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Preparedness for Use of Health Information for Planning and Decision Making: A Study of Health Facilities in the Kumasi Metropolis, Ghana

Richard OSEI AMANIAMPONG*
S.D.A. Hospital, Asamang, CHAG, P.O BOX 33, Agona- Asamang, Ashanti Region- Ghana

Peter Agyei-Baffour
School of Public Health, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Daniel Boateng
School of Public Health, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Abstract
Background: Providing the right quality information system promotes effective and efficient ways of using scarce resources through proper planning and decision-making. This however depends on availability of infrastructure and adequate staff training on use of health information.**Methods:** This cross-sectional study was conducted among health facilities in the Kumasi metropolis and data was collected from June to September 2011. The study involved 323 health staffs, recruited from among1162 health workers from public, private, quasi and mission health facilities and the Metro Health Directorate in four of the ten sub-metros across the Kumasi metropolis. Data was analysed with STATA 11 software. **Results:** More than 50% had received training on HI among all the facilities. Comparatively, training on HIS was lower in the public hospitals. Training on HI and relevance the training had significant associations with the use of HI ($p<0.001$). Respondents who had never had training on HI were less likely to use HI for planning and decision-making as compared to those who had ever had training (OR=0.086; 95% CI=0.03, 0.25). Although most facilities had available logistics for storage, processing and using health information, not all were functioning. Challenges associated with use of HI included inaccurate data, low knowledge on IT, unreliable information, inconsistent data, improper documentation and power cut offs. **Conclusion:** Use of health information remains critical to making evidenced based decision-making. Improving health training and the requisite logistics could improve use of HI among health staffs.
Keywords: health information, planning, Kumasi metropolis, training, logistics, preparedness

1. Introduction

The availability of complete, accurate Health information has improved healthcare and experiences in the world recently. This has further expanded the collective knowledge about diseases and appropriate treatments, strengthened insights into the effectiveness and efficiency of healthcare systems, supported public health and security goals, and helped health facilities and their workers, and customers to intervene their needs. Aggregation of health information into very large data sets and repositories offers extremely valuable opportunities and benefits though it has limited understanding by the general public. [1]

Recently the Health Metrics Network (HMN) has established as an international network to increase the availability and use of timely and accurate health information from a variety of data sources [2]. This abound at different forums regarding which data source is preferable for developing and tracking health system targets, documenting best practices or effectiveness of interventions, and identifying gaps in performance. It is argued (personal communications to authors at various meetings) that household and facility surveys yield better quality information than self-reported routine health information systems (RHIS) or health management information systems (HMIS) because of more objectivity and less bias. Others perceive RHIS to be costly, producing low quality and mostly irrelevant information, [3] thereby contributing less to decision-making processes. The missing point in the debate is that each method of data collection serves a different purpose and has its own strengths and weaknesses. Further, there is no evidence that a third party survey assures better accountability or improvement in health system performance. Performance remains an organizational issue and needs to be dealt with as such. Health system managers have no substitute for information in terms of monitoring progress towards achieving service coverage objectives and managing associated support services (e.g. logistics, human resources, finance) for their local target populations. Thus, the focus of debate should shift from abandoning HIS over other sources of data to showing how to improve HIS.

The mission statement of Ministry of Health, Ghana, which is similar to other developing countries seek to improve all the health status of citizens in Ghana, irrespective of their age, sex, religious and political affiliations, and socio-economic levels [4]. To address this issue the collection of health information is instrumental of every health service. This is the basis for epidemiology and prevention, alerting health authorities

to the emergence of health problems, for example increase in cases of an infectious disease, which can signal the possible start of an epidemic, and is needed for effective initiation and management of Primary Health Care (PHC).

In order to attain the goals of Ghana's vision 2020 in tandem with the WHO's universal health coverage, an effective and efficient health system is indispensable. The district is the key level for the management of PHC. Ideally, all health related activities taking place in the district should be coordinated into a district health system and managed by a District Health Management team (DHMT) [5].

The collection of health information is a vital part of every nation's health service. It is the basis for epidemiology and prevention, alerting health authorities to the emergence of health problems for example, an increase in cases of an infectious disease such as the H1N1, which was killing most people around the world, recently was detected immediately due to the use of health information system. Information is crucial at all management levels of the health services from the periphery to the centre. It is crucial for patient's management. Lack of proper data and surveillance systems has been linked with the inability to control disease outbreaks and solve major health problems in this part of the world.

Health Information System defines the ways the health sector operates. That is the way health information managers discharge their duties to enhance development of health information as an important part of managerial capabilities. Therefore providing the right quality information system promotes effective and efficient ways of using scarce resources through proper planning and decision-making. The Ghana Health Services and other developing countries have over the years made efforts at strengthening it Health Information System in order to improve management efficiency and effectiveness. These efforts were demonstrated in the training of all Districts on HIS, after which efforts at institutional training and support have been provided. Currently, comprehensive software such as DHIMS, DHIS, HMIS is being used to help standardized the reporting of health information from one level of the system to another. Despite these efforts, there is little assessment of the effects of the interventions made by the Ghana Health Service and other developing countries on improving HIS. There is limited evidence as to the orientation of staff towards the use of health information in the daily management functions, such as planning and decision-making as well as the preparedness of the various facilities to collect and use data for effectively for planning and decision-making.

2. Methodology

2.1 Study design and setting

The study was descriptive cross-sectional and was carried on between March and August 2012. The study was conducted in the Kumasi metropolis, located in the transitional forest zone and is about 270km north of the national capital, Accra. It is bounded by four (4) districts: Kwabre to the north, Bosomtwe and Atwima Kwanwoma to the south; on the east is Ejisu and Atwima is on the west. It has an estimated population of 2,035,064 with an annual growth rate of 3.4 percent. The study population was conducted among all health workers in the various Hospitals in the Sub-Metros, who collect data and use data for planning and decision-making.

2.2 Sampling and sample size

The sample size of 355 selected from 1162 health workers was randomly selected from the four sub-Metros (i.e public, private, quasi and mission facilities) and the Metro Health Administration. This number was obtained through the health workers who qualify for the study and was available during the period of the research. It was estimated based on the formula by [6]:

$$n = \frac{Z^2}{d^2}, \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where n = the desired sample size, z = the standard normal deviation 1.96, p = the proportion in the target population who collect data and uses data for planning and decision making is estimated to be 30% (0.30), q = 1.0-p, d = degree of accuracy desired at 0 .03.

This study was conducted in selected hospitals in all the five (5) sub-Metros; five (5) public hospitals out of five (5) one (1) Mission hospital out of three (1) mission hospitals, twenty-five (25) private clinics out of one hundred and eighty (180) and two (2) quasi hospitals out of four (4) quasi institutions. These were selected purposively to have a representation of health staff from various institutions (public, mission, quasi and private) from the sub metros. The percentage distribution of respondents according to sub-metro and facilities is shown in Table 1.

2.3 Data collection and analysis

Official letters were taken to the Metro Director of Health Services for notification of the study in the Metropolis. In addition to this, an introductory letter was sent to the Medical Superintendent and all Sub-Metro Heads through the District Health Administration to sought permission to begin the fieldwork. Two Research

Assistants (RAs) were recruited to work as the investigators. Among other things, the research assistants were responsible for ensuring that all questionnaires have been properly filled in and all days` work collected from each respondent. The research assistants were trained for two (2) days on how to properly administer the questionnaire to ensure consistency. They were also trained on how to handle data. Data was collected over period of one month, from June to July 2011.

In order to obtain the required information at the period of study, the investigator used structured questionnaires. The consents of the various respondents were sought verbally before questionnaire administration. Other techniques included for gathering data included non –participant observation at file storage retrieval and data processing and inspection of official records, equipment and logistics using checklist.

Data were verified and entered into computer using SPSS Software version 19. After the data entry, the questionnaires were kept under lock and key. Data analysis involved cleaning and exploration by running univariate analysis to assess the distribution of the data and cross-tabulations to access the influence of training on use of HI for planning and decision making at a significant level of $p<0.05$. Health facility preparedness also involved assessment and functioning of requisite facilities to enhance management and use of data.

Ethical clearance

The study protocols were sent to the Committee for Health Research Publication and Ethics, Kwame Nkrumah University of Science and Technology for clearance before the commencement of the study. Respondents were given the opportunity to decide whether to partake in the study. Also, respondents were assured of the confidentiality of their identity in the study.

3. Results

3.1 Background characteristics of respondents

Table 2 presents the various frequencies and corresponding percentages of the demographic characteristics of respondents. The mean age of the respondents was 37 years (SD=10.8). Most of the respondents (42.4%) fell within the age category of 25-34 years. 26.9% were above 45 years and 5.9% below 24 years. majority of the respondents held tertiary diplomas as academic qualifications with 24.1% holding bachelor degrees. Only 4.6% of the respondents interviewed held master degrees. Majority were clinicians with 35% being in other professions.

3.2 Training and use of HI

As shown in Figure 1 below, more than 50% had received training on HI among all the facilities. Comparatively, training on HIS was lower in the public hospitals where 108 (59%) of respondents indicated had received training on HI. Training on HI was statistically different among the various facilities studied ($p=0.034$).

Training on HI and relevance the training had significant associations with the use of HI as shown in table 2 ($p<0.001$). Respondents who had never had training on HI were less likely to use HI for planning and decision-making as compared to those who had ever had training (OR=0.086; 95% CI=0.03, 0.25). One hundred and thirty representing 60% of respondents who had ever received training on HI indicated training was received yearly whereas 51 (25%) indicated training were received quarterly and 29 (15%) monthly. Respondents' perceptions about the relevance of training to HI also influenced their use of HI for planning and decision-making. Negative perceptions about the relevance of the HI decreased the likelihood of using HI for planning and decision-making (OR=0.01; 95% CI=0.002, 0.06), Table 2.

3.3 Logistics

Effective use of HI for planning and decision-making depends to a larger extent available and functioning logistics. More than 50% of respondents indicated that computers, pen drives, software, UPS, forms, generators and cabinets were available in their various facilities. It is worthy to note however, that all respondents from the mission facilities indicated that computers were available as compared to 58% from the public facilities. On Internet, only 35% of respondents from public facilities and 42% from mission facilities indicated was available for use as detailed in table 3.

Functioning of the most of the logistics was generally low across board as indicated in table 3. Functioning of computers among mission facilities was high among private (63%), mission (83%) and quasi (53%). Most printers were also not function in all facilities with the exception of private where 53% were functioning. Internet facilities were low among all the facilities with private facilities recording the lowest (33%). More than 50% of respondents from all facilities indicated cabinets were however functioning with the exception of quasi (40%).

3.4 Challenges in using HI for planning and decision making

A description of the various logistical and structural challenges faced by health staff in using health information in planning and decision-making function s is presented in this section.

Almost all the respondents interviewed indicated having challenges with the use of health information for planning and decision making. Inadequate logistics emerged the most cited challenges faced by in using HI for planning and decision making (10.4%). Inaccurate data (9.8%), low knowledge on IT (9.0%), unavailability of information (9.2%), inconsistent data (7.6%), improper documentation and inadequate training on the use of HI (6.4%) were the other cited challenges for not using HI.

4. Discussion

4.1 The preparedness of health facilities for optimal use of Health Information

Effective roll out and use of HI demands a well prepared human resource who have access to all the required logistics. However, in other cases, technology may be available but cannot be used for a range of reasons, including problems with the power supply, the absence of other essential resources that are needed to use the equipment and lack of staff skills.

There is plenty of specific evidence that many – even most – health care information systems are failures. Anderson's [7] work on HCIS cites "studies that indicate half of all computer-based information systems fail". Green [8] notes that, "For every documented success, there seems to be a clutch of failures." Results from other studies also indicate that many health care institutions have consumed huge amounts of money and frustrated countless people in wasted efforts to implement information systems [9]. This indicates that without the required amount of preparedness, efforts to improve use of HI for planning and decision making will come to a not.

This study sought to determine the level of preparedness of health staff to use HI for planning and decision making. This was assessed from the personal and behavioral as well as the environmental point of view. Most of the respondents have ever received training on Health information. This was however low in the public facilities with 43% not receiving any training on Health information and 60% receiving training yearly. In a comparative analysis, use of HI was high among those who have received training (98%) as against those who have not received training (77%).

Training on HI had significant association with use of HI for planning and decision making in the comparative analysis. Those who had not received training on HI were less likely to use HI for planning and decision making. This indicates that facilities that receive more training are more likely to use health information for planning and decision-making. This emphasizes the low utilization rate among public facilities. The result of the study was similar to a study by Green, [8] which indicated that the training of a data collector can affect the accuracy of his information. Green [8] however focused on data collectors whilst this study looked at use of HI among all health staff. Facilities must therefore ensure training of health staff on the use of HI and this must also be organized regularly. As reported by WHO [10], the health service must ensure all health staff; are not only trained on how to fill forms, but also on how to analyse, interpret and use the information collected in their daily planning and decision making.

Although logistics were available in most facilities, not all were functioning. All respondents from mission facilities indicated computers were available for data entry and analysis. Internet facilities were low among the public facilities (35%) and external hard drives were mostly not available in all the facilities. The percentage of generators functioning was low among the Mission (42%) and Quasi (47%). The absence of these logistics makes it difficult to analyze data and thus plan with it. The absence of a reliable and functioning computer and internet greatly hinders the implementation of HI systems in the Ghana Health Service. E-health since its evolution in 1999 has been a preferred means of health care delivery in many countries including India [11]. E-health is a relatively recent term for healthcare practice supported by electronic processes and communication. The introduction of e-health has reduced the burden on most patients and health providers. Some countries use E-health in the treatment of mental disorders and these are essential especially in countries with low resources for health delivery including Ghana and other developing countries in the world. However, e-health thrives on data exchange, which needs very functional computers with an Internet system, and an uninterrupted power supplies.

The enormous amount of information available and the many uses one can have through the Internet have made it the most valuable tool in various settings of a person's life. The Internet has an enormous amount of publications added on it every day and it's evolving as the most powerful source of information. Also, use of the Internet has made jobs easier and oversimplified tasks that would take an enormous amount of time before. However, the results of this study indicate that not all computers available were functioning and most facilities did not have internet access. Internet availability was less than 50% across all the facilities and this to some extent will influence their data sharing. This indicates that more still needs to be done if Ghana and other developing countries aim at joining the modern era of E-health.

The result was inconsistent with a recent study in Brazil where all municipalities studied had computers with 94% having internet access [12]. This inconsistency might have however arisen as a result of the difference in the social and economic settings where the two studies took place and also the different sectors where the studies were conducted. Computer technology can greatly enhance and expedite data processing and the

presentation of information. It greatly reduces the time required for processing large volumes of data at the various facilities.

External hard drives were less available in all facilities with Quasi facilities having the least, 33%. Pen drives were also less functioning among the various facilities with Quasi facilities recording the least (33%). Data storage and retrieval forms another important component of the use for information in the health sector for planning and decision making. Data, which is the cornerstone of health information must be properly stored for avoid data lost. Reliance on only computer hard disks as the only means of data storage often times lead to failure. External hard drives are needed as backup data storage which can be retrieved for use at any point in time. Lack of adequate storage facilities was also reported in a study by Kebede et al [13]. A World Health Organization report [14], on the framework and standards for country health information systems also acknowledged the inadequacy of statistical and laboratory capacity for the effective manage and use of health information and its impact on measuring diseases in such parts of the world.

The report by Kebede et al [13] indicates that critical infrastructures (such as road transport, broadband communication or electric power) needed to improve use of health information are woefully inadequate. For example, with the exclusion of South Africa and Algeria, the entire African Region total electric consumption is less than that of Republic of Korea. A lot of efforts are therefore needed to bridge the logistical gap and to provide the necessary platform for effective health information use.

4.2 The challenges associated with collection, storage and usage of health information

Using health information for planning and decision making is fraught with challenges especially in the context of limited logistics and inadequate staff training. A total of 130 respondents from all facilities representing 38% of the respondents had some form of challenges in using HI for planning and decision making. There wasn't much difference between the various facilities in terms of challenges faced in using HI for planning and decision making. Inadequate logistics emerged the most cited challenges faced by in using HI for planning and decision making (10.4%). Most health staff doesn't have the requisite logistics including soft wares to enter and analyze health information to be able to use it for planning or decision making. Management and all at the helms of affairs must come to the realization the role technology play in modern health care delivery and make conscious efforts to provide the necessary tools to enhance effective data collection and management.

Other challenges cited included Inaccurate data (9.8%), low knowledge on IT (9.0%), unavailability of information (9.2%), unreliable information (7.84%), inconsistent data (7.6%), improper documentation, power cut offs (6.7%) and inadequate training on the use of HI (6.4%) were the other cited challenges for not using HI. These challenges impede the smooth application of health information and data management. This is similar to a report by Aqil, Lippevel & Hozumi [15] which stated that data management is problematic and not adequate in most countries where there are problems with the collection, storage, analysis, and distribution of data due to lack of clear procedures.

Challenges in the implementation of health information are not always logistical especially in this setting. Behavioral aspects also play a major role. For instance there are situations where staff have all logistics but refuse to use them citing they are comfortable with traditional procedures. As reported by Vidor et al [12], there is resistance to electronic communication or fragility of internet access among some staff and these contribute towards delays in feeding back information.

This study might have suffered some methodological limitations. There was the possibility of misclassification of some of the characteristics studied. The authors however ensured that questionnaires were standardized and research assistants were well trained to avoid different interpretations. There was also a possibility of respondents' bias as they may have given answers to satisfy the research team instead of telling the truth. The study scrutinized the study protocols and procedures to minimize the effects of the limitation on the findings.

5. Conclusion

This study revealed the extent of training on HI in health facilities and how it influence use of HI for planning and decision-making. Although the facilities had most facilities for enhance data management and use, majority was not functioning and health workers narrated their challenges with the use of HI. This included lack of training and inadequate logistics. This indicates that there is much to be done to close the gap in terms of equipping health facilities for proper collection, storage and use of data. It is recommended that training on use of HI be organized for all health staff and frequently to enhance use of HI among health staffs at all levels.

Competing interests

The authors declare that they have no competing interests

Authors' contribution

The study was conceived and designed by all authors. PAB was involved in the data analysis and interpretation of the study findings. ROA wrote the first draft of the manuscript. All authors reviewed and critically revised the manuscript for important intellectual content and agreed to submit the manuscript for publication.

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Tables and captions

Table 1: Distribution of respondents by sub district and facility

Facilities	Number of respondents	Percentage
Sub metro		
Bantama	50	15.5
Oforikrom	67	20.7
Subin	56	17.3
Manhyia	63	19.5
Tafo	87	26.9
Facility		
Private	100	31.0
Quasi	15	4.6
Mission	24	7.4
Public	184	57.0

Table 2 Training on HI and use for planning and decision-making

	Use of HI			
	Yes	**No**	**P-value**	**OR (95% CI)**
Training				
Yes	198	5	<0.001	1
No	82	24		0.09 (0.03, 0.25)
How often				
Monthly	29	0	0.211	1
Quarterly	49	2		0.23 (0.17, 2.09)
Yearly	123	7		0.56 (0.22, 1.39)
Relevance of training				
Yes	231	5	<0.001	1
No	8	14		0.01 (0.002, 0.06)

Table 3 Availability and functioning of logistics

	Government		**Private**		**Mission**		**Quasi**	
Logistics	**Present**	**In use**	**Present**	**In use**	**Present**	**In use**	**Present**	**In use**
Computer	58	47	77	63	100	83	80	53
Pen drive	51	45	53	45	58	50	60	33
Software	53	46	59	57	83	75	67	47
External hard drive	36	36	39	39	42	33	33	40
Printer	35	28	53	53	42	25	47	27
Internet	56	35	57	33	50	42	67	47
Ups	52	47	73	55	75	42	67	40
Generator	60	55	74	65	67	42	60	47
Cabinet	81	55	82	67	75	58	73	40

Table 4 Challenges faced in using HI for DM

Challenges	**Frequency**	**Percentages (%)**
Inadequate training	23	6.44
Incorrect analysis	21	5.88
Inconsistent data	27	7.56
Power cut offs	24	6.72
Low knowledge in IT	32	9
Inaccurate data	35	9.8
Inadequate logistics	37	10.36
Unreliable information	28	7.84
Information not available	33	9.24
Incomplete information	26	7.28
Improper documentation	26	7.28
Staff attitude	17	4.76
Inadequate funds to support action	12	3.36
Information often late	16	4.48

Figure 4.1: Training of health staff on healh information.

108 health staffs had received training on health information whereas 74 had not. Among private facility health staffs, 66 had received training, 34 had not. 20 and 12 health staffs had received training on health information among mission and quasi facilities respectivley whereas 4 and 2 had not.

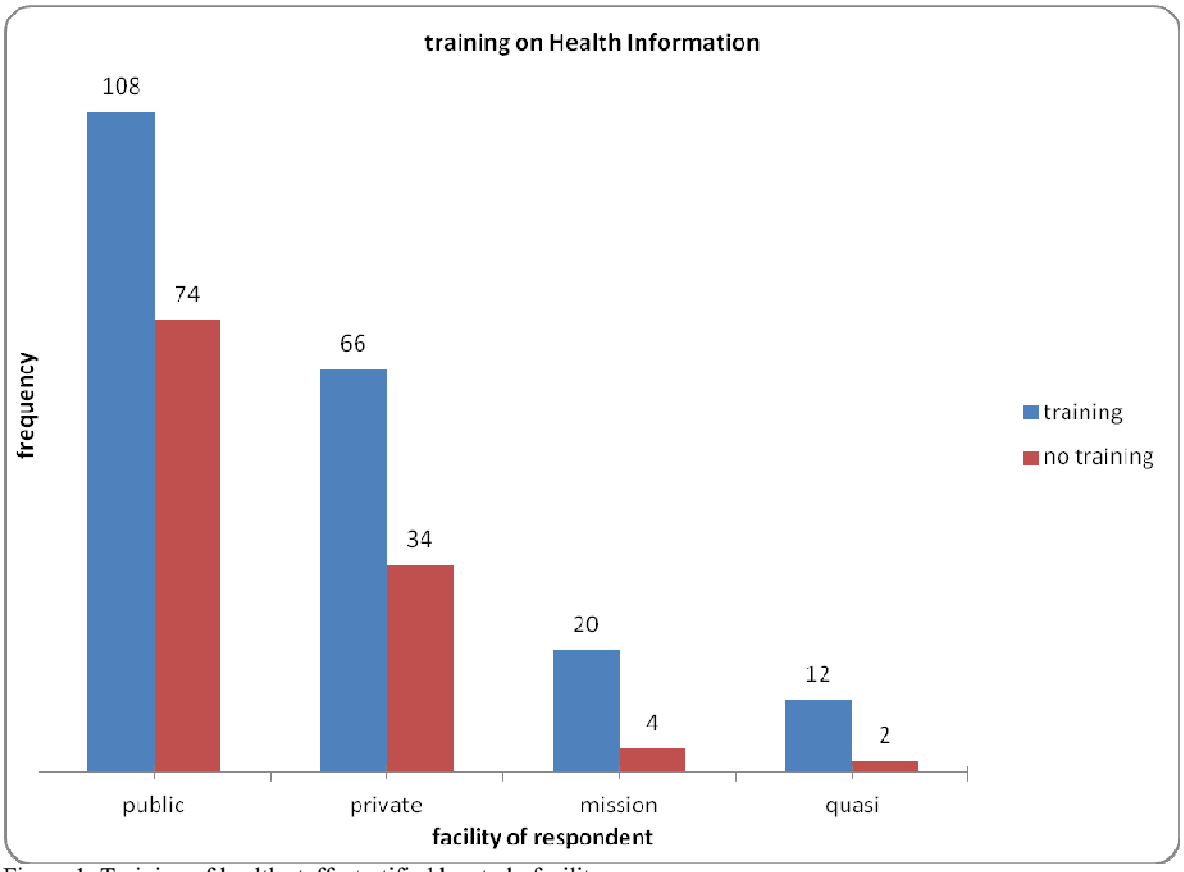

Figure 1: Training of health staff, stratified by study facility