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Factors influencing national rollout of quality improvement approaches to public hospitals in Tanzania

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Abstract

Purpose – The purpose of this paper is to identify factors that influence the implementation of the rollout of the 5S approach in public hospitals in Tanzania, and share the way to scale this up for similar setting in developing countries.

Design/methodology/approach – The effect size was calculated from pre- and post-assessment results of Training of Trainers (ToT) to examine the effectiveness of ToT. A questionnaire with 14 explanatory variables was developed and completed based on information collected during Consultation visits (CVs) and progress report meetings (PRMs). Then, data were analysed to identify the influencing factors in relation to outcome variables (CV average score).

Findings – Among 14 explanatory variables, five explanatory variables showed statistical significant association with the CV average score. Those are: "Feedback and information sharing," ($p = 0.031$), "Quality Improvement Team roles and responsibility" ($p = 0.002$), "5S knowledge," "Involvement and commitment," and "5S guidelines use and availability," ($p = 0.000$). When the explanatory variables were controlled by levels of hospitals; "involvement and commitment" was the only explanatory variable for national level hospitals. For regional referral hospitals, "QIT roles and responsibility" ($p = 0.02$) and "5S knowledge" ($p = 0.03$) were statistically significant. For district hospitals, "involvement and commitment" ($p = 0.01$) and "availability of guideline ($p = 0.001$)" were statistically significant.

Research limitations/implications – This study has the following limitations. The data were collected from existing reports and presentation materials only. There might be reporting bias, as PRM data is self-reported from the hospitals. Caution is therefore needed in extrapolating the study results to other settings. Despite these caveats, the findings will provide important insights for designing and implementing QI programs in Tanzania and in other African countries.

Originality/value – The authors' conceptual framework is based on the existing literature on the science of diffusion and scale up of innovation in the health sector. Few studies are known from resource constrain settings in Africa which assess the determinants of the process of nationwide scale-up of proven interventions.

Keywords Quality (assurance, improvement, structures, strategies, frameworks), Tanzania, 5S approach, Gap between knowledge and practice, National Rollout, Public hospitals

Paper type Research paper

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Introduction

In general, provision of health care in resource constrained settings in developing countries, is generally considered to be of low quality. Many African countries have made the provision of quality health care a top priority (MoHSW, Tanzania, 2011; MoH, Uganda, 2011; MoMS and MoPH, Kenya, 2011). Developing countries often struggle with the complexity of insufficient human resource combined with inadequate access to necessary medicines and technologies (Epping-Jordan *et al.*, 2004). Asian countries such as Laos and Cambodia have also been facing similar challenges in the provision of health care (Hanvoravongchai *et al.*, 2012). Despite serious human and financial resource shortages, various Asian countries took action to improve the quality of health care using the 5S-KAIZEN-TQM approaches (Chaisiri, 2006; Kaluarachchi, 2009).

Based on the successes from Asian countries, the Asia-Africa Knowledge Co-creation Program (AAKCP) was launched in 2007 by Japan International Cooperation Agency (JICA). A total of 15 African countries joined AAKCP, including Tanzania, and learnt from Asian countries about these approaches, and started to introduce them in 2007. However, the majority of the countries that introduced the 5S-KAIZEN-TQM are struggling to scale up the approach nationwide. Thus, this paper focuses on identifying key factors for successful rollout of the 5S-KAIZEN-TQM approaches in public hospitals in Tanzania.

Concept of "rollout"

In this paper, "rollout" is defined as the introduction of the 5S-KAIZEN-TQM approaches to a particular hospital as a pilot followed by "scale up" to other hospitals in phases. "Scale up" is defined as the deliberate effort to increase the impact of health service innovations successfully tested in pilot or experimental projects, so as to benefit more people and so foster policy and program development (WHO, 2009). This paper draws on a model to disseminate innovation (Greenhalgh *et al.*, 2004) focusing on four of its elements: design, implementation process, outer context, and the adopters of innovation such as organisations and staff.

Background of 5S approach

The 5S approach is a tool that was developed originally in the Japanese manufacturing sector to organize the workplace (Kaluarachchi, 2009). "5S" stands for five abbreviations of Japanese terms, all with the initial S. These are *Seiri*, *Seiton*, *Seisou*, *Seiketsu*, and *Shitsuke*. The five Japanese words are translated into English as shown in Table I (MoHSW, Tanzania, 2013).

Rollout of 5S approach in Tanzania

The 5S approach was introduced in Tanzania in 2007, as part of AAKCP initiated by the Government of Japan, through JICA. AAKCP allowed Asian and African countries to share knowledge and experience, and thereby facilitating the development of country specific QI methods and implementation plans (Japan International Cooperation Agency, 2010). The Mbeya Referral Hospital (MRH) was chosen to be the pilot hospital in Tanzania, with the aim of making it a Centre of Excellence for 5S-KAIZEN-TQM approaches, and implementation started in August 2007. MoHSW management decided to scale up the 5S approach to other public hospitals in phases starting level 3 hospitals down wards. This policy decision is captured well in the

	Japanese	English	Meanings
S1	*Seiri*	Sort	Remove unused items for current work processes from your workplace. This step will also help to identify what is missing from your workplace
S2	*Seiton*	Set	Organize everything needed in proper order for easy work. This step is based on finding efficient and effective storage of necessary items. Setting of necessary items can save time and energy when looking for something
S3	*Seiso*	Shine	Maintain high standard of cleanliness of workplace, tools and equipment. This will create ownership of infrastructure, equipment and tools, and will make it easy to find any abnormality of infrastructure, equipment and tools
S4	*Seiketsu*	Standardize	Maintain an environment where S1 to S3 are implemented in the same manner throughout the organization
S5	*Shitsuke*	Sustain	Maintain S1-S4 through discipline, commitment and empowerment. This step focuses on defining a new mind-set and standard in the workplace

Table I.
Explanation of 5S approach

"Implementation Guidelines for 5S-KAIZEN-TQM approaches in Tanzania" (MoHSW-Tanzania, 2009).

The rollout of the 5S approach in Tanzania follows the model shown in Figure 1. The model has four key elements: inception and establishing a centre of excellence, Ministry of Health and Social Welfare (MoHSW) adopting the approach, phased scale up to other hospitals, and internal and external monitoring and evaluation (M and E).

Levels of hospitals in Tanzania, affiliation to training institutions and funding for QI

Within the decentralized health systems in Tanzania, three levels of hospitals exist, and provide public health services: Level 1 hospitals are all hospitals at district level.

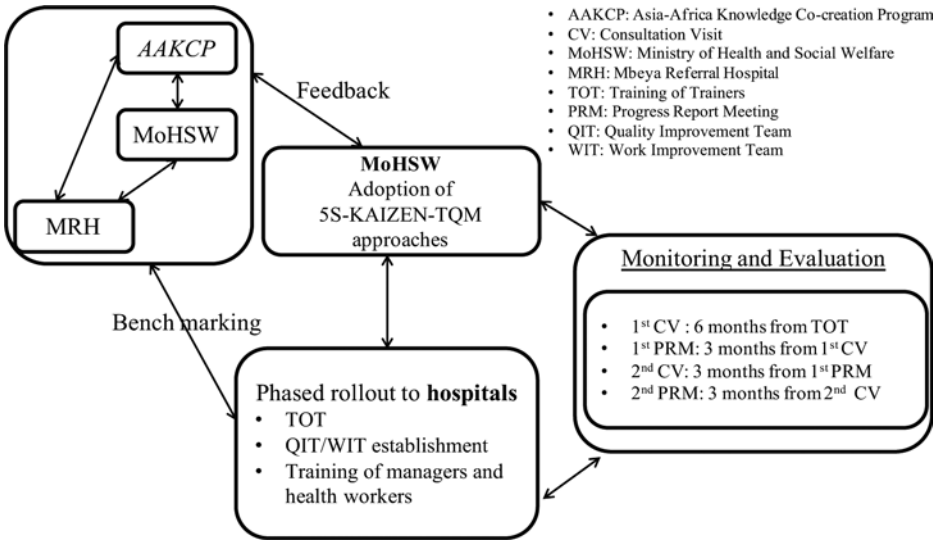

Figure 1.
The model

Level 2 hospitals are all referral hospitals at regional level and Level 3 hospitals are all zonal and national level hospitals (MoHSW-Tanzania, 2009). Both zonal and national hospitals are affiliated to health training institutions. Regional referral hospitals do not have training roll *per se* but some of them host internship program for doctors, nurses, pharmacists and laboratory graduates. Several district hospitals have affiliated nursing training schools.

In general, hospitals and local health councils have no budget line for QI activities. Running costs for district hospitals come from basket funding, in addition to cost sharing and reimbursement from insurance funds. Regional, Zonal and National hospitals are receiving block grant, as well as cost sharing and reimbursement from insurance funds (The World Bank, 2011; International Social Security Association, 2011).

Scale up to hospitals in phases

The starting point at the hospitals was training of trainers (ToT). Three key personnel from the hospital management team (HMT) of 46 public hospitals were invited to participate in the training. This training was to create a resource team that would serves as a catalyst for change, providing guidance and technical assistance within each respective hospital and to facilitate other hospitals planning to introduce 5S-KAIZEN-TQM approaches. Basic quality improvement concepts, methodology of the 5S approach implementation, implementation structure for the approaches, and internal M and E methodology were taught during ToT. Knowledge on 5S-KAIZEN-TQM approaches obtained by participants of ToT was measured through pre- and post-training assessments. All participants were instructed to follow steps outlined in the implementation guideline of the approach (MoHSW, Tanzania, 2013) which included formulation of a quality improvement team (QIT), training of hospital managers and health workers, establishment of work improvement teams (WITs) at the implementation level, such as departments and sections, and identification of pilot service areas.

Monitoring and evaluation

M and E of the rollout was designed with two key elements. The first was internal M and E done by QIT in collaboration with WITs, and the results were shared in the progress report meeting (PRM). The second element was external M and E done through consultation visits (CVs). Both internal and external M and E activities have been documented to increase chances of innovation uptake and sustainability (Greenhalgh *et al.*, 2004).

The consultation visits are designed to visit hospitals twice a year to observe the progress of the 5S approach implementation and to provide technical advice on the spot. The CV team uses a "5S-KAIZEN M and E sheet" with standardised marking criteria to evaluate progress at each section practicing the 5S approach in the hospital. At the end of CV, a feedback session is held to provide the results of the evaluation, and make suggestions for further improvement to members of HMT, QIT and WITs.

PRM is organised every six months after each CV. A PRM is designed to encourage self-evaluation and to strengthen record keeping of 5S-KAIZEN activities. All hospitals that participated in a PRM must report self-evaluation results, activities conducted and challenges faced during the past six months. The peer review method is applied to all presentations (participants from other hospitals and facilitators raise questions and suggestions to improve 5S-KAIZEN activities in the hospital).

Rationale and aim of the study

There has been substantial literature on introducing quality improvement (QI) programs using the *kaizen* approaches or lean management in hospital settings; however, the majority of studies were conducted in developed countries such as the US or in Asian countries (Chaisiri, 2006; Stankovic, 2008; Bartel *et al.*, 2009; Withanachchi *et al.*, 2007). The quality of patient care in hospitals is firmly on the agendas of developed countries, but has been slower to gain traction in developing countries (Campbell *et al.*, 2008). Studies in South Africa and Ghana using *kaizen* approach, reported improvement of clinical operations, work efficiency, reduction of waiting time and congestion (Isaacs and Hellenberg, 2009; Carter *et al.*, 2012). However, there has been no study, to the authors' knowledge, conducted to look at the national rollout of QI approaches in public hospitals in Africa.

The overall aim of this study is to identify factors that influenced national scale up of 5S-KAIZEN-TQM approaches to public hospitals in Tanzania, and to draw up lessons for use by other developing countries. Our original hypothesis was that effective ToT gives good knowledge and skills to practice and sustain the 5S approach. We expected that the number of staff trained/sensitized, the health facility leadership, and the composition and functionality of QIT would influence the practice of the 5S approach. Based on the conceptual framework, this study aims to answer the following questions: was ToT effective in transferring the knowledge and skills of 5S to the participants? What factors, other than knowledge and skills gained during ToT, influences practice of the 5S approach in hospitals?

Methods

Design

All 46 public hospitals that participated in ToT between 2008 and 2011 were studied.

The effectiveness of ToT was measured through calculating the effect size (d) for t test, based on the results of pre- and post-training assessments conducted during ToT in 2009, 2010 and 2011. Effect size (d) is calculated from the average of the post-training assessment scores minus the average of the pre-training assessment scores divided by the standard deviation of the two conditions (Thalheimer and Cook, 2008; Becker, 2000).

Data source and collection

Data studied are based on the rollout conceptual framework shown in Figure 2. Information was extracted from the first CV reports (after six month of ToT) from the 46 hospitals. The average of the CV results was used to show the implementation status as calculated from the "M and E sheet for 5S-KAIZEN activities," which is an officially used tool for monitoring of 5S-KAIZEN activities in the Tanzania Health Sector. The sheet has 14 sections with 52 assessment items. Among 14 sections, section 1 to 6 with 27 items is used to assess implementation of 5S activities, and the rest of the items are used to assess *kaizen* implementation. All assessment items in the sheet are scored between 1 and 5. All areas in the hospital practicing 5S activities were assessed, and the overall score of all areas was calculated as the "CV average." The scoring of progress was carried out with experienced facilitators using standardised scoring criteria.

The authors developed a questionnaire that identified 14 explanatory variables as shown in Table II. The questionnaire was developed based on the "M and E sheet for

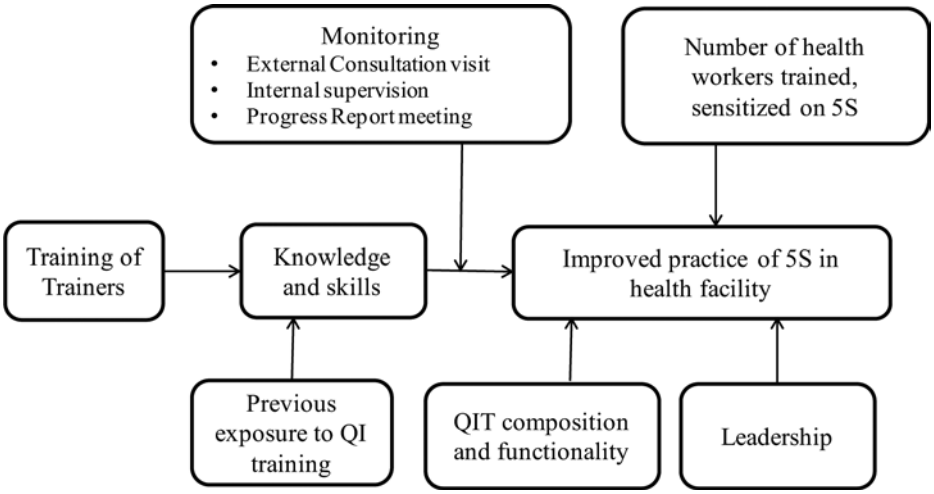

Figure 2.
The rollout conceptual framework

5S-KAIZEN activities." Explanatory variables 1 to 8 are categorised as "strength of QIT," explanatory variables 9 to 11 are categorised as "effect of training," and explanatory variables 12 to 14 are categorised as "leadership in implementation area" in the "M and E sheet for 5S-KAIZEN activities." The authors filled in the questionnaire based on the information extracted from CV reports and PRM presentations.

Data analysis

The effect size for the pre- and post-training assessment was analysed using an effect size calculator, developed by University of Colorado, Colorado Springs (Becker, 2000).

After all 14 explanatory variables were recorded, they were turned into binary variables 0/1 (as dummy variables shown in Table II). T-test was conducted with Stata/SE 12.0 for Mac to check the association between the explanatory variables (binary) and the outcome variable (CV average score), in order to identify what factors influenced the implementation of the 5S approach. Also effect size (r) was calculated to find the most influential variable among five identified explanatory variables.

Additionally, a t-test was conducted to find the association between the explanatory variables and the outcome variable (CV average score) by levels of hospital (national, regional and district), to see the difference on influencing factors among the three levels of hospitals.

Results

Testing of sample normality

From Table III, p-value of 0.28 does not result in rejection of the hypothesis that the CV average of 46 hospitals is from a normally distributed sample.

Effectiveness of ToT

Table IV shows the effect size (d) of each ToT. Based on effect size (d) scale (Small effect: between 0.20-0.50, Medium effect: between 0.50-0.80, Large effect: more than 0.80), all ToT had a large effect size in range between $d = 0.63$ and 1.59.

Explanatory variables	Code	Choices	Binary variables coding
1. QIT establishment	QITEST	5: < or = 1 month	1
		4: 2-3M after TOT	1
		3: 3-4M after TOT	1
		2: > or = 6M after TOT	0
		1: Not established	0
2. Composition of QIT	QITCOMP	5 = Nr., Dr, AH, Admin and minor	1
		4 = Nr., Dr, AH, and Admin	1
		3 = Nr., Dr, and AH	1
		2 = Nr, Dr.	0
		1 = Nr only	0
3. Recognition of QIT	QITREC	5 = HMT is part of QIT	1
		4 = QIT reports to I/C	1
		3 = Report to Nurse in charge	1
		2 = No recognized	0
		1 = Not established	0
4. Development of roles and responsibilities	QITRR	5 = Developed and shared with all staff	1
		4 = Developed and shared QIT only	1
		3 = Developed but no evidence of sharing	1
		2 = Under development	0
		1 = Not developed	0
5. Training of staff	QITTRST	5 = Trained staff	1
		4 = Trained managers only	1
		3 = Sensitization	1
		2 = Reporting only	0
		1 = No training	0
6. Record keeping	QITRCK	5 = All minute, reports and pics available	1
		4 = Some are missing	1
		3 = Records scattered	1
		2 = Few records kept	0
		1 = No records	0
7. Regular communication	QITREGCOM	5 = Scheduled meeting conducted	1
		4 = Meeting scheduled but not regularly conducted	1
		3 = Communicate but ad hoc	1
		2 = No evidence of communication	0
		1 = No communication	0
8. Conducting internal M and E	CONINME	5 = Internal M and E regularly conducted	1
		4 = Internal M and E occasionally conducted	1
		3 = Monitor the activities but not evidence evaluation	1
		2 = Monitor the activities irregularly	0
		1 = No internal M and E	0
9. Feedback/sharing of information	FBKINFO	5 = Regular scheduled feedback and sharing	1
		4 = Feedback done but less often	1
		3 = No evidence of feedback	1
		2 = Outline reported	0
		1 = Not shared	0

(*continued*)

Table II.
Explanatory variables, coding and choices

Explanatory variables	Code	Choices	Binary variables coding
10. Action plan development	ACTPDP	5 = Developed and shared	1
		4 = Developed	1
		3 = Process of developing	1
		2 = Plan to develop	0
		1 = Not developed	0
11. Budget allocation for 5S-KAIZEN activities	BUDGET	5 = Annual budget allocated	1
		4 = Allocate when funds are available	1
		3 = Support through material procurement	1
		2 = Plan to allocate	0
		1 = No budget allocation	0
12. Knowledge on 5S approach among section in-charges	SKNOW	5 = Knows how to practice	1
		4 = Can explain 5S words	1
		3 = Knows 5S words only	1
		2 = Heard about it	0
		1 = No knowledge of 5S	0
13. Involvement and commitment	INVCOM	5 = Strong involvement taking lead to practice	1
		4 = Partially involvement	1
		3 = Committed but not involved often	1
		2 = Knows but involved in training only	0
		1 = No idea	0
14. Availability and use of guideline	AVGUIDE	5 = Available many staff use	1
		4 = Available some staff use	1
		3 = Available but limited access	1
		2 = Available but not used	0
		1 = Not available	0

Table II.

Variable	Obs	W	V	z	Prob > z
CV average	46	0.97	1.32	0.60	0.28

Table III.
Result of Shapiro-Wilk test

The implementation progress of the 5S approach in the hospitals

Figure 3 shows the average CV result scores in 46 hospitals at the time of the first CV. The hospital with the highest score (81 per cent) has a score three times higher than the hospital with the lowest score (27 per cent). The mean score was 51 per cent. Figure 3 shows that the progress of the 5S implementation differs from hospital to hospital.

Factors affecting the implementation of the 5S approach

Statistical analysis revealed that five explanatory variables out of 14 showed statistical significant association with the CV average score. Those are "feedback/sharing of information," ($p = 0.031$), "development of roles and responsibility," ($p = 0.002$), "knowledge of 5S approach among section in-charges," "involvement and commitment," and "5S guideline use and availability" ($p = 0.000$). Among the five identified explanatory variables, "involvement and commitment of section in-charge" showed the largest effect size ($r = 0.67$) (Table V).

Table IV.
Results of effect size

Year of TOT	Number of participants	Pre-ToT assessment score			Post-ToT assessment score			*t*-test	*p*-value	Cohen's effect size (d)
		Mean	Score range	SD	Mean	Score range	SD			
2009	37	53.3	48.6-57.9	14.2	76.0	71.3-80.7	14.3	6.720	$p < 0.01$	1.59 (L)
2010	61	53.3	48.7-57.9	18.0	70.2	66.7-73.7	13.7	9.954	$p < 0.01$	1.06 (L)
2011	66	61.1	59.3-63.0	7.71	65.5	64.0-67.0	6.13	4.210	$p < 0.01$	0.63 (L)

Notes: Scale of effect size (d): (S) $0.20 \leq$ small < 0.50, (M) $0.50 \leq$ medium < 0.80, (L) $0.80 \leq$ large

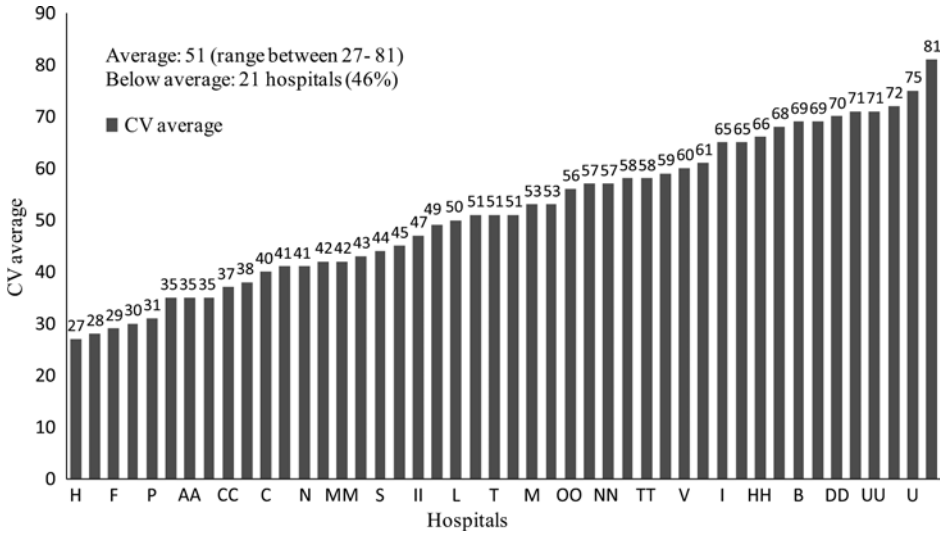

Figure 3.
Average CV result scores in 46 hospitals at the time of the first CV

Results of the analysis by level of hospital showed differences in the influencing factors by the level of the hospital. The CV average of the national level hospitals is influenced by "involvement and commitment" ($p = 0.03$). The CV average of regional referral level hospitals is influenced by "QIT roles and responsibility" ($p = 0.02$) and "5S knowledge" ($p = 0.03$), while for district hospitals, it is influenced by "involvement and commitment" ($p = 0.01$) and "availability of guidelines" ($p = 0.001$), as shown in Tables VI and VII.

Discussion

Policy makers, development partners and QI implementers in Tanzania and other developing countries have expressed a need to understand better the determinants of QI interventions. Our findings show some of the important attributes of effective rollout of QI intervention.

The analysis of effect size (d) revealed that all ToTs were effectively conducted to transfer knowledge and skills of the 5S approach. However, the CV average score varied from hospital to hospital. This indicates that knowledge and skills provided to participants through ToT is not enough to improve implementation of 5S activities in hospitals, and there are other factors such as leadership and teamwork influencing quality and effect of implementation. Our findings echo Rowe's view, that training as main intervention to improve poor performance of health workers had mixed results (Rowe *et al.*, 2005).

Based on our findings, a QIT needs to be established in all hospitals with team members having clear roles and responsibilities. Our study results corroborate Silimperi's study which found that teamwork helps in the generation of more and better ideas, in improving the willingness to take risks, in developing feelings of power and influence, and improve quality of work life (Silimperi *et al.*, 2002). Experience of the authors from five years of implementation also attest to this observation, that roles and

Table V. Results of uni-variable analysis

Independent variables	Code	t test	p-value	Effect size (r)	Degree of freedom
QIT establishment	QITEST	1.6035	0.116	0.23(S)	44
Composition of QIT	QITCOMP	0.9538	0.345	0.14 (S)	44
Recognition of QIT	QITREC	1.7900	0.080*	0.26 (S)	44
Development of roles and responsibilities	QITRR	3.1901	0.002***	0.43 (M)	44
Training of staff	QITTRST	1.0321	0.307	0.15 (S)	44
Record keeping	QITRCK	1.2377	0.222	0.18 (S)	44
Regular communication	QITREGCOM	0.6235	0.536	0.09 (N)	44
Conducting internal M and E	CONINME	1.6092	0.114	0.24 (S)	44
Feedback/sharing of information	FBKINFO	2.2281	0.031**	0.32 (M)	44
Action plan development	ACTPDP	1.2309	0.224	0.18 (S)	44
Budget allocation for 5S-KAIZEN activities	BUDGET	0.8868	0.380	0.13 (S)	44
Knowledge of 5S approach among sections in-charges	SKNOW	4.7179	0.000***	0.58 (L)	44
Involvement and commitment	INVCOM	5.9385	0.000***	0.67 (L)	44
Availability and use of guidelines	AVGUIDE	4.3747	0.000***	0.55 (L)	44

Notes: t-test $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$; Effect size (r): (S) $0.10 \leq$ small < 0.30, (M) $0.30 \leq$ medium < 0.50, (L) $0.50 \leq$ large (N): No effect; Dependent variable = CV average score

responsibilities of the QIT members need to be shared with all hospital staff, otherwise there will be resistance in implementation of 5S activities among staff.

In our study, the importance of feedback and of sharing information was studied immediately after completion of ToT until the time of CV and during PRM. Proper feedback of the attendees of ToT facilitated the uptake of the 5S approach by management and other staff. Parand's study mentions that feedback is especially important when disseminating information back to the top management to enthuse senior management and to improve understanding of the program within the hospital (Parand *et al.*, 2012).

Knowledge of the 5S approach among sections in-charge (middle level managers) in our study significantly influenced practice of the 5S approach. Their role in transferring information and knowledge from top management and outside QI experts or existing QI literature to lower level staff plays a key role here. Hakim's study backs up our observation that middle level managers shoulder an important role of knowledge management implementation (Hakim and Hassan, 2011).

Some studies on QI interventions have identified that leadership from the top management is a key success factor (Kaluarachchi, 2009; Weiner *et al.*, 1997). However, our study results show that not only top management, but also sections in-charge, are a key success factor of 5S implementation, which is captured with the explanatory variables "involvement and commitment" and "knowledge on 5S" among sections in-charge.

Table VI.
Results of uni-variable analysis by types of hospital

	National referral specialized hospitals	Regional referral hospitals	District hospitals
No. of facilities	8	21	17
Mean	56	43	57
Range	40-81	27-70	30-75
SD	14.1	13.52	13.25
Average bed capacity	400-600	200-300	150-200

Table VII.
Results of uni-variable analysis by types of hospital

Explanatory variables code	*T* test	*p*-value	*T* test	*p*-value	*T* test	*p*-value
QITEST	0.265	0.800	0.120	0.905	2.061	0.057*
QITCOMP	1.262	0.253	NA	NA	NA	NA
QITREC	0.362	0.729	0.170	0.866	1.951	0.070*
QITRR	0.512	0.626	2.663	0.015**	1.523	0.148
QITTRST	NA	NA	0.217	0.830	NA	NA
QITRCK	0.214	0.837	0.009	0.992	1.017	0.324
QITREGCOM	0.264	0.800	0.693	0.496	0.303	0.765
CONINME	0.512	0.626	0.945	0.356	NA	NA
FBKINFO	NA	NA	1.366	0.187	NA	NA
ACTPDP	NA	NA	NA	NA	NA	NA
BUDGET	NA	NA	NA	NA	0.515	0.613
SKNOW	NA	NA	2.369	0.028**	0.117	0.281
INVCOM	2.789	0.031**	1.947	0.066*	3.186	0.006***
AVGUIDE	1.340	0.228	1.440	0.166	3.965	0.001***

Notes: *t*-test $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$; Dependent variable = CV average score

Availability of good references and proper use of 5S implementation guidelines are the factors that influence the implementation of 5S activities in the early stage. Orem's study found that the majority of guidelines are not available at service delivery points and are poorly disseminated. Unavailability of guidelines influences evidence-informed decisions and health service delivery (Orem *et al.*, 2012).

Differences are found between the results of overall data analysis and data analysis by levels of hospital. Based on the observation of the differences, district hospitals are using the implementation guidelines on the 5S approach more than regional referral and national level hospitals. This can be explained by the fact that health workers sometimes prefer to use mind lines instead of guidelines, especially referring to a simple procedure or condition (Chandler *et al.*, 2008), especially at national level.

Section in-charges of regional referral hospitals are seeking more knowledge on the 5S approach than national level hospitals. Involvement and commitment of middle level managers is key for successful implementation of the approach at all levels. National level hospitals usually have a strong QI implementation structure to manage programs or activities compared with other hospital levels. The results of data analysis by hospital level indicate that regional referral hospitals and district hospitals need to establish functional QIT with clear recognition and roles and responsibilities.

This study has the following limitations. The data were collected from existing reports and presentation materials only. There might be reporting bias, as PRM data is self-reported from the hospitals. Caution is therefore needed in extrapolating the study results to other settings. Despite these caveats, the findings will provide important insights for designing and implementing QI programs in Tanzania and in other African countries.

Conclusions

This study examined the national rollout experiences of a QI approach in public hospitals in African settings. The study revealed that although the training was effectively conducted to provide knowledge and skills on the 5S approach to top management of the hospitals, the implementation progress differed from hospital to hospital. Gaps between knowledge obtained from ToT and practices of 5S activities were observed. The following factors, influencing implementation of the 5S approach, were identified:

- establishment of hospital based QIT at an early stage with clear roles and responsibilities;
- feedback and sharing of information of all staff in hospital management and service delivery;
- good understanding of the 5S approach among sections in-charge;
- commitment and involvement of sections in-charge; and
- availability and use of implementation guidelines of 5S.

The study results suggest that it is important to conduct follow-up activities such as coaching and mentoring through CV and to guide hospitals in establishing QIT with clear roles and responsibilities. Once QIT is established, feedback and information sharing on QI activities among hospital staff must be emphasized. Moreover, involvement of sections in-charge (middle class managers) at implementing areas in

the hospitals with proper knowledge and technical backup is key for successful implementation of a QI program. These findings are echoed in a commentary by Gilson and Schneider (Gilson and Schneider, 2010), that provision of sustained support to managers and health workers, encouraging learning, and promoting sharing of experiences are key to scale up. These factors need to be reflected in the rollout plan of a QI program for successful rollout. Lastly, we hope that the findings will be useful for other African countries that have been practicing 5S activities in their health sector, as well as other QI programs in Tanzania that are planning for scale up.

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