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Information needs, sources and channels used by the health care providers in primary level health care of Ethiopia: Ethnographic method

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A B S T R A C T

Introduction: Health care system is information-driven sector where Health Care Providers (HCPs) regularly deliver comprehensive health services based on the available, accessible, and reliable health information. However, there is lack of empirical evidence about the culture of current state of health information needs; sources and channels that used by the health professionals in Primary Level Health Care (PLHC) of Ethiopia. Thus, this study aimed to explore the health information needs, sources, and channels used by the health professionals in PLHC in Wolaita zone, South Ethiopia based on the information seeking and behavior need model.

Material and Methods: Ethnographic study design was employed using participant observation and key informant in-depth interviews as a data collection method. Observation and interviews data were entered on Qualitative Data Analysis mine software version. The quotes and field notes were summarized and linked to the information seeking and behavior need model to generate new meaning.

Results: Consequently, HCPs demonstrated their needs of health promotive and disease preventive health information as compared to health information focusing on early diagnosis and treatment. The major purpose was to answer colleagues and patients' question. The unpredictability of the health conditions and associated HCPs skepticism was a major precursor for a deliberate search of health information. Although it is pigeonholing HCPs in PLHC settings preferred formal channels of information and resources held in and delivered in digital format using mobile, computer, and Internet as compared to print and human sources. Furthermore, the absence of library or resource center, shortage of ICT infrastructure, and poor information literacy skill were raised as reasons for unmet health information need in PLHC settings.

Conclusion: Thus, this study showed that the need for formal channels of information and suggests the establishment of reading/resource corners/centers and design, development, and implementation of information literacy module for HCPs in PLHC.

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INTRODUCTION

Health care system is information-driven sector and information is inescapable in the comprehensive health care provision [1]. Concurrently, the health information system delivers unprecedented foundations for evidence based on decision-making [2, 3]. More importantly, appropriate, and timely use of health and health related information is an essential element in the process of transforming the health sector and it is a foundation for all building blocks of health system. Thus, need to become motivated, competent, and compassionate HCP who have vital roles in achieving health goals of a given country was paramount [3].

Further, complete, and reliable information is the underpinning for essential health system policy development and implementation [2]. Accordingly,

Ethiopia grapples to achieve Universal health coverage as evidently demonstrated in the development and implementation of strategic plans since 1998. One of the core agenda and health system building blocks in the whole process was Health Information (HI). To this end, in 2016, the Ethiopian Federal Ministry of Health introduced the "Information Revolution Roadmap" in its health sector transformation agenda [4].

Ethiopia has continued the three-tier health system as a pillar of health service delivery. Of which the Primary Level Health Care (PLHC) continued to be the backbone of health system with potential coverage reaching more than 90% of the population in 2019. [3] Further, several studies have reported that HCPs need easy to digest, timely, and up-to-date information from authoritative content sources [5-10]. However, little is known about the culture of current state of Health Information (HI) needs; sources and channels that used by the HCPs in PLHC of Ethiopia. Thus, exploring the information needs and information-seeking behavior of HCPs reaching more than 90% of the population is crucial as it assist in the management of information system and services [5].

MATERIAL AND METHODS

This study was tuned in the paradigm of interpretive research design. Thus, in this study ethnographic exploratory research design was employed.

Theoretical background

There are several theories and models on information need and seeking developed by different scholars at different times [11-14]. However, several studies highlighted the fitness of ISBN model of Leckie to different professional groups in different geographical location [15-17]. Thus, standing on the shoulders of giants in this study the Leckie ISBN model was adapted to conduct deductive analysis based on the six major components and corroborate the newly emerging themes in Fig 1, from inductive analysis of field data.

Settings

The study was conducted in two PLHC institutions in the Southern Ethiopia: Wolaita Sodo Town and Bedessa District Health Center.

Sample

The two facilities were purposefully selected based on the preliminary analysis of early orientation and mapping of the study area; where the researcher established good relations with all individuals at the research site as, [11] emphasized the importance of trust and support from the participants for the ethnographic research to be successful.

Field study methods

The prime researcher conducted direct observations and a total of 42 in-depth interviews on both study sites. The 8 months direct observation was conducted to explore the unique culture of HCPs information needs, sources, and channels used in situ. As a pure observer, the researcher did not participate in the action but presented on the scene; and write field notes while HCPs execute their daily routine tasks. Each day the prime researcher self-reflects and record key findings and observations and type the handwritten field notes on personal computer.

Data analysis

Observation and interviews data were entered on Qualitative Data Analysis mine software version [18, 19]. The data was analyzed twice, once in a deductive style to inform development of the guides and once inductively to identify patterns and themes of this study. Accordingly, data from the field notes and key informant interviews were first analyzed using the template developed from ISBN model (more deductive) method of analysis. The researcher read and coded the document, and decided which quotations were appropriate to each guide. More precisely, the quotes and field notes were summarized and linked to the model to generate new meaning.

RESULTS

The newly proposed ISBN model in this study describes how HCPs in PLHC settings find and use HI in the course of their daily service delivery. The three major areas of this study (HI need, source, and channel) were used as a frame of reference during the analysis of thick description of observation and in-depth interview findings (Fig 1 and Table 1).

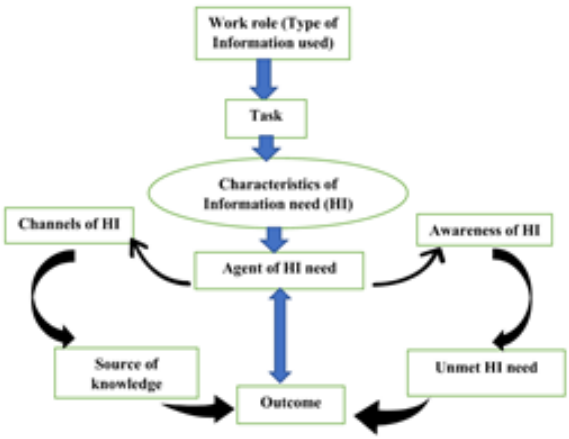

Fig 1: The newly modified version of ISNB model

Table 1: Definition for variables used in the proposed theoretical model

Variable	Definition
Work roles	Health professionals who work in specific room that health information used for service delivery
Associated tasks	Distinct task of health professionals (promotive task and counseling, diagnostic task, therapeutic task, and administrative task)
Characteristics of health information (HI) need	Purpose to utilize needed health information of health professionals
Agent of HI need	Factors facilitated health information need of health professionals
Channels of HI	transmission to access health information of health professionals
Sources of information	Demands of carriage to fill health information of health professionals
Awareness of HI	Factor to prefer a method/source of health information of health professionals
Outcome	the knowledge would like is met and also the skilled accomplishes the task, like patient care, diagnosis and treatment, doing research
Unmet HI need	Reason to unmet health information need of health professionals

Area 1: HI need

HCPs seem to have unique HI needs. In this study, it was found that those who work in the PLHC settings have demonstrated differing and personalized HI needs consistent with the.

Accordingly, the following themes were emerged under this area; types/content of HI needed frequently, context of HI need, characteristics of HI need, and facilitators of HI need.

Theme 1: Types of HI needed

The researcher had observed that all HCPs have delineated work roles and responsibilities. And these work roles determined the types of HI needed. In this study, 15 (35.7%) of HCPs needed health promotive information see Fig 2.

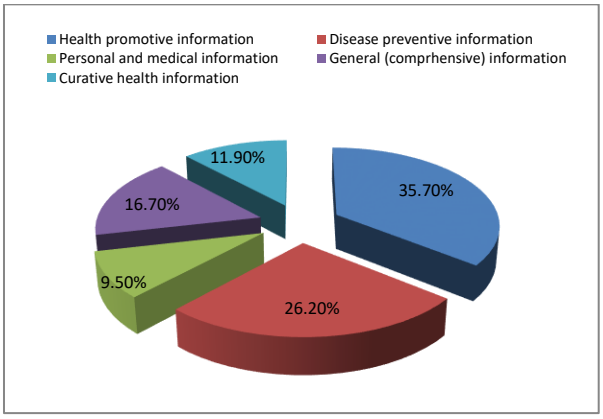

Fig 2: Types of HI used in line with the work roles assigned in PLHC

For instance observation of morning health education session,

> The educator said, "… We need to invest on our health. Our health stock depreciates as age increases; therefore, we have to do regular health checkups, do physical exercise, and focus on balance diet to increase control over, and to improve our wellbeing." She mentioned that: to execute this role she regularly needs health promotive evidence (Field note 4: 9 August 2019)

The typical patient-physician encounter demonstrated:

> The patient asked, "How can I prevent diarrheal diseases?" and the general practitioner answered showing the key steps of hand washing posted on the wall chart. (Field note 12: 15 January 2020)

According to the most recent three-tier health system of Ethiopia, PLHC facilities are primarily supposed to provide, health promotive and disease preventive activities. The possible claim for this notion is summarized as follows:

> "Most of the disease conditions in PLHC settings are easily preventable by simple measures like health education, personal hygiene, and environmental sanitation." (ZHD, 1)

Theme 2: Task category/ context

According to finding from participants, the distinct tasks linked to working context. In this study, 14 (33.3%) of HCPs needed health promotive information to execute counseling and prevention activities in the PLHC settings (Table 2).

Table 2: Lists of sub-themes with their respective description, frequency, and percentage

Clustered theme	Second order theme	Description	Number (%)
Task category/ context	Health Promotive and disease Preventive task	In the PLHC context include promoting breastfeeding, promoting child and family nutrition, injury prevention, keeping personal hygiene and environmental sanitation, promoting institutional delivery, promoting vaccination against vaccine-preventable disease, and promoting physical activity	14 (33.3)
	Diagnostic task	The constellation of a goal-oriented process to identify the causes and nature of disease based on the history of the patient (history of present illness, history of similar illness in the family), physical examination using (inspection, palpation, auscultation, and percussion) techniques, and laboratory investigation	11 (26.2)
	Therapeutic task	medical treatments with the intent of remediation of the disease condition of the patient	10 (23.8)
	Administrative task	planning, organizing, staffing, leading, and monitoring, and evaluating all activities of the PLHC facilities using the available resource to reach the intended goal of the facility	7 (16.7)
Characteristics of HI need	Answering questions from colleagues and patients	Occasions where patients are asking questions about their diagnosis and treatment. Whereas the health professionals are answering the questions	15 (35.7)
	Making clinical decisions	A consecutive process of gathering information about the cause, diagnosis, and treatment of disease conditions and making the best choice among options to deliver a safe and effective service	9 (21.4)
	Continued professional development	every effort health professional are doing to develop and update their professional skills	11 (26.2)
	Facilitating managerial work	Activities related to performance report generation, planning, assigning a job, monitoring activities, and communications	7 (16.7)
Factors that facilitate HI need	Scepticism	A form of uncertainty where health professionals have a lack of confidence about something to perform and develop an attitude that includes a curious mind.	19 (45.2)
	Ambiguity	A situation when health professionals face confusing or unclear patient/client conditions that can be understood in more than one way.	7 (16.7)
	Having multiple options	The presence of multiple options to work within the context of PLHC facilities	10 (23.8)
	Facing infrequent disease	Unusual disease and health related condition where HCPs never faced before	6 (14.3)
Channels of HI	Formal channels	Health information that constituted deliberately structured, pre-defined, and from authoritative bodies as formal channels.	32 (76.2)
	Informal Channels	all unauthorized channels like colleagues, individual experience, and informal communication	10 (23.8)
HI sources	Electronic sources	Health information sources held in and delivered in digital format using mobile, computer, and internet technology	16 (38.0)
	Print sources	printed documents like manuals, guidelines, textbooks, drug information leaflets, banners, brochures, and wall charts … etc.	14 (33.3)
	Human sources	All sensible health professionals working as a team	12 (28.7)
Awareness of information source characteristics	Accessibility-related	convenient, easy to use, and available at the time of care, and familiar with	26 (61.9)
	Information	Up to date; reliability, credibility, and authenticity;	16 (38.1)

Clustered theme	Second order theme	Description	Number (%)
	resource quality-related	relevance; and comprehensiveness	
Reasons for unmet HI need	Absence of Library or information resource center	Having no formalized reading and browsing corners with collection of relevant reading materials either in print format (textbooks, standard treatment guidelines, manuals, standard operating procedures… etc.) or in electronic format in the vicinity of PLHC facilities	18 (42.9)
	Workload/lack of time	the daily routine work and associated lack of time	3 (7.2)
	ICT and poor information literacy skill	The ability of PLHC facility health care providers in identifying, locating, and accessing proper sources of health information to meet the information need.	13 (30.9)
	Shortage of ICT infrastructure	Software, internet access, equipment, and other similar resources essential in the provision of healthcare services.	8 (19.0)

For instance, health extension worker interview summarizes:

> "… The cross-cutting activity in my service of humanity is the health education of the community about personal hygiene and environmental sanitation. To execute this task usually, I need additional health information." (HEW, 1)

Health promotion and disease prevention tasks commonly performed in the PLHC context include:

> Health education to promote breastfeeding, child and family nutrition, injury prevention, keeping personal hygiene and environmental sanitation, promoting institutional delivery, promoting vaccination against vaccine-preventable disease, and promoting physical activity (Field note 6: 4 September 2019)

The second most important task category in the PLHC settings is a diagnostic task. To complete this task, health professionals need HI. For example, observation of OPD consultation:

> The general practitioner: "What can I help you? What is your problem?"
>
> The patient: "Ife el burning sensation during urination"
>
> The general practitioner: "When was started" The patient: "It was about 4 days"
>
> The general practitioner: "Do you have sense of urgency, frequency"
>
> The patient: "Yes. It comes again and again too frequently, and I have to rush to the restroom"
>
> The general practitioner: "Is the pain occurring at the start of urination or at the end"
>
> The patient: "I don't actually remember the timing."
>
> The general practitioner looked after the wall chart in the room entitled 'Initial Approach in a Woman with Acute Dysuria' and ordered for laboratory investigation in order to reach on definitive diagnosis. (Field note 10: 12 September 2019)

Theme 3: Characteristics of HI need

The most frequently demonstrated characteristics of health information was answering questions raised by patients and colleagues 15 (35.7%) followed by continued professional development 11 (26.2%) (Table 2). The researcher has observed different occasions where patients are asking questions about their diagnosis and treatment. For instance,

> The pharmacy professional dispensing drugs to the clients based on the prescription paper he receives. Pharmacist said: *"Take this (while showing) drug every 8 hours and put this eye ointment twice daily."* The client who looks in average more than 60 years said*: "I am confused… please repeat."* The pharmacist exhausted while serving several clients before said: *"uh… you need to give attention while I am telling you."* Then the pharmacist repeated. Yet, the patient asked like: *"what are the possible side effects and I am worried of my eye, please."* Immediately, the pharmacist opened the drug pack and read the information on the leaflet and answered to the questions of the patient. (Field note 16: 18 September 2019

Theme 4: Factors that facilitate HI need

In the process of executing their roles and specific tasks, health professionals face several motivating factors that initiate the beginning process of information need. More precisely, in the PLHC settings of the Wolaita zone, the researcher identified skepticism 19 (45.2%), as a major precursor for a deliberate HI need (Table 2). For example, study participants said,

> "… If I feel not confident on the selected option of management of the case I am dealing with, I refer to the manuals and guidelines developed by authoritative bodies like the federal ministry of health and world health organization." (HN, 1)

Area 2: Channels of HI

In this study, the researcher followed the typology of formal and informal to describe the channels used in PLHC settings.

Theme 5: Formal and Informal Channels

Although it is pigeonholing and difficult to discern the complex combination of formal and informal channels, the researcher coded HI that constituted deliberately structured, pre-defined, and from authoritative bodies as formal channels. For instance, midwife and pharmacist interview summarizes as follows:

> "For all my actions I need to have evidence. Therefore, those materials produced by the ministry of health and other authorized offices are what I am using regularly to base my decisions." (MW, 2):

In the field observation, the researcher noted that:

> When the formal channels did not provide enough information and difficult to access due to various reasons, health professionals turned to informal channels to find the needed HI at the point of service delivery. (Field note 13, 15, and 18: 23 to 25 September 2019

For example a key informant said:

> "… Do you know grapevine? …. It is invisible. Likewise, invisible communication is very essential to facilitate activities in the health center. We are working in a dynamic and uncertain setting; so, I prefer to collect evidence informally from experienced staff to support my decisions." (HoHC, 2)

Area 3: Sources of Information

Theme 6: HI sources

Sub-theme 6.1: Electronic sources

In this study 16 (38.0%) electronic health information sources. In the field observation, the researcher noted that:

> Sr. Martha (Pseudonymized) has finished delivering antenatal care service to all mothers by 11:00 am. Then after, she opened her desktop computer and started to feed the clients' data on the DHIS2 system. Until 12:30 am she was reading E-books from her desktop. (Field note 21: 02 October 2019) see pictures as show in Fig 3.

The emergency room is another interesting place for the researcher to observe:

> Three professionals surrounded the patient and discussing on the condition of the patient. One of them opened his smart phone and said: *"Let me check UpToDate"* After 10 to 15 seconds of gazing at the mobile phone, he dominated the discussion while clarifying the condition to his colleagues. (Field note 25: 12 October 2019)

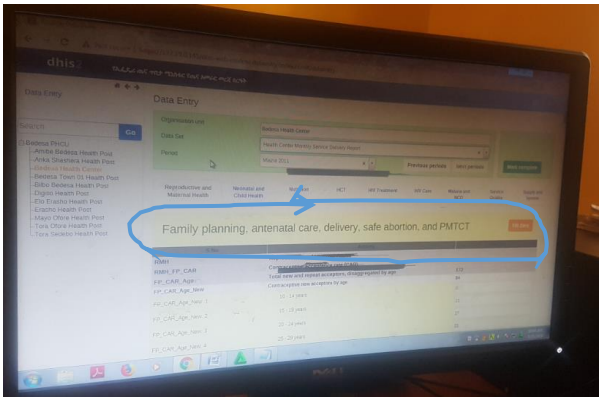

Fig 3: Screen shot picture of DHIS-2 window depicting the use of electronic information sources

Sub-theme 6.2: Print sources

Observation in the field could be summarized as follow:

> The labor and delivery room wall is one of the heavily decorated places in the PLHC. There are too many wall-charts, papers, and banners posted for quick reference by HCPs. The midwife working in the room with four University students entered to the room. The midwife, while pointing at the wall said: "Always you need to refer to the texts posted in the wall to confirm really you are following the standard operating procedures." (Field note 26: 14 October 2019)

Sub-theme 6.3: Human sources

In this study, all sensible HCPs working as a team are categorized as sources of HI. For instance,

> Coordinators working in the family planning and delivery unit, disease prevention unit, chronic disease management unit, adolescent health unit, and out-patient department unit came and consult the health Informatician. (Field note 27: 14 October 2019)

Further, key informants for in-depth interviews summarized as follows:

> "… It is very common to consult colleagues working with me whenever I feel it is important to confirm my opinion." (LT, 1)

Theme 7: Awareness of information source characteristics

Sub-theme 7.1: Accessibility

HCPs working in the PLHC settings of Wolaita zone were frequently using the HI source that was convenient, easy to use, and available at the time of care, and familiar with. For instance,

> Mr. Degu Gobe (Pseudonymized) working in the ART clinic, arrived at the ART clinic early in the morning by 7:30 am. By 8:00 am the first client knocked on the door and Mr. Degu said: *"Please come in"* After a welcome greeting, Mr Degu asked: *"Is it your scheduled visit or*

not?" The client replied while showing the appointment card*: "Yes!"*

Then, Mr. Degu opened the WHO strategy for providing comprehensive care to people with chronic diseases: PDF file from the desktop computer he can access at the time of need. (Field note 28: 15 October 2019)

Sub-theme 7.2: Information source quality

The selection of HI sources in PLHC settings are also linked to information source quality For instance, the in-depth interview findings with the HCPs summarized as follows:

"… Practical and locally relevant HI can be accessed from professional associations conference proceedings." (EH, 1);

Theme 8: Reasons for unmet HI need

Sub-theme 8.1: Library or information resource center availability and access

In this study near tot half 18 (42.9%) of the study participants mentioned the absence of library or resource center as a reason for not meeting the HI needed at the point of care (Table 2). For instance field observation report summarized as follows:

The head of health center while showing the compound of Sodo health center said: "The HCPs in our health center repeatedly expressed the need for reading corner (library or resource center) with collection of relevant reading materials either in print or electronic format in the vicinity of PLHC facilities" (Field note 35: 12 December 2019)

Sub-theme 8.2: Workload/lack of time

The other important reason identified in the PLHC settings, for not meeting the HI needed was the daily routine work and associated lack of time. For instance, a typical working day observation of medical doctor demonstrated as follows:

Dr. Asrat Tera (Pseudonymized) arrived in the healthcare facility at 7:55am in the morning. He entered to his OPD and changed his cloth. There are more than 30 patients waiting outside to see Dr. Asrat. The nurse working with Dr. Asrat arranged the card on first-come-first-served order. The nurse started to call each patient turn by turn. Dr. Asrat asks each patient main problem, write on the patient card, order for laboratory investigation, and give medication prescription paper. He was busy and jump from one patient to another patient. (Field note 29: 18 November 2019)

Sub-theme 8.3: ICT and information literacy skill

The other essential sub-theme found to be linked to not meeting the HI needed in the PLHC settings was ICT and poor information literacy skill. The in-depth interview findings summarize as follows:

"…a lack of ability in searching and filtering booming medical literature and overwhelming online data made my life difficult." (GP, 2);

Sub-theme 8.4: Shortage of ICT infrastructure

Health ICT infrastructures are operational zed as software, internet access, equipment, and other similar resources essential in the provision of healthcare services. For example, BSc. Nurse mentioned as follows:

"… In one of my working days at emergency department patient presented with severe erythema to his left lateral chest wall after sustained motorbike accident. So I searched for additional HI to reach on right diagnosis using my Smartphone data connection. But, Ifini shed my internet data package without getting the HI I needed." (N, 2)

Furthermore, in the participant observation the researcher has observed that:

Computers in the healthcare facilities are insufficient and were shared with other HCPs

The desktop, Due to the poor resource organization practice in the healthcare facilities the quality of hardware is poor, and the installed software is malfunctioning. (Field note 30: 19 November 2019)

Even though the numbers of desktop computers connected to the internet are few and often have limited or unpredictable connectivity, the health center has access to WAN and LAN internet connection. (Field note 31: 19 November 2019)

DISCUSSION

This study found that the work roles HCPs in PLHC was consistent as it was stated in the health sector transformation plan of Ethiopia [4] and the types of HI needed depend on the types of the profession as reported via various studies [16, 17, 20]. Majority (61.9%) demonstrated the need for health promotive and disease preventive types of HI similar to literatures [3, 21, 22]. However, inconsistent findings were reported by Clarke and colleagues and OECD review of the Korean health system in which the focus of PLHC was curative service [23]. The possible explanation for the observed discrepancy was the difference in the working situation and work roles assigned by the different health care system.

In this study it was identified that near to one-third (32.7%) of the HCPs working in the PLHC facilities utilize the needed HI to meet the purpose of answering a colleague and patient question. Consistently, studies [10, 24] demonstrated, HCPs require information to answer queries from the patient and staff related to any of the health care service.

HCPs in this study faced several motivating factors that initiate the beginning process of information need. More importantly, near to half, 45.2%, of HCPs

explained skepticism as a precursor for a deliberate search for HI. Similarly, earlier studies discerned that HI need spark from the haziness or uncertainty associated with providers' understandings of their information need [1, 25, 26]. The possible explanation for the similarity could be, the HI need of HCPs is not constant and can be conditional on intervening factors.

In this study, more than three-fourth (76.2%) of the HCPs preferred formal channels to satisfy their HI need. The finding is more consistent with studies [32, 39] where all HCPs agree with the statement *"The information we get in printed form is more operative and long-lasting. Verbal arguments fly away; printed words from authoritative source endure."*

This study discerned that electronic HI sources are more preferred as a method to meet HI need. The finding is similar with previous study [27]. Furthermore, human sources like colleagues and seniors and print sources were mentioned as sources of information in this study. Similarly studies reinforced colleagues as the most used, efficient, and reliable source of information and locally relevant collections usually in print format as prime port of call for information [23, 28-30]. The reasons for the observed similarity could be the deep-rooted similarity in culture of medicine and health care service delivery that is characterized by team work to achieve a common goal.

In this study 26 (61.9%) of the HCPs mentioned accessibility of information sources in PLHC settings as a major reason for the selection. Consistently several research reported the presence of information sources in the practice setting for immediate use by HCPs as a major reason for selection [24, 31-34].

Near to half 18 (42.9%) of this study participants mentioned the absence of library or resource center as a reason for not meeting the HI needed at the point of care. Consistently, several studies reported inability to access library services and lack of creating central repository like searchable databases as a major reason for unmet HI need [35-39].

Furthermore, this study discerned poor information literacy skills as a reason to unmet information need in PLHC facilities. Consistently, earlier studies reported the ability of HCPs in identifying, locating, and accessing proper sources of HI to meet the information need is vital [6, 40-43]. The similarity might be explained due to less emphasis of this competence in pre-service medical training curriculum and in-service need-based training. Further, the researcher of this study based on field data argues that ICT infrastructures are over sold and under used. Similarly, the report of [44, 45] indicate although a number of infrastructure problems still exist, the low-income countries can certainly benefit by exploiting the available ICT infrastructures to exchange scientific information.

CONCLUSION

In conclusion, this study explored the information seeking behavior of HCPs in PLHC settings using the ISBN model, as framework for deductive analysis. Accordingly, the HI need of HCPs is rooted within types of profession and associated routine task attached to the first tier of Ethiopian health system; that is health promotion and disease prevention. Although it is pigeonholing HCPs preferred formal channels of information and resources held in and delivered in digital format using mobile, computer, and internet technology as compared to print and human sources. Furthermore, the absence of library or resource center, shortage of ICT infrastructure, and poor information literacy skill were raised as reasons for unmet health information need in PLHC settings. Thus, this study implies specific information practices embedded inside a profession. Therefore, it was imperative to establish and equip reading corners and develop information literacy modules and consider in-service training.

Limitations of research

Although this study contributes to information seeking behavior of HCPs in PLHC by exploring needs, sources and channels used by employing ethnographic design, yet, it suffers from certain limitations inherent to design like hard to generalize and highly obtrusive. Further, due to the high information security and data sharing rule we were not able to supplement the tick descriptions of direct observation and in-depth interviews via document analysis. Despite the limitations of this research, it has widened our understanding of information seeking behavior of HCPs in PLHC settings.

Implications of this research

Based on the study findings, a listing of implications and tips is conferred for the highest management bodies, health professionals and other stakeholders (university, NGOs) to boost the result of actual health information need, source, and channels for health professionals in PLHC settings.

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AUTHOR'S CONTRIBUTION

All authors contributed to the literature review, design, data collection and analysis, drafting the manuscript, read and approved the final manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the publication of this study.

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REFERENCES

1. Pakenham-Walsh N, Bukachi F. Information needs of health care workers in developing countries: A literature review with a focus on Africa. Human Resources for Health. 2009; 7(1): 1-3.
2. World Health Organization. Research for international tobacco control [Internet]. 2008 [cited: 2020 Feb 11]. Available from: https://www.who.int/teams/health-promotion/tobacco-control/global-tobacco-report-2021
3. World Health Organization. Measuring health systems strengthening and trends: A toolkit for countries [Internet]. 2008 [cited: 2021 Apr 15]. Available from: https://www.who.int/healthinfo/statistics/toolkit_hss/EN_PDF_Toolkit_HSS_Introduction.pdf
4. Ministry of Health-Ethiopia. Health sector transformation plan II [IInternet]. 2021 [cited: 2021 Aug 1]. Available from: https://fp2030.org/sites/default/files/HSTP-II.pdf
5. Ministry of Health-Ethiopia. Health sector transformation plan I [Internet]. 2015 [cited: 2021 Agu 1]. Available from: https://www.globalfinancingfacility.org/sites/gff_new/files/Ethiopia-health-system-transformation-plan.pdf
6. Bovi AM, Council on Ethical and Judicial Affairs of the American Medical Association. Ethical guideline for the use of electronic mail between patients and physicians. Am J Bioeth. 2003; 3(3): W-IF2. PMID: 14735881 DOI: 10.1162/152651603322874771 [PubMed]
7. Revere D, Turner AM, Madhavan A, Rambo N, Bugni PF, Kimball A, et al. Understanding the information needs of public health practitioners: a literature review to inform design of an interactive digital knowledge management system. J Biomed Inform. 2007; 40(4): 410-21. PMID: 17324632 DOI: 10.1016/j.jbi.2006.12.008 [PubMed]
8. Soong A, Au ST, Kyaw BM, Theng YL, Car LT. Information needs and information seeking behaviour of people with dementia and their non-professional caregivers: A scoping review. BMC Geriatr. 2020; 20(1): 61. PMID: 32059648 DOI: 10.1186/s12877-020-1454-y [PubMed]
9. Kim SU, Syn SY. Credibility and usefulness of health information on facebook: A survey study with US college students. Information Research. 2016; 21(4): n4.
10. Teklegiorgis K, Tadesse K, Mirutse G, Terefe W. Factors associated with low level of health information utilization in resources limited setting, eastern Ethiopia. International Journal of Intelligent Information Systems. 2014; 3(6): 69-75.
11. Rossouw SF. Networking Africa's scientific and technical information resources. In: Dubois JE, Gershon N (Eds). The information revolution: Impact on science and technology. Springer; 1996.
12. McMillan JH, Schumacher S. Research in Education: Evidence-based inquiry. Pearson; 2010.
13. Wilson TD. Models in information behaviour research. Journal of Documentation. 1999; 55(3): 249-70.
14. Dervin B. An overview of sense-making research: Concepts, methods and results to date. International Communications Association Annual Meeting. 1983.
15. Kapadia-Kundu N, Sullivan TM, Safi B, Trivedi G, Velu S. Understanding health information needs and gaps in the health care system in Uttar Pradesh, India. J Health Commun. 2012; 17 Suppl 2: 30-45. PMID: 22724670 DOI: 10.1080/10810730.2012.666625 [PubMed]
16. Kundu DK. Models of information seeking behavior: A comparative study. International Journal of Library and Information Studies. 2017; 7(4): 393-405.
17. Hertzum M, Simonsen J. How is professionals' information seeking shaped by workplace procedures? A study of healthcare clinicians. Information Processing & Management. 2019; 56(3): 624-36.
18. Russell LB. Is prevention better than cure? The Brooking institution; 1986.
19. Reeves S, Kuper A., Hodges BD. Qualitative research methodologies: Ethnography. BMJ. 2008; 337: a1020. PMID: 18687725 DOI: 10.1136/bmj.a1020 [PubMed]
20. Leckie GJ, Pettigrew KE, Sylvain C. Modeling the information seeking of professionals: A general model derived from research on engineers, health care professionals, and lawyers. The Library Quarterly. 1996; 66(2): 161-93.
21. Ingwersen P. Cognitive perspectives of information retrieval interaction: Elements of a cognitive IR theory. Journal of documentation. 1996; 52(1): 3-50.
22. Wai-yi BC. An information seeking and using process model in the workplace: a constructivist approach. Asian Libraries. 1998; 7(12): 375-90.
23. Wendimagegn NF, Bezuidenhout MC. Integrating promotive, preventive, and curative health care

services at hospitals and health centers in Addis Ababa, Ethiopia. J Multidiscip Healthc. 2019; 12: 243-55. PMID: 31040687 DOI: 10.2147/JMDH.S193370 [PubMed]

24. Clarke MA, Belden JL, Koopman RJ, Steege LM, Moore JL, Canfield SM, et al. Information needs and information-seeking behavior analysis of primary care physicians and nurses: a literature review. Health Info Libr J. 2013; 30(3): 178-90. PMID: 23981019 DOI: 10.1111/hir.12036 [PubMed]

25. Davies K. The information-seeking behaviour of doctors: A review of the evidence. Health Info Libr J. 2007; 24(2): 78-94. PMID: 17584211 DOI: 10.1111/j.1471-1842.2007.00713.x [PubMed]

26. De Villiers MR, De Villiers PJT. The knowledge and skills gap of medical practitioners delivering district hospital services in the Western Cape, South Africa. South African Family Practice. 2006; 48(2): 1.

27. Moulding NT, Silagy CA, Weller DP. A framework for effective management of change in clinical practice: Dissemination and implementation of clinical practice guidelines. Qual Health Care. 1999; 8(3): 177-83. PMID: 10847875 DOI: 10.1136/qshc.8.3.177 [PubMed]

28. Scott SD, Albrecht L, Given LM, Hartling L, Johnson DW, Jabbour M, et al. Pediatric information seeking behavior, information needs, and information preferences of health care professionals in general emergency departments: Results from the Translating Emergency knowledge for kids (TREKK) needs assessment. CJEM. 2018; 20(1): 89-99. PMID: 28067181 DOI: 10.1017/cem.2016.406 [PubMed]

29. Fox S. The social life of health information [Internet]. 2014 [cited: 2021 Agu 12]. Avilable from: http://www. pewinternet. org/Reports/2009/8-The-Social-Life-of-Health-Information. aspx. 2009.

30. Asad Khan M. Failure analysis of primary health care in Pakistan and recommendations for change [Internet]. 2009 [cited: 2021 Aug 12]. Available from: https://www.scribd.com/document/139572234/Failure-Analysis-6-28-09

31. Musoke MG. Information and its value to health workers in rural Uganda: A qualitative perspective. Health Libr Rev. 2000; 17(4): 194-202. PMID: 11198325 DOI: 10.1046/j.1365-2532.2000.00289.x [PubMed]

32. Benner P, Hughes RG, Sutphen M. Clinical reasoning, decision-making, and action: Thinking critically and clinically. In: Hughes RG. (ed). Patient safety and quality: An evidence-based handbook for nurses. AHRQ Publication; 2008.

33. Lemma I. Assessment of access to health information resources among health professionals working in HIV/AIDS and family health units of public health centers in Addis Ababa, Ethiopia [MSc Thesis]. Addis Ababa University; 2009.

34. Xie I, Joo S. Selection of information sources: Accessibility of and familiarity with sources, and types of tasks. Proceedings of the American Society for Information Science and Technology. 2009; 46(1): 1-8.

35. Kahouei M, Ahmadi Z, Kazemzadeh F. Challenges of Evidence-Based nursing among Iranian nurses. IIOAB Journal. 2016; 7(Suppl 2): 428-31.

36. Asemahagn MA. Determinants of routine health information utilization at primary healthcare facilities in Western Amhara, Ethiopia. Cogent Medicine. 2017; 4(1): 1387971.

37. Peirson L, Ciliska D, Dobbins M, Mowat D. Building capacity for evidence informed decision making in public health: A case study of organizational change. BMC Public Health. 2012; 12(1): 1-3. PMID: 22348688 DOI: 10.1186/1471-2458-12-137 [PubMed]

38. Gillam S, Siriwardena AN. Evidence-based healthcare and quality improvement. Qual Prim Care. 2014; 22(3): 125-32. PMID: 24865339 [PubMed]

39. Obidike NA. The library as an effective tool for understanding the health status of rural communities in Nigeria. Library Philosophy and Practice. 2011; 2011: 1-7.

40. Chipungahelo MS, Haruna H, Ndege J, Lujenje S. Promoting public access to health information: Experience of the association for health information and library in Africa. IFLA World Library and Information Congress. IFLA; 2015.

41. Mataboge ML, Beukes S, Nolte AG. The experiences of clients and healthcare providers regarding the provision of reproductive health services including the prevention of HIV and AIDS in an informal settlement in Tshwane. Health SA Gesondheid. 2016; 21(1): 67- 76.

42. Bandyopadhyay S, Kumar R, Singhi S, Aggarwal AK. Are primary health workers skilled enough to assess the severity of illness among young infants? Indian Pediatr. 2003; 40(8): 713-8. PMID: 12951373 [PubMed]

43. LaPelle NR, Dahlen K, Gabella BA, Juhl AL, Martin E. Overcoming inertia: increasing public health departments' access to evidence-based information and promoting usage to inform practice. Am J Public Health. 2014; 104(1): 77-80. PMID: 24228662 DOI: 10.2105/AJPH.2013.301404 [PubMed]

44. Bertrand I, Certain E. Access to reliable information for health workers in developing countries: information for all, starting at grass roots level in Africa. Health Libr Rev. 2000; 17(4): 222-4. PMID: 11198330 DOI: 10.1046/j.1365-2532.2000.00296.x [PubMed]

45. Aparicio MA. Access to electronic publishing in African countries: Some reflections. International Conference on Electronic Publishing. ELPub; 2009.