

ORIGINAL RESEARCH

# Health Information Needs and Reliability of Sources Among Nondegree Health Sciences Students: A Prerequisite for Designing eHealth Literacy



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## Abstract

**BACKGROUND** Understanding health information needs and health-seeking behavior is a prerequisite for developing an electronic health information literacy (EHIL) or eHealth literacy program for nondegree health sciences students. At present, interest in researching health information needs and reliable sources paradigms has gained momentum in many countries. However, most studies focus on health professionals and students in higher education institutions.

**OBJECTIVE** The present study was aimed at providing new insight and filling the existing gap by examining health information needs and reliability of sources among nondegree health sciences students in Tanzania.

**METHOD** A cross-sectional study was conducted in 15 conveniently selected health training institutions, where 403 health sciences students were participated. Thirty health sciences students were both purposely and conveniently chosen from each health-training institution. The selected students were pursuing nursing and midwifery, clinical medicine, dentistry, environmental health sciences, pharmacy, and medical laboratory sciences courses. Involved students were either in their first year, second year, or third year of study.

**RESULTS** Health sciences students' health information needs focus on their educational requirements, clinical practice, and personal information. They use print, human, and electronic health information. They lack eHealth research skills in navigating health information resources and have insufficient facilities for accessing eHealth information, a lack of specialists in health information, high costs for subscription electronic information, and unawareness of the availability of free Internet and other online health-related databases.

**CONCLUSION** This study found that nondegree health sciences students have limited skills in EHIL. Thus, designing and incorporating EHIL skills programs into the curriculum of nondegree health sciences students is vital. EHIL is a requirement common to all health settings, learning environments, and levels of study. Our future intention is to design EHIL to support nondegree health sciences students to retrieve and use available health information resources on the Internet.

**KEY WORDS** electronic health information literacy, eHealth literacy, health information needs, health information sources, information-seeking behavior, health sciences students

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## INTRODUCTION

Health information needs and the reliability of sources among health sciences students are increasingly significant components for supporting health sciences education. Students need a wide range of health information in order to meet their health science educational needs.<sup>1</sup> Understanding students' information needs and sources as well as how they obtain information helps a health information specialist to provide relevant services that encourage students to maintain up-to-date knowledge related to their field, as well as become lifelong learners.<sup>2</sup> The relevance of health information is measured by 2 indicators: first, information needs, which is a recognition that the person's knowledge is inadequate to satisfy a purpose that one needs to achieve; second, information-seeking behavior, which is the purposive searching for information because of a need to satisfy some goals.<sup>3</sup> Rapid change in the manner in which health information is created, stored, retrieved, and transmitted has resulted in increasing challenges that health information professionals face to ensure proper and timely access to relevant health information by students.<sup>4</sup> In the recent years, access to health information in an electronic environment has been made possible as a result of the advancement of technology.

Health sciences settings (including educational institutions), in relation to developing countries, experience difficulty in searching for health information that could support their education as well as clinical practice.<sup>1,5,6</sup> In the health sector, information overload is one of the main challenges, where various information sources have emerged and doubled every 2 decades.<sup>7,8</sup> Recently, health information has been presented in numerous formats to enable users to access various options for finding their health information. Health sciences students are required to have access to health information in both print and electronic forms in order to support their educational, research, clinical, and service activities.<sup>9</sup> The rapid proliferation of health information in the current era has important implications for health education. It is thus crucial for health sciences students to be exposed to and use different sources of health information, including print and electronic formats, as well as human sources, in order to support the access and use of health-related information for their education, as well as during provision of health care services.

The present study compared the difference between students' levels of study (certificate,

diploma, and advanced diploma) rather than location of health training institutions (urban and rural), years of study (first, second, and third), or gender (men and women). The main reason is to design different electronic health information literacy programs that cater to the needs of all levels of study. This will enable health-training institutions to meet educational health information needs if their requirements differ. However, health information needs and reliability sources of nondegree programs are different from undergraduate or postgraduate programs in terms of settings, levels of study, duration of study, awards, and competence level. Hence, this research aims to fill this gap by examining health information needs and the sources of information of nondegree health sciences students in Tanzania. Furthermore, the results of this survey will provide the rationale and guidance behind the design of electronic health information literacy programs for nondegree health sciences students. This study was guided by 3 main research questions (RQ):

RQ1: What are the health information needs of non-degree health sciences students in health training institutions in Tanzania?

RQ2: To what extent are health sciences students in nondegree programs aware of and use print, electronic, and human health information sources to meet their education information needs?

RQ3: What challenges are encountered by nondegree health sciences students in meeting their health information needs to support their education?

By responding to these questions, this study will contribute further insights into current knowledge in the field and improve the general understanding of various aspects of nondegree health sciences students' health information needs and their perceptions of the reliability of health information resources and information-seeking behavior for their education requirements. The findings of this study are expected to serve as baseline evidence and lead to specific recommendations to inform researchers in developing and designing future learning management system interventions for teaching and learning EHIL.

## METHODS

**Study Design.** A cross-sectional study was conducted in 15 conveniently selected health training institutions, for which 450 health sciences students were invited to participate in this study. Thirty

health sciences students were both purposely and conveniently chosen from each health-training institution. The selected students were pursuing nursing and midwifery, clinical medicine, dentistry, environmental health sciences, pharmacy, and medical laboratory sciences courses. The involved students were in either their first, second, or third year of study.

**Study Setting.** This study was conducted in selected health training institutions in Tanzania. These training institutions are located in various districts and regions countrywide, and they offer different courses such as nursing and allied health sciences. The government, under the Ministry of Health and Social Welfare, Department of Human Resource for Health Development, manages activities in these nondegree health training institutions. *Nondegree program* in this study means that after course completion the students are awarded a certificate, ordinary diploma, or higher diploma (advanced diploma). In this case, 15 health training institutions were conveniently chosen to participate in this study.

**Data Collection.** This study employed a mixed method for data collection. As such, both quantitative and qualitative data were collected from closed and open-ended questions. Generally closed-ended questions serve as the main data collection approach, whereas 1 open-ended question serves to collect supplemental information. The survey instrument was pretested among a different group of health sciences students to check the consistency and validity of the questions. The survey questionnaires consisted of 5 parts: basic demographic information, health information needs, health information-seeking behavior, sources of health information, and challenges. The questionnaire was modified from related studies on health information needs and health information-seeking behavior particular to health settings.<sup>10-12</sup> Various 4-point Likert scales were used for some questions related to the health information needs and health information-seeking behavior variables. The questionnaire survey and consent form were sent through e-mail to all tutors of each respective health training institution. Tutors printed the survey and consent forms for distribution among the selected participating students and the principal of each health training institution. Participants were informed that participation in this study was entirely voluntary. Tutors administered a 15-minute survey to collect data from students. Afterward, the survey questionnaires were sent to the primary investigator for subsequent analysis.

**Measures of Data Analysis.** On receipt of all filled-in survey questionnaires from respective tutors of chosen health training institutions, data analysis procedures commenced. SPSS (version 22) was used to analyze data collected from closed-ended questions. Descriptive analysis was used to summarize statistics, and nonparametric statistic tests were conducted for comparison purposes. Data collected from open-ended questions were analyzed by summarizing responses.

## RESULTS

This section presents the study results with focus on the following aspects: basic personal information, health information needs, health information-seeking behavior, and sources of health information, as well as challenges and suggestions in accessing health information.

**Demographic Information.** A total of 403 (89.6%) out of 450 health sciences students from health training institutions responded to the surveys. Male respondents comprised 56.1%, whereas female respondents made up 43.9%. Thirty-eight percent of respondents indicated themselves as studying nursing, followed by clinical medicine, 23.6%; laboratory, 12.9%; environmental health sciences, 12.4%; dental therapy, 9.7%; pharmacy, 2.5%; and radiography, 0.7%. Also, respondents were asked to identify their level of study. The results indicate that 45.9% of students were enrolled in diploma courses, followed by 40.9% in certificate courses, and 13.2% in advanced diploma classes. Furthermore, in response to the question asking respondents to indicate their year of study, results revealed that 46.7% of respondents were first-year students, 32.3% were second-year students, and 21.1% were in their third year of studies. Health training institutions were divided into rural (50.6%) and urban (49.4%), according to their locations.

**Health Information Needs of Health Sciences Students.** Respondents were asked to indicate whether they needed health information to support their education. Overall, 97% of respondents indicated that they needed health information to support their education, and 3% of respondents did not indicate yes or no. On the other hand, respondents were asked the main reasons for seeking health sciences information. [Table 1](#) presents the main reasons influencing students to seek health information. “To improve knowledge” was the main reason, whereas “for use during internship” was indicated as the least common reason.

**Table 1. Responses to “What Are Your Main Reasons/Purposes for Seeking Health Information?”**

Reasons	Frequency	%
To improve knowledge	309	76.7
To prepare for examination	308	76.4
For patient care	303	75.2
For continue education	294	73
For keeping up-to-date in the field	283	70.2
For doing assignments	281	69.7
For sharing knowledge with colleagues	281	57.3
To conduct research	268	66.5
To improve clinical decision-making	268	66.5
For professional and carrier development	265	65.8
For doing class presentation	256	63.5
For hospital management	251	62.3
For preparation to attend class	248	61.5
For use during field work	234	58.1
For answering patients' questions in the clinical Area	212	52.6
For answering colleagues' questions	187	46.4
For use during internship	91	22.6

**Health Information—Seeking Behavior of Health Sciences Students.** In this section, we also asked several questions to gauge health sciences students' health information—seeking behaviors. In response to the questions asking about the availability of libraries in their health training institutions, 89% of the participants answered “yes,” a library was available, whereas 10.2% answered “no.” In addition to the previous question, principle investigators asked about the use of health training institution libraries to access health information; 87.1% of respondents confirmed that “yes,” their library had such access, whereas 12.9% of respondents answered “no.” We also asked, “How well do you rate the information services provided by your health training institution library?” In response to this question, a majority (61.3%) indicated “good,” followed by “poor” (22.8%), “very poor” (8.2%), and lastly “excellent” (7.7%).

In this study, researchers were also keen to understand how often health sciences students used their local health training institution library for different activities. A nonparametric Kruskal-Wallis test was used to compare the frequency across different levels of study. The significance levels ( $P = \text{value}$ ) are reported in Table 2. Statistically significant differences were found in 7 out of 12 categories of activities ( $P < .05$ ). The output for the follow-up pairwise analysis indicated that students who took certificate courses reported significantly more frequent use of health training institution libraries for accessing computers ( $P = .000$ ) and

attending information literacy training ( $P = .005$ ) than did ordinary diploma and advanced diploma students.

The study also compared reported differences in information-seeking frequency between levels of study, and the statistics and results of Kruskal-Wallis test are shown in Table 3. Overall, 10 out of 14 activities turned out to be statistically significant. Generally, follow-up pairwise tests revealed that advanced diploma students often sought health information for doing assignments ( $P = .001$ ) and for hospital management ( $P = .004$ ). In these 2 areas (assignments and hospital management) the results indicate greater statistical significance in the case of advanced diploma students than for the certificate and ordinary diploma categories. *Conducting research* ( $P = .000$ ) and *keeping up-to-date* ( $P = .000$ ) were reported significantly across all levels of study. Also, the certificate programs revealed greater significance in *writing field work reports* ( $P = .000$ ), *sharing knowledge with colleagues* ( $P = .000$ ), *answering colleagues' questions* ( $P = .001$ ), and *answering patients' questions in clinical areas* ( $P = .000$ ) than did other levels of study.

**Sources of Health Information.** Researchers were interested in understanding where respondents obtained the health information that supported their health sciences education. Their health training institution library (79.9%) was indicated as the most often consulted, followed by online information databases (78.4%). Furthermore, 71.7% indicated their instructors, 64.8% colleagues, and 35.2% mentioned other sources. On the other hand, information services outside their health training institution accounted for low responses (15.6%) in this study.

The study also assessed sources of information respondents normally use to seek health information. The responses in Table 4 indicate that respondents normally seek health information from numerous sources: Textbooks (77.2%) remain the most preferred health information resources, followed by lecture notices (74.4%). On the other hand, online tutorials (16.4%) were reported to be the least accessed sources of health information.

Additionally, this study asked how often respondents used the sources as listed in Table 5 to seek health information. Table 5 indicates statistical significance for 15 out of 19 sources of health information ( $P = .05$ ). Follow-up pairwise tests revealed that 7 source categories were indicated significantly more often among students who studied in certificate programs than for those who studied

at other levels: electronic books, search engines such as Google or Yahoo, hospital specialists, research reports, curricula, library catalogues, and websites. On the other hand, students who studied in advanced diploma courses indicated that they used printed textbooks, print journals, and tutors more often than for other levels. Furthermore, electronic information sources and training handouts were tied more significantly to the certificate level than to advanced diplomas.

## DISCUSSION

The results of this study provide a better understanding of nondegree health sciences students' health information needs, the reliability of their sources, and their seeking behaviors related to various resources. Understanding the health information needs, reliability of available sources, and health information-seeking behavior of users in order to act as the driving force to undertake a literature search seems very important for health sciences librarians. The survey data indicate that health sciences students studying nondegree courses require health sciences information to support their education. Table 1 indicates various reasons for seeking health information, also producing similar results to a prior study<sup>12</sup> that indicated health sciences students need information pertaining to diagnosing patients' problems, possible treatments, general information about diseases, procedures used in each type of case, and issues related to general management.

The use frequency distribution for health sciences libraries shown in Table 2 could strongly explain the significance of student study levels on the activities performed when visiting the library. The Kruskal-Wallis test reveals that comparisons with levels of study found more significant differences than other groupings. Test results indicate that students enrolled in the certificate level program visited the library more often than those enrolled in other courses (diploma and advanced diploma). The reasons for this are that certificate students are those who have just completed their ordinary levels (lower levels of education, hence they have less knowledge) and thus they do not have any prior knowledge and training on health-related issues. Having limited knowledge on health issues tends to force certificate students to rely more on the library as a source of health information for their study. In comparison, diploma and advanced diploma students tend to not to use the library often because at this stage of

**Table 2. Responses to "How Frequently Do You Use Your Health Training Institution Library for the Following Activities?"**

Activities	Certificate	Diploma	Advanced Diploma	Sig. Kruskal-Wallis
<b>For studying</b>				
N	157	165	50	0.167
Mean	3.07	2.89	3.24	
Medium	3.00	3.00	3.50	
<b>For discussion with colleagues</b>				
N	154	156	47	0.190
Mean	2.47	2.24	2.34	
Medium	3.00	2.00	2.00	
<b>For checking e-mails</b>				
N	147	147	42	0.130
Mean	1.45	1.60	1.64	
Medium	1.00	1.00	1.00	
<b>For textbooks collection</b>				
N	148	151	49	0.006 <sup>†</sup>
Mean	2.74	2.69	3.20	
Medium	3.00	3.00	3.00	
<b>For journal collection</b>				
N	145	141	44	0.031
Mean	1.77	1.69	2.14	
Medium	1.00	1.00	2.00	
<b>For computer access</b>				
N	148	153	47	0.000 <sup>†</sup>
Mean	1.59	2.20	2.17	
Medium	1.00	2.00	1.00	
<b>For reference assistance from librarian</b>				
N	147	154	46	0.231
Mean	2.54	2.49	2.80	
Medium	3.00	3.00	3.00	
<b>Photocopying services in the library</b>				
N	144	149	47	0.071
Mean	1.63	1.48	1.53	
Medium	1.00	1.00	1.00	
<b>For access reserved materials</b>				
N	148	144	46	0.010 <sup>†</sup>
Mean	2.59	2.23	2.28	
Medium	3.00	2.00	2.00	
<b>For attending information literacy training</b>				
N	143	142	40	0.005 <sup>†</sup>
Mean	1.64	1.96	2.13	
Medium	1.00	2.00	2.00	
<b>For personal interest/leisure</b>				
N	149	138	39	0.042 <sup>†</sup>
Mean	1.38	1.55	1.72	
Medium	1.00	1.00	1.00	
<b>For searching online information</b>				
N	149	148	44	0.000 <sup>†</sup>
Mean	1.47	2.08	1.89	
Medium	1.00	1.00	1.00	

Coded value of rating: 1, never; 2, rarely; 3, sometimes; 4, frequently.

\* Significance at  $P < .05$  level.

† Significance at  $P < .01$  level.



**Table 3. Responses to “How Often Do You Seek Health Information to Support the Following?”**

Activities	Certificate	Diploma	Advanced Diploma	Sig. Kruskal-Wallis
<b>Preparing for examination</b>				
N	152	159	45	0.074
Mean	3.33	3.42	3.58	
Medium	4.00	4.00	4.00	
<b>Preparing to attend class</b>				
N	154	153	48	0.561
Mean	3.14	3.10	3.27	
Medium	3.00	3.00	3.00	
<b>Doing assignment</b>				
N	156	157	48	0.001 <sup>†</sup>
Mean	3.12	2.95	3.52	
Medium	3.00	3.00	4.00	
<b>For patient care</b>				
N	150	149	42	0.103
Mean	2.75	2.77	3.17	
Medium	3.00	3.00	3.00	
<b>Presenting in the class</b>				
N	152	155	47	0.042 <sup>†</sup>
Mean	2.93	3.14	3.30	
Medium	3.00	3.00	3.00	
<b>Conducting research</b>				
N	146	147	47	0.000 <sup>†</sup>
Mean	1.70	2.33	2.94	
Medium	1.00	2.00	3.00	
<b>Writing field work reports</b>				
N	146	147	41	0.000 <sup>†</sup>
Mean	1.84	2.41	2.83	
Medium	1.00	3.00	3.00	
<b>Doing internship</b>				
N	141	135	35	0.388
Mean	1.65	1.86	1.89	
Medium	1.00	1.00	2.00	
<b>For hospital management</b>				
N	147	141	42	0.004 <sup>†</sup>
Mean	2.31	2.21	2.86	
Medium	2.00	2.00	3.00	
<b>Keeping up-to-date in the field</b>				
N	144	150	45	0.000 <sup>†</sup>
Mean	2.35	2.80	3.36	
Medium	2.00	3.00	4.00	
<b>Improve knowledge</b>				
N	157	159	47	0.001 <sup>†</sup>
Mean	3.18	3.52	3.53	
Medium	3.00	4.00	4.00	
<b>Sharing knowledge with colleagues</b>				
N	152	157	48	0.000 <sup>†</sup>
Mean	2.90	3.25	3.31	
Medium	3.00	3.00	4.00	
<b>Answering colleagues' questions</b>				
N	150	150	43	0.001 <sup>†</sup>
Mean	2.58	2.96	3.14	

(continued)

their academic careers, they are more open to the use of a diverse range of sources.

The study also compared reported differences in information-seeking frequency between levels of study. The Kruskal-Wallis test found that on 10 out of 14 activities significant differences between levels of study were reported (Table 3). A pairwise comparison found a significance in seeking information for hospital management on the part of students studying for an advanced diploma, mostly because they are more likely than their counterparts to have reached the management level (more senior) in various health facilities around the country. On the other hand, keeping up-to-date seems significant to all levels of study, because all of them need to conduct research and to be aware of new developments in the field, because we are all aware that in the health field there are constantly emerging technologies and diseases.

For health information sources, most nondegree health sciences students (79.9%) relied primarily on their local health training institution library to obtain health information for their education. This is similar to other related studies conducted elsewhere, wherein printed textbooks were identified as the primary sources of information for health sciences students.<sup>13</sup> This might be due to the fact that nondegree students had not been introduced to other sources, such as electronic health information sources, rather than depending on holdings in the library. In addition, they are not aware of the availability of relevant health information on the Internet. In this regard, awareness of the availability of various sources of electronic health information for health sciences students is essential.

The study indicated that health sciences students mainly sought information from textbooks (77.2%), as presented in Table 4. By the same token, other scholars have reported similar results in a prior study.<sup>13</sup> Other sources include lecture notices (74.4%) and the Internet and other online information (64.3%). On the other hand, studies about the information needs and information-seeking behavior of health practitioners indicate that colleagues and doctors' verbal statements are the main sources for health information in developing countries.<sup>14</sup> Following up with possible reasons for this discrepancy, other studies have indicated different factors, such as lack of relevant information, shortage of time for locating other sources, and experienced practitioners in the field being more knowledgeable.<sup>4,14</sup>

A pairwise test after the Kruskal-Wallis test significantly indicated that students rely on 7 sources of

health information, including electronic books, search engines, hospital specialists, findings of research reports, curricula, library catalogues, and websites, and these are often used more by students enrolled in the certificate program than those in other levels of study. As indicated previously, students in the certificate course have less knowledge compared with those in other levels of study. In connection to this, health information sources are very useful in meeting and answering students' health information needs. In conclusion, significant differences in connection with students' levels of study were found for 15 out of 19 sources of information (Table 5). Our results were similar to previously reported data,<sup>15</sup> wherein sources of health information also mostly indicate a significant association among students' levels of study. This implies that during the designing of course materials, students' levels of study should be taken into consideration.

The intention of this study was to assess print, human, and electronic sources of health information used by students to support their education. Results indicate that the majority (65.8%) of nondegree health sciences students do use the Internet to seek health information. This seems to contradict a study done in the United States, which indicated significantly higher student usage of electronic databases and the Internet for seeking health information, at 96%. This is because students in that location are better trained in the information literacy skills needed for locating electronic health information and are exposed to different databases and intranets.<sup>16,17</sup> Therefore, it is possible that the reported problems associated with electronic information literacy skills may affect the accessibility of electronic health information. Hence, during course design, designers should consider students' levels of study.

Challenges regarding the accessibility of health information are also associated with the accessibility of electronic resources. Similarly, it has been confirmed that the most commonly recognized challenge in locating health information for undergraduate health sciences students is a lack of skills in using electronic health resources.<sup>18</sup> In addition, students still face problems in identifying, defining, analyzing, and articulating the nature of their health information needs.<sup>19</sup> These problems confront nondegree, undergraduate, and postgraduate health sciences students, as a result of the fact that health information literacy skills are not integrated into their curricula, nor are they being taught

**Table 3. continued**

Activities	Certificate	Diploma	Advanced Diploma	Sig. Kruskal-Wallis
Medium	3.00	3.00	3.00	
Answering patients' questions in clinical areas				
N	151	153	46	0.000 <sup>†</sup>
Mean	2.38	2.78	3.24	
Medium	2.00	3.00	4.00	

Coded value of rating: 1, never; 2, rarely; 3, sometimes; 4, frequently.  
 \* Significance at  $P < .05$  level.  
 † Significance at  $P < .01$  level.

throughout the entire duration of the developed course program.<sup>4</sup> The majority of students in this study indicated a lack of user training on electronic health information searching skills as being a main challenge in seeking health information for their education in the 21st century.

**Limitations and Recommendations of the Study.** This study was conducted among a few selected health training institutions, of which there are about 138 within Tanzania. Invited participants were selected from a few courses, whereas other courses were not represented in this study. Therefore, more studies should be conducted to represent other courses and health training institutions. The nondegree health

**Table 4. Sources of Information Normally Used by Respondents to Seek Health Information**

Health Information Sources	Frequencies (N)	%
Textbooks	311	77.2
Lecture notice	300	74.4
Search engines to navigate the web (eg, Google, Yahoo)	259	64.3
Instructors	257	63.8
Internet and online information	254	63.0
Students training manual	152	62.5
Training handout	220	54.6
Colleagues	219	54.3
Curriculum	201	49.9
Clinical area specialist	175	43.4
Library catalogue	169	41.9
Research reports	147	36.5
Government report	112	27.8
Website	102	25.3
Electronic information sources	99	24.6
Newspapers and magazines	98	24.3
Health databases (eg, HINARI, PubMed)	94	23.3
Journal literatures	69	17.1
Online tutorial	66	16.4

**Table 5. Responses to “How Often Do You Use the Following Sources to Seek Health Information?”**

Information Resources	Certificate	Diploma	Advanced Diploma	Sig. Kruskal- Wallis
<b>Colleagues</b>				
N	149	154	44	0.411
Mean	3.34	3.31	3.52	
Medium	4.00	4.00	4.00	
<b>Personal textbooks</b>				
N	115	111	32	0.144
Mean	2.64	2.79	2.50	
Medium	3.00	3.00	2.50	
<b>Electronic books</b>				
N	138	146	38	0.000 <sup>†</sup>
Mean	1.96	2.32	2.82	
Medium	2.00	2.00	3.00	
<b>Printed textbooks</b>				
N	149	145	44	0.012 <sup>*</sup>
Mean	2.91	2.84	3.41	
Medium	3.00	3.00	3.00	
<b>Printed journal</b>				
N	139	131	38	0.001 <sup>†</sup>
Mean	1.73	1.83	2.37	
Medium	2.00	2.00	2.00	
<b>Electronic journal</b>				
N	136	120	34	0.011 <sup>*</sup>
Mean	1.58	1.82	2.06	
Medium	1.00	1.00	2.00	
<b>Search engines such as Google, Yahoo</b>				
N	151	158	44	0.000 <sup>†</sup>
Mean	2.73	3.28	3.30	
Medium	3.00	4.00	4.00	
<b>Librarians</b>				
N	144	145	41	0.053
Mean	2.58	2.58	3.02	
Medium	3.00	3.00	3.00	
<b>Tutors</b>				
N	142	139	46	0.001 <sup>†</sup>
Mean	2.91	2.86	3.48	
Medium	3.00	3.00	4.00	
<b>Hospital specialists</b>				
N	146	145	39	0.002 <sup>†</sup>
Mean	1.98	2.30	2.51	
Medium	2.00	2.00	2.00	
<b>Newspapers and magazines</b>				
N	139	137	40	0.000 <sup>†</sup>
Mean	1.76	2.33	2.88	
Medium	1.00	2.00	3.00	
<b>Findings of research reports</b>				
N	141	144	41	0.000 <sup>†</sup>
Mean	1.64	2.26	2.40	
Medium	1.00	2.00	2.00	
<b>Health databases (eg, HINARI, PubMed)</b>				
N	136	134	37	0.000 <sup>†</sup>
Mean	1.85	2.34	2.86	
Medium	2.00	2.00	3.00	

(continued)



**Table 5. continued**

Information Resources	Certificate	Diploma	Advanced Diploma	Sig. Kruskal- Wallis
<b>Curriculum</b>				
N	149	157	49	0.000 <sup>†</sup>
Mean	3.04	3.36	3.47	
Medium	3.00	4.00	4.00	
<b>Student training manuals</b>				
N	142	140	37	0.096
Mean	2.58	2.83	2.51	
Medium	3.00	3.00	3.00	
<b>Electronic information sources</b>				
N	146	145	39	0.001 <sup>†</sup>
Mean	2.10	2.40	2.77	
Medium	2.00	2.00	3.00	
<b>Library catalogues</b>				
N	139	137	40	0.000 <sup>†</sup>
Mean	2.32	2.93	3.11	
Medium	2.00	3.00	3.00	
<b>Websites</b>				
N	136	134	37	0.000 <sup>†</sup>
Mean	2.85	3.37	3.55	
Medium	3.00	4.00	4.00	
<b>Training handouts</b>				
N	152	153	45	0.000 <sup>†</sup>
Mean	3.20	3.44	3.49	
Medium	3.00	4.00	4.00	

Coded value of rating: 1, never; 2, rarely; 3, sometimes; 4, frequently.  
 \* Significance at  $P < .05$  level.  
 † Significance at  $P < .01$  level.

sciences program in Tanzania is one health field that has been under-researched. This study calls researchers to focus on this group, because they are very important to the delivery of primary health care services from the grassroots level of Tanzania’s health care system, which has a pyramidal structure. This study serves as the baseline for developing EHIL or eHealth literacy for nondegree health sciences students. Further study should also be conducted to determine the impact of health information sources on academic performance among nondegree health sciences students.

**Conclusion and Way Forward.** This study assessed the health information needs and source reliability among health sciences students in Tanzania taking nondegree courses such as certificates, ordinary diplomas, or advanced diplomas. In general, similar to a study conducted among other population groups such as health professionals and students in higher learning institutions,<sup>10,14,20,21</sup> this study found that nondegree health sciences students’ health information needs and sources, apart from focusing on their

educational requirements, clinical practice, and personal information, are further determined by their level of study. For instance, the first group comprise of those who pursued certificate training level: Because most of them were fresh from secondary school, they could have relied heavily on the library as their main source of information for their academic success. The second group were those who studied at an ordinary diploma training level, the reason could be combining pre-service and in-service students in a classroom and other learning activities. Preservice students had similar requirements as certificate students, whereas in-service students, because of their experience working in health environments, tended to use other sources of information, such as colleagues and the Internet, as well as health professionals in clinical areas. However, because of their being in a combined environment, preservice students quickly adapt to access for and use other sources of health information along with the in-service students. Finally, advanced diploma students, who were more experienced in health environments, tended to more fully use the

various sources of health information that were available in their health facilities. As such, their health information needs and source reliability were more advanced than those of the first 2 groups.

Generally, the majority of students used various resources to locate health information, and these sources can be categorized into 3 groups: print, human, and electronic. Additionally, this study noted that there are numerous challenges facing nondegree health sciences students in seeking and meeting their educational information requirements. These include a lack of research skills in navigating various health information resources that are mostly online, being unaware of the availability of free Internet and other online health-related databases, and having insufficient facilities for accessing health information, a lack of specialists in health information, and high costs for subscriptions to electronic health information resources.<sup>6,18</sup>

Moreover, levels of study have a significant association with the information needs, sources, and information-seeking behaviors evident among

nondegree health sciences students. Therefore, this study found that incorporating an EHIL program into their curricula could be the solution to overcoming most of the identified challenges. In addition, it was confirmed that EHIL is a requirement common to all health settings, learning environments, and levels of study.<sup>4,16,19,22</sup> After this study, the design of EHIL skills will be an ongoing project to ensure nondegree health sciences students acquire optimal information to support their education and future clinical practices in order to apply evidence-based medicine. In connection to this, an EHIL program will trigger lifelong learning habits for health sciences students in Tanzania and other developing countries where resources are inadequate.

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