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Knowledge of Health Information for Healthcare Decision Making: A Cross Sectional Study of Health Staff in Kumasi Metropolis, Ghana

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Abstract
Health information collected and analyzed by health staff is the backbone for decision-making. Health staff's Knowledge and understanding influence their usage of health information for health care planning and decision-making. This study assessed the knowledge and understanding of health information among health staffs in the Ashanti region, Ghana. This cross-sectional study was conducted from June to September 2011. The study involved 323 health staffs who were sampled 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. The study outcome indicates a high level of knowledge of health information among health staffs in the Kumasi metropolis with 77% having comprehensive knowledge on HI (measured by correct responses of the statements to tease out knowledge). Awareness was however low among staff of quasi facilities. Staffs knowledge of health information was influenced by their academic qualification, profession and training on health information. Lack of awareness and training on health information discouraged the use of HI among health staffs (OR=0.02 and 0.08 respectively). Health information remains critical to making evidenced based decision-making. Improving the knowledge and understanding of health staffs will go a long way to increase the use of health information for planning and decision-making.
Keywords: Health information, planning, Kumasi metropolis, knowledge, decision making

1. Background

Health care decision making is based on health information which is generated, collated and analysed by health staff. Thus staff's Knowledge and understanding of health information system influence its usage in health care planning and decision making. Knowledge generation, acquisition and absorption or application are related to the total intellectual capacity. Many studies have documented the link between knowledge and utilization of health services including studies from Africa [1], [2] and Canada [3].

Khokar and Kadt [4] observed the urgency in discussing the importance of the use of health information with all categories of health rather than focusing only on how to fill forms correctly. This suggests that health facilities must ensure that field workers or data collectors have the necessary training and the ability to collect and transmit appropriate data to the relevant management levels. In addition, data collectors should be well acquainted with the types of data needed, who generates them and in what form. Basic skills on how to arrange and summarize data, in what reporting format and in what system should be considered for storing and quick retrieval is also essential among health staffs [5], [6].

It is important to note that the level of motivation of the data collector and his training can affect the accuracy of the information and subsequently enhance performances and output. As indicated by the World Health Organization (WHO), the quality of data used at health centers will improve, when local staff involved in data collection are able to analyze and interpret them for subsequent use in decision making [7]. It further reports that much more effort should be directed to provide health staff with training and orientation needed for the collection of relevant and reliable data, their analysis and interpretation, as well as utilization for decision making to improve delivery of health service. This could however be achieved through regular training and relentless effort at capacity building in health information system. Limited knowledge of the usefulness of Routine Health Information System (RHIS) data is a function of low data quality and information use [8-10]. In Ghana, useful data collection is the single most immediate challenge for health sectors. Challenges include monitoring and evaluating all sector activities from both reporting and non-reporting facilities. This could stem from the inadequate knowledge of health staff on health knowledge and its use in healthcare decision making. This study was conducted to assess the knowledge of health staffs on health information as well as factors influencing knowledge of health information.

2. Methods

2.1 Study design and setting

A cross sectional study which employed quantitative techniques was used to obtain information from selected health staff from June to September 2011 describe the current situation in the Kumasi Metropolis. The study was

conducted in the Kumasi metropolis, the second largest metropolis in Ghana and the capital city of Ashanti region. The metropolis is located in the transitional forest zone and is about 270km north of the national capital, Accra. It is between latitude $6.35^{o} – 6.40^{o}$ and longitude $1.30^{o} – 1.35^{o}$, an elevation which ranges between 250 – 300 meters above sea level with an area of about 254 square kilometers. It has an estimated population of 1,430,241 with an annual growth rate of 3.4 percent. This population is distributed in about seventy-six (76) communities in the metropolis.

There are both public and private health facilities in the metropolis. These are organized around the five sub-metropolitan health teams. The various health facilities in Kumasi include one teaching hospital, four quasi-government health institutions, three Christian Health Association of Ghana (CHAG) institutions, two Mother and child health clinics, one community clinic, five government hospitals and one hundred and eighty private institutions [11]. The Komfo Anokye Teaching Hospital serves as the only teaching hospital in the region and the northern sector of the country, and the Kumasi South Hospital has been designated as the Regional hospital. Majority of the health institutions in the metropolis are privately owned with 13 out of the 180 private health institutions being industrial clinics. The study population were health workers in different cultural settings; public hospitals, private and Christian Health Association of Ghana (CHAG) and Quasi facilities who collect, process and transform into information for health service planning and decision-making. All other health workers who are not primarily involved in data processing and use were excluded.

2.2 Study population and sample

The study population were health workers in different cultural settings; public hospitals, private and Christian Health Association of Ghana (CHAG) and Quasi facilities who collect, process and transform into information for health service planning and decision-making. All other health workers who are not primarily involved in data processing and use were excluded. A sample size of 323 was randomly selected from 1162 health workers from public, private, quasi and mission health facilities and the Metro Health Directorate in four of the ten sub-metros. The sample was distributed as follows: all the five public hospitals, one out of three Mission hospitals, twenty-five out of one hundred and eighty private clinics and two out of four (4) quasi hospitals as shown in Table 1.

Table 1 Distribution of respondents by facilities

Institution	**Total Number**	**Number selected**	**Total sample (%)**
Public Health facilities	5	5	184 (57.0)
Private Health facilities	180	25	100 (31.0)
Christian Health Association of Ghana	3	1	24 (7.4)
Quasi Health facilities	4	2	15 (4.6)
Total			323 (100)

2.3 Data collection and analysis

Data were collected using structured questionnaire and checklist. The checklist was used in a non-participant observation for records and other data related issues. The questionnaire was administered by the authors. The questionnaire and the checklist were pre-tested at Sunyani Municipal in the Brong Ahafo Region which was not part of the study area but has similar characteristics like Kumasi Metro. Seventy-five (75) health workers were interviewed in the Municipal. The main issues that were addressed after the pretesting were inconsistencies and logical flow of questions and additional questions suggested by data practitioners. 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 started with data cleaning and exploration by running unilabiate analysis to assess the distribution of the data. This was followed by bivariate during which some selected variables (Gender, academic qualification, profession, training and type of facility) were cross-tabulated to establish relationships regarding the outcome measure, HI use in decision making at a significant level of $p<0.05$. Finally, a step wise logistic regression was run to assess the strengths of some of the variables on HI use in decision making. The variables were grouped into three; background characteristics of health staff (age, sex, academic qualification, profession, and facility), characteristics of HI accuracy (completeness, reliability and timeliness) and health facility preparedness (awareness training and feedback).

2.4 Ethical consideration

This study was a non-invasive one and did not cause any physical harm to respondents. 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 seek permission to begin the fieldwork. Permission was sought from the Regional Director of Health Services, Metro Director of Health Services, Metro Health Management Team (MHMT) and Medical Superintendents in-charge of the health institutions. At each interview point, there was self-introduction

by the research team after which the purpose of the study was comprehensively explained to respondents. Respondents were given the opportunity to decide whether to voluntarily partake in the study after the informed consenting processes had been explained. The study protocols were reviewed and cleared by an institutional review board called, Committee for Health Research Publication and Ethics, Kwame Nkrumah University of Science and Technology, prior to the commencement of the study.

3.0 Results

We interviewed 323 respondents using structured questionnaire from five (5) sub metros in the Kumasi Metropolis; 26.9% of the respondents were from Tafo sub metro while 15.5% were from Bantama sub metro. In Table 2, majority of the respondents (57%) were from the public health facilities while respondents from Quasi facilities constituted the lowest number of respondents (4.6%) with 53% males and 47% females. Majority (40.6%) were clinicians while 35% were other health professionals. The mean age of the respondents was 37 years (SD=10.8) with majority (42.4%), falling within the age category of 25-34 years, 26.9% in the above 45 years and 5.9% in the below 24 years' group. About 40% of the respondents had tertiary diplomas, 24.1% had bachelor degrees with only 4.6% having master degrees.

Table 2 Socio demographic characteristics of respondents

Variables	**Frequency**	**Percentage (%)** ***(n = 323)***
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
Age		
– < 25	19	5.9
– 25 – 34	137	42.4
– 35 – 44	80	24.8
– > 45	87	26.9
Gender		
– Male	170	53.0
– Female	153	47.0
Academic qualification		
– SSS certificate	36	11.1
– Tertiary certificate	59	18.3
– Tertiary diploma	128	39.6
– Bachelor	78	24.1
– Masters	9	2.8
– Other	13	4.0
Profession		
– Administrators	43	13.3
– Clinicians	131	40.6
– Paramedics	34	10.5
– Biostatisticians	26	8.0
– Other	89	27.6

3.1 Knowledge level of Health information

Knowledge level of HIS among respondents was assessed using accuracy, reliability, completeness and timely submission. The analysis indicates that respondents have good knowledge on HIS. High proportion of respondents reported that HIS should be accurate, reliable, complete and submitted on time for it to be much more useful, Table 3. Two hundred and forty-eight respondents representing 77% had comprehensive knowledge

on HI (measured by correct responses of the statements to tease out knowledge).

The study explored the relationship between some selected factors (awareness, knowledge level, and factors that influence knowledge level). The awareness was across the types of facilities, Figure 1, shows high awareness level in the public and least among the respondents from the quasi facilities. Awareness of HIS however had no significant relationship with the type of facility of respondents (chi square= 4.533, p= 0.209).

Table 3 Knowledge level of respondents on characteristics of HIS

Variables	Frequency (n=323)	Percentage (%)
HIS should be:		
Accurate		
– Yes	252	78
– No	-	-
– Don't know	71	22
Reliable		
– Yes	250	77.4
– No	-	-
– Don't know	73	22.6
Complete		
– Yes	250	77.4
– No	2	0.6
– Don't know	71	22
Timely		
– Yes	250	77.4
– No	2	0.6
– Don't know	71	22
Comprehensiveness	248	77
Incomprehensiveness	75	23

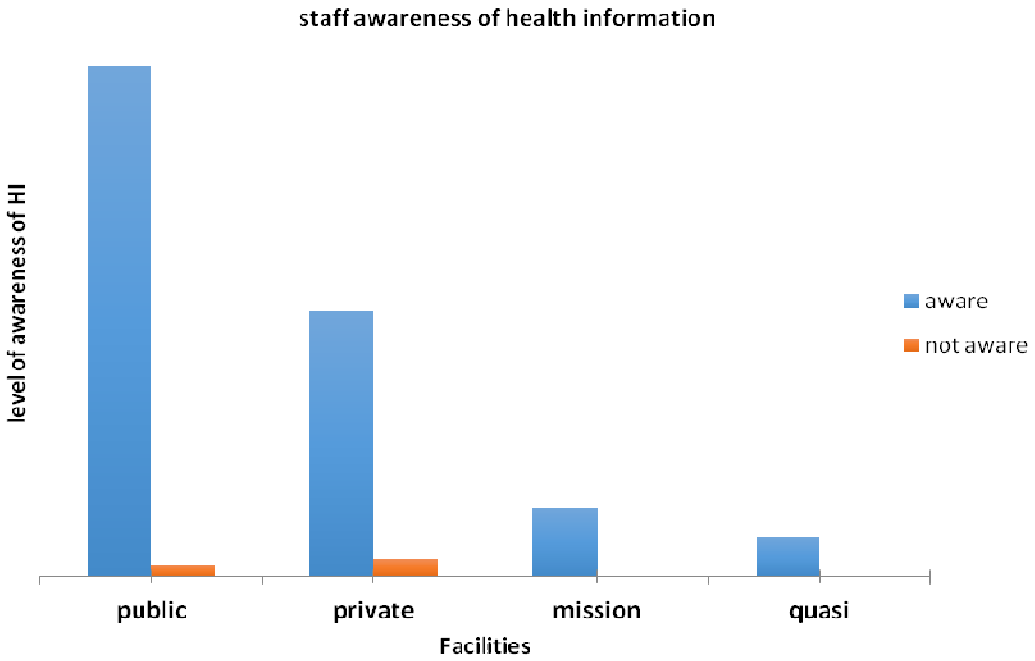

Figure 1 Staff's awareness of health information

3.2 Factors that influence knowledge level

A comparative analysis using chi square test was used to assess the relationship between some selected factors and staff's knowledge level on HIS. In Table 3, there were differences among various groups in terms of level of

knowledge on HIS. Training on HI had statistically significant relationship with knowledge level on HI. Staff who had received training were more likely to have comprehensive knowledge compared to those who had not ($p<0.001$). The academic qualification of staff and staff's profession also had statistically significant relationship with knowledge level on HI, $p<0.001$.

We further explored factors influencing the use of HI among health staffs using multivariate analysis. Table 4, model 1 assesses the combine effects of the background characteristics on the use of HI for planning and decision making while Model 2 shows the combine effects of both the background characteristics and the characteristics of health information on planning and decision making. In Model 3, the combined effects of background characteristics, characteristics of health information and the preparedness of health staff to use HI for planning and decision making were assessed.

Age of staff showed varied effect in the three regression models. The various age categories showed strong positive association with the use of HI with reference to those below the age of 25 years. Staff aged 25-34 years had statistically significant association with the use of HI for planning and decision making as in Model 1 (OR=7.83; 95% CI=0.89 – 69.30; p= 0.044). In models 2 and 3, staff age above 45 years had significant association with the use of HI for planning and decision making, Table 4.

Table 4 Factors that influence knowledge level

	……...Knowledge Level……..		
Covariates	**Comprehensive**	**Incomprehensive**	**Chi-Square/p-value**
Gender			
– Male	135	35	1.394
– Female	113	40	(p=0.238)
Academic qualification			
– SSS certificate	24	12	
– Tertiary certificate	53	4	
– Tertiary diploma	82	40	
– Bachelor	68	10	24.169
– Masters	10	5	(p=0.000)
– Other	5	0	
Profession			
– Administrators	31	12	
– Clinicians	95	36	
– Paramedics	24	10	11.067
– Biostatisticians	26	0	(p=0.026)
– Other	70	17	
Training			
– Yes	194	20	75.952
– No	49	55	(p=0.000)
Facility			
– Public	144	40	
– Private	72	28	3.572
– Mission	18	6	(p=0.312)
– Quasi	13	1	

Table 5 Multivariate analysis of the strength of association between various independent variables and use of HI for planning and decision making

Covariates	Model 1	Model 2	Model 3
	Odds (CI)	Odds (CI)	Odds (CI)
I. Background			
Age			
– < 25	1	1	1
– 25 – 34	7.83 (0.89, 69.30)*	51.80 (3.58, 74.60)*	14.91 (0.70, 26.23)
– 35 – 44	1.95 (0.15, 5.84)	6.28 (0.63, 62.21)	5.40 (0.27, 11.51)
– > 45	2.77 (0.43, 17.93)	23.51 (1.79, 30.10)*	32.53 (4.11, 45.67)*
Sex			
– Male	1	1	1
– Female	0.43 (0.14, 1.30)	0.29 (0.07, 1.27)	0.36 (0.06, 2.13)
Acad. qualification			
– SSS certificate	1	1	1
– Tertiary certificate	1.41 (0.31, 6.47)	0.40 (0.05, 3.42)	0.60 (0.04, 8.97)
– Tertiary diploma	0.81 (0.18, 3.59)	0.65 (0.07, 5.94)	0.79 (0.04, 14.34)
– Bachelor	1.91 (0.32, 11.33)	0.35 (0.03, 4.83)	5.21 (0.11, 23.98)
Profession			
– Administrators	1		
– Clinicians	2.24 (0.33, 15.34)	0.95 (0.08, 11.11)	2.87 (0.04, 8.97)
– Paramedics	0.37 (0.06, 2.39)	0.06 (0.01, 0.41)*	0.01 (0.00, 1.17)
– Biostatisticians	0.33 (0.04, 2.88)	0.02 (0.01, 0.41)*	0.01 (0.00, 0.62)*
– Other	3.24 (0.43, 24.30)	0.57 (0.04, 7.97)	0.14 (0.00, 11.76)
Facility	2.62 (1.06, 6.44)*	2.63 (0.96, 7.16)	2.70 (0.85, 8.55)
II. Characteristics of HI			
Accuracy	0.60 (0.97, 7.16)	0.60 (0.97, 7.16)	0.64 (0.04, 8.55)
Completeness	1.04 (0.02, 54.57)	1.04 (0.02, 54.57)	0.35 (0.02, 5.14)
Reliability	0.60 (0.97, 7.16)	0.60 (0.97, 7.16)	0.10 (0.00, 10.04)
Timeliness	0.10 (0.01, 2.99)	0.10 (0.01, 2.99)	0.29 (0.04, 2.84)
III. Preparedness			
Awareness			0.02 (0.00, 0.41)*
Training			0.08 (0.01, 0.70)*
Feedback			0.20 (0.02, 2.70)
No. of observations	278	272	268
Log likelihood ratio	-74.398	-49.422	-36.759
Likelihood ratio Chi2	0.0048	0.0000	0.0000

Main outcome = USE OF HEALTH INFORMATION; * = p<0.05

Gender of staff had negative association in all three models. Female staffs were less likely to use HI as compared to the male staff. These differences were however not statistically significant. In model 1, females staff were 67% less likely to use HI for planning and decision making compared to male staff (OR=0.43; 95% CI = 0.14-1.30; p= 0.134). The profession of staffs mostly had negative association with the use of HI in the three models. However, in Model 1, clinicians were 2 times more likely to use HI for planning and decision making (OR=2.24; 95% CI = 0.33-15.34) compared to the other professions. In Model 2, paramedics and biostatisticians had significant association with the use of HI for planning and decision making. In table 4, negative perceptions about the various characteristics of health information for planning had negative association with the use of HI in both model 3 and 4 with the exception of completeness in model 2. Staff who were not aware of HI, not trained on HI and did not receive feedback were less likely to use HI for planning and decision making. Awareness and training had statistically significant relationship with the use of HI for planning and decision making.

4.0 Discussion

Health information is the bed rock of health service planning and decision making. Yet limited knowledge of the usefulness of Routine Health Information System (RHIS), questions the validity of this correlation. We conducted a cross sectional survey with 323 health staff across varying health facilities in the Kumasi Metropolis, Ghana.

The study revealed that the level of knowledge on HI was high with more than 70% having a clear idea

about the various characteristics of health information. This is partly an indication that training on HI had been effective across facilities; health staffs with low knowledge level were less likely to use HI for planning and decision making. Staff level of knowledge on HI use is influenced by their academic qualification, professional background and whether they had or had not received training on health information. Knowledge level of HI was influenced by one's academic qualification (p=0.000). As one's academic qualification increases, he is more likely to understand better what health information is and its relevance in planning and decision making. Knowledge level was high among those with Bachelor degrees and tertiary certificate with 87% and 93% respectively having comprehensive knowledge about HI. There were also differences among the various professions in terms of their knowledge level of HI.

It is worthy to note however, that as expected all Biostatisticians had comprehensive knowledge about Health Information. Comprehensive knowledge was lowest among the Paramedics with about 29% not having comprehensive knowledge about HI.

Use of HI for planning and decision making is met with some constraints and internal resistance [12]. The study further assessed factors influencing the use of HI for planning and decision making. Biostatisticians work directly with data and are more likely to utilize HI for planning and decision making than other health staff. Staff's profession (p=0.026) and training (p=0.000) also have significant association. The result was consistent with a study by Rotich [8], where limited knowledge of HI was a major factor in the low data and information use. This was also reported by other studies in the African sub region [9],[10]. Completeness, timeliness and accuracy of reporting are often described as problematic for routine health information because they relate only to the populations using public health services. Data management is also not adequate in most countries where there are no clear procedures for the collection, storage, analysis, and distribution of data [13]. These factors tend to influence use of decision making among health staff. However, this study showed not significant influence of data characteristics on use of HI for planning and decision making.

4. 1 Limitations

The study had some limitations. First, there is a high possibility of respondents' bias as they may have given answers to satisfy the research team instead of telling the truth. Again, cross-sectional study design could not permit an investigation of the cause-effect relationship between the various factors and use of health information. Also, some respondents may have failed to disclose their perception, knowledge and competent level for data collection and utilization of data for planning and decision making. These limitations notwithstanding the study scrutinized the study protocols and procedures to minimize the effects of the limitation on the findings.

5.0 Conclusion

Knowledge level of HI was high among respondents from all facilities with 77% having comprehensive knowledge on HI. Staffs with adequate knowledge tend to understand the importance of HI in priority setting so as to generate solutions that squarely meet the problems of today. Awareness of HI was also high and showed significant relationship with use of HI. Academic qualification increases with understanding and use of HI in planning and decision making.

Competing interests

The authors declare that they have no competing interests

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Authors' contribution

The study was conceived and designed by all authors. ROA, DB jointly collected the data under supervision by EAA and PAB. ROA, DB and PAB were as well involved in the data analysis and interpretation of the study findings. ROA and DB 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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