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## ORIGINAL ARTICLE

# Quality and Safety Management of Health Care Service Delivery among Public Hospitals in Rwanda: a Cross-Sectional Survey

Deogratias Ndagijimana, MPH, RN;<sup>✉1</sup> Connie Mureithi, PhD;<sup>2</sup> Nicholas Njau Ngomi, PhD<sup>2</sup>

<sup>1</sup>Save the Children International, Kigali, RWANDA; <sup>2</sup>Mount Kenya University, Thika, Nairobi, KENYA

<sup>✉</sup>Corresponding author email: [nd.deos09@gmail.com](mailto:nd.deos09@gmail.com)

## ABSTRACT

**Background or Objectives:** Quality and safety of health care service delivery remain a challenge worldwide due to unsafe care, inappropriate practices, adverse events and medication errors that result in harm, disability and death of patients. This study examines the status of quality and safety management of health care service delivery in public hospitals in Rwanda.

**Methods:** The study was a descriptive cross-sectional study. Overall population of interest comprised of 564 hospital managers from 47 hospitals. An online email-based questionnaire was used for data collection. Statistical analysis included bivariate, multivariable, and logistic regression analyses with significance at  $p < 0.05$ . Data were analyzed using Statistical Package for social Sciences (SPSS) Software v.21.

**Results:** The study sample population was 235 managers (5 persons from each hospital). Of the 235 responses received, 72.3% were from male managers and 27.7% were from female managers. The prevalence of adverse events among public hospitals in Rwanda is 0.007% ( $p = 0.02$ , 95% CI: 0.017-0.023) with risk of incidents of 0.073%. In all, 98.7% of public hospitals reported incidents, and only 39.3% of them have regularly reported all types of incidents. The most common incidents were adverse drug event (25.3%), loss to follow-up/referrals (25%), and surgical site infection (20%). Rwanda has 0.043 (IQR: 0.032-0.060) doctors per 1,000 population. The country also has 0.25 (IQR: 0.18-0.33) nurses per 1,000 population. The 76.5% of respondents reported that variation of consultation time is between 10-15 minutes ( $p = 0.003$ , 95% CI: 0.002-0.004) which is associated with 0.12% risk of incidents. The public hospitals have on average  $44.25 \pm 13.46$  SD consultations per clinician per day. More than a half of respondents 54.3% ( $p = 0.033$ , 95% CI: 0.029-0.036) reported that 10-20% of treatment given to patients were not needed and are significantly associated with high risk of incidents. The public hospitals score Level 1 (documentation) ( $p = 0.016$ , 95% CI: 0.014-0.019) for quality health care services delivery and, over half score Level 2 (implementation). They also score Level 1 (documentation) ( $p = 0.209$ , 95% CI: 0.201-0.216) for safe health care, and approximately half of them score Level 2 (implementation).

**Conclusion and Implications for Translation:** The quality and safety of health care services should be a priority for health care professionals and healthcare systems. The culture of blame and punishment is a challenge across hospitals. Reassuring adverse events reporting and learning from errors need to be emphasized and prioritized in public hospitals.

**Key words:** Quality and Safety Management • Health Care Service Delivery • Rwanda • Quality and Safety Score levels

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## I. Introduction

### 1.1 Background of the study

Quality and safety of health care services delivery is an important global health concern. Patients contribute to an estimated 23 million Daily Adjusted Life Years (DALYs); lack of patient safety includes harm from inpatient adverse events such as medication errors, hospital-acquired infections, foreign body left in body during surgical procedure, etc.<sup>1,2</sup> Research shows that the way hospitals are managed can influence the quality and safety of health care services.<sup>3</sup> Hospital management comprises strategic plan, data-centered activities, quality improvement measures, implementation of policies and procedures related to quality and safety standards, tracking changes and providing feedback. However, there is a discrepancy and insufficient engagement of hospital management efforts to improve the quality of healthcare services delivery.<sup>4</sup>

Low quality and unsafe delivery of health care are likely to be caused by diagnostic errors and inappropriate medical procedures. This, in turn, can lead to injury, permanent harm, and adjust the natural history of a disease.<sup>5</sup> One study demonstrated that incorrect diagnoses were given at first to 87% of individuals with fibrodysplasia ossification progressiva (FOP).<sup>5</sup> In the same vein, the safety of patients in U.S. hospitals is a critical issue, medical errors affecting an important number of admitted patients.<sup>5</sup> Adverse events were found in 56% of the reviewed records of six Belgian Hospitals for unexpected referrals to the Intensive Care Unit or an inpatient medical emergency, of which practically half were considered highly preventable.<sup>6</sup>

Quality and safety of health care services is essential for health care effectiveness and efficiency in the World Health Organization's (WHO) broadly approved agenda for health scheme reinforcement in Low and Middle Income Countries (LMICs).<sup>7</sup> Even if current practices that refine quality health care are progressively used worldwide, their implementation is a challenge in developing countries.<sup>7</sup>

WHO patient safety resolution (WHA55.18) established the World Alliance for Patient safety by

Secretariat in 2004 and renamed in 2009 as World Health Organization's Patient Safety Program.<sup>8</sup> Since that time, the WHO has worked hard to address the challenges of quality and safety of healthcare services delivery. For example, in 2011, the WHO Director General renewed momentum for patient safety with five years strategy with the following strategic objectives: (1) to give worldwide authority for patient safety; (2) to harness knowledge, expertise and innovation to improve patient safety; and (3) to connect with health care systems, nongovernmental organizations, civil society and the expert community in the global endeavor of making medicinal services more safer.<sup>8</sup>

Rwanda, like many low- and middle-income countries (LMICs), pursues health care reforms in order to achieve universal health coverage (UHC); the advancement of national accreditation frameworks has become a quality system supported by payers, including Ministries of Health (MOH) and has made much progress in health care quality improvement.<sup>9</sup> Three million Rwandans live in rural areas with accessibility to health facility within a distance of five (5) kilometers from their homes which results in increased access to health care services.<sup>10</sup>

The Rwanda Ministry of Health and all stakeholders have improved the health status of population within five years since 2005. This was after the launch of the nation's Health Sector Strategic Plan which resulted in a blend of vigorous national ownership; an execution based condition with common responsibility at all dimensions; and a groundbreaking community based health insurance (CBHI) system across the country with an enrollment of 91% which increased the healthcare services's accessibility leading to exceptional results.<sup>11</sup>

Similarly, Rwanda has made a lot of progress in rebuilding its health sector in the last 22 years; and by 2015, it had met almost all the Millenium Development Goals health indicators.<sup>12</sup> Health care system accreditation in Rwanda started with the University Teaching Hospitals, facilitated by Council of Health Care Service Accreditation of Southern Africa (COHSASA) in 2006, after which MOH started implementing the accreditation policy into district

hospitals with their critical and core standards.<sup>13</sup> The leadership and management support are crucial for improving quality and patient safety, given that strong leadership is important in making and continuing an organizational culture that underpins quality care delivery. Rwanda MOH called on all hospitals to improve quality of healthcare services delivery and consider the demand and supply of health care services to meet the the population needs.<sup>13</sup> Accreditation is key to enhancing quality and safety of health care delivery system.<sup>14</sup>

### **1.2 Objectives of the study**

The objective of this study was to examine the status of quality and safety management of health care service delivery among public hospitals in Rwanda. The specific aims were to: (1) establish the occurrence and factors that contribute to preventable adverse events in public hospitals; (2) determine quality and safety measures put in place for maintaining quality and safety of healthcare services delivery among public hospitals; (3) explore the needs and priorities for health care services improvement among public hospitals; and (4) explore the managerial aspects associated with patient-centered care and safety culture. Findings from this study will be useful for researchers, government, health care providers, and general public. The results will help health care providers to identify various ways to improve quality and safety of health care services delivered across Rwandan health care delivery systems.

## **2. Methods**

The study was a descriptive cross-sectional study. The study was conducted in Rwanda, specifically in public health facilities from the districts up to the referral hospitals. Rwanda has 36 district hospitals, 4 provincial hospitals, and 7 referral hospitals. The study population comprised of 564 hospital managers from 47 hospitals. This included: one nursing director, one monitoring and evaluation officer, four clinical and primary health care supervisors, one accreditation officer, one human resource manager, one pharmacist, one clinical director/head of clinical services, one administrator, and one medical director per hospital. In anticipation of a low rate of response with online questionnaires, the study questionnaire was sent to

564 persons and limited to 235 responses (5 persons from each hospital). With the online questionnaires, the responses were emailed straight back to the researcher. Four Levels of Effort (LoE) scores for reaching the expectations were used. At Level 0, the desired activity is absent, or inconsistent activity related to risk reduction; at Level 1, the policies, procedures and plans are in place to address the risk; at Level 2, the processes are in place for consistent and effective risk-reduction activities; and at Level 3, there are data to confirm successful risk-reduction strategies and continued improvement.

### **2.1 Study variables**

The researcher used Google form to design an email-based questionnaire with detailed variables of information to be collected into google spreadsheet as raw data. The questionnaire was divided into four categories: (1) Biography of respondents and their hospital settings, (2) Quality of health care service delivery, (3) Safety of health care services, and (4) Management of quality and safety of clinical services. The independent variables consist of biography of respondents, health facility descriptions, and quality and safety management; the intervening variables were accreditation and health care strategies; and the outcome variables were quality and safety of health care services delivery.

### **2.2 Statistical analysis**

We conducted multivariable and logistic regression analyses. All analyses were performed using the Statistical Package for Social Sciences (SPSS), version 21 (IBM Corporation, 2017). For statistical tests, a p-value of <0.05 was considered to be statistically significant with 95% confidence interval [95% CI].

### **2.3 Ethical approval**

The proposal was submitted for approval to Institutional Review Board of Mount Kenya University; then to National Health Research Committee, and obtained authorization of research from Mount Kenya University, then from Ministry of Health. The study followed the basic ethical principles, respected the research participants and participation in the study was voluntary with informed consent. The study

maintained confidentiality of private information and the study participants were informed of the study prior to data collection. Written informed consent was obtained from all study participants.

### 3. Results

#### 3.1 Sociodemographic characteristics of study participants

Managers from all provinces in Rwanda participated in the study with slight difference in number of respondents. The percent of participants in the study included 23.9% from Kigali City; 20.9% from Northern Province; 19.2% equally from Southern and Western Provinces; and 16.7% from Eastern Province.

Most of the respondents were males; of 235 responses received, 72.3% (170) were males and 27.7% (65) were females. Table 1 shows that of the 235 respondent-managers, 16 (6.8%) had advanced diplomas; 150 (64.1%) had bachelor’s degree; and 68 (29.1%) had master’s degree. The distribution of work experience among managers who responded were as follows: 60.7% of them had >5 years of experience; 39.5% of them with 2-5 years; and 3.4% of them had <2 years of work experience. Majority of the respondents representing 188 (80%) were from district hospitals, and as would be expected, 76.6% were from all public hospitals; 25 (11%) were from referral hospitals; and 22 (9%) were from provincial hospitals (Table 1).

#### 3.2 Clinician-patient-ratio and prevalence of preventable adverse events

The results show that Rwanda has on average 44.25 ± 13.46 (SD) consultations per clinician per day with 13.4 of standard deviation. Rwanda has 0.043 (IQR: 0.032-0.060) doctors per 1,000 population; Eastern Province had 0.049 and Kigali City had 0.046, representing a slightly higher staffing ratio compared to the rest of provinces. The country also has 0.25 (IQR: 0.18-0.33) nurses per 1,000 population. Staffing regulations consist of limiting the number of patients assigned to each nurse and doctor (Table 2).

The prevalence of adverse events among public hospitals in Rwanda was 0.007% (p: 0.02, 95%

**Table 1: Characteristics of respondents and study catchment areas.**

	District Hospital	Provincial Hospital	Referral Hospital	Total
<b>Sex</b>				
Female	50	5	10	65
Male	138	17	15	170
<b>Location of Hospital</b>				
Eastern Province	34	3	2	39
Kigali City	44	-	12	56
Northern Province	38	9	2	49
Southern Province	38	4	4	46
Western Province	34	6	5	45
<b>Position</b>				
Accreditation Officer	14	3	3	20
Administrator/DAF	16	4	4	24
Head of Clinical Services	29	4	4	37
Human Resource Manager	17	2	1	20
M&E/Supervisor	36	3	1	40
Medical Director/DG	28	1	5	34
Nursing Director	28	2	1	31
Pharmacist	20	3	6	29
<b>Experience</b>				
<2 years	7	1	-	8
>5 years	116	12	15	143
2-5 years	65	9	10	84
<b>Level of Education</b>				
Advanced Diploma	15	1	-	16
Bachelors	121	14	16	151
Masters	52	7	9	68
<b>Grand Total</b>	<b>188</b>	<b>22</b>	<b>25</b>	<b>235</b>

CI: 0.017-0.023) and risk of incidents was 0.073%. The results showed that referral hospitals have higher risk of incidents of 0.084% than district hospitals that had 0.074% and provincial hospitals that had 0.033%. The southern province had high risk of incidents 0.14% and low prevalence of incidents 0.005% when compared to others provinces, and both are different from Kigali with high risk of 0.10% and high prevalence of 0.012% (Table 3).

Majority of respondents 76.5% reported that variation of consultation time is between

**Table 2: Descriptive statistics of the study continuous variables.**

Variables	Mean	Variance	SD	Median	IQR	
Patient/Clinician/day	44.25	181.30	13.46	45.00	35.00	50.00
Health Utilization Rate	0.239	0.015	0.123	0.207	0.146	0.340
Total incidents	25.19	175.20	13.24	15.00	5.000	28.00
Prevalence of incidents	0.007	0.000	0.006	0.005	0.003	0.010
Risk of incidents	0.073	0.015	0.121	0.052	0.010	0.040
Doctors per 1000 population	0.044	0.000	0.018	0.043	0.032	0.060
Nurses per 1000 population	0.252	0.009	0.093	0.228	0.182	0.330

**Table 3: Risk of quality and safety incidents across different perspectives.**

Variable	Value Label	Frequency n (%)	Prevalence of Incidents %	Risk of Incidents %	p Value	(95%CI)
Type of Facility	District Hospital	188 (79.9)	0.006	0.074	0.02	(0.017-0.023)
	Provincial Hospital	22 (9.4)	0.005	0.033		
	Referral Hospital	25 (10.7)	0.010	0.084		
Location of the Hospital	Eastern Province	39 (16.7)	0.008	0.028	<0.001	(0.000'-0.001)
	Kigali City	56 (23.9)	0.012	0.103		
	Northern Province	49 (20.9)	0.004	0.019		
	Southern Province	46 (19.2)	0.005	0.140		
Average of consultation time	Western Province	45 (19.2)	0.006	0.045	0.003	(0.002-0.004)
	5 minutes	39 (16.7)	-	-		
	10 minutes	102 (43.2)	0.011	0.073		
	15 minutes	78 (33.3)	0.006	0.047		
	20 minutes	10 (4.3)	0.006	0.176		
Treatment that patients do not need	>20 minutes	6 (2.6)	0.003	0.019	0.033	(0.029-0.036)
	1-10%	68 (28.6)	0.005	0.066		
	10-20%	127 (54.3)	0.012	0.084		
	20-30%	39 (16.7)	-	-		
	30-50%	0 (0.0)	-	-		
Quality healthcare	>50%	1 (0.4)	0.001	-	0.016	(0.014-0.019)
	Level 0	328 (17.5)	0.015	0.117		
	Level 1	883 (47.1)	0.008	0.084		
	Level 2	606 (32.4)	0.003	0.033		
Safe healthcare	Level 3	56 (3.0)	0.003	0.023	0.209	(0.201-0.216)
	Level 0	335 (17.9)	-	-		
	Level 1	938 (50.1)	0.008	0.089		
	Level 2	559 (29.9)	0.007	0.061		
	Level 3	41 (2.2)	0.003	0.026		

10-15 minutes which is associated with 0.12% of risk of incidents. More than a half of respondents, 54.3% reported that 10-20% of treatments given to patients were not needed and are significantly associated with high risk of incidents (Table 3).

A high number of preventable incidents were found in Kigali City, Southern Province, and Western Province compared to the rest of the provinces. The results show that most pressing incidents were adverse drug event (25.3%), lost to follow-up/

referrals (25%), and surgical site infection (20%). The above incidents representing 70% could have been prevented. The 39.3% of the public hospitals reported all types of incidents; in addition, 10.3% exclude deep vein thrombosis (DVT) and 6% exclude DVT and injury due to medication (Figure 1).

### 3.3 Quality of healthcare services delivery

The Pearson correlation coefficient of 0.091 indicates a strong positive correlation between number of consultations per clinician per day and risk of incidents, and 0.067 indicates a strong positive correlation between health utilization rate and risk of incidents.

Using the four Levels of Effort (LoE) scores for reaching their patient delivery expectations, we

found that the average score of public hospitals in terms of quality of healthcare services delivery in Rwanda was level 1: documentation ( $p=0.016$ , 95% CI: 0.014-0.019). Over half of public hospitals scored on level 2: implementation, under 10% scored level 0: no documentation and under 5% scored level 3: outcome. The completion of post-operative note within 48 hours scored high at 62% for level 2; 30.8% for level 1; 3.8% level 3; and 3.4% level 0, the infection control measures flow (Figure 2).

The average LoE score of public hospitals in terms of safety of health care services delivery in Rwanda was level 1 ( $p=0.209$ , 95%CI: 0.201-0.216). Approximately half of the public hospitals scored on level 2; one third scored level 0; and under 5% of public hospitals scored level 3. Handwashing

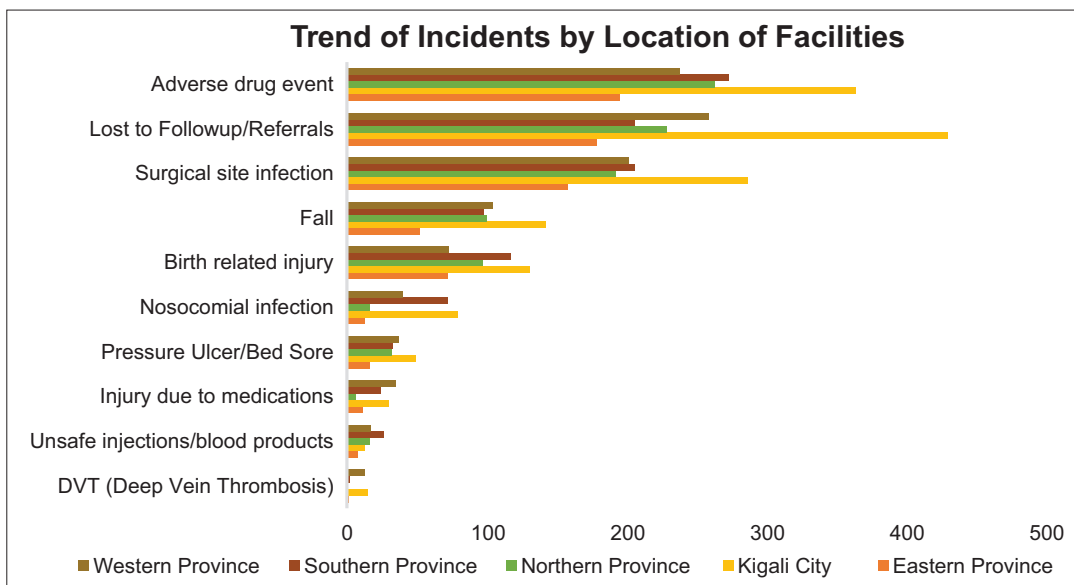


Figure 1: Distribution of incidents by location of hospitals

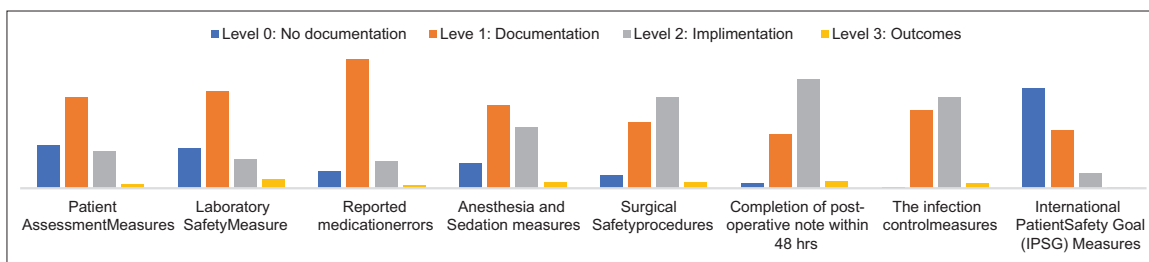


Figure 2: Quality measures covered in hospital accreditation

practices scored high 57.3% on level 2 and 4.7% on level 3 (Figure 3). There were statistically significant relationships between nurse per 1,000 population ratio, patients per clinician per day ratio, and health utilization rate with risk of incidents. However, there was no significant relationship between doctor per 1,000 population ratio and risk of incidents.

### 3.4 Safety of healthcare services delivery

The results show that 98.7% of public hospitals reported incidents. However, 1.3% of the hospitals did not report incidents due to lack of incident reporting policy. Thus, they did not provide feedback of outcome from incidents reported. In all, 43.2% of respondents confirmed that equitable, safety, effectiveness, efficiency, timeliness, patient-centred care, and correct diagnosis were the key domains of safety and quality covered during accreditation process.

The results show that 46.6% of respondents confirmed that doctor was not putting in enough efforts, and that doctors did not have enough time to make the correct decisions. About 28.6% of them reported that doctors not having enough time to make the correct decisions was the reason why the patients were incorrectly diagnosed and treated. Finally, 15.4% of the respondents said that doctors were not putting in enough efforts, lacked medical knowledge, and did not have enough time to make the correct decisions.

### 3.5 Management of quality and safety of health care services delivery

Out of the 235 manager-respondents, 53.8% (126) confirmed that all investment priorities are needed to improve quality health care; 31.6% (74) excluded improved financial protection when accessing

health care; and 8.5% others highlighted the needs of equipment and clinical research as priorities of health care system investment. The results indicated the differences in top priorities among the managers were as follow: 37.6% (88) prioritized improved health outcomes; 35.5% (83) prioritized improved physical access to health care; and 23.5% (55) prioritized improved financial protection when accessing health care. The managers identified their top priorities to improve quality health care: 27.2% would invest in financial support; 25.9% on education for health care professionals; 18.8% on policy analysis; 17.9% on indicators; and 10.1% on international comparative statistics. Also, 29.9% of respondents mentioned policy analysis, financial support, and education for healthcare professionals as priority needs to improve quality health care. In addition, 30.7% of them identified indicators and international comparative statistics as their priorities.

Responses on strategies needed to improve patient-centred care varied among the respondents. In all, 21.4% identified increased funding; 20.7% identified building the will; 19.9% identified training of more health care professionals; 13% identified new ideas; 12.7% on execution skills; and 12.3% on technological innovations. The findings indicate that of the 235 respondents, 23.5% confirmed that new ideas, building will, increased funding, and training of more healthcare professionals were strategies needed to improve patient-centred care. The study findings indicate that 28.6% of respondents confirmed that electronic ordering, medication safety, patient-centred care, and clinical decision support were among the needs for electronic health records, and 25.2% identified efficiency of care.

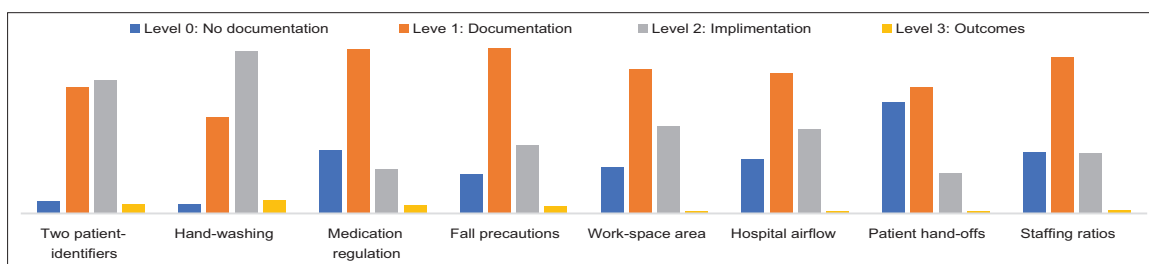


Figure 3: Safety measures covered in hospital accreditation

On what factors positively impact patient experience, 21.8% of respondent-managers identified quality of care and patient satisfaction; 21.7% identified safety/no harm; 20.9% identified respect; 18.4% identified communication; and 17.2% identified empathy. The results show that 47.4% of respondents indicated that respect, safety/no harm, empathy, quality of care and patient satisfaction, and communication positively impacted patient experience, while 13.7% of them excluded empathy and 12.8% excluded communication as impactors of patient experience. On factors that negatively impact patient experience, 22.9% of respondents identified poor communication, 22.6% identified negligence, 21.7% identified disrespect, 19.5% identified rudeness, and 13.3% reported cost. About half of the respondents (49.1%) said that disrespect, cost, negligence, rudeness, and poor communication negatively impacted patient experience. Among the managers, 38% said the first steps to improve patient experience were improving communication, engagement, attentiveness of clinicians, and adoption of electronic health records in their respective hospitals.

The study indicates that 61.9% of respondents confirmed that personal level, micro-system/unit level, organization level change were needed to improve safety culture and patient experience in their respective hospitals, while 20.1% of them reported external level change. About 47.4% of participants used many types of assessment of awareness regarding the importance of their hospitals including 23% who said they used patient interviews, clinician interviews, and surveys. About 33% of public hospitals use randomized control trials, observational studies, and descriptive studies to examine health care service delivery.

#### 4. Discussion

The findings indicate progress in quality and safety of healthcare service delivery. According to patient safety advocates, there is an increased recognition of patient safety improvement as a scientific and methodological process. In adopting a systems approach to patient safety, it is important to first examine facilitators in a system. The study reported

0.073% preventable risk of incidence in Rwanda. Similar analysis in developed countries reported 9% of inpatient complications due to adverse events, of which around 44% may be preventable. Estimates from developed countries suggest that the adverse drug events varies between 7.5% and 10.4% of patients in acute care settings.<sup>15</sup> One study in the U.S. estimated 251,000 deaths annually caused by medical errors.<sup>16</sup> Medical errors in the U.S. result in annual unnecessary deaths of 44,000 to 98,000 and excess injuries of 1 million.<sup>17</sup>

Rwanda has on average  $44.25 \pm 13.46$  (SD) consultations per clinician per day which is under the maximum standard of 50 consultations/clinician/day. The study also indicate that 54.5% patients get treatment they did not need, which is associated with 0.081% risk of incidents. This study also found that 46.6 % patients are incorrectly diagnosed because doctors were not putting in enough effort, did not have enough time to make the correct decisions. Doctors may order extra, unnecessary, and potentially harmful tests to cover themselves from liability issues which also increases 2% of healthcare expenditures.<sup>18</sup> Estimated 50% of drugs in developing countries are not what they are supposed to be.<sup>19</sup> According to one study, patients are correctly diagnosed and cared for only about 55% of the time.<sup>20</sup>

For consultation time, 76.5% of patients spent 10-15 minutes with clinicians during consultation which is above the minimum consultation time of 5 minutes; however, this study found this to be associated with high risk of incidents (0.12%), which indicate the low quality of time spent with doctors. According to World Alliance for Patient Safety, the time spent with patients, waiting time and physician-patient interaction is important for closing the gap between patient expectations, patient experience and patient outcome as it breaks down barriers between patients and doctors, increases transparency and provides users a voice within the system.<sup>21</sup>

The quality measure in health care use the health records to examine overall health plans and health care providers' performance against recognized quality standards. For Rwanda, accreditation and



certification are frequently seen as vital indications of exceptional standards and demonstrating that organization meets pre-established standards. The method of developing significant quality measures and their application are ongoing as we have a tendency to collect and measure additional knowledge on quality.<sup>22</sup> There is an uncertainty of worldwide practice in healthcare system for measuring the effect of errors on patient outcomes.<sup>23</sup>

According to Australian Commission on Safety and Quality in Health Care,<sup>24,25</sup> quality care is the right care for the right person at the right time, first given in accordance with guidelines for clinical practice or other protocols of evidence-based care. Health care that recognizes and incorporates individual patients' distinct wishes and needs, with emphasis on patient values and preferences increases patient experience. Surveillance of reducible metrics for quality of care such as consultation time, number of questions asked works for routine check-ups, number of physical exams should be implemented to enhance quality measures.<sup>26</sup>

Health investment priorities need to be increased at rate of 53.8% and there is an information gap on what role the health system is playing and how well the health system is doing, but not only health care spending contrast with health care outcome. Rwanda is a low income country where the resources are limited, but the country is trying to build a strong health system to maximize the effective use of available resources. An Australian study indicated that problem is not simply lack of resources but how allocation of resources and incentives for doctors and patients were aligned. The incremental costs ranged from 0.2% to 1.7% of the total cost over the accreditation cycle on average.<sup>27</sup>

For safety culture, 61.9% of culture change needs line with personal level, micro-system/unit level, and organization level to improve safety culture and patient experience. In majority of the situations, harm in healthcare are really due to human error.<sup>28</sup> A systematic review and meta-analysis of the 12 Hospital Survey on Patient Safety culture (HSOPS) dimensions, six scored under 50% of positivity, with "no punitive response to errors" the lowest one.

In the meta-regression, three aspects were proven to be affected by the proportion of physicians and five by the continent where survey was held.<sup>29</sup> The idea that to make a secure health care system management must give some thoughts to systems of care. Understanding the parts of a system is vital to ever-changing the system for the higher. Human behavior, processes and technologies must be considered in efforts to enhance healthcare safety in a healthcare system.<sup>30</sup> The disposition of health care professionals to have interaction in creating systems safer for patients needs a culture that extremely values safety. Assessing the culture of safety is crucial to confirm a safety culture and examining unsafe prerequisites one of the considerations is failure to correct a problem.<sup>31</sup>

In order to foster safety culture, the practitioners should feel secure to document and report the near-misses and errors rather than creating pressure, bringing punishment, blame and shame which can lead to hide or deny errors.<sup>32</sup> The accountability to report errors and near-misses and accountability to be a part of the answer to resolve drawbacks.<sup>33</sup>

Rigorous electronic health records (her) is needed to improve quality and safety of health care. Healthcare providers should ensure that EHR are accurate and executed at lowest level, then build up to organization, regional, national, and global levels. A study in Canada, showed that when there was a promise of Electronic Medical Records (EMR) to measure quality of care, the increasing the use of EMR can change the way in which statistics to rework the method that knowledge on quality were collected, assessed, and on healthcare and health outcomes extra-factual, opportune, functional, and affordable.<sup>34</sup> The researcher revealed that e-prescription would reduce by 55% of all adverse drug events.<sup>6</sup>

The physicians should continue to be involved; they need to be part of the procedure in order to appreciate its significance and purposeful structure. Gathering and analyzing records from lapses in patient safety affords a crucial first step and underpinning for lowering the opportunity of damage and re-engineering structures for improvement whilst examination of past error is important.<sup>35</sup> Whereas

it was have noted that there is substantial variations within the rates of errors in numerous countries, the fundamental kind of errors that occur in most settings are comparatively similar.<sup>36</sup>

#### 4.1 Limitations

The study participants were busy persons with limited time. The study excluded all private hospitals in Rwanda, and cannot be generalized to all hospitals in the country. Also, due to the many discrepancies in quality and accessibility of care worldwide, the study cannot be generalized globally. More studies are needed on quality and safety of health care services in Rwanda and Africa to enhance forecasting and better allocation of resources in health subsidies. Such studies should emphasis further on evidence-based research and practice. More studies are also required to establish the leverage of hospital managers on quality and safety of healthcare services delivery. Such studies should examine the impact of accreditation on improvement of quality healthcare. Further studies are essential to demonstrate the potency of quality measures framework approach underneath structures, processes and outcomes of healthcare.

### 5. Conclusion and Implications for Translation

According to Rwanda healthcare managers, the priority needs required to improve health care in Rwanda are financial support, education for health care professionals, policy analysis, indicators, and use of international comparative statistics. The strategies needed to improve patient-centered care include increase funding, building will, training of more health care professionals, new ideas, execution skills and technological innovation. EHRs are needed for electronic ordering, medication safety, patient-centered care, clinical decision support and efficiency of care. The steps needed to improve patient experience are improving communication, engagement, attentiveness of clinicians, and EHRs need to be applied to public hospitals. The safety culture and measuring safety and quality of health care services are needed with the accreditation process of policy, standard procedures implementation in public hospitals in Rwanda.

### Compliance with ethical standards

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#### Key Messages

- Hospital managers can influence the quality and safety clinical outcomes, processes and performance by measuring quality improvement, assessment of quality and safety of health care services, applying policies and standards procedures, and health care coordination.
- Safe and high-quality health care benefits patients by endorsing the highest standards of safety, quality, and cost-effectiveness in healthcare.
- The introduction of electronic health care records, and quality measures have the potential to improve safety, efficiency, and effectiveness of health care.

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