Original Research Article

Assessment of the Effect of SBAR Communication Training on Inter-Professional Team Collaboration in Rwanda

Abstract

Background

Teamwork in clinical settings and especially in emergency department requires straightforward, clear and consistent communication as well as good collaboration between health workers.Lack of good communication between healthcare providers impacts patient care safety, leads to misdiagnosis increases delays in treatment and medication errors, increases patient morbidity and mortality. Researches indicate that more than 70 percent treatment errors are due to poor communication. The number is even big in developing countries include Rwanda.**Objective:** To examine the effect of SBARcommunication education on the competencies of inter-professionalteam collaboration. **Methods:**an intervention study design with thirty registered nurses working in the emergency department at CHUK was utilized.**Tools:**A self-administered questionnaire was completed prior to and after the. training. **Results:** indicated that there is a statistical significant improvement of the nurses' competencies of inter-professional collaboration after SBAR communication education (p(T>t) =0.0002)..**Method**Univariate analysis and paired t-test were used to evaluate the association between communication and some demographic characteristics and to test whether there is a significant improvement in communication after the intervention.**Results:** indicated that there is a statistical significant improvement of the nurses' competencies of inter-professional collaboration after SBAR communication education (p(T>t) =0.0002).**Conclusion**This study concluded that SBAR communication education for emergency nurses increases their communication skills and may thus increase the care to patients.

Keywords: SBAR communication, partnership, coordination, cooperation

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Introduction

Inter-professional team collaboration's competencies are essential to achieve better patients' diagnosis outcomes, [1]. Its competencies include coordination, cooperation, and partnership. These competencies are influenced by the communication strategies between health care providers.

Numerous researches revealed that miscommunication is accounts for more than 70 percent of all patients' treatment errors, [2-4]. By trying to alleviate miscommunication issue among various health care providers, health organizations and countries adopted theSituation Background, Assessment, and RecommendationSBAR communication tool in early twenties which was implemented by US submarines military and later adopted by aviation industry as their communication toolkit, [5].

Later on, world health organization, Royal College of Physicians of London, and UK National Health Service recommended the use of SBAR tool in health care,[1]. Various studies were conducted on the contribution of that tool to alleviate practice errors of health providers. Fortunately, there is a consistent testimony of contribution of SBAR to health outcomes of patients but there are some significant differences in reported level of contribution, [6].

Although SBAR communication tool is doing better to rescue most patients' life in some countriesand some countries seem to resist adopting its utilization. The most recent statistics indicate that SBAR is being used only in UK, USA, Europe, and Australia and very few Low and Middle Income Countries, [1].

In the frame of this study, the researcher conducted training on the use of SBAR communication tool among registered nurses working in the emergency department at University Teaching Hospital of Kigali, and explored the capacity to engage in inter-professional collaboration among nurses after the training.

Poor quality communication between healthcare providers is a barrier to healthcare safety and challenges effective healthcare practices with inter-professional team collaboration. Limited communication or poor-quality communication impacts patient outcomes and may result in increased patient morbidity and mortality. Ineffective communication does not enhance the workplace or build team spirit, but delays treatment, increases medication errors, leads to misdiagnosis, and increases patient morbidity and mortality, [7].

In the late of nineties, the leading cause of death was errors, 70% of these errors have a cause related to communication failures, [3].The issue of medical errors spurred the IOM to introduce SBAR, a succinct, efficient structured communication method to reduce errors arising from miscommunication. These reported figures have been increasing to date according to the recent research of Mohajan, [7]. His study found out that in 2015, deaths due to medication errors were 5 times higher than in 1999.Although there are no available figures for different geographical region of the world including

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Rwandan context,deaths due to medication errors figures are always higher in countries with low and medium income, [8].

In alleviating the issue of deaths due to medication errors, health care practioners adopted the so-called “SBAR”, [9]. This is a foundational component to formalize communication between healthcare providers. The U.S. Navy originally developed SBAR as a communication technique used on nuclear submarines in the late 1990s, [5].

In a research conducted in South Africa in 2017, SBAR adoption in health sector was foundto improve communication among health care providers and reduce deaths due to treatment errors. This study revealed a 41 percent increase as reported by nurses participated in the study, [6].

The use of SBAR communication has acquired significant testimonies to improve the health care providers collaboration which leads to improve in patients’ safety. These stress international health organizations to put their attention to the use of this new communication toolkit. They further recommend every health care provider to use it to rescue the lives of many patients as a result of practice errors, [8].

Methods

This section presents methods and process that was used to conduct this study includes research design, research approach, research setting, population, sampling, sampling strategy, sample size, data collection procedure, data analysis, ethical considerations, data dissemination, limitations, and challenges.

Design

This is an intervention study design. In this technique, inter-professional team collaboration indicators’ data were collected among nurses in emergency department at CHUK before and after intervention (SBAR training).

Intervention

SBARis a structured method recommended by the World Health Organization (WHO) to hand-over communication between staff and manages critical information that requires immediate attention and action, [1]. The use of the SBAR technique is based on concrete cases and help to answer to the following questions:

- **S-Situation:** What is going on with the patient?
- **B-Background:** What is the clinical background or context?
- **A-Assessment:** What do I think the problem is?
- **R- Recommendation:** What would I do to correct it?

The fulltime nurses working in accident and emergency department nurses followed the SBAR communication education adapted to their contexts. This study assessed the contribution of SBAR communication on inter-professional team collaboration.

Setting

This study was conducted at CHUK which is in Kigali, Rwanda. CHUK is a teaching facility for the University of Rwanda. As the primary main referral facility, it serves a population of 12.5

million. CHUK is organized into divisions; one division supports the clinical areas and the second division is non-medical. CHUK's clinical service includes surgery services for all ages, pediatrics, urology, orthopedic surgery, ophthalmology, and dentistry. Also, CHUK has specialized services clinics in Nephrology, Cardiology, Pneumology or Pulmonary, Dermatology, Endoscopy, and Endocrinology.

Population

The study participants were the available nurses working at CHUK. The number of nurses employed at CHUK is approximately 300 nurses. This researcher focused on the nurses employed full time in the emergency department (N=33).

Sampling

A convenient sample of 33 nurses who working full time at CHUK who meet criteria . at Given that the targeted population were too small (33 nurses), The researcher decided to use the "Total population sampling approach". The Total Population Sampling in full(TPS) is a technique where the entire population that meet the criteria are included in the research being conducted andis more commonly used where the number of cases being investigated is relatively small, [10].

However, only 30 nurses out of 33 nurses were able to participate in both pretest data collection, trained and participate in post test data collection. Thus all the analyses are based on the responses on 30 nurses.

Inclusion

Sampling inclusion criteria for participants was employed nurses at the Emergencydepartment of CHUK, aged 21 years or over and working as a registered nurse. They must be able to complete the tool and be available to have tool completion in one to two weeks post SBAR training.

Exclusion

The study exclusion criteria are non-nursing persons and nurses less than 21 years in the emergency department.

Reliability of Research Instruments

The validity of a tool has many dimensions; it refers to the extent to which a tool subjectively appears covering the concepts it is supposed to measure, [11]. Validity was guaranteed by presenting the data collection tool to the experts to judge its suitability of the tool. For the purpose of this study, content validity and face validity are considered. Starting with face Validity which refers to the subjectivity appearance of a tool suitable to measure the construct of interest, it was assured by presenting the tool to experts who approved it prior to research implementation. For the content validity, it was assured by making sure that all of the study objectives are covered in the subsection of our data collection tool. The content validity is summarized in the table 2.

To test the validity of the tool the researcher conducted also a pilot study in the Surgical department before starting, questionnaires were given to 5 nurses (17% of the sample size)at the end of the pilot study the researcher asked the respondents for any suggestion or any necessary corrections to improve instrument

further.No suggestions for collection were given by the participants. With regard to reliability, it is the extent to which a data collection tool can produce a repeatable and consistency results, [11]. For the purpose of this study the data collection tool to be used is originally in English and the results were found to be reliable.

Data Collection

After ethical clearance of the study from the CHUK research committee, the research approached nurse's managers and explained about the research's aims and data collection process. With her approval the researcher was present in the morning staff to distribute questionnaires to the nurses on day duty,the data were collected in two phases on the same nurses using same questionnaire. The questionnaire adopted the Assessment of Inter-Professional Team Collaboration scale II (AITCs II) Tool which is designed and validated as a useful tool to evaluate IPTC was used to collect baseline data. After the end of this task data were entered in SPSS25 for future reference and analysis.

The following step was to train the same nurses how to use SBAR tool while informing their peer practitioners about patients' information. The training took 2 weeks, 2 sessions per week. 1 Session lasted 1 hour.By working together with the hospital, all nurses (30) participated in baseline data collection completed all sessions.

The researcher himself trained nurses. The assessment of understanding was done using teach back technique which is an agreed effective method to assess comprehension, [12].

The same data on nurses' perspectives of inter-professional team collaboration were collected on the same nurses after one week following the end of the training. Therefore, data from those 2 phases were merged together to proceed to data management and analysis.

Data Management

The consent forms and data collection tools have been kept in a private room with a locked cupboard to ensure data security and privacy of information. After entering data in a computer, it has been locked with a personal password; the data backup was done on flash-drive to ensure security of information. The stored data will be archived for five years and then hard copies of the research will be destroyed.

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Data Analysis

Data was analyzed using the Statistical Package for the Social Sciences (SPSS2525) and STATA15. Raw data from continuous variables were grouped into categories.

Descriptive analyses were also performed to understand the demographic characteristics of respondents (gender, age, working experience and education level) and the assessing the existing relationship between inter-professional team collaboration and demographic factors.

in inter-professional team collaborationIn addition to descriptive analyses, paired t-test was used to test whether there an overall significant improvement. Further, the same test of improvement was performance individually on inter-professional team collaboration indicators (partnership, coordination and cooperation). Sub-indicators were considered to estimate the level of partnership among nurses whereas

other sub-indicators were considered to estimate the level of coordination among nurses. The same as partnership, also sub-indicators were considered to estimate the level of cooperation among nurses.

Ethics

The study proposal was approved by Institution Review Board of University of Rwanda, College of medicine and health sciences. Authorization to collect the data was also obtained from Kigali University Teaching Hospital Research committee. The participants were briefed on the voluntary nature of their participation in the study and necessary information was provided on study objectives and how to complete the questionnaires before beginning. Furthermore, anonymity and confidentiality was considered as before answering questionnaire each participant has signed the consent form. no mentioning of participants names was prohibited the researcher indicated them to use name initials only. The participants were informed that they are free to drop out of the study in case they felt like doing so.

DataDissemination

This study results will be shared with the staff and management team at CHUK, with the UR school of nursing and midwives and the Rwandan Ministry of Health. This researcher will submit presentations to national and international conferences and write for publication in peer reviewed journals.

Limitations of the Study

This study faced some challenges. One of them is financial means that would be used to hire research associates to help me gather information to nurses and physicians from other department or even from other hospitals to allow comparability of results and increase precision at the same time. The study reached only 30 nurses from urban areas only. Therefore, it is difficult to generalize the findings to the entire nursing population of Rwanda. Moreover, it was difficult to get probabilities in favor of inter-professional team collaboration given that nurses have been trained on SBAR or not.

In addition to small population, this study did not evaluate the contribution of SBAR to the survivorship and recovery of patients as the main aim of the work of nurses and doctors. The author recommends future researchers to look at that angle.

Results

This section summarizes the results of analyses. Both descriptive and paired t-test were performed across different indicators of inter-professional team collaboration. Theresearch is purposely conducted to investigate the effect of SBAR communication training on IPTC with the nurses at CHUK in the accident and emergency.

Demographic Characteristics of the Participants

In order to analyze the effect of SBAR communication training on IPTC research participants' demographics such as sex, age, education level, and position held were collected.

Descriptive statistics of the sample included gender as 60% (N=18) were female and 40% (N=12) were male. The majority of participants (63.3 %) were aged between 30 and 35 years. As far as educational level is considered, 66.7% (20) have a diploma education, and 33.3 % (10) have a bachelor's or master's degree. Lastly,

63.3 % (19) had working experience between 6 and 10 years. Table 1 displays the details:

Table 1: Demographic characteristics of participants

Variables	Levels	Gender		Total
		Female	Male	
Age(Years)	30-35	11	8	19
	36-40	2	3	5
	>40	5	1	6
	Sub-total	**18**	**12**	**30**
Education Level	Bachelor's	5	5	10
	Diploma	13	7	20
	Sub-total	**18**	**12**	**30**
Experience (Years)	1-5	5	3	8
	6-10	10	9	19
	>10	3	0	3
	Sub-total	18	12	30

Overall Evaluation of Effect of SBAR Communication Training

The difference in overall mean score before and after SBAR communication training was evaluated using paired t-test. The p-value of **0.0002** which is greater than any value of significant level indicates that the intervention (training) had significant impact on the improvement of communication at the accident and emergency department. Table 2 displays the details:

Table 2:Overall test of difference in average score between before and after SBAR training

Variable	N	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
Overall-posttest	30	91.36667	0.871626	4.774092	[89.58399, 93.14934]
Overall-pretest	30	81.53333	2.466667	13.51049	[76.48843, 86.57823]
Difference	30	9.833333	2.395438	13.12035	[4.934113, 14.73255]

Mean (difference) = mean (Overall-posttest - Overall-pretest) t = 4.1050
Ho: mean (difference) = 0 degrees of freedom = 29
Ha: mean (difference) < 0 Ha: mean (difference) != 0 Ha: mean(difference) > 0
Pr(T < t) = 0.9998 Pr(T > t) = **0.0003** Pr(T > t) = **0.0002**

Evaluation of Contribution of Performance Across Dimensions

Partnership

The difference in the average score was tested based on scores for partnership sub-indicators only. The Table3 summarize the results of analysis. Based on p-value of 0.0000 in the same table, we can conclude that partnership were increased after SBAR communication training intervention.

Table 3:Test of difference in average scores for partnership indicator

Variable	N	Mean	Std. Err.	Std. Dev.	[95% Conf.Interval]
Partnership-posttest	30	34.96667	0.4635776	2.539119	[34.01854, 35.91479]
Partnership-pretest	30	28.76667	0.7266414	3.979979	[27.28052, 30.25282]
Difference	30	6.2	0.90134	4.936842	[4.356553, 8.043447]

Mean (difference) = mean (Partnership-posttest - Partnership-pretest) t = 6.8786
Ho: mean (difference) = 0 degrees of freedom = 29
Ha: mean (difference) < 0 **Ha**: mean (diff) != 0 **Ha**: mean (difference) > 0
Pr(T < t) = 1.0000 Pr(T > t) = **0.0000** Pr(T > t) = **0.0000**

Coordination

The same as partnership, Table 4 indicates also that the coordination was significantly improved after SBAR communication training.

Table 4:Test of difference in average scores for coordination indicator

Variable	N	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
Coordination-posttest	30	35.3	.2801888	1.534657	[34.72695, 35.87305]
Coordination-pretest	30	30.13333	1.085678	5.946505	[27.91287, 32.35379]
Difference	30	5.166667	1.077549	5.901977	[2.962832, 7.370501]

Mean (difference) = mean (coordination-posttest – coordination-pretest) t = 4.7948
Ho: mean (difference) = 0 degrees of freedom = 29
Ha: mean (difference) < 0 **Ha**: mean (difference) != 0 **Ha**: mean (difference) > 0
Pr(T < t) = 1.0000 Pr(T > t) = **0.0000** Pr(T > t) = **0.0000**

Cooperation

Unlike partnership and coordination indicators, Table 5 indicates that at either 5% or 1% level of significance, we can conclude that there is no difference in average score before and after SBAR communication training for cooperation indicator (p=0.0920).

Table 5:Test of difference in average scores for cooperation indicator

Variable	N	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
cooperation-posttest	30	21.1	.5238013	2.868978	[20.02871, 22.17129]
cooperation-pretest	30	22.63333	1.033333	5.6598	[20.51993, 24.74674]
Difference	30	-1.533333	.8798293	4.819024	[-3.332786, .2661197]

mean (difference) = mean (cooperation-posttest- cooperation-pretest) t = -1.7428
Ho: mean (difference) = 0 degrees of freedom = 29
Ha: mean (difference) < 0 **Ha**: mean (difference) != 0 **Ha**: mean (difference5) > 0
Pr(T < t) = **0.0460** Pr(T > t) = 0.0920 Pr(T > t) = 0.9540

Assessing the Association Between Communication and Social Demographic Characteristics

The section evaluated the existing association between communication status (The level of communication after SBAR communication training grouped as improved if the overall score increase or not improved if the overall score reduced or remain the same). We evaluated this for overall scores and for each and every inter-professional team collaboration's indicator (coordination, Partnership and cooperation). However, Table 6 indicates that at alpha =5% or 1% there is no significant relationship between inter-professional team collaboration and demographic characteristics. This could be explained by the fact that the numbers of participants fall within each are very few which hard for test statistic to discover patterns.

Table 6:Univariate analysis of communication status and demographic characteristics of participants

Variable	Levels	Communication Status		Total	Chi-square(P-value)
		Improved	Not improved		
Gender	Female	16	2	18	3.7578(0.053)
	Male	7	5	12	
	Sub-total	23	7	30	
Age (Years)	30-35	14	5	19	2.6970(0.260)
	36-40	3	2	5	
	>40	6	0	6	
	Sub-total	23	7	30	
Education	Bachelor's	6	4	10	2.3292 (0.127)
	Diploma	17	3	20	
	Sub-total	23	7	30	
Experience (Years)	1-5	6	2	8	1.0199 (0.601)
	6-10	14	5	19	
	>10	3	0	3	
	Sub-total	23	7	30	

Discussion

This section discusses the findings from the study and make comparisons with what was found in similar studies like presentations of results and also discussion was done according to the objectives of the study.

Findings from the Study and their Similar Study

This study sought to assess the effect of SBAR communication on IPTC among nurses at CHUK. Three research questions were considered to achieve the overall research objective. The main research question was: "*At what extend SBAR communication training can improve Nurses' inter-professional collaboration competences at CHUK*?". On the basis of the study results SBAR training found to have significant effect on IPTC (Pr (T > t) = **0.0003).** This confirms the plausibility of Verspuy and Ong models of inter-professional team collaboration, [13,14]. This result is an indication that the use of SBAR tool while passing patients' information can improve inter-professional team collaboration and lessen treatment failure in hospitals.

Several studies have similarly concluded that implementing the communication tool SBAR among pharmacy students, [15], Anesthetists, [16], neonatal nurses and doctors,[1], Nurses and Physicians, [17] physicians and nurses working in perinatal services department surgical hospitals wards, [18] have not only improved communication between professionals but also improved the safety climate and

reduced incidents caused by communication errors.

Meester studied the effect of SBAR on the incidence of serious adverse events (SAE's) in hospital wards. They trained 425 nurses from 16 hospitals and the SBAR elements were checked before and after the training in two different years. After the training, they found an increased perception of effective communication and collaboration in nurses (from 58 (range 31–97) to 64 (range 25–97); $p < 0.001$), an increase in unplanned intensive care unit (from 13.1/1000 to 14.8/1000) admissions and a decrease in unexpected deaths (from 0.99/1000 to 0.34/1000) admissions. For his point of increase in communication, his finding does agrees with this study findings except for the cooperation competency. The disagreement found could be linked to the low sample size for this study.

Narayan has added also that SBAR do not only improve inter-professional team collaboration but also reduces rehospitalization of patients while increasing their safety, [19].

However, some research findings revealed that the effect of SBAR on inter-professional team collaboration is little or unclear. One of them is Müller and his colleagues who in short period confirm the existing effect of SBAR on both inter-professional team collaboration and reduction in patients' transfers as well as patients' hospitalization but their study revealed that in long period the effect vanishes, [20]. This agrees also to this study for short term period. However, further researches are needed to investigate long term period relationship between the two.

The study also examines different competencies of inter-professional team collaboration given that SBAR training has been implemented or not. In this, the second, third and fourth research question were used to guide the process. The second research question concerned with coordination competency and it is entitled as: "*At what extend SBAR communication training can improve Nurses' coordination competences at CHUK?"*

The results for this specific objective indicates that the use SBAR communication tool has significant effect on the improvement of the coordination among health care providers (Pr (T > t) = **0.0000**). In other words, the tool easier the coordination between nurses by passing patients' information effectively. This confirms the plausibility of previous researchers' findings on role of SBAR communication on coordination among nurses and physicians, [14,21].

The second IPTC competency considered is cooperation as guided by the third research question: "*At what extend SBAR communication training can improve Nurses' cooperation competences at CHUK?*". This question sought to see whether SBAR communication can help health care providers to listen to everyone and value the viewpoints of all team members and to contribute everyone own views. Unlike coordination competency, the results shows that the use of SBAR communication doesn't have any significant contribution to the overall cooperation level among health pratitioners (Pr (T < t) = **0.0460**).

This result converse the literature. Testimonies from different studies and research findings

revealed that use of SBAR communication significantly improve the cooperation. This might be caused by the study's small population which makes it difficult to learn possible pattern among data. However, the significance was confirmed for the third IPTC competency: partnership (Pr (T > t) = **0.0000)**. This competency underlines the ability to create open and respectful relationships in which all members work equitably together to achieve shared outcomes. This result confims the plausibility of Flores and Rowe, [3,4].

The author tried to see whether the findings of this study are linked to any social demographic characteristics of questioned nurses but it turns out that there was insufficient evidence to prove any difference in results for any indicator considered (age, education level, working experience, and gender). However, this difference was significantly observed in previous researchers like, [22-24]

The author regard this as the drawback of including fewer nurses in the study. This makes difficult for any statistical test of equality of scores on SBAR elements to discover every possible pattern accrosses social demographic pattern. This was cost effective to the author and the results are promising for large study sample.

Overall, the use of the SBAR communication tool proved to be a beneficial tool to improve interprofessional collaboration competences among nurses employed full time in the emergency department at CHUK. The tool positively impacted nurses' competences and actions towards interprofessional collaboration. While there are many strengths of this study, it is not without limitations. Future studies could use large samples and follow up study in order to see if the change observed have been sustained after a given period of time. The results of our study are reported for a single group of Nurses with no control group to serve as a benchmark for comparison. We would also recommend the use of the SBAR tool not only among nurses but also among other healthcare professionals such as Doctors, pharmacists, etc.

In this study, nurses reported that using the SBAR communication tool enhanced their ability to collaborate and agree on patients care when speaking to their colleagues. This has potentially implications for improved patient care and safety. However, our study has not explored the relationship between improved inter-professional collaboration and patients' outcomes.

Moving forward, these limitations could be addressed by other studies and the use of the SBAR communication tool will continue to improve inter-professional collaboration among healthcare providers in LMICs.

Conclusion

This sectionprovides conclusion basing on the presented and discussed results as well as providing recommendations for improving identified gap.

This study sought to assess the effect of SBAR communication on inter-professional team collaboration at CHUK. The study used 30 nurses operate at CHUK in emergency to evaluate their professional team collaboration competencies. The data were collected in two

phases: one before the SBAR training another after the SBAR training.

As expected, the results of analyses revealed that SBAR communication can help to improve the IPTC among health nurses and physicians. In the same way SBAR communication was found also to influence the overall level of partnership and coordination among nurses and physicians. However, this positive relationship was not obtained for cooperation competency. Moreover, there is no difference in any inter-professional team collaboration competencies among different demographic characteristics.

Therefore, based on these findings the author outline recommendations in the following section.

Following the outcomes of this study, the author recommends the following:

Practice: The ministry of health to initiate the use SBAR communication in all hospitals start from the departments that receive critical patients to lessen the treatment failure resulted from miscommunication.

Education: The ministry of education to incorporate this program into the current program used to train nurses and physicians.

Research: Research organizations as well as individual researchers to extend this research to the large scale practioners to test the generalizability of this findings to the whole Rwandan health practioners or even beyond.

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