n=317)		Moderate knowledge (n=217)		High knowledge (n=293)		
	No	%	No	%	No	%	
Academic year							
Second level	79	29.9	88	33.3	97	36.7	19.203 0.001**
Third level	95	37.8	66	26.3	90	35.9	
Forth level	143	45.8	63	20.2	106	34.0	
Age in years							
18-20	136	33.3	127	31.1	145	35.5	21.603 0.001**
21-22	147	41.8	70	19.9	135	38.4	
23-25	34	50.7	20	29.9	13	19.4	
Sex							
Male	126	44.1	70	24.5	90	31.5	6.192 0.045*
Female	191	35.3	147	27.2	203	37.5	
level of fathers' education							
Illiterate or reading and writing	15	31.3	7	14.6	26	54.2	16.592 0.011*
Elementary education	36	32.4	28	25.2	47	42.3	
Secondary education	109	39.8	85	31.0	80	29.2	
University and post university education	157	39.8	97	24.6	140	35.5	
level of mothers' education							
Illiterate or reading and writing	18	30.0	9	15.0	33	55.0	19.439 0.003**
Elementary education	45	39.5	22	19.3	47	41.2	
Secondary education	130	40.2	98	30.3	95	29.4	
University and post university education	124	37.6	88	26.7	118	35.8	
Fathers' job							
Work	123	39.0	199	27.0	250	34.0	6.428 0.040*
Not work	194	33.0	18	19.8	43	47.3	
If the fathers' works, does he work in the health field							
Yes	111	35.0	39	33.3	37	31.6	3.555 0.169
No	206	38.9	178	25.1	256	36.1	
Mothers' job							
Work	129	39.8	93	28.7	102	31.5	3.882 0.144
Housewife	188	37.4	124	24.7%	191	38.0	
If the mothers' works, does she work in the health field							
Yes	24	32.9	23	31.5	26	35.6	1.469 0.480
No	293	38.9	194	25.7	267	35.4	
Place of residence							
Rural	125	30.5	119	29.0	166	40.5	21.327 0.001**
Urban	192	46.0	98	23.5	127	30.5	
Family income							
Enough	209	37.7	142	25.6	203	36.6	4.103 0.392
Not enough	61	44.2	33	23.9	44	31.9	
Enough and save	47	34.8	42	31.1	46	34.1	

p<0.05* significant p<0.01 highly significant**

Table (IV): Relation between the studied students' socio-demographic characteristics and levels of electronic health literacy

Socio-demographic characteristics	The studied students (n=827)				χ^2 P
	Levels of electronic health literacy				
	Poor e-health literacy level (n=364)		Good e-health literacy level (n=463)		
	No	%	No	%	
Academic year					
Second level	103	39.0	161	61.0	10.817 0.004**
Third level	101	40.2	150	59.8	
Forth level	160	51.3	152	48.7	
Age in years					
18-20	171	41.9	237	58.1	7.466 0.024*
21-22	153	43.5	199	56.5	
23-25	40	59.7	27	40.3	
Sex					
Male	122	42.7	164	57.3	0.327 0.568
Female	242	44.7	299	55.3	
level of fathers' education					
Illiterate or reading and writing	24	50.0	24	50.0	21.375 0.001**
Elementary education	27	24.3	84	75.7	
Secondary education	122	44.5	152	55.5	
University and post university education	191	48.5	203	51.5	
level of mothers' education					
Illiterate or reading and writing	25	41.7	35	58.3	3.832 0.280
Elementary education	41	36.0	73	64.0	
Secondary education	147	45.5	176	54.5	
University and post university education	151	45.8	179	54.2	
Fathers' job					
Work	326	44.3	410	55.7	0.211 0.646
Not work	38	41.8	53	58.2	
If the fathers 'works, does he work in the health field					
Yes	56	47.9	61	52.1	0.819 0.210
No	308	43.4	402	56.5	
Mother's job					
Work	152	46.9	172	53.1	1.817 0.178
Housewife	212	42.1	291	57.9	
If the mothers' works, does she work in the health field					
Yes	28	38.4	45	61.6	1.040 0.308
No	336	44.6	418	55.4	
Place of residence					
Rural	160	39.0	250	61.0	8.217 0.004**
Urban	204	48.9	213	51.1	
Family income					
Enough	240	43.3	314	56.7	4.442 0.108
Not enough	71	51.4	67	48.6	
Enough and save	53	39.3	82	60.7	

p<0.05* significant p<0.01 highly significant**

Table (V): Relation between students' routine medical checkup and electronic health literacy level

Routine medical checkup	The studied students (n=827) levels of electronic health literacy				χ^2 P
	Poor e-health literacy (n= 364)		Good e-health literacy (n= 463)		
	No	%	No	%	
Do you perform a routine checkup					
No, don't perform a routine checkup	278	46.9	315	53.1	7.619 0.022*
Yes, Every six months	39	39.8	59	60.2	
Yes, Every year	47	43.6	89	65.4	

Table (VI): Relation between students' knowledge about electronic health literacy and levels of electronic health literacy

Knowledge levels	The studied students (n=827) Levels of electronic health literacy				χ^2 P
	Poor e-health literacy (n= 364)		Good e-health literacy (n= 463)		
	No	%	No	%	
Low level of knowledge	216	68.1	101	31.9	129.766 0.001**
Moderate level of knowledge	79	36.4	138	63.6	
High level of knowledge	69	23.5	224	76.5	

Table (VII): Relation between sources of the studied students' knowledge about electronic health and levels of electronic health literacy

Sources of students' knowledge about electronic health	The studied students (n=827) levels of electronic health literacy				χ^2 P
	Poor e-health literacy level (n=364)		Good e-health literacy level (n=463)		
	No	%	No	%	
Social media					47.909 < 0.001**
Yes	244	37.7	403	62.3	
No	120	66.7	60	33.3	
Books, journal and magazine articles					15.262 < 0.001**
Yes	177	38.1	288	61.9	
No	187	51.7	175	48.3	
Web page					40.141 < 0.001**
Yes	188	35.7	338	64.3	
No	176	58.5	125	41.5	
Electronic health application					74.567 < 0.001**
Yes	156	31.7	336	68.3	
No	208	62.1	127	37.9	
Not found					1.808 0.102
Yes	122	47.5	135	52.5	
No	242	42.5	328	57.5	

p<0.05* significant p<0.01 highly significant**

Table (VIII): Correlation between age of the studied students, total knowledge score and total e- health literacy (e-HL) score

Variables	Total knowledge score	Total e - health literacy score
	r P	r P
Age	-0.129- 0.001**	-0.143- 0.001**
Total knowledge score	-	0.560 0.001**

Discussion

One of the most important concerns that requires proper communication is the availability of health information. Improving health care quality and health education programs face a basic issue in health literacy. People with e-health literacy abilities are able to use electronic health information resources appropriately and efficiently in such a setting, as well as locate reliable and high-quality health information online **(Almeida, Pinto, Correia, Veiga, & Almeida, 2024)**.

Information technology and internet are becoming a more common use in education institutions especially among university students so, it expected to increase electronic health literacy level. This was approved by the current study as; it was found that slightly more than one half of the studied students had good e-health literacy level **(figure 3)**. From researcher's perspective, this can be justified as the majority of students' fathers studied were working and slightly more than two-thirds of the studied student had enough income to use internet and smart phones to search on information in the current study and more than one half of the studied students were from urban areas where the internet and information technology were found **(Table I)**.

Similarly, **Mekawy, Ismail, and Mohamed, (2020),** who conducted a study to assess electronic level of health-literacy between university nursing students in Egypt and found that 50.1% of students had high level of digital health literacy and about 40.4% of them had moderate level . This may be due to the similarity of educational culture and availability of internet to find and evaluate e-health information.

On the other hand, **Uysal, Ceylan and Koç, (2020)** conduct a study applied to university in nursing, law and Islamic sciences students to assess health literacy at a university in Turkey found that 58.9% had inadequate and problematic health literacy level. From the research investigator point of view, this may be due to low awareness of students in this study about health literacy and access to the internet is limited.

Improving knowledge and increasing awareness of student about electronic health literacy is crucial to improve their skills and abilities to find good

health informatio**.** By the way, the current study found that slightly more than one third of them had high level of knowledge concerning electronic health literacy **(Figure2).**

The findings of the current study is in contrast with the findings of the study conducted by **Tarihoran, Anggraini, Juliani, Ressa, and Fardan, (2021)** who applied a study to assess electronic health literacy among Indonesian student nurses and found that the majority (92.6%) had good level of knowledge and internet skill about e-health such as where to find and evaluate health information resources on the internet.. From the researcher point of view, this may be due to the spread of social media used between the studied students in the current study to search for health information easily, but this information may be incorrect since more than three-quarters of the studied students used social media to find information about electronic health **(Figure 1)**.

The level of student**'**s knowledge regarding health literacy can be affected by many factors. In the current study, there was a statistically significant relation between level of knowledge and socio-demographic characteristics of the studied students including academic year, age, sex, level of parent education, place of resistance, father's occupation. Meanwhile, there was no statistically significant relation between the level of knowledge and other socio-demographic characteristics which were included working in health field, mother's occupation, and family income **(Table III)**.

These findings are consistent with **Top and Yigitbas, (2020)** who conducted a study to assess electronic level of health literacy in adolescents and they found that socio demographic data such as educational level, sex and age have a major impact on knowledge level about electronic health literacy. From researcher's perspective, this can be justified by the entrance of technology in all life fields and become useful for all age group.

On the other hand, **Aldebasi, Alhassan, Al-Nasser and Abolfotouh. (2020)** who conducted a study to assess degree to which Saudi medical students are aware of the development and use of online resources for health-related information to support healthcare services and found that the level of knowledge about electronic health affected by family income. From researcher's perspective, this can be justified by the high cost of using internet technology to search and evaluate about health information.

The electronic health literacy level was affected by many determinants. This was approved by the current study as there was statistically significant relation between levels of electronic health literacy and socio-demographic characteristics which were included academic year, level of father education, place of residence, age, and students' routine medical checkup .Meanwhile, there was no statistically significant relation with sex, father's and mother's occupation,

working in health field, and family income **(Table IV and V)**.

Likewise, a study conducted by **Holt ,Overgaard, Engel and Kayser , (2020)** who assess digital literacy, e-health literacy, and health literacy among entry- and graduate-level Danish nursing students and found that health condition and routine checkup influence on students' electronic health literacy and parents' job in the medical field had no effect on e-health literacy. Conversely, **Top and Yigitbas, (2020)** found that there was no effect was found between the level of electronic health literacy level and routine checkup among students in their study. This is justified by similarity of educational level and age group in those studies and the current study. Meanwhile, the study of **Top and Yigitbas, (2020)** had the difference in age group and different culture in this study than the current study.

Regarding the relation between sources of the studied students' knowledge about electronic health and their levels of electronic health literacy, **the** current study revealed a statistically significant relation between all sources of the studied students**'** knowledge about electronic health and their levels of electronic health literacy **(Table VII)**.

The results of the present study are similar to **Almeida et al.,(2024)** who conducted a study to assess Portuguese university students' e-health literacy, knowledge, attitude, and online health information and found that higher e-health literacy among students led to greater utilization of health information sources. From the research point of view, this can be justified by frequent access to sources, allows students to acquire more health-related knowledge and improve their capacity to assess it.

Enhancing knowledge and awareness of student about electronic health literacy and interfere the concepts of health literacy in their curriculum can have appositive effect on electronic health literacy level. The current study found that there was a statistically significant relation between levels of students' knowledge about e-health literacy and their electronic health literacy level **(Table VI)**. Also, the total knowledge score was positively and statistically significantly correlated with total e- health literacy score **(Table VIII)**.

The findings of the present study are congruent with **Li, Cui, Kaminga, Cheng, and Xu, (2021)** who conduct a study to assess the relationships between Chinese college students' health literacy, e-health literacy, and COVID-19-related health behaviors and found that knowledge levels were positively associated with e-health literacy. From the researcher point of view, this can be justified as the more the students know about use of technology to get health information, the more they will they use it .

Electronic health literacy and level of knowledge are affected by age. The current study reveals that, age of the studied students was significant negative correlation with their total knowledge and total e- health literacy score **(Table VIII)**. Similarly, **kemp**

et al., (2021) who conducted a study to assess health literacy, digital health literacy and the implementation of digital health technologies in cancer care and found that age impact on electronic health literacy, raising age group has negative effect on level of health literacy. From researcher' s perspective, this may be due to the increasing of age group make the individual become preoccupied with the other responsibility and lower the motivation to use technology .

On the other hand , **Shekofteh, Ghaedi, Valizadeh-haghi, and Baghestani, (2022)** who assess healthcare students' e-health literacy and the impact of demographic factors and found that significant positive correlation between age and e-health literacy This correlation can be explained by increased experience with using technology in the healthcare system. Older students are more equipped to interact with healthcare experts and navigate the healthcare system due to their increased age and experience.

Conclusion

Based on the findings of the present study, it can be concluded that there were significant gaps in electronic health knowledge and literacy among humanistic science students, highlighted by a high reliance on social media and web pages as primary information sources. While a notable more than one- third of students demonstrated low knowledge levels about electronic health literacy and exhibited poor e-health literacy level.

Recommendations

Based on the findings of the present study, the following recommendations were suggested:

- Initiation program of e-health literacy for university students. In which students may demonstrate clinical practices on resources of e-health on the internet.
- Providing workshops for the university students about basic concepts of medical terminology and the information given on medications and have the ability to read prescriptions in order to treat health-related issues.
- Further studies should be conducted on humanistic students about implement health educational program to improve electronic health literacy level.

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