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Using Quality Improvement Process to Enhance Health Staff Confidence and Competence in Health Information System Tasks in the Ejisu Juaben Municipal Health Directorate, Ghana

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Abstract

Routine Health Information is faced with huge challenges which reduce its decision making and planning yields. The objective of the study was 1) to undertake competency gap analysis of health staff's performance in routine health information tasks, 2) implement quality improvement process training module, 3) to measure the improvement in the competency level of health staff in performing RHIS tasks after application of Quality Improvement Process principles. A quasi-experimental, uncontrolled before and after study was conducted in 18 health facilities in the Ejisu Juaben Municipal Health Directorate, Ghana. The study involved assessment of competency level and training of 141 staff using Data Quality Improvement Process (DQIP) training module over a twelve-month period. RHIS task competence was measured by a pencil and paper test that measured the ability of respondents to perform calculations, and to interpret and use RHIS results, based on the same indicators as used dimension of confidence level. The study found huge competency gaps among staff amidst high confidence in undertaking RHIS tasks while their performance of these tasks scored objectively, yielded low average scores of improvements in competency gaps; data analysis (-36.9%: +3.6%), data interpretation (-42.2%: +9.8%) and use of data (-44.6%: +2.6%) in the baseline and endline evaluations respectively. The study concludes that Quality Improvement Process (QIP) centred training drives the effectiveness of staff competency in performing RHIS tasks, but not necessarily their confidence level.

Keywords: Confidence and competency; Quality Improvement Process; Health Information System.

1. Introduction

Effective policy implementation and efficient resource distribution for management decisions in the healthcare delivery require reliable Routine Health Information (RHIS). This is needed to monitor the delivery of quality health services and related support systems, such as logistics and supplies, and manpower. Despite the enormous role RHIS play in developing countries, it is characterised by challenges such as: lack of policy and legal framework to serve as a guide for collection, quality, use and management of data(Upadhaya et al., 2016, Kihuba et al., 2014, Aqil et al., 2009, Mavimbe et al., 2005; Odhiambo-Otieno 2005). It is common to detect gaps in data collected at the health facilities, either left empty on the pretence of lack of sufficient time due to work overload or due to lack of knowledge of the implications of using incomplete data in decision making. Such situations reduce the confidence in the use of data for decision making at the various levels of health service.

Lack of adequate understanding of the principles of data quality is associated with its limited use. Consequently, critical decisions made in the health system may not be based on the analysis of the information generated but based on circumstantial evidence which are always not scientific(Davoudiet al., 2015, da Silva and Laprega 2005). Limited use of data is also because of lack of confidence and competency in how data are analysed (Booth and Gerard 2011, Odhiambo-Otieno 2005; Nsubuga et al., 2006). The analysis of data does not necessarily depend on the application and use of sophisticated tools and software. Though necessary sometimes, it is not a sufficient condition. Having knowledge and competency in data analysis and use are integral in strengthening the use of data and hence RHIS. Lack of competency in analysis, interpretation and data use lead to poor RHIS management practices (Lavin et al., 2015, Rotich et al., 2003; Kamadjeu 2005).

The situation in Ghana is not different in most health settings, including Ejisu Juaben Municipal health directorate. In Ghana, the management of RHIS is handled mostly by the Records and Biostatistics Department of Ghana Health Service but its generation transcends experts and non-experts in health informatics. In health facilities for instance, data are generated by health staff which are complemented by data from the community (MOH).

To improve data collection and use the Ghana Health Service (GHS) has been organizing refresher training and support supervision to the frontline providers. Currently, there has been an improvement in health information management system through deployment of a web-based database called the District Health Information System (DHIMS2). The new system allows remote retrieval of data in real-time (Nyonator et al, 2011).

Demand for data in response to changing donor funding mechanisms has become imperative. There has been the need to demonstrate corresponding achievements and benefits to vulnerable groups based on donor investments in the health sector (Munthali et al., 2014, WHO, 2007). The Ministry of Health, Ghana, is also under severe pressure to demonstrate progress towards the achievement of their targets and to ensure that donors can show the extent to which their contributions to the health sector have helped in health development. According to MOH, the RHIS is unacceptably under reported with exclusion of key providers in the private and quasi government sectors (MOH, 2007 – 2011 Strategic Plan).

This study analyses gaps in health staff competencies in performing RHIS tasks to inform the design of appropriate quality improvement (QI) training modules to close these competency gaps, and ultimately improve the quality of the RHIS for better health services planning and management. This paper evaluates the impact of the modelled DQIP on health staff confidence and competency in performing RHIS tasks. The intervention aimed at improving the confidence and competency level of health staff in performing RHIS tasks in Ejisu-Juaben Municipal Health Directorate through application of Quality Improvement Process.

2. Methods

2.1 Study design

The research employed quasi-experimental, uncontrolled before and after study design. The design is noted for accurate measurement of providers' confidence and competency in performing RHIS tasks, after training, coaching and mentoring. In such modules, any observed differences in RHIS performance are assumed to be due to the interventions. Following are the details of how the study was conducted as explained in the various phases of the study:

2.2 Baseline Assessment Phase

In March 2012 research proposal was discussed with the Metropolitan Health Municipal Health Directorate (MHD) and approval was granted as it fitted into one of the MHD's major challenges in

health care delivery. A cross sectional study was conducted to provide baseline information to inform the intervention strategy. In June 2012, three Research Assistants were recruited and trained to embarked on pre-test of the data collection tools and subsequent baseline data collection in July 2012.

2.3 Intervention Phase

Based on the gaps identified in the baseline study, four training modules comprising 1: Review of RHIS principles, assumptions and benefits, 2: Improving RHIS data quality, 3: Data analysis, Interpretation and use of RHIS, and 4: Model for Improvement, & Application of QI tools were designed in September 2012. To rollout our intervention, a data quality improvement team (DQIT) made up of at least two members were selected from each of the health facilities within the Municipal Health Directorate. In January 2013, the DQIT were trained as change agents using the project designed training module to build their capacity to enhance their knowledge and skills identified as gaps in the baseline assessment. These gaps included their competencies in checking data quality, performing data analysis, interpretations of analysed data, and use of information generated from analysed data for planning and decision making. The DQITs were given additional training in application of Quality Improvement tools such as Model for Improvement (PDSA), and Process Mapping to equip them with the needed skills to apply QI methodology in solving problems. After the training session which lasted three days, the DQITs were tasked to implement the knowledge and skills acquired to improve RHIS tasks in their respective facilities while the research Team, in collaboration with the MHD followed-up and offered supportive supervision, mentoring and coaching. The follow-up was done through mobile phone calls and onsite visits.

Learning Session - a means of accelerating peer-to-peer learning and large-scale improvement was also used. To encourage peer learning among DQITs, in June 2013, first learning session was held where each of the DQITs presented progress of their RHIS improvement work. Participants shared experiences and learnt from their colleagues. Lessons learnt were used by the DQITs to redesign strategies to either maintain achievements and to improve performance through the improvement cycle (i.e. Plan – Do – Study – Act). Learning Sessions were held quarterly for participants to acquire updated QI knowledge and skills and to learn from one another. Three consecutive learning sessions were convened in the project life. Learning Sessions were interspersed with Activity Periods (APs) during which the DQITs, with support from their facility managers and the research team, developed, tested and assessed change ideas to improve RHIS processes. The intervention lasted for 12 months; from January-December 2013.

2.3.1 Improvement Theoretical Framework

Langley, Moen, Nolan, Nolan, Norman, and Provost (Langley et. al., 1996, Langley et. al., 2009) combined the three questions and the PDSA cycle to form the basis of the API Model for Improvement (see Figure 1).The three questions define the aim, measures, and possible changes. Seventy-two change concepts are given to provide a starting point for use of the PDSA cycle for developing, testing, implementing, and spreading changes that result in improvement. The model can be applied to the improvement of processes, products, and services in any organization, as well as improving aspects of one's personal endeavors. The model attempts to balance the desire and rewards from taking action with the wisdom of careful study before taking action.The Model for Improvement is a structured approach to help organizations that seek to improve access and identify opportunities to enhance their current performance, offering a process for generating new ideas and better practices.

Three principal improvement methods were used to improve data quality and use: The Model for Improvement and Learning Networks among health staff in the municipality. The study used the primary health systems intervention, the "Model for Improvement" (Langley et al, 2009: Figure 1). The Model asked health facilities these questions: what are we trying to accomplish? How will we know that a change is an improvement? What change can we make that will result in improvement?

What are we trying to accomplish?

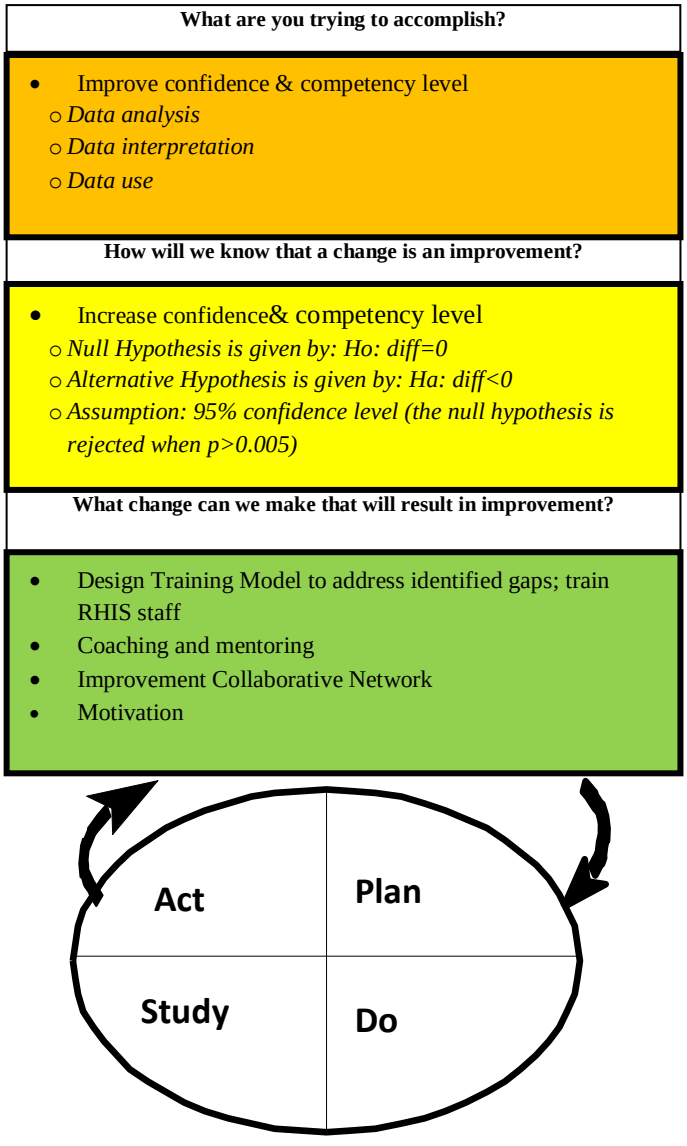
The study intended to improve the health staff confidence and competency in data analysis, interpretation of analysed data and the use of information generated from the analysed data in the Ejisu-Juaben Municipal Health System to promote evidence-informed decision making which is an ingredient for health service planning and decision making. The study guided each local QI team (DQITs) from sub-municipal health directorate and health facilities to develop their own specific aims and sub-aims to meet this overall project aim during initial training (Learning Network meetings). The study worked closely with the local QI teams to ensure that their aims and sub-aims set during learning sessions were focused and accomplished by applying the model for improvement.

How would we know that a change is an improvement?

A set of measures that track changes in confidence and competence level were outlined and developed during the intervention stage of the study.

What changes could we make that would result in improvement?

The DQITs were trained to interpret process performance data, how to solicit change ideas to improve those processes,and how to lead rapid iterative Plan-Do-Study-Act cycles to test those change ideas.



Source: Associate in Improvement, Langley et al, 2009

Figure 1: Model for Improvement

2.4 Endline Assessment Phase

An endline assessment was conducted to assess the impact of the intervention. In February 2014, endline data collection tools were reviewed and updated based on feedback from the baseline assessment to ensure validity and consistency. Three Research Assistants were again recruited and trained. Data entry screen was modified to accommodate both the baseline and endline data for easy comparative analysis. In March 2014, endline, analysis was carried out to determine change in performance of RHIS indicators in both the baseline and endline surveys. The Endline assessment lasted for 3 months; January - March 2014.

2.5 Sampling and setting

2.5.1 Profile of Study Area

The study was carried out in the Ejisu-Juaben Municipal in the Ashanti Region. Ejisu-Juaben Municipal is one of the 27 districts and municipals in Ashanti Region. The municipal has a projected population of 146,762 based on 2010 population and housing census with growth rate of 3.4% per annum (Population and Housing Census, Ghana Statistical Service, 2010). There are 91 communities. The road network is fairly good with few tarred roads. Some of the communities are extremely hard-to-reach during the rainy season. For the purpose of Health Administration, the municipal has been divided into five sub-municipals in accordance with the Primary Health concept. The total staff strength is 247. There are twenty-six health facilities with eighty-one outreach points.

2.5.2 Study Population

The study population comprised health staff and management who collect or use data routinely in all health facilities: both private and public, in the Ejisu-Juaben Municipality. The staff were mainly females, 65% and males 35%. Majority, 70% had worked in Ghana Health Service for an average of 4.8 years. All facilities staff in the study area who had worked for at least 6 months, involved in data generation, processing and use, and consented to participate were included. Eligible participants who did not meet the inclusion criteria were excluded. Total number of 151 out of 247 health staffs were recruited into the study. However, only 141 consented to participate. Thus, all analysis and conclusions are based on the 141 and not 151. The null hypothesis was that the mean of individual differences in RHIS performance level will be zero. If the effect of the Quality Improvement Process (QIP) is as large as a mean difference of -15, then the study wished to have power of 0.95 for rejecting the null hypothesis. Since the study expected an improvement in RHIS performance, a one-sided test with $\alpha = 0.025$ was used. From past studies, the standard deviation of the difference in RHIS performance levels is estimated as 51. STATA statistical software (version 11) was used to compute the sample size to obtain 151, which represent 75 percent of the total number of staff who were engaged in RHIS processes. The same percentage was used to calculate the sample size for each facility. To give equal opportunity to all the eligible staff to participate in the study, a simple random sample was used to select participants. The selected staff who voluntarily consented to participate, were included in the study and they constituted data quality improvement team in their respective facilities.

2.6 Data Collection Techniques and Tools

Survey data were obtained from staff of selected health facilities in Ejisu-Juaben Municipality. The study adapted the Performance of Routine Information System Management (PRISM) tool package (Aqil et al. 2009) (Hozumi et al. 2002; JICA HMIS Study Team 2004), Uganda (Aqil 2004; Aqil et al. 2008) and further refined in China (Aqil et al. 2007a,b). The research employed varying techniques such as interviews, observations and pencil paper tests techniques to collect data.

2.6.1 RHIS organizational and behavioural assessment tool (OBAT)

The tool was self-administered by respondents in a paper and pencil test. This tool compared health staff confidence with competency in RHIS tasks and identified the strengths and weaknesses of these behavioural factors (Aqil et al. 2009).

2.7 Measurements and Data Analysis

2.7.1 Measurements

The confidence and competency levels scale consisted of three dimensions: analysis, interpretation and use of data. The dimension of confidence in performing RHIS tasks comprise the following indicators: 1. "How to calculate percentages/rates correctly", 2." how to plot data by months or years", 3. "how to analyse trends from bar charts", 4. "how to explain findings & their implications, 5. "how to use data for identifying gaps in health performance and setting targets for intervention", and 6. "how to use data for making various types of decisions to address the gaps identified and providing feedback". The health staff were asked to rate their confidence level for various RHIS tasks on a scale: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100. For each dimension, all indicators and their ratings were added together and then divided by the total number of indicators and multiplied by one hundred to obtain a percentile score. RHIS task competence was also measured by a pencil and paper test that measured the ability of respondents to perform calculations, and to interpret and use RHIS results, based on the same indicators as used dimension of confidence level, (Aqil et al. 2009).

2.7.2 Hypothesis

The study tested the null hypothesis which stated that, improvements in health staff RHIS tasks through application of Quality Improvement Process (QIP) will not necessary lead to improved confidence and competency levels. That is the mean individual RHIS task performance differences will be zero. RHIS performance is a composite indicator made up of three indicators. These includes respondents' confidence and competency in performing data analysis, data interpretation and data use indicators. Assumption: 95% confidence level (i.e. the null hypothesis is rejected when $p > 0.005$).

2.8 Ethical Considerations

The study protocols were submitted to the Committee for Human Research Publications and Ethics of Kwame Nkrumah University of Science and Technology for review and clearance which were duly done. Permission was also sought from the Municipal Health Directorate to implement the study. The selected participants were briefed about the study's objectives, potential risks, benefits, the role of the participants and their freedom to participate and withdraw at any stage of the study. Those who agreed to participate were asked to sign an informed consent form to confirm their willingness to be part of the study.

2.9 Reliability, Validity and Internal Consistencies

Questionnaires for the study were pre-tested at Mampong in Sekyere West Municipality, which was not part of the study area but has common characteristics like Ejisu-Juaben Municipality. Based on feedback from the field pre-test, the tools were modified to ensure its suitability for the study. Research Assistants were given 3-day training on the research protocols and data collection tools. This was important to make them familiar with the tools and the expected way of questionnaire administration to reduce inconsistencies and biases. To ensure data quality, data verification was conducted for randomly selected administered questionnaires. Also, data validation checks were included in the data entry software to minimize data entry errors. In adapting the PRISM data collection instruments, face and content validity were assessed through a review and consultation with District Health Management Team (DHMTs), Regional Health Management Team (RHMT) and Centre for Health Information

Management (CHIM). Thus, the validity of these tools is well-established. The reliability and validity of the organizational and behavioural assessment tool, is established in previous studies (Heritage et al., 2014).

3. Results

3.1 Characteristics of Respondents

The section presents characteristics of respondents selected in both baseline and endline sub-studies for the self-administered organizational and behavioural questionnaire. Female respondents were more than male. For instance, in baselines 65 percent of respondents were females while 33 percent were males, and 2 percent missing values. Again, in endline, females constituted about 65 percent whereas 35 percent were males. In baseline, 73 percent of respondents had Post Senior High level of education compared to 77 percent in endline. Another 13 percent and 20 percent respectively in baseline and endline had Senior High School level of education. The remaining 1 percent and 3 percent respectively in baseline and endline had Junior High School level of education. The mean age of the respondents was 29 years in baseline (varying from 21 to 63 years). Also, the mean working experience of respondents in baseline was 4.8 years (varying from 1 to 36 years). On the other hand, the mean age of the respondents in endline was 29.6 years (varying from 21 to 64 years). Again, the mean working experience of respondents in endline was 5 years (varying from 1 to 37 years). The specialization of respondents was similar in both baseline and endline which includes: Doctor (5%), Physician Assistant (7%), Nurses/Midwives (45%), Technical Officers (34%), Health Information Officers/ Biostatistician (7%), and other staff (1%). The results of the background characteristics suggest no significant difference in sample characteristics in the baseline and endline surveys. Regarding whether respondents had received training in RHIS in the past six months prior to the time of the survey, about 30 percent in baseline compared to 70 in endline respectively claimed they had received some training while 70 percent and 30 percent respectively also said they had not during the same period.

3.2 Confidence & Competencies Gap Analysis

In this sub-section, results on the performance of staff confidence and competencies are presented in Table 1 and Table 2

3.2.1 Staff Confidence level in performing RHIS tasks

Table 1 shows the test-retest analysis findings for the scale of the use of staff confidence and competencies in performing RHIS tasks. The results suggest that the mean levels of the indices measuring a RHIS tasks competence were significantly (p-value<0.005) higher in endline compared to the situation in baseline. However, except for confidence in using RHIS (p-value<0.005), the index of confidence in analysis and interpreting RHIS information was not significantly (p-value>0.005) higher in endline compared to baseline.

Table 1: Respondents' Confidence in performing RHIS tasks

Confidence in RHIS Tasks	Baseline (2012) (Mean, SD, n)	Endline (2014) (Mean, SD, n)	Standard Error of Difference (2012-2014)	T of Difference (p value)
Data Analysis	73.33	78.59		2.37
	(20.97)	(15.87)	2.21	(0.01)
	141	141		
Data Interpretation	68.96	74.35		2.42
	(21.99)	(14.58)	2.22	(0.01)
	141	141		
Data Use	65.00	80.34		7.26
	(21.49)	(12.93)	2.11	(0.00)
	141	141		

A two-sided paired t-test of the null hypothesis that the mean change in data analysis skills (Ho: diff = 0) yielded a paired t-statistic value of 2.39 and associated two-sided p-value = 0.01. This is statistically insignificant, that is, we failed to reject the null hypothesis. The study concludes that these data do not provide statistically significant evidence that there is a change in respondents' confidence in calculation of percentages/rates correctly and plotting of charts; before and after the study. Again, two-sided paired t-test of the null hypothesis that the mean change in data interpretation (Ho: diff = 0) yielded a paired t-statistic value of 2.42 and associated two-sided p-value = 0.01. The result is statistically insignificant, and we failed to reject the null hypothesis. We conclude that these data do not provide statistically significant evidence that there is a change in respondents' confidence in explaining findings in data and their implications after the intervention. Hence, the intervention could not adequately improve staff confidence in data analysis and data interpretation. Furthermore, a two-sided paired t-test of the null hypothesis that the mean change in use of information (Ho: diff = 0) yielded a paired t-statistic value of 7.26 and associated two-sided p-value = 0.0000. This is statistically significant; thus, the null hypothesis is rejected. Therefore, we conclude that these data provide statistically significant evidence that there is a change in respondents' confidence in using data for making decisions after the intervention.

3.2.2 Staff's Competency in performing RHIS tasks

A two-sided paired t-test of the null hypothesis that the mean change in use of information (Ho: diff = 0) yielded a paired t-statistic value of 59.12 and associated two-sided p-value = 0.0000. This is statistically significant, meaning the null hypothesis is rejected. The study concludes that these data provide statistically significant evidence that there is a change in respondents' actual competency in calculation of percentages/rates correctly and plotting of charts; between the baseline and endline of measurement.

Table 2: Respondents' Competency in performing RHIS tasks

Competency in RHIS Tasks	Baseline (2012) (Mean, SD, n)	Endline (2014) (Mean, SD, n)	Standard Error of Difference (2012-2014)	T of Difference (p value)
Data Analysis	36.41	82.19		59.12
	(7.83)	(4.82)	0.77	0.00
	141	141		
Data Interpretation	26.80	84.14		81.84
	(5.29)	(6.42)	0.70	0.00
	141	141		
Data Use	20.41	82.83		84.97
	(5.50)	(6.77)	0.73	0.00
	141	141		

A two-sided paired t-test of the null hypothesis that the mean change in use of information (Ho: diff = 0) yielded a paired t-statistic value of 81.84 and associated two-sided p-value = 0.0000. This is statistically significant. The null hypothesis is rejected. The study concludes that these data provide statistically significant evidence that there is a change in respondents' competency in explaining findings in data and their implication; between the baseline and endline of measurement.

A two-sided paired t-test of the null hypothesis that the mean change in use of information (Ho: diff = 0) yielded a paired t-statistic value of 84.97 and associated two-sided p-value = 0.0000. This is statistically significant. The null hypothesis is rejected. The study concludes that these data provide statistically significant evidence that there is a change in respondents' competency in using data for making various types of decision and providing feedback; between the baseline and endline of measurement.

4. Discussion

The role of RHIS in decision making is of paramount importance. Yet, there are gaps and other challenges in data analysis and use (Peersman, 2014, Rotich *et al.*, 2003; Kamadjeu 2005). Consequently, the role of routine health information in planning and decision making is under estimated (Ajzen 2005). The study hypothesized that improvement in health staff RHIS tasks through application of Quality Improvement Process (QIP) will not necessarily lead to improvement in their confidence and competency levels in data analysis, data interpretation and data use. From our study we found that there has been significant (p-value<0.005) improvement in respondents' competencies in all RHIS tasks including calculation of percentages/rates correctly and plotting of charts, explaining findings in data and their implication; and using data for making various types of decision as well as providing feedback. Another area of improvement is the confidence level (p-value<0.005) in using data for making various types of decision and providing feedback. Nevertheless, the confidence levels (p-value>0.005) of data analysis and interpretation saw improvement over the baseline, the change was not statistically significant.

4.1 Characteristics of Respondents

The gender composition of the baseline and endline are similar indicating that more females are engaged in RHIS tasks in the municipality. In terms of level of education, the study also revealed both in the baseline and endline that almost three out of every four cadre of staff who are engaged in RHIS tasks possessed Post Senior High qualification. The mean age of the respondents was 29 years in baseline (varying from 21 to 63 years). Also, the mean working experience of respondents in baseline was 4.8 years (varying from 1 to 36 years). On the other hand, the mean age of the respondents in endline was 29.6 years (varying from 21 to 64 years). Again, the mean working experience of respondents in endline was 5 years (varying from 1 to 37 years). The result indicates homogeneity in the background characteristics of respondents in both baseline and endline. Pearson's analysis indicates no statistical significance (p-value >0.005) of association between the background characteristics of respondents and their competencies in performing RHIS tasks.

4.2 Confidence and Competency in performing RHIS Task

Evidence indicate RHIS users' need confidence, motivation and competence to perform RHIS tasks, affect RHIS processes and performance directly (Eindra and Maxine, 2013, Aqil et al. 2009). The baseline assessment indicated that health staff and management had relatively high confidence in undertaking RHIS tasks such as data analysis, data interpretation and data use. However, their confidence level marginally and insignificantly improved after been exposed to the PRISM framework (Aqil et al. 2009), as evidence in the endline assessment. Notwithstanding, their confidence level in data use improved significantly. On the contrary, their competency in RHIS tasks scored objectively, yielded low average scores in the baseline assessment suggesting capacity gap in performing RHIS tasks. On the other hand, there were astronomical and significant improvement in all staff and management competency in performing RHIS tasks. Consequently, the endline assessment results indicated an improvement in the gaps between staff and management confidence and competency level after the intervention, in data analysis (-36.9%: +3.6%, p-value<0.005), interpretation (-42.2%: +9.8%, p-value<0.005) and use of data (-44.6%: +2.6%, p-value<0.005) respectively. This confirmed the statement that "The blind spot (Carney et al., 2016, Aqil et al. 2009) shows that people are unaware of a gap between their perceived and actual competence in performing a task". As indicated by Aqil et al. 2009, the PRISM framework has this unique strength of unveiling this blind spot as it relates to organizational and technical determinants. It is possible to use quality improvement approach to bridge RHIS task capacity gap by applying QI tools such as Model for Improvement" (Langley et al, 2009), process map, peer-to-peer learning, mentoring and coaching through well-designed training modules to train and work with staff and management within municipal health structures. This attests to the enormous improvement in competency of staff in performing RHIS tasks as proved by the endline evaluation results.

5. Limitations of the study

Uncontrolled before and after studies are relatively simple to conduct and are superior to observational studies; however, they are intrinsically weak evaluative designs, (Russell and Grimshaw, 1992) as secular trends or sudden changes make it difficult to attribute observed changes to the intervention (Conor 2010). Furthermore, in such studies, the intervention is confounded by the Hawthorne effect [the non-specific beneficial effect on performance of taking part in research] (McCambridge et al, 2014) which could lead to an overestimate of the effectiveness of an intervention. There is also some evidence to suggest that the results of uncontrolled before and after studies may overestimate the effects of interventions. The simple random sample used is only practicable when the population is relatively small and concentrated in a small geographical area and where the sampling frame is complete. With regards to RHIS Organizational

and Behavioural assessment, the tool addresses major knowledge, skills and perceptions of the promotion of a culture of information on a broad scale, and needs to be adapted to include other important areas as identified by senior management. These notwithstanding the scientific rigor processes followed by the research team insulated the findings in terms of validity and reliability.

6. Conclusions

The application of PRISM and Model for improvement framework has high utilities for identifying competency gaps and improving confidence of staff respectively. The study thus agrees with the assertion that "How some individual feels about the utility or outcomes of a task (Jackson et al., 2015), or his confidence in performing that task, as well as the complexity of the task, all affect the likelihood of that task being performed". The baseline results from Ejisu-Juaben Municipal also showed inadequate training for staff in RHIS tasks, where about seven out of ten of the respondents had no training in RHIS for the past 6 months prior to the baseline assessment. As indicated by previous studies (Gagnon et al., 2012 Aqil et al. 2009, Rotich et al. 2003;Odhiambo-Otieno 2005b), this study supports the assertion that limited knowledge of the usefulness of RHIS data is a major contributing factor to lack of information use. Application of PRISM and Model for Improvement drives the effectiveness of staff competency in performing RHIS tasks, but not necessarily their confidence level. These findings have policy utilities to improve the quality of routine data for health care decision making.

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Authors' contribution

ROB, PAB and AKE contributed to the concept, data collection, and review of the article. ROB contributed to the data analysis of the research. ROB, PAB and AKE contributed to the writeup and review of the article.

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