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Improving Adherence of Infection Prevention Standards in Health Facilities: The Role of Competition Approach from Four Regions of Tanzania Mainland

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Abstract

Introduction: Implementation of infection prevention and control in health facilities faces several barriers. We conducted quality competition activities amongst health facilities as a model of Improving compliance to Infection Prevention and Control (IPC) standards in four regions of Tanzania.

Methodology: The quality competition activities' implementation design was held in sixty (60) health facilities. Before the competition, healthcare workers from facilities were taken through a thorough capacity building on IPC as a continued essential health services project post first wave of COVID-19. The sampled facilities were informed that the competition was going to be held based on adherence to IPC principles. Two tools were used, i.e., the IPC national checklist tool and the star rating assessment tool. Both tools focused on the Reproductive, Maternal, Newborn and Child Health. The assessments, using both tools, were done independently and then the mean score was developed.

Results: A substantial improvement in adherence to IPC in all the participating facilities was observed. The top three health facilities from each region were selected as winners for a non-monetary gift. The gifts were given based on the level of health facility, that is hospitals, health centers and dispensaries receiving an award worth 13,043.5USD (Tshs. 30,000,000/=) for hospitals, 10,869.6.0USD (Tshs. 25,000,000/=) for health centers and 6521.7USD (Tshs.15,000,000/=) for dispensary. The funder was Catholic Relief Services (CRS).

Conclusion: Completion was found to be facilitator for the adherence of infection prevention principles amongst healthcare facilities.

Keywords: *Infection prevention control; Quality of care; Maternal and newborn health*

Introduction

The World Health Organization (WHO) advocates that Infection prevention and control (IPC) is a practical, evidence-based approach which prevents patients and health workers from being harmed by avoidable infection and helps to mitigate antimicrobial resistance [1]. Unfortunately, the implementation of IPC in the health facilities of developing countries has been jeopardized by number of barriers and facilitators [2].

The awareness of IPC principles continues to affect the endeavors to improve IPC implementation in most of sub-Saharan African countries. Normally, interventions are required to be done by all hospital staff as part of their duties. However, limited knowledge on IPC guidelines, lack of formal feedback on performance, lack of resources, and staff hierarchy issues, continue to hamper IPC enforcement at facility level [3]. Health Care Workers believe that patients pose no health risks especially when there is an asymptomatic presentation. Little awareness of infection existence or following IPC recommendations coupled with unavailability of adequate resources, high workload, and time limitation interferes with providing good patient care [4].

Compliance to IPC guidelines, standards, and standard operating procedures in Tanzania has been shown to be inadequate. Compliance to IPC standards between 2010 and 2017 was found to be 32% in 2010, then improved to 53% in 2014, and dropped to 34% in 2017 [5]. Implementation of IPC principles in primary healthcare facilities, as assessed through star rating implementation in 2015/2016 and 2017/2018, found that "median adherence to IPC principles increased from 31 percent in 2015/16 to 57 percent in 2017/18" [6]. In outpatient settings, in 2018, adherence to hand hygiene was found to be 6·9%, for glove use 74·8%, disinfection of reusable equipment 4·8%, and waste management 43·3% [7]. For example, according to a study conducted in Dodoma by Wiedenmayer, et al, (2020), only 6.1% and 3.0% of assessed units in intervention and non-intervention facilities respectively were able to reach the recommended World Health Organization compliance rate of ≥81% in Water, Sanitation and Hygiene [8].

Conceptually, the integration of Care for Child Development (CCD) into Management of Possible Severe Bacterial Infection (PSBI) and Neonatal Survival Program [9] is hinged in "The Lancet Global Health Commission on High Quality Health Systems in the Sustainable Development Goals (SDG) reports [10]. The report proposed four actions that require: (i) commitment of health system leaders to govern for quality of care and continuous learning; (ii) countries to redesign service delivery to maximize health outcomes; (iii) transform the health workforce by adopting competency-based clinical education and performance; (iv) governments working with the civil society to hold systems accountable and actively seek high-quality care [10].

The main aim of the study was to translate the Lancet Global Health Commission on High Quality Health Systems report in health system improvement for IPC in Tanzania and strategize to understand what works, why, and in what contexts" [10]. Hence, the main aim of this study was to highlight quality competition activities amongst health facilities as a model of improving IPC compliance in Health Facilities in four regions of Tanzania.

Methodology

The quality competition activities implementation design was held in sixty (60) health facilities of Iringa (16), Mbeya (15), Njombe (14) and Songwe (15) regions. The facilities included regional referral and district hospitals (19), health centres (36) and dispensaries (5). Before implementation of the quality competition activities, healthcare workers from these facilities had a thorough capacity building on IPC as a continued essential health services (CES) project post first wave of coronavirus disease of 2019 (COVID-19) which ended in June 2020. The CES project was designated as a response towards prevention, detection and early containment of outbreaks, that has been developed jointly by the Tanzanian Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) and President's Office - Regional Administration and Local Government (PO-RALG) in collaboration with AMREF Health Africa - Tanzania under the financial support of UNICEF. The implementation started in August 2020 and ended in October 2021. The project's goal was to increase capacity of health facilities to continue to provide essential health services through strengthening IPC during the COVID-19 pandemic in 17 regions of Tanzania; Mainland (12) and Zanzibar (5). The regions in Tanzania Mainland were: Arusha, Dar es Salaam, Dodoma, Iringa, Kilimanjaro, Manyara, Mbeya, Morogoro, Mwanza, Tanga, Njombe and Songwe.

The CES project deployed a blended cascading mode to train health care workers on IPC to ensure that there is CES even during pandemic time. The project physically trained 40 national level master trainers who then trained virtually 237 regional and district level trainers. These then trained virtually and physically 1,172 facility-based trainers called facility champions who finally trained their fellow health care workers in their facilities. These facilities champions then provided training and mentorship to their fellow health care workers physically. A total of 5,172 health care workers both medical and non-medical, had been reached from 297 health facilities. To ensure a good practice of IPC standards by health care workers information, education and communication (IEC) materials on IPC were developed and distributed to facilities in the Mainland and Zanzibar side.

In order to strengthen the implementation of the IPC standards, the MoHCDGEC and PO-RALG in partnership with Catholic Relief Services (CRS), and with financial support from UNICEF, conducted a quality competition on IPC implementation to the purposefully sampled health facilities which were reached by the CES project that is implemented under AMREF Health Africa - Tanzania. Improving adherence of IPC in the selected health facilities design also fits well with the "*behaviour change wheel*" fitting with communication and motivation components and of the "*source of behaviour* (*capability, opportunity and motivation - producing a behaviour [COM-B]*)" involving some aspects of policy and intervention functions [11], as shown in Table 1. The quality competition is conceptualized to be a behavioural change technique in a form of material incentive to winning facility valued at 13,043.5usd (Tshs. 30,000,000/=) for hospitals, 10,869.6.0usd (Tshs. 25,000,000/=) for health centers and 6521.7 (Tshs.15,000,000/=) for dispensary. The expected mechanism of action of the quality competition is by triggering an attitude towards improving IPC practices (which is the intended behaviour change in the project implementing facilities [12].

The sampled facilities were informed that, the competition was going to be held based on adherence of IPC and quality improvement principles. The exact timing of the competition was not disclosed to the participating facilities as they would change behavior in response to the knowledge that they are being evaluated. They were informed of the existence of competition for ethical purposes only. Two assessment tools were used, i.e., the IPC Standards Assessment Tool (which uses the Standard Based Management and Recognition (SBM-R) approach) to check for IPC adherence and star rating tool (SRT) to check for quality of health services provision. Both tools focused the Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCAH). The tools are in the Afya Supportive Supervision system. This system was developed by the ministry to ease the supervision and assessments. The tools can be accessed by using phones, tablets, computers, etc. The assessment using the tools was done independently, scores were autogenerated and the mean score was developed.

Table 1: Behavior change wheel [11] fit with quality competition for improving IPC practices in four regions of Tanzania Mainland.

Behavior Change Wheel (BCW) – components, categories and intervention functions			**Interventions planned in the quality competition for improving implementation of IPC in Iringa, Mbeya, Njombe and Songwe**
BCW– Policy & COM-B system		**BCW - Intervention functions**	
Policy categories		Guidelines	• Planning meetings at national level both consultative and technical involving key stakeholders for deigning on its implementation (assessment and mentorship modalities) and involvement of sub-national levels.
COM-B system	Capability – physical	Training Enablement	• Training of health workers in the selected facilities on the use of the SBM-R tool for self-assessment and improvement.
	Capability – psychological	Education Training Enablement	• Mentorship of health care workers in the health facilities by two members from the Council Health Management Team (CHMTs) aiming at: promoting self-reflection and quality improvement; data use for individual quality improvement; and encourage self-monitoring and evaluation of IPC indicators at unit and facility level.
	Motivation – reflective	Incentivization	• Self-assessment by individual facilities and working unit which aims at stimulating accountability towards quality improvement. • Process of benchmarking against peer facilities and work towards a public award. • Use of monitoring system to rate facilities on the implementation of appropriate IPC and WASH. • Awarding the highest-ranking facilities with material awards that will be used towards further quality improvement in their respective facilities
	Motivation – automatic	Incentivization	• External-assessment by National Quality Assessors which aims at stimulating accountability towards quality improvement. through quality competitions between facilities in the target regions in which facilities will compete with other facilities of the same type in each of the four target regions. • Process of benchmarking against peer facilities and work towards a public award. • Awarding the highest-ranking facilities with material awards that will be used towards further quality improvement in their respective facilities.

Table 2: Average scores for facilities in Iringa Region.

	Name of Health Facility	**Council**	**SBMR/IPC Score - RMNCH related Departments (%)**	**SRT Score (%)**	**Final Score (%)**
A.	**Hospitals**				
1	Frelimo District Hospital (CH)	Iringa MC	71.00	93.50	82.25
2	Iringa Regional Referral Hospital (RRH)	Iringa MC	68.10	90.00	79.05
3	Mafinga Town Hospital (TH)	Mafinga TC	64.00	68.00	66.00
4	Kilolo District Hospital	Kilolo DC	67.00	50.50	58.75
B.	**Health Centers**				
1	Ipogolo HC	Iringa MC	78.20	81.00	79.60
2	Kidabaga HC	Kilolo DC	67.00	80.50	73.75
3	Mlowa HC	Iringa DC	61.10	86.00	73.55
4	Nzihi HC	Iringa DC	55.60	91.00	73.30
5	Kiponzelo HC	Iringa DC	55.13	86.00	70.57
6	Ngome HC	Iringa MC	51.70	86.00	68.85
7	Malangali HC	Mufindi DC	53.00	82.50	67.75
8	Ihongole HC	Mafinga DC	54.00	78.00	66.00
9	Mgololo HC	Mufindi DC	60.00	70.00	65.00
10	Mgama HC	Iringa DC	43.20	86.50	64.85
11	Ismani HC	Iringa DC	35.00	89.00	62.00
12	Sadani HC	Mufindi DC	57.00	54.50	55.75

Data Analysis

Scores (%) of the facilities were extracted from Afya Supportive Supervision System (afya SS) after assessment using SRT for RMNCH Services and IPC – SBM-R tool for department/functional areas related to RMNCH Services and exported to the excel spread sheet. The average score of the facility was computed using excel. The top three best performers on the aspects/domains/variables of SBMR / IPC Score - RMNCH related Departments (%) and Star rating assessment in the reproductive health departments were selected as winners from each region

Results

Average Score (%) of the facilities of Iringa Region after assessment using SRT for RMNCH Services and IPC–SBM-R tool for department/functional areas related to RMNCH Services are shown in Table 2.

Table 3: Average scores for facilities in Mbeya Region.

SN	Name of the Facility	Council	SBMR/IPC Score -RMNCAH related Departments (%)	SRT Scores (%)	Average score (%)
Health Centres					
1	Igawilo HC	Mbeya CC	68.29	96.14	82.22
2	Utengule Usangu HC	Mbarali DC	63.06	95.18	79.12
3	Ipinda HC	Kyela DC	54.29	100	77.15
4	Ilembo HC	Mbeya DC	60.43	93.81	77.12
5	Chalangwa HC	Chunya DC	56.31	94.32	75.32
6	Ntaba HC	Busokelo DC	54.27	87.82	71.05
7	Ikuti HC	Rungwe DC	39.80	90.42	65.11
Hospitals					
1	Chunya Council Hospital (CH)	Chunya DC	68.84	100	84.42
2	Mbarali (CH)	Mbarali DC	53.41	100	76.71
3	Mbeya Zonal Referral Hospital	Mbeya CC	56.31	95	75.66
4	Mbeya (CH)	Mbeya DC	46.13	100	73.07
5	Tukuyu (CH)	Rungwe DC	43.24	95.15	69.20
6	Kyela (CH)	Kyela DC	38.14	100	69.07
7	Busokelo (CH)	Busokelo DC	48.21	88.50	68.36
8	Mbeya Regional Referral Hospital (RRH)	Mbeya CC	32.91	95	63.96

Table 4: Average scores for facilities in Njombe Region.

SN	Name of the Facility	Council	SBMR/IPC Score -RMNCAH related Departments (%)	SRT Average Score	Overall Score (%)
	HOSPITALS				
1	Ludewa CH	Ludewa DC	50.1	100	75.1
2	Makete CH	Makete DC	49.3	100	74.7
3	Njombe RRH	Njombe TC	40	100	70
4	Njombe TCH	Njombe TC	31.8	100	65.9
	HEALTH CENTERS				
1	Lupembe HC	Njombe DC	69.7	100	84.9
2	Njombe HC	Njombe TC	60.3	100	80.2
3	Lupila HC	Makate DC	49.4	100	74.7
4	Ihalula HC	Njombe TC	49.7	100	74.9
5	Matamba HC	Makete DC	48	100	74
6	Wanging'ombe HC	Wanging'ombe DC	46.4	100	73.2
7	Manda HC	Ludewa DC	38.5	100	69.3
8	Ipelele HC	Makete DC	42.5	100	71.3
9	Makambako HC	Makambako DC	36.4	100	68.2
10	Mlangali HC	Ludewa DC	30.6	100	65.3

Average Scores (%) of the facilities selected from Mbeya Region after assessment using SRT for RMNCAH Services and IPC – SBM-R tool for department/functional areas related to RMNCAH Services are shown in Table 3.

Average Score (%) of the facilities Njombe Region after assessment using SRT for RMNCAH Services and IPC–SBM-R tool for department/functional areas related to RMNCAH Services are shown in Table 4.

Average Score (%) of the facilities of Songwe Region after assessment using SRT for RMNCAH Services and IPC – SBM-R tool for department/functional areas related to RMNCAH Services are shown in Table 5.

Three Winners in Every Region

The top three health facilities from each region were selected as winners for the gift. The gifts were given based on the level of health facility. That is 13,043.5USD (Tshs. 30,000,000/=) for hospitals,

Table 5: Average scores for facilities in Songwe Region.

SN	Name of the Facility	Council	SBMR/IPC Score -RMNCAH related Departments (%)	SRT Score (%)	Average Score (%)
	HOSPITALS				
1	Vwawa Desinated RRH	Mbozi DC	47.8	94.5	71.1
2	Mwambani CDH	Songwe DC	44.2	90.5	67.3
3	Itumba CH	Ileje DC	20.5	88.5	54.5
	HEALTH CENTERS				
1	Itaka HC	Mbozi DC	62.4	93	77.7
2	Tunduma HC	Tunduma TC	17.9	83	50.4
3	Ibaba HC	Ileje DC	12	87	49.5
4	Kamsamba HC	Momba DC	18.1	79	48.5
5	Nanyala HC	Mbozi DC	19.2	72	45.6
6	Mbuyuni HC	Songwe DC	11.9	74.5	43.2
7	Lubanda HC	Ileje DC	9.0	66	37.5
	DISPENSARIES				
1	Isongole	Ileje DC	42.5	100	71.2
2	Katete	Tunduma TC	31.2	90.5	60.8
3	Ngwala	Songwe DC	22.8	90	56.4
4	Mlowo	Mbozi DC	21.4	71.5	46.4
5	Ivuna	Momba DC	24.7	65.6	45.1

Table 6: Facilities which won the competition.

Region	Winners			
	Facility Name	SRA average score	Average SBMR RMNCAH related Department's score (%)	Overall score (%)
Mbeya	Chunya CH	100.0	68.8	84.4
	Igawilo HC	96.1	68.3	82.2
	Utengule Usangu HC	95.2	63.1	79.1
Iringa	Frelimo Hospital	93.5	71.0	82.3
	Ipogolo HC	81.0	78.2	79.6
	Iringa RRH	90.0	68.1	79.1
Njombe	Ludewa CH	100.0	50.1	75.1
	Lupembe HC	100.0	69.7	84.9
	Njombe HC	100.0	60.3	80.2
Songwe	Vwawa Designated RRH	94.5	47.8	71.1
	Itaka HC	93.0	62.4	77.7
	Isongele Dispensary	100	42.5	71.2

10,869.6.0USD (Tshs. 25,000,000/=) for health centers and 6521.7USD (Tshs.15,000,000/=) for dispensary. The facilities were not given cash but rather to choose an in-kind award worth of the amount. CRS procured the awards as proposed by the winner facilities. The facilities that won are shown in the table 6 below.

Discussion

The main aim of our study was to highlight quality competition activities amongst health facilities as a model of improving IPC compliance in Health Facilities in four regions of Tanzania. Our data have shown this model of competition is effective in fostering IPC compliance. The highest average score was 84.4%.

Training of Infection Prevention and Control to Health Care Workers

The WHO recommends that IPC education should be in place for all health care workers by utilizing team- and task-based strategies that are participatory. This should include simulation training to reduce the risk of Health Associated Infection and Anti-Microbial Resistance. IPC education and training should be a part and parcel of an overall health facility education strategy, including new employee orientation and the provision of continuous educational opportunities for existing staff, regardless of level and position (for example, including also senior administrative and housekeeping staff)

[15]. Taking that into account, the training was taken as critical to the facilities. There was engagement of stakeholders that is, government officials, partners and the participating facilities. The engagement was enhanced so as to cultivate the culture of ownership of IPC in the facilities and the government. The cascaded training used both physical and virtual approaches to maximize usage of available resources. The national trainers were responsible to designing the training package based on the selected topics that captured all standard and transmission-based precautions. The development of the training package led to all the trainers to be conversant and own the training package. The national trainers trained the reginal and district trainers virtually. Likewise, the reginal and district teams trained the facility-based trainers. The facility-based trainers trained the health care workers at facility level.

Infection Prevention and Control Mentorship: Facilities Based and External Based

The health facility-based mentorship was done by the health facility-based mentors who were also the trainers. This approach of using the facility-based mentors ensured the ownership. The ownership of any approach facilitates long term sustainability. We need sustainability of compliance of the IPC by all health workers in all health care settings. We find this approach of giving ownership to the health care workers to take lead in the training and mentorship of their fellow healthcare workers to be more successful than depending on the external trainers and mentors.

The external mentors also took part in the mentorship after when the internal mentors had finished mentoring session. The external mentors main obligation was to further emphasize what the internal mentors had done but also to mentor areas where the internal mentors did not mentor as well as to further mentor the health facility mentors. The external mentoring also created motivation to the facility-based mentors and health workers. In addition, the external mentoring created smooth means of communication between health facility workers and upper levels that's, district, region and the MoHCDGEC of health as well as the implementing partners.

Internal Assessment Using National IPC Checklist

The health facility-based assessors also assessed the health care workers and the facility as a whole to check out how far do they comply with the IPC standards. The internal assessors had assessed themselves to identify the gaps and plan for the interventions to correct the gaps. This approach worked well because the facilities were able to identify the gaps based on the IPC checklist and plan the measures by themselves. Again, this way promoted ownership to the gaps identified and hence the facilities felt that the gaps were theirs and thus, they were responsible to correct them. This approach therefore was successful to improve the compliance of IPC.

Competition by External Assessment Using National IPC Checklist

When the process of preparing the facilities in terms of training, mentorship and internal assessment were done, it was the time to conduct health external assessment and compare health facilities. The facilities that had scored higher were rewarded. As the facilities were told before that, those facilities that scored higher got the gift. The fact that the facilities knew there would be a gift fostered competition amongst health workers from different health facilities. The healthcare workers took self-initiatives to improve IPC by complying to the standards put by the MoHCDGEC. Though overall improvements were noted at inter-facility level, variations in results were observed during the external assessment. These variations are attributable to the overall performance of health facilities in the regions.

The implementation of the project applied a multi-pronged strategy in order to be able to improve IPC in at targeted facilities. Accountability was instituted through quality competitions between facilities in the target regions. This was based on the fact that quality competitions have been used in a variety of settings and gained recognition as a potential approach for increasing accountability and building a culture of quality in health facilities [10]. Therefore, facilities competed with other facilities of the same type (dispensary vs. health center vs. hospital) in each of the three target regions namely Mbeya, Njombe and Songwe.

The process of benchmarking against peer facilities and work towards a public award has been shown to be motivating, as demonstrated in a recent study of a national quality improvement program in Tanzania [13]. Monitoring system to rate facilities on the implementation of appropriate IPC and WASH was used. The highest-ranking facilities received public awards that will be used towards further quality improvement in their respective facilities. In order to ensure fair and just competition, this activity involved: formation of team of judges, orientation of health facilities on selected indicators, selection and orientation of external health facilities, data collectors from each region, from Regional Health Management Team (RHMT) and/ Council Health Management Team (CHMT), data collection; and judges spot check of HF implementation of IPC/ WASH activities and selection of winning HF and award celebrations per regions.

Limitations

The was no control group of health facilities where CES project was not implemented so as to compare with the facilities where CES project was implemented. The scores achieved by these facilities might also be achieved by facilities where there were not implementing CS.

Conclusion

Overall, quality Competition on the adherence of IPC best principles and standards for maternal and child health was found to be a facilitator for the adherence of infection prevention principles amongst healthcare workers. It is envisaged that subsequent efforts in this field will gain insights from the approach to comprehensively address key obstacles that prevent adherence of IPC best principles. By using competition to trigger improvement in IPC practices in the health facilities, the CRS project has been able to show that it is possible for Tanzania to use the approach as a way of further elevating and incentivizing quality of care in health facilities and thus accelerating attainment of what Nimako and colleagues have referred to as "a survival-focused universal health coverage agenda" [14].

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Disclaimer

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Author Contribution

All authors contributed to designing the manuscript, oversaw the implementation, conducted the literature review, and wrote the first and final draft. Amref Africa and CRS led the implementation of the program in the country.

Conflict of Interest

There was no conflict of interest amongst authors

Ethical Considerations

This work does not require ethical clearance because IPC is part of the routine patient care. There is therefore no requirement of the formal ethical clearance for publication of these data.

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