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**ATINER's Conference Paper Series
LIB2016-2141**

**Information Needs, Sources and Resources for Fifth
Year Medical Students during the Integrated
Longitudinal Clinical Clerkship (ILCC)**

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This paper should be cited as follows:

Chitha, N., Chitha, W., Mabunda, S., Godlimpi, L. and Mlonyeni, S. (2016). " Information Needs, Sources and Resources for Fifth Year Medical Students during the Integrated Longitudinal Clinical Clerkship (ILCC)", Athens: ATINER'S Conference Paper Series, No: LIB2016-2141.

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www.atiner.gr

URL Conference Papers Series: www.atiner.gr/papers.htm

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ISSN: 2241-2891

21/02/2017

Information Needs, Sources and Resources for Fifth Year Medical Students during the Integrated Longitudinal Clinical Clerkship (ILCC)

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Abstract

As part of its commitment to Community Based Education (CBE), Problem Based Learning (PBL) and social responsiveness, the Faculty of Health Sciences at Walter Sisulu University in South Africa's Eastern Cape Province introduced a 20 week extensive Integrated Longitudinal Clinical Clerkship (ILCC) rotation block in June 2014, where fifth year medical students were placed in six district hospitals. A descriptive cross-sectional survey of 72 fifth year medical students participating in the ILCC programme in 2014 was conducted. Out of the 72 medical students, 51 returned the questionnaires, giving a response rate of 70.83%. Males constituted 68.6% (n=35) of the respondents. Fifth year medical students perform a wide variety of activities in the hospitals in which they are placed during the ILCC. The most prominent tasks that students carried out generally relate to the care of patients. Attending tutorials (86%), doing ward-rounds, doing after-hour calls and weekend calls (84%) which came as the most performed activities. In addition, these students conduct clinical examinations (75%), prepare case summaries and presentations (73%), request radiological investigations including X-ray (73%), and making follow ups on investigations for patients under their care counted for (65%). The study further revealed that the information needs of the students during the ILCC revolve around patient care. Medical doctors are the most available information sources for their needs (76%), library books came second at 74.5%, followed by pocket handbooks (72,5%) and computers at 67%. Clinical guidelines kept in the ward or somewhere in the hospital (65%), reference books kept in the hospital (63%) and electronic books (60%) were ranked as very important. Students ranked mobile phones and internet access as very important at both (67%), followed by hospital library (64%), health professionals (62%) and computer laboratory (60%). Other information resources such as peers and newspapers had frequencies between 10% and 22%.

Keywords: information needs, information sources, Integrated Longitudinal Clinical Clerkship medical students

Introduction

Information Needs of Medical Students

A need for information is presumably the first stage in the process of information seeking. Literature conceptualises information need as recognition of the gap that exists in one's knowledge base (Case 2006). It has been further suggested that medical students need information that is related to specific patient care, mainly diagnosis (Mehdi et al. 2010). The finding is supported by Saporova who postulated that first-year medical students needed information for diagnosis and understanding of medical knowledge (Saporova 2012). Similarly, in a study of information needs of medical students in an emergency department, it was observed that medical students asked questions pertaining to diagnosing the patient's problem (Kahouei et al. 2011). These findings were similar to earlier findings on medical student's information needs who found that medical students mostly asked questions related to diagnosis and treatment (Codgill and Moore 1997).

In all probability, "All people do seek information, yet for some people and in some situations the stakes are much higher" (Case 2006). International Consortium of Longitudinal Integrated Clerkships (CLIC) defines ILCC as the principal component of clinical training where medical students, "(1) participate in the comprehensive care of patients over time; (2) participate in continuing learning relationships with clinicians in the hospital; and (3) meet the majority of the year's core clinical competencies across multiple disciplines simultaneously through these experiences." As part of its commitment to Community Based Education (CBE), Problem Based Learning (PBL) and social responsiveness, the Faculty of Health Sciences at Walter Sisulu University (WSU) introduced a 20 week extensive Integrated Longitudinal Clinical Clerkship (ILCC) rotation block in June 2014, where fifth year medical students were placed in six various district hospitals across the Eastern Cape Province.

For medical students in the ILCC program the stakes are obvious. Just like qualified medical doctors, medical students in the ILCC, deal with people's lives and nothing can be more important than that. Understanding information behaviour of students in the ILCC program in relation to their information needs, sources and resources is crucial in order to ensure that information that is responsive to their needs is provided for them. Having access to relevant and up-to-date information contributes to the provision of quality teaching, learning and patient care.

Information Sources and Resources Used by Medical Students

A study amongst medical faculty students at the University of Jordan on awareness and usage of computer and internet, reported that the preferred resource for getting information amongst the students was the internet (Almarabeh et al. 2016). On the other hand, a study of third and fourth year medical students in the clinical clerkship program in four Canadian universities showed a high use of smart phones and tablets as information

resources (Boruff and Storie 2014). These findings are consistent with those of a systematic review, which revealed that the use of smart phones is getting more attention in healthcare day by day (Mosa et al. 2012). These findings have also been tested on first year medical students (Koh et al. 2014). In this group the authors studied the perception of the students regarding the impact of mobile medical applications on their clinical practices; and reported high prevalence of smart and medical apps usage amongst first year medical students (Koh et al. 2014).

We defined the information source as what provides information for any person wanting to be informed on a particular subject or field for example a book. On the other hand information resources are used to access the information sources for example a library or computer. Different information sources and resources may be exploited to meet a particular information need. The choice of information source or resource can be motivated by factors such as the time available, the availability of an information source and resource and the quality of an information source and resource, amongst others. Understanding the various sources and resources of information used by various users of information is valuable for information providers in order to provide sources and resources of information that are responsive to the needs of each user group. The provision of information sources and resources that respond to the needs of students while undergoing ILCC would contribute to the improvement of services they provide for their patients.

The emphasis on the use of evidence for those who diagnose and treat patients requires the use of various relevant information sources to ensure provision of quality services. It is therefore important to ascertain the preferred sources of information by medical students so as to improve the provision of those sources. New medications and treatments are introduced at a rapid rate; and new, rare diseases are uncovered that need specialty knowledge, which can be achieved by consulting relevant up-to-date sources.

This study aimed at determining information needs, sources and resources used by the fifth year medical students during the ILCC placement in six district hospitals in the Eastern Cape. The study was motivated by the desire to understand the information behaviour of the students in relation to the information resources and sources during the ILCC program. It was important to have a better understanding of the information needs of the students and how the students met their needs during the ILCC program. This is based on the assumption that students had moved from the university environment where their normal curriculum had been mostly delivered to join a clinical learning environment in district setting away from the university centre.

Method

Study Setting

The study took place in the five rural district hospitals in South Africa’s Eastern Cape Province where students were placed for their ILCC program.

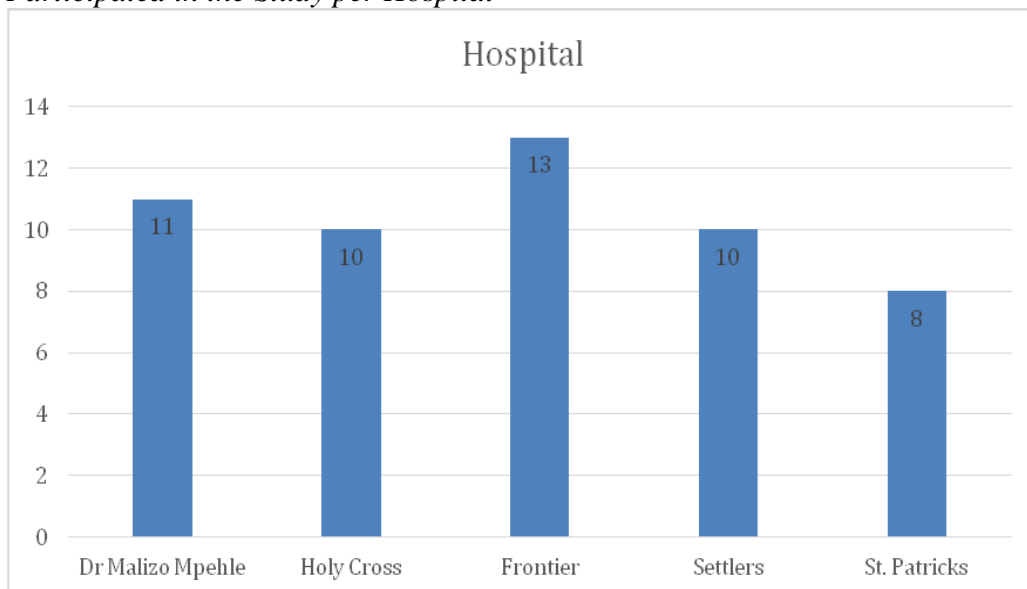
Instrument

An interviewer-administered questionnaire was used to collect data. The focus of the questionnaire was in five areas that were used to determine the information needs of fifth year medical students as well as information sources and resources used by fifth year medical students during the ILCC placement. These were tasks that medical students carry out while in the ILCC program, the information needs of medical students in the ILCC program, information sources that support their information needs, information resources that support their information needs and factors that enhance the use of information by fifth year medical students. To understand if there is any corollary in the use of information sources and resources between those who were familiar with rural life and those who were not, students were asked to indicate the time spent in the two areas.

The Study Participants

The study participants were students doing their fifth year of medicine. As shown in Figure 1, the participants were almost equally distributed between Frontier hospital (n=13); Dr Malizo Mpehle (n=11); Holy Cross and Settlers hospitals (n=10) and St Patricks hospital (n=8).

Figure 1. *Distribution of Medical Students in the ILCC Program who Participated in the Study per Hospital*



Data Analysis

All data collected was captured and coded in Microsoft Excel 2010 (Microsoft Corporation, Seattle, USA) and exported for analysis onto STATA 14.1 (Stata Corp LP, College Station, Texas, USA). Univariate categorical data is summarised using percentages. The 95% confidence interval is used to summarise the precision of demographic characteristics. Proportions were also compared using the two sample tests of proportions to ascertain statistical differences. The level of significance for hypothesis testing was set at a 5% (p-value \leq 0.05).

Results

Demographics

Male students constituted a high number of participants at 35 (68%) compared with 16 (31%) female students. Out of 52 students 48 (94%) were South African and 4 (7%) were non South Africans. A significant number (70%) of students had spent more that 5 years in rural areas and 16 (30%) of them had spent less than five years in a rural setting. Twenty five (49%) had grown up in rural areas while 27 (52%) did not. Out of 52 students, 16 attended a rural school. Table 1 summarises the demographic characteristics of the study participants.

Table 1. *Demographic Characteristics of Participants*

Variable	Category	n (%; 95% confidence interval)	P-value
Gender	<i>Male</i>	35 (68.6%; 55.9 - 81.4)	<0.0001
	<i>Female</i>	16 (31.4%; 18.6 - 44.1)	
Citizenship	<i>South African</i>	48 (92%; 81.5 - 97.9)	<0.0001
	<i>Non-South African</i>	4 (8%; 2.1 - 18.5)	
< 5 Years in a rural setting	<i>Yes</i>	16 (30.8%; 18.2 - 43.3)	<0.0001
	<i>No</i>	36 (69.2%; 56.7 - 81.8)	
Grew up in a rural area	<i>Yes</i>	25 (48.1%; 34.5 - 61.7)	0.695
	<i>No</i>	27 (51.9%; 38.3 - 65.5)	
> 5 Years in a rural setting	<i>Yes</i>	28 (53.8%; 40.2 - 67.4)	0.433
	<i>No</i>	24 (46.2%; 32.6 - 59.7)	
Grew up in urban area	<i>Yes</i>	27 (51.9%; 38.3 - 65.5)	0.695
	<i>No</i>	25 (48.1%; 34.5 - 61.7)	
Attended a rural school	<i>Yes</i>	16 (30.8%; 18.2 - 43.3)	<0.0001
Family lives in a rural area	<i>Yes</i>	25 (48.1%; 34.5 - 61.7)	0.695
	<i>No</i>	27 (51.9%; 38.3 - 65.5)	

Tasks that Medical Students Carry Out while in the ILCC Program

The result as shown in Table 2 demonstrated that ILCC students perform various tasks. Students are actively involved in patient care. Students are able to put the skills they have learnt at medical school into

practice with real patients, working like doctors in the hospital. Out of various responsibilities that they perform, the results showed that there were tasks that students were more involved in than others (Table 2). The top five tasks that students felt strongly about included; attending tutorials 45 (86.5%), doing ward-rounds 44 (84.6%), doing after-hour calls 43 (84.3%), doing weekend calls 43 (84.3%), and conducting clinical examination of patients 39 (75.0%). Doing ward rounds together with a doctor had a high rating. The less performed activities included; participating in mortality and morbidity meetings, participating in intake meetings, and participating in the morning meetings.

Table 2. *Task that Medical Students Carry while in the ILCC Program*

Activity/Task	Strongly Agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)	Total
Participate in morning meetings	26 (50.0%)	23 (44.2%)	2 (3.9%)	1 (1.9%)	52 (100%)
Participate in intake meetings	12 (23.1%)	20 (38.5%)	16 (30.8%)	4 (7.7%)	52 (100%)
Participate in mortality & morbidity meetings	13 (25.0%)	25 (48.1%)	10 (19.2%)	4 (7.7%)	52 (100%)
Perform theatre assistance	33 (63.5%)	19 (36.5%)	0	0	52 (100%)
Attend bedside teaching	27 (51.9%)	15 (28.9%)	4 (7.7%)	6 (11.5%)	52 (100%)
Do ward-rounds	44 (84.6%)	8 (15.4%)	0	0	52 (100%)
Attend tutorials	45 (86.5%)	7 (13.5%)	0	0	52 (100%)
Visit local clinics	24 (46.2%)	18 (34.6%)	7 (13.5%)	3 (5.8%)	52 (100%)
Do after-hour calls	43 (84.3%)	8 (15.7%)	0	0	51 (100%)
Do weekend calls	43 (84.3%)	8 (15.7%)	1 (1.9%)	0	52 (100%)
Work in outpatients department	43 (84.3%)	9 (17.3%)	0	0	52 (100%)
Request radiological investigations including X-rays	37 (71.2%)	15 (28.9%)	0	0	52 (100%)
Request laboratory investigations in order to make diagnosis	38 (73.1%)	14 (26.9%)	0	0	52 (100%)
Follow up on investigations for patients under their care	32 (61.5%)	18 (34.6%)	2 (3.9%)	0	52 (100%)
Conduct clinical examination of patients	39 (75.0%)	13 (25.0%)	0	0	52 (100%)
Diagnose and treat common conditions	34 (65.4%)	15 (28.9%)	2 (3.9%)	1 (1.9%)	52 (100%)
Prepare case summaries and presentations	38 (73.1%)	12 (23.1%)	1 (1.9%)	1 (1.9%)	52 (100%)
Perform ward procedures	33 (63.5%)	18 (34.6%)	1 (1.9%)	0	52 (100%)

Information Needs of Medical Students in the ILCC Program

Students were asked to rate what they need information for. While access to information was needed for various reasons, the results demonstrate that ILCC students need information in order to carry out various medical tasks. In this survey a high number of students indicated that they need information to learn how to diagnose as they rated that as very important and also for preparing for tutorials. They also felt it is important to have access to information that will assist them to read more about cases encountered in ward-rounds. Table 3 summarises the activities for which students need information during the ILCC placement.

Table 3. *Activities for which Student in the ILCC Program Need Information*

Activity/ Task	Important (1)	Somewhat important (2)	Very important (3)	Not important (4)	Total
Learn about theatre procedures	23 (44.2%)	8 (15.4%)	19 (36.5%)	2 (3.9%)	52 (100%)
Prepare cases for bedside teaching	23 (44.2%)	3 (5.8%)	24 (46.2%)	2 (3.9%)	52 (100%)
Read more about cases encountered in ward-rounds	27 (51.9%)	3 (5.8%)	22 (42.3%)	0	52 (100%)
Prepare for tutorials	22 (43.1%)	2 (3.9%)	27 (52.9%)	0	51 (100%)
Read more about conditions encountered during visits to local clinics	25 (48.1%)	8 (15.4%)	17 (32.7%)	2 (3.9%)	52 (100%)
Read about cases during or after the after-hour calls	22 (42.3%)	7 (13.5%)	23 (44.2%)	0	52 (100%)
Read about cases during or after the weekend calls	23 (45.1%)	10 (19.6%)	18 (35.3%)	0	51 (100%)
Learn about common conditions encountered in outpatients department	24 (46.2%)	7 (13.5%)	21 (40.4%)	0	52 (100%)
Understand radiological investigations including X-rays and interpretation thereof	22 (42.3%)	5 (9.6%)	25 (48.1%)	0	52 (100%)
Understand laboratory investigations in order to make diagnosis	23 (45.1%)	3 (5.9%)	25 (49.0%)	0	51 (100%)
Follow up on investigations for patients under their care	23 (44.2%)	5 (9.6%)	24 (46.2%)	0	52 (100%)
Learn how to examine various systems of the human body	22 (42.3%)	2 (3.9%)	27 (51.9%)	1 (1.9%)	52 (100%)
Learn how to diagnose and treat common conditions	19 (36.5%)	2 (3.9%)	31 (59.6%)	0	52 (100%)
Prepare case summaries and presentations	23 (44.2%)	6 (11.5%)	22 (42.3%)	1 (1.9%)	52 (100%)
Learn how perform ward procedures	21 (40.4%)	5 (9.6%)	26 (50%)	0	52 (100%)

Information Sources Preferred by Medical Students during the ILCC

The results in Table 4 show that the majority of the students (76%) reported that the "very important" information source at their disposal is medical doctors followed by books (74%) and their handbooks (72%). Despite the fact that the use of the internet has become universal and rich in various forms of information, the "very important" rating attached by students to related information resources was somewhat mixed: mobile phones (53%), tablets (50%), iPads (39%), electronic books (60%), electronic journals (32%) and computers (67%). However, the "important/very important" ratings are higher: mobile phones (78.9%), tablets (69.2%), electronic books (84%), computers (92%) with electronic journals (53.9%) and iPads (58.8%).

Table 4. *Information Sources Used by Medical Students during the ILCC According to their Level of Importance*

Information Source	Important (1)	Somewhat important (2)	Very important (3)	Not important (4)	Total
Peers	27 (51.9%)	2 (3.8%)	23 (44.2%)	0	52 (100%)
Professional nurses	25 (48.1%)	7 (13.5%)	19 (36.5%)	1 (1.9%)	52 (100%)
Nursing assistants	15 (29.4%)	18 (35.3%)	14 (27.5%)	4 (7.8%)	52 (100%)
Medical doctors	12 (23.1%)	0	40 (76.9%)	0	52 (100%)
Other health professionals	20 (38.5%)	15 (28.9%)	16 (30.8%)	1 (1.9%)	52 (100%)
Newspapers	15 (29.4%)	18 (35.3%)	4 (7.8%)	14 (27.5%)	51 (100%)
Mobile phone	13 (25%)	11 (21.2%)	28 (53.9%)	0	52 (100%)
Tablets	10 (19.2%)	8 (15.4%)	26 (50%)	8 (15.4%)	52 (100%)
iPads	10 (19.6%)	12 (23.5%)	20 (39.2%)	9 (17.7%)	51 (100%)
Computers	13 (25%)	4 (7.7%)	35 (67.3%)	0	52 (100%)
Reference books kept in the hospital	8 (15.4%)	8 (15.4%)	33 (63.5%)	3 (5.8%)	52 (100%)
My pocket book	10 (19.6%)	4 (7.8%)	37 (72.5%)	0	51 (100%)
Clinical guidelines kept in the ward or somewhere in the hospital	8 (15.4%)	8 (15.4%)	34 (65.4%)	2 (3.9%)	52 (100%)
Library books	6 (11.8%)	6 (11.8%)	38 (74.5%)	1 (2.0%)	51 (100%)
Hospital policy manual	11 (21.6%)	10 (19.6%)	19 (37.3%)	11 (21.6%)	51 (100%)
Intake meetings	17 (32.7%)	15 (28.9%)	13 (25.0%)	7 (13.5%)	52 (100%)
Electronic books	7 (14.0%)	7 (14.0%)	30 (60.0%)	6 (12.0%)	50 (100%)
Mortality & morbidity	16	16	14	6	52

meetings	(30.8%)	(30.8%)	(26.9%)	(11.5%)	(100%)
Journal clubs	12 (23.5%)	16 (31.4%)	11 (21.6%)	12 (23.5%)	51 (100%)
In-service training meetings	10 (19.2%)	17 (32.7%)	13 (25.0%)	12 (23.1%)	52 (100%)
Protocol discussions	11 (21.2%)	16 (30.8%)	18 (34.6%)	7 (13.5%)	52 (100%)
Electronic Journals	11 (21.2%)	14 (26.9%)	17 (32.7%)	10 (19.2%)	52 (100%)
Print Journals	11 (21.6%)	14 (27.5%)	18 (35.3%)	8 (15.7%)	51 (100%)
Hospital seminars or workshops	15 (28.9%)	13 (25.0%)	19 (36.5%)	5 (9.6%)	52 (100%)
Videoconferencing facilities	11 (21.2%)	11 (21.2%)	19 (36.5%)	11 (21.2%)	52 (100%)

Information Resources Preferred by Medical Students during the ILCC

Table 5 demonstrates that mobile phones (66.7%), computers with internet access (66.7%), hospital library (64.4%) and library in the health resource centre (64.4%) were rated as the "very important" information resources that mostly support the students' learning and teaching during the ILCC placement.

Table 5. *Information Resources that Support Students' Learning and Teaching During ILCC*

Information Resource	Important (1)	Somewhat important (2)	Very important (3)	Not important (4)	Total
Peers	21 (46.7%)	3 (6.7%)	21 (46.7%)	0	45 (100%)
Health Professionals	15 (33.3%)	2 (4.4%)	28 (62.2%)	0	45 (100%)
Newspapers	14 (31.8%)	10 (22.7%)	10 (22.7%)	10 (22.7%)	44 (100%)
Mobile phones	12 (26.7%)	2 (4.4%)	30 (66.7%)	1 (2.2%)	45 (100%)
Computer laboratory	12 (26.7%)	1 (2.2%)	27 (60.0%)	5 (11.1%)	45 (100%)
Computer with internet access somewhere in the hospital	8 (17.8%)	4 (8.9%)	30 (66.7%)	3 (6.7%)	45 (100%)
Hospital Library	11 (24.4%)	2 (4.4%)	29 (64.4%)	3 (6.7%)	45 (100%)
Library in the Health Resource Centre	13 (28.9%)	1 (2.2%)	29 (64.4%)	2 (4.4%)	45 (100%)

Factors that Enhance Use of Information by Fifth Year Medical Students

Students strongly agreed that availability of reliable internet access (42%) and access to personal smart phones with internet access (40.8%) enhance the use of information by fifth year medical students during the ILCC (Table 6). Students further agreed that the trustworthiness of the information source (65%), familiarity about the information source (61.7%),

turnaround time taken to access information (57%), format of the information source (53.1%), cost of accessing information (53.1%) and accessibility of the information source (51%) enhance the use of information by the students

Table 6. *Factors that Enhance Use of Information by Fifth Year Medical Students*

Factor	Strongly agree (1)	Agree (2)	Disagree (3)	Strongly disagree (4)	Total
Accessibility of the information source	17 (34.7%)	25 (51.0%)	4 (8.2%)	3 (6.1%)	49 (100%)
Format of the information source	16 (32.7%)	26 (53.1%)	4 (8.2%)	3 (6.1%)	49 (100%)
Cost of the information	9 (19.2%)	20 (42.6%)	12 (25.5%)	6 (12.8%)	47 (100%)
Familiarity about the information source	12 (25.5%)	29 (61.7%)	3 (6.4%)	3 (6.4%)	47 (100%)
Trustworthiness of the information source	11 (22.5%)	32 (65.3%)	4 (8.2%)	2 (4.1%)	49 (100%)
Cost of accessing information	12 (24.5%)	26 (53.1%)	6 (12.2%)	5 (10.2%)	49 (100%)
Turnaround time taken to access information	9 (18.4%)	28 (57.1%)	8 (16.3%)	4 (8.2%)	49 (100%)
Availability of reliable internet access	21 (42.9%)	17 (34.7%)	4 (8.2%)	7 (14.3%)	49 (100%)
Availability of print books in the hospital	13 (26.5%)	19 (38.8%)	12 (24.5%)	5 (10.2%)	49 (100%)
Availability of physical library facilities	14 (28.6%)	23 (46.9%)	5 (10.2%)	7 (14.3%)	49 (100%)
Access to personal smartphones (with internet access)	20 (40.8%)	19 (38.8%)	4 (8.2%)	6 (12.2%)	49 (100%)

Discussion

The results revealed that despite the fact that the medical students are still learning as students, they perform various tasks that doctors perform in the hospital setting. They perform clinical examination, diagnose and treat patients like any medical doctor. The students engage with patients on a daily basis in order to gain the required skill and competencies. It is therefore essential that medical students have the knowledge in all medical domains to ensure that they practice according to the standards expected from any qualified medical practitioner. Doing ward rounds together with a doctor was highly rated. This is because they gain more insight in the ward rounds that is where teaching takes place. In the ward rounds that is where a detailed plan about the patient takes place, giving students the opportunity to learn. Attendance of tutorial was also a major thing; that is where they learned to apply their theoretical teachings through practicals. The less performed activities include participation in mortality and morbidity meetings, participation in intake meetings, and participation in the morning meetings.

Medical students in the ILCC program mainly needed information to carry out different medical tasks. The finding is in congruence with some recent studies of information needs of medical students (Mehdi et al. 2010). Students in the ILCC program identified the sources of information as doctors. Wilson (2000) suggests three source characteristics that impact information sources use. They include access, credibility and channel of communication. Several studies of information behaviour by medical doctors have reported also the use of human sources (Kosteniuk et al. 2013, Norbert and Lwoga 2012). The choice of human sources as the most used information source was associated with their availability, familiarity and reliability. Moreover there are no costs involved when getting answers from colleagues and the answers are immediate.

With regard to information resources, mobile phones and computers with internet access were mostly used. The finding supports the findings by Boruff and Storie (2014). A widespread of mobile phone use was reported in a study that was conducted in four Canadian universities. Furthermore, the study revealed that, most of the medical students in their clinical clerkship were users of mobile phones. It has also been found that high rate of internet use has to do with the vast tools that support and transmit medical information (Anyaku et al. 2015). This finding is consistent with the findings in a study that looked at internet use by medical students. This study revealed that 97% of students use the Internet daily for various reasons related to their medical education (Almarabeh et al. 2016). This study further concluded that the use of mobile phones can be associated with the fact that they are easily accessible (Almarabeh et al. 2016). The choice of internet was associated with easy accessibility.

Conclusion

The study found that fifth year medical students perform various patient care related tasks including clinical examinations, diagnosis and treatment. They engage with patients on a daily basis in order to gain the required skill and competencies. Although, mobile phones, computers with internet access, hospital library and library in the health resource centre were rated as the "very important" information resources that mostly support the students' learning and teaching during the ILCC placement, availability of access to reliable internet and access to personal smartphones with access to internet enhanced use of information for teaching and learning by fifth year medical students.

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