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RESEARCH ARTICLE

IMPLEMENTING QUALITY; A MISSING PIECE WITH A NEED FOR PROCESS OF BEHAVIOR CHANGE: A CASE FOR IMPLEMENTING QUALITY CB-IRS DELIVERY MODEL IN ZAMBIA

Emmanuel Hakwia Kooma¹ and David Zinyengere²

1. Ministry of Health, National Malaria Elimination Centre, Lusaka, Zambia.
2. Health Environment and Development Consultancy (HEDEC), Zimbabwe.

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Abstract

Background: In the wake of increasing malaria cases in Zambia, IRS has been coming under increasing accountable pressure from the public for quality IRS performance and its decentralized approach. In response, a new IRS approach; Community-Based Indoor Residual Spraying (IRS) Delivery model has been introduced in the country and institutionalized in the community health care system. The objective of this study was to introduce quality assurance approach methods to the model in terms of structure, process and outcomes for quality performance.

Materials and Methods: We reviewed both published and unpublished documents, articles, papers on quality service delivery and explored field experiences and the understanding of IRS service delivery. The Donabedian model has been found to lead to improvements of quality that in turn could improve the health outcome of the community. Equally, dimensions of quality were analyzed under effectiveness, efficacy, acceptability, equity and relevance to IRS delivery of services and best approaches.

Results: Quality assurance becomes strong and successful when its well organized with features of a health atmosphere that motivates IRS teams, Spray operators (SOPs), and the house hold owners, thus becoming a common goal as a result of good level management. The District IRS Operational Committee, typically must possess quality assurance superior technical skills and expertise. However, it is not only quality assurance guidelines that strengthen team building but also established rules, processes, tracking of progress, IRS quality assurance learning environment, improvements and leadership support initiatives. These could be supplemented by enabling tools and a nurturing quality friendly atmosphere within the IRS teams and SOPs as front liners. Donabedian model for improvement of quality has been widely adopted in the hospital care set up, but has not yet been fully recognized, utilized and validated in the vector control system.

Conclusion: The study suggests that the Donabedian's structure-process-outcome is a valid model for implementing quality CB-IRS Delivery model in the IRS program campaign. The interventions that perform well in terms of

Corresponding Author:- Emmanuel Kooma, Dr PH, DBA

Address:- Ministry of Health, National Malaria Elimination Centre, Lusaka, Zambia.

structure tend to perform better for quality service delivery processes, that in turn have favorable influence on the community health status outcome.

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Introduction:-

Background:

The decentralization and integration of Community –Based Indoor Residual Spraying Delivery model into institutionalized community-based health care system has, over the years, been found to be more cost-effective and efficient. However, quality performance of the model still remains unanswered. Quality has been hard to describe, but we all know it when we see it and we definitely notice when something is not up to par. We need to embrace quality for IRS performance over quantity. In Zambia, implementation of quality for IRS performance has been coined in the Ministry of Health mission statement (Kooma E.H,2020). Further, the approach to the implementation of the model has been best achieved by empowering the community through using the local community health workers(CHWs) as SOPs to implement IRS in their own communities.

Improving quality has been found to require the knowledge, choice and use of specific methods adjusted to local circumstances through changing other people’s behavior by changing our own. The IRS coverages have since improved in areas where this new paradigm shift to IRS has been implemented(Kooma E.H,2020).The Innov 8 approach to leave no one behind, supports these efforts of the model and with realization of the universal health service coverage and the right to health through using local resources and empowering the community (WHO,2016). <http://apps.who.int/iris/btstream/>.

However, the overall quality of IRS services delivered by the CHWs have been varying a cross-settings while the public and HHs owner’s dissatisfaction has been evident from low uptake of the intervention coupled with high refusal rates, absenteeism and locked up structures. Quality services are not “one size fits all”. Instead, perceptions of and expectations for quality come from people’s own understanding and personal experience (Ronnie L et al.,2005).

Problems with implementation of Quality to Community-Based Health Programs:

Quality of health service delivery resolutely shifted the discourse on Universal Health Care from coverage to quality but fell short of providing actionable models for improving the quality of the community health programs (Zumbruni J et al., 2018). The new guidelines for optimizing CHWs progress have not explicitly stated how quality must be systematically measured and improved. Therefore, the embedding of quality assurance into CHW programs risk being overlooked by national and health system institutions in favor of higher public health priorities (Fielding E.J, 2009).

In addition, the current practice often regards engagement of CHWs as the only method for community involvement and influencing, getting the communities to health facilities as a means of increasing demand. However, the achieving of quality universal health care coverage (UHC) through the IRS approach model requires meaningful engagement of local authorities within the communities in which CHWs are trusted and valued to provide quality of IRS performance in their community. The spray swathes, age of pumps, attitude and behavior of SOPs and wall types affect residual efficacy of the insecticides for IRS (KokMC, Broerse Jew, Theobald S, et al.,2017). Further, there remains a need to focus on optimizing community health as an integral part of the broader discourse on the quality of IRS service delivery.

The purpose of the study is to discover important factors that can promote quality performance of the Community –Based IRS Delivery Model through the CHWs/SOPs performance and other community-based agents. CHWs can ignite belief and demand for quality performance delivery of the model, ensuring that the IRS services they provide meet beneficiary preferences, needs and own expectations and build trust in the delivery of IRS for impact. CHWs have a unique position in the community in amplifying the voices of the vulnerable and ensure that the push for universal IRS coverage is not at the expense of equity of access to model approach.

Embedding quality improvement in CB-IRS Delivery Model and fully integrating the model into the community health care systems improves also efficacy, equity and spray for quality (Berwick D.M, Geoffrey A B, Roessner J,1990). Quality CHWs/SOPs capacity building system has been found to greatly assist through the development and implementation of quality orientation program for CB-IRS Delivery model (Allen C & Brownstein.N,2016). This paper promotes a focus on quality for IRS performance in particular for the newly introduced model and provides IRS teams including SOPs with an opportunity to make informed strategic choices to advance the model quality improvement.

Objectives of the study:-

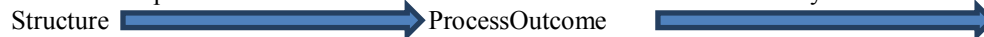
1. To establish quality assurance approach methods for the CB –IRS Delivery Model
2. To provide literature reviewed insights to quality assurance for the model performance improvement during implementation
3. To promote good CB-IRS Delivery Model practice using quality standardized procedures
4. To strengthen the implementation of quality assurance and control methods by IRS teams and SOPs
5. To come up with recommendations for better outcome of the model through quality assurance activities

Materials and Methods:-

This study is part of the larger IRS campaign quality assurance approach methods for improving CB-IRS Delivery Model performance in practice setting. We reviewed published and unpublished documents, articles, papers on quality of service delivery and explored the understanding of IRS service delivery quality actions needed to be taken to improve quality assurance for the model. Dimensions of quality were equally analyzed under effectiveness, efficiency, acceptability, accessibility, equity and relevance in delivery of services and best approaches that could be achieved, taking into account the needs and wants of HH owners for IRS performance and the general public.

Using the Donabedian model, we assessed the structures, processes or the outcomes needed for quality assurance performance of the new model. Donabedian model has been found to assess, and thereby improving health care quality delivery. The model considers the measurement and improvement of quality in three key stages of health care-the structure, or environment in which health service has been provided, the process or method by which health care has been provided and the outcome.

Table 1:-Adopted Donabedian model in the context of the CB-IRS-Delivery Model.



-Access to IRS services by HH owners
 -Utilization of local CHWs, NHCs, CBOs, FBOs etc.
 -Utilization of Community Executive Committee
 -Decentralize acquisition of PPEs& Equipment including chemicals
 -Culture study & implementation of PHC
 -Motivational approach for SOPs &Community
 -Decentralized selection criteria for SOPs & their qualifications
 -State of spray pumps& availability of means for mobility of SOPs
 - Communication & Feed back
 -Availability of SOP reporting forms
 -Existence of Quality Assurance Mechanism
 - Availability of adequate chemicals, structures & manageable structure sizes by SOPs per day
 -Preventive maintenance skills for pumps
 -Review meetings with the community as feedback means

-Committees capacity building
 -Provision of a “How to Manual”
 -Provision of standard operating procedures, Job AIDs, Guidelines, checklists, pocket data books
 -Performance monitoring charts
 -Monitoring&Supervision tools
 -Community& HH Responses to survey questions
 -Village/compound/ward meetings /training
 Timeliness[effectiveness&efficiency]
 -Comprehensiveness
 -Positive behavior of SOPs, Peer supervision, mentor ship etc.
 -Promote good relationship with executive committees &HH owners

-Malaria situation /status in the community

 -Reported few deaths due to malaria in under-fives
 -Increased productivity

 -Community responsiveness & acceptability

 -Increased mosquito mortality

 -Few absconders, refusals, and locked homes

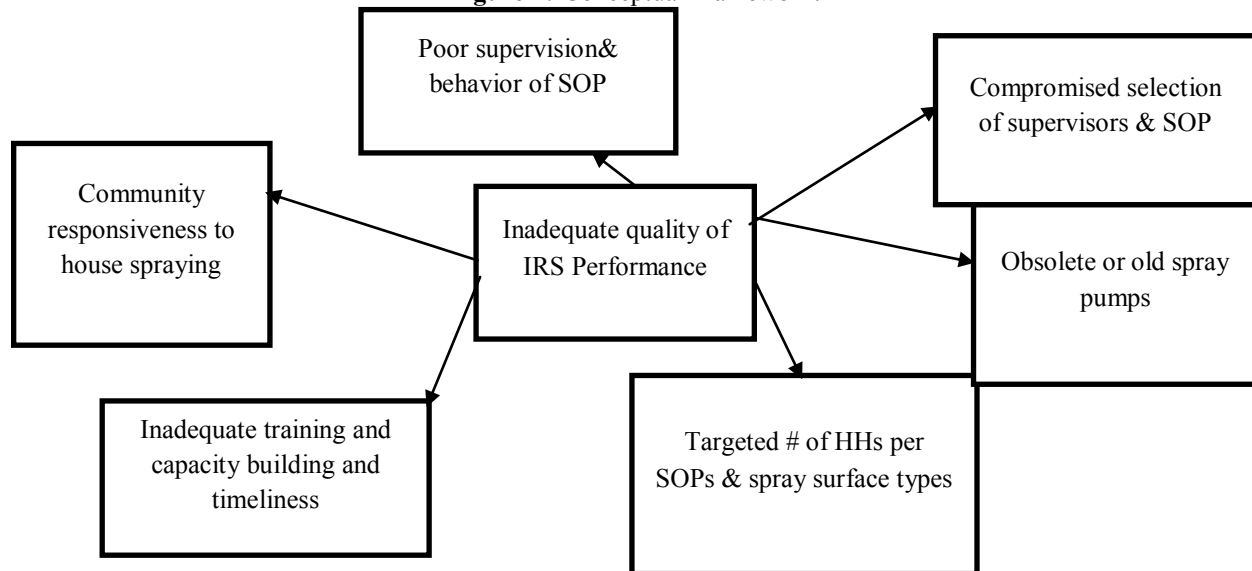
 -Evidence of community pull of the intervention and promotion of program public image

Research Questions:

1. How were the SOPs & Supervisors selected for the campaign?
2. How could supervisors per spray team be improved?
3. How strong were the social mobilization for each health facility catchment area?
4. What sizes/number were the spray rooms? What could be the minimum distance between each eligible spray able structure for one spray operator?
5. Did the training curriculum embrace quality? How long was the practical period or what time was allotted for SOPs quality training?
6. What quality of pumps status were SOPs using?
7. How is the behavior of SOPs managed?

Conceptual Framework:

The conceptual frame work variables included factors such as: inadequate supervision, compromised selection of SOPs, obsolete or old spray pumps, targeted numbers of households per SOP, inadequate training or capacity building and timeliness of IRS, type of walls, community responsiveness to house spraying and finally the core being inadequate of quality of IRS performance for impact. These variables are unique to each practice and were assessed under literature review in order to identify appropriate areas of improvement for the CB-IRS Delivery model.

Figure 1:-Conceptual Framework.

Source: Writer's Schema.

Results:-

This article provides insights to quality assurance approach methods for the CB-IRS Delivery Model by critically analyzing relevant literature. It also evolves and proposes an integrated conceptual frame work that provides supportive quality qualities desirable for CB-IRS Delivery Model for achieving better quality spray by supporting IRS campaign exercise and getting house hold owner's satisfaction. However, three groups of strategies are discussed herein: strategies that target the spray operator; those that are meant to be used by spray teams and those that have to be used at managerial(district) level to support quality of IRS performance.

Frame work on inadequate quality of IRS Performance:

As a result, quality assurance (QA) has been the implementation of systematic and well planned activities to prevent sub-standard services on the interventions(WHO,2016). There have been some arguments for promoting a focus of quality in the community health service systems. Even where health systems are well developed and resourced, there has been evidence that quality remains a serious concern (Crossing the Quality Chasm,2001) with expected outcomes not predictably achieved and with wider variations in quality standards of health service delivery within and between community health service delivery systems (Saver G. Barry,2015).

Until now, QA has not been well defined in the context of vector control specifically for IRS. However, with increasing pressure for greater accountability of prompting malaria disease elimination program, more formal and transparent methods of communicating service quality standards for IRS performance has become more pronounced and prominent (Kooma E.H,2020)

In the meantime, there have been standard protocols that delineate how quality problems are identified and the feedback loops in place to effectively correct them (Atoolkit for IVM in Sub Saharan Africa,2016). Good quality assurance has been a proactive approach for maximizing resources to increase the likelihood of IRS program success. Whether or not the planned outcomes and impact are achieved, the quality assurance approach ensures sufficient information for the strategic and operational levels of IRS program to either support the current malaria elimination strategy or make necessary challenges (Atoolkit for IVM in Sub-Saharan Africa,2016).

However, the type of structured approach to identifying IRS strengths and weaknesses in the IRS stages, lead to innovative ways of dealing with challenges and avoiding the potentially devastating consequences of poor vector control management(WHO,2016). Furthermore, the success of CB-IRS Delivery Model approach has been found to depend on quality assurance and in combination with other quality strategic community activities. To be sure, the IRS managers and stakeholders at strategic and operational level must drive the new model quality assurance agenda in order to gather knowledge to support effective CB-IRS Delivery Model. Equally, communities have to be consulted to understand their expectations of the model.

Under those circumstances, planning for Quality Assurance for the model starts with the preparation of quality assurance frame work documents and operational guiding documents. In addition, the aim of the frame work defines the quality of IRS and subsequently describe the approach methods to be used to ensure quality performance throughout the Delivery model and set out actions.

Elements of quality assurance for the CB-IRS-Delivery Model:

Besides, there have been three elements of quality assurance suitable for the model for effective coverage, namely quality, standards and relevance (Michael R,2018). As discussed above, quality assurance has been the process of checking that the standards and quality of IRS provision meet agreed standards. However, quality assurance has been an elusive concept (Green,1994). In addition, it has been an important production and establishment of quality levels for the model and assuring that those levels are achieved. The report examined strategies that needed to be implemented in order to improve quality of IRS performance provided by the spray operators using the new model.

Furthermore, it provided information on the usefulness of various strategies and the context in which they have been shown to be useful. The importance of targeting multiple environments of influence and creating ownership of the need for change for quality assurance in spray operators has been emphasized. Finally, there have been ways in which supervisors and IRS team leaders have to lead and support the improvement in quality of IRS performance. Supervisors at all levels have been found not to adequately lead in developing a climate for IRS quality assurance development; help has been needed in the development of ideas and strategies that enable quality improvement.

Indoor Residual Spraying Campaign Structures, Processes and Outcomes:

The delivery of quality for IRS campaign against malaria has three aspects: structure, process and outcome (Donabedian,1966). In the case of the IRS structure, features such as numbers and types of Spray Operators(SOPs), the age and type of equipment used, other facilities and the aspects of the community executive committee structures (NHCs, CHWs&CHAs) play a major role to Quality of IRS performance. In addition, there have been characteristics, such as comprehensiveness of IRS coverage, personal and environmental safety related to the structure. In addition, processes have been found to include IRS activities that were involved in providing and receiving protection to HH owners.

The process indicators of quality involve aspects like timeliness of IRS campaign, continuity and HH owner's compliance. Further, the outcome of equity of access to IRS campaign involve the effects of IRS on the vector and the health status of the community and that included measures of quality of life in relation to the disease burden, functional of the equipment and HH owner's satisfaction. The structure of IRS delivery system such as its funding level, the types and mix of SOPs, the types of equipment available, and managerial expertise at all levels have to play a role in the quality of IRS delivered.

Further, it has however been found that, a good IRS performance lied on structure that has been found to be the easiest to measure. So many early attempts to improve quality of IRS performance relied heavily on assessing the adequacy of structure to meet the mandates of Ministry of Health. The process by which it has to be delivered has been found important, although a good process has been found not to always lead to high quality outcome (Donabedian,1992). There has been increasing interest in not only examining the structure and the process of IRS, but also in determining the outcome. However, outcomes have yet remained the most difficult to measure (Donabedian,1992). In addition, problems in quality of IRS performance have been found to relate to structure, process or outcomes of IRS(Donabedian,1992).

Relationship of components of IRS Implementation to Quality:

However, quality of IRS performance has three interrelated components: firstly, technical services (appropriateness, effectiveness) that involve using public health knowledge and appropriate technology to maximize the benefits of IRS for the HH owners while minimizing the risks that are involved; interpersonal responsiveness/service delivery(acceptability) that involves paying attention to the psychosocial aspects of the campaign including SOP relationship with HH owners. Secondly, the larger social context in which the campaign has been provided and social circumstances with which the HH owners should cope; thirdly, the organization of IRS (Equity,accessibility,comprehensiveness, efficiency) which determines its comprehensiveness, efficiency amenities provided and efficiency (Hussein,1990).

On the other hand, developing an agreement among stakeholders regarding the meaning of quality of IRS performance that has been a necessary part of any attempt to measure quality of IRS performance. At the local levels, SOPsmay be more concerned with accessibility, satisfaction and effectiveness of issues while allocative efficiency could be of greater concern at national and provincial or district level.

Measurement of quality for Indoor Residual Spraying Performance

This includes information taken from a variety of IRS data sources(e.g. number of HHs, SOPs, monitoring /supervision book logs, charts, SOP notes,administrative management, information management system, data etc.). The speed with which the information has to be given back to SOPs, HH owners and managers has been often an issue. This may help shape the indicators chosen. Besides, timely information has been more likely to spur action to address problems of quality early and on time (Weger D E.J,2018).

In addition, the availability of technology (state of pumps and wall types, quality of spray swathes) needed to provide quality of IRS performance and the expertise and style of IRS resource management (adequacy of chemicals, motivation initiatives, SOPs ratio to number of structures sprayed,continuous skills development and type of supervisors'traits, incentives, behavior andsupervisor's skills for mentorship) could all influence quality of IRS performance. Above all, entry level knowledge, skills and SOPs behavior become affected by the quality of the basic education and recruitment system of SOPs. The deployed SOPs must also have access to the field tools (Literature, Guidelines, Job AIDs& Standard Operating Procedures) and general resources needed to increase their motivation, level of knowledge and behavior (Mpembeni N. M. Rose,2015).

Tools to support SOPs improve quality of IRS performance:

As was previously stated, tools that target SOPs performance directlyinclude data management use, use of educational influence, implementation of IRS standards, practiceguidelines, performance reminder systems built into practice records, peer supervision and feedback based on guidelines and plethora of other types of formal and informal continuing education opportunities (Ferrell B,2008). However, self and peer assessmentof acquiring skills and lessons learned, need to be addressed. Further, numerous activities could be used in an effort to enhance quality and these include standard operating procedures, guidelines, forming and working with the community executive committees to locally monitor key model work activities during IRS implementation and further giving credentials to Environmental Health Technologists/Officers(EHTs/EHOs) where work has been done well (Ferrell B,2008).

Quality improvement initiatives involve Job/IRS process re-engineering or cross training of SOPs. Thesupervisors and team leaders must have mid-week reviews of data and information to guide re-engineering of the processes in order to attain quality performance.As a consequence, theSOPs must be given certificates to increase the likelihood to seek ways to continue their own learning, putting much effort to IRS work in the community. On condition, daily and weekly review meetings by IRS teams and supervisors with SOPs will improve quality performance.

Comprehensive quality strategy for quality IRS performance:

Importantly, enhanced IRS data systems and improved monitoring and continuous examination of the IRS outcomes at the community level are needed to provide feedback to SOPs and inform the supervisors and team leaders. HHowners could be empowered by providing them with more information on how to use the IRS delivery system and what to expect from SOPs and the exercise itself. A comprehensive strategy for continuous quality development requires; building mechanisms to support and encourage quality strong new model management structures and approaches and paying attention to all levels of the IRS delivery system(Diclemante etal,1991).

Besides, the IRS delivery system that engages in total quality management must have mechanisms built into the model management structures at all levels which help anticipate the implication of new ideas for the maintenance and improvement of quality of SOPs in the IRS system. Initiatives likewise, need to be reviewed with explicit goals of determining the SOP capacity building and other support resources needed for the SOPs to deliver quality IRS services, given the new circumstances. Information system must provide supervisors and leaders with feedback on whether the initiatives taken have been the desired effects on quality of IRS performance and being very important (Norashikin Hussein,2004).

Promoting SOPs behavior change to improve quality of IRS Delivery Practice:

Good behavior has been the last refuge of mediocrity (Henry S. Haskins,2008). Further, human behavior flows from three main sources: desire, emotion and knowledge. The improved quality of IRS practice has been concerned with the performance of IRS teams and SOPs.Competence(what SOPs know and how to do) has not always reflected in IRS practice performance (what they actually do) in a given public health situation in order to assist SOPs improve the quality of their IRS practice, ways must be found to help them change their IRS practice behavior or performance (Prochaska etal,1992). However, it has to be known that changing the human behavior has always been difficult(Prochaska & Diclemate,1988,1992). Their studies showed how people go about changing bad habits and guide the thinking about the necessary and sufficient conditions for any complex behavior change.

The stages of SOPs behavior change towards improved quality of IRS performance:

Prockaska's model posits that behavior change usually occurs gradually as the person moves through five developmental stages of motivational readiness or intuition to change. Progress has not always been in a direct linear fashion as a person may revert to an earlier stage before entering the next stage. During the pre-contemplation stage the person is unaware but not considering change and displays no interest in learning about how to change(Prochaska,1988).During the contemplation stage, the SOP has been considering a behavior change towards good attitude to IRS processes and might actively seek out more information about the advantages and disadvantages of the change for improved quality of IRS performance. In this stage, the SOP has been more aware of performance difficulties but ambivalent about the costs and benefits of current behavior. Further, during the preparation or decision-making stage, the SOP actively makes plans to change and takes some steps towards the action for example attempts to gain as much information as possible that will help him/her behavior and the environment in order to make the change (Proschaska etal.,1992).

Finally, maintenance stage has reached and the SOP has been quite comfortable in the new behavior but might still have to guard against reverting to the old behavior that also the supervisors must always observe this before re-occurrence. Thus,environmental support for the change remains very important in the maintenance phase and supervisors must remain on the lookout. Sustaining behavior change has been found to be very difficult if the environment provides cues that trigger the old behavior (Michael R,2018).

Processes to effect change of behavior by SOPs:

In order to help SOPs with change of behavior, one must determine which stage they currently were, in use of tools /strategies congruent with that stage and assist them in moving onto subsequent stages.An early interest to change must be created by IRS teams.The IRS activities and events that support consciousness raising,environment re-evaluation and exploration of feeling regarding change are needed to predispose the SOP to contemplate change. The belief that SOPs could and should change have to be developed and opportunities that enable SOP for self-evaluation must move the SOP from contemplation into actively preparing for change.

Importantly, factors that provide an impetus to action include SOPs' confidence in their ability to change behavior, making the environment conducive to and accepting change. Action occurs when the SOPs have the opportunity to learn the new behavior. Thus, if we wish SOPs to change their behavior for achieving quality of spray, we first need

to consider ways to motivate them in changing IRS campaign that aim to improve the quality of spray in the field. We must pay attention to the extent to which SOPs already think they need to change in order to tailor IRS for impact to better assist them in changing. It has been found important to facilitate change by such means as rehearsal reminders and to maintain the change by providing support in the environment in which the expected behavior has to be used (Diclamente, 1992).

Developing activities that support the behavior change process:

Green et al., (1980) posited the PRECEDE (Predisposing, Reinforcing and Enabling Causes in Educational Diagnosis and Evaluation Model) which suggests that some strategies predispose front liners to behavior change such as dissemination of new information. Supervisors and team leaders must create a good working environment for SOPs through activities that best succeed in changing SOPs performance and IRS service delivery outcomes that create an environment for change and also use IRS practice-enabling strategies.

The importance of environmental factors for SOP behavior change:

The importance of environmental factors in creating readiness for behavior change and facilitating change has been reviewed in the literature hereafter. Wergin et al., (2012) noted that there have been other influences on IRS practice such as facilities and equipment, interaction with continuing education contents have been found to affect performance. Bayley (1998) indicated that reinforcement in the social environment has been needed for achieving the desired behavior change. Thus, to promote change in the performance of SOPs in the field, there have been strategies that focus on the environment in which the SOPs practice IRS must be considered.

However, SOP behavior has been influenced by the immediate environment and interactions with HH owners, supervisors or team leaders and peers in that local operational environment. However, the enabling and reinforcing features could be built into this environment. It has been more difficult to influence the personal environment of the SOP but we must be aware that this also influences the behavior. The capacity building environment consists of the way the capacity building system has been structured with regard to basic, advanced and continuing education/learning for SOPs (Allen C & Brownstein N, 2016).

Furthermore, the environment helps shape the kind of learning opportunities that have been provided by the IRS management teams. The professional environment consists of fellow SOPs and the DHO (District Operational Committee), RHC and Health post that have to give SOPs certificates/awards for their individual performance. The professional environment often alerts the SOP to be new and important in the field of IRS practice and tries to promote the SOP profession. It might assist the DHMT in changing the behavior by sponsoring continuing capacity building activities for campaign team. The DHMT must offer motivational certificates or awards to SOPs and place limits with sanctions on SOP behavior (Kooma E H, 2020).

However, the community environment determines how SOPs are perceived in the wider community including the local decision makers who own the IRS services and as opinion leaders that help shape the environment. The administrative environment that determines the kind of rules and regulations that govern aspects of SOP behavior, SOP field working conditions, health promotion activities and the community (Veyera J, Mwilwauke W. I, 2020). This environment creates a broad set of incentives and sanctions for SOPs and makes them accountable for their action during the IRS campaign. The administrative environment (Team leader, supervisors, community executive committee) has been created by structures, processes at each of the levels.

Table 2:- Showing multiple environments that influences SOP Behavior during the campaign process.

Type of Environment	SOP influencers for quality of IRS Performance
Immediate environment	SOP interaction with HH owners and IRS teams, Team leaders, peers and supervisors
Personal environment	IRS teams, NHCs, community executive committees with meaningful relationships with SOPs, personal preference and values, etc.
Educational environment	The opportunities for the SOP's capacity building that exists and the planned continuing capacity building and other field learning opportunities that are both formal and informal
Professional environment	DHMT/RHC, SOPs, IRS teams, or credentialing systems and their guidelines

Community environment	How the SOP is perceived in the wider community & in the media, during meetings and among opinion leaders and decision makers in the entire PHC health care system
Administrative environment	Guidelines, standard operating procedures, laws that govern SOP behavior, field working conditions and guidelines, community capacity building, available written motivational actions/incentives
Social-cultural environment	The traditions, values, norms and culture of each particular community
Economic environment	The history of prevailing survival and economic conditions in the community especially as they affect IRS campaign, SOPs operations [Nchelela, Fikubala Harvesting etc.]
Political environment	The dominant ideologies, political structures, interferences etc. that set limits on types of political actions that are acceptable for Quality of IRS performance

Source: Coles E, (2020).

Strategies for promoting SOP behavior change:

The individual SOP behavior change could be facilitated by the predisposing conditions and events that help develop an understanding of the need for change and which provide information about the different opinions. The common strategies that influence SOPs to modify their behavior have been: capacity building learning materials that alert the SOP to the new development while implementing IRS in the communities, the use of printed materials by SOPs alone has rarely led to improvements in their performance (Allen C & Brownstein N, 2016).

Importantly, capacity building materials for the SOPs are better seen as part of a package of learning activities and materials that could assist SOPs in improving the quality of IRS performance. It has been important to make explicit efforts to determine IRS practice needs or facilitate IRS practice change (Davies, Thomson, et al., 1992 and 1995, Oxman and Thomson et al., 1995). However, such strategies alone are not effective in changing SOP personal behavior although knowledge of an area of IRS practice has been improved. Such studies note that the addition of other strategies like written materials or instruments relevant to IRS practice problems have been more likely to result in some service delivery behavior change. Capacity building, meetings on the job seminars, monitoring and supervisory visits have been useful in alerting the SOP about changes that are occurring (Donabedian A, 1992).

In addition, outreach visits, which are also known as capacity detailing and mentoring have shown to be effective in changing SOP's approach to a specific type of HH owner's or IRS problem. The supervisor and the IRS team or the team leaders conducting the out-reach visits spend considerable time tailoring the information provided to the specific needs of the individual SOPs. In some cases, the information given might include feedback on the SOP's performance.

Further, the improvement in prescribing behavior, IRS and the general IRS management teams have been reported in the community studies using out-reach visits to mentor field teams. Such visits are quite limited in actual use as they have been seen as having large start-up costs and considering continuing costs. Because SOPs often turn to respected fellow SOPs to ask for advice about IRS problems, researchers have tried to identify SOPs in a given community that are considered to be credible. Such individuals known as opinion leaders, are then provided with the latest information and support to incorporate into their IRS practices.

The spillover of this strategy to improve the quality of IRS for performance of others in the community has been assessed in several trials. The observed effects on quality of IRS performance are not uniform; they can be substantial or insignificant (Davis, Thomson, Oxman and Hayes, 1995). Rogers (1983) suggested that opinion leaders or members of the Community Executive Committee are effective because they permit colleagues to observe the outcomes of a particular innovation (the model) in an atmosphere conducive to its adoption on community basis. In reality, IRS practice guidelines must be adopted only after local discussion and consensus has created a sense of ownership of the guidelines and commitment to their user needs to develop. Therefore, self-assessment tool could assist the individual in reviewing their current IRS practice and identifying learning needs. Self-assessment could be voluntary and informal or structured as compulsory and formal (e.g. preparatory to or part of a career/performance review).

However, self-assessment has been seen as an important predisposing strategy which might help as a person move from the contemplative stage towards action when it has been coupled with strategies that enable behavior change. There have been reported predisposing strategies that have been more likely to have a positive impact on quality of IRS service delivery. Therefore, the effectiveness of several types of enabling tools in changing SOP IRS practice behavior has been evaluated.

In addition, it has been found that providing opportunities to rehearse new skills within the context of continuing capacity building event has shown to produce positive results (Kottke, Brekke, Stolbsg & Hughes, 1989). IRS quality guidelines have been systematically developed as IRS performance statement to assist practitioner decisions about appropriate IRS service delivery for specific IRS circumstances (Field & Lohr, 1990). There must be a sense of ownership of the guidelines by the SOP asked to implement them to improve the chances that they have been adopted. Guidelines have been generally doomed to failure as a quality improvement strategy when (i) seen as irrelevant to the SOP's practice (ii) produced by experts who have no understanding of the local situation and (iii) distributed in an impersonal way with no reminder system or feedback to assist the SOP in developing compliance with them.

Service Maps and IRS practice algorithms:

Reminders to perform a task (such as mixing and quality of the spray swathes on the walls) are developed from widely disseminated practice guidelines (Davis et al., 1992; Oxman, et al., 1995). Many enabling quality strategies are based on the use of IRS practice guidelines. This category describes situations where information has been sought directly from the HHs (and given to the SOP) or information has been given directly to the HH owners who then mentions it to the SOP (e.g. the capacity building materials or reminder letters for quality or IRS performance to SOPs). HH owners-mediated strategies rely on HHs to suggest new approaches to IRS service personnel or to remind them to do something seen as beneficial.

Strategies for reinforcing change in SOP Behavior:

In order to move SOPs into the contemplative stage (e.g. by alerting the SOP to changes in IRS practices, creating a perceived need for change and ownership of the change) a positive climate for examining IRS practices must be created and the necessary tools provided to help them make the changes for the success of the new model. The SOP attempts to change must be positively rewarded and the environment must continue to support the change approaches. Maintenance of SOP behavior change requires immediate environments that support new behavior and that do not have cues to repeating the old behavior. There have been a host of environmental (professional, community and administrative) activities that could be posited as likely to help reinforcement or extinguish new SOP behavior.

Likewise, the audit strategy of IRS activities involves chats by a peer SOP/ team leader or supervisor to provide feedback on IRS spray performance to the SOP audited. It has been found that the audit criteria must be explicit and have been agreed upon in advance (Al-Khaddash H, 2013). The SOP might receive only the general feedback or specific feedback. It has been found that not only the feedback on his/ her performance but also the information about the mean (variation) in the group audited (performance relative to others) or information about the expected standard of service delivery (absolute criterion). However, there have been also conflicting evidence of the effectiveness of the audit procedures with feedback in changing the IRS team behavior. It has been likely to be a function and how soon the feedback has been provided, how specific it has a function of how soon the feedback has been provided and how specific it has been and perceived (help versus threatening) by the IRS team.

Spray Operator Peer Review for Quality of IRS performance:

Identically, peer review has been seen as a type of quality audit and feedback mechanism among fellow SOPs that involves using SOP peers to audit IRS new model practices. Whereas, the SOP has to be asked to complete a questionnaire about the IRS practice before hand to ensure the right type of fellow peer has to be chosen (Benshoff J M, 1989). Implicit or explicit criteria could be used to answer one of each of the three questions: was the IRS campaign adequate? Could it be improved? Or was it acceptable? (Brook, Mc Glymn and MacCleary, 1996). The SOP might be interviewed about the management of spraying some houses (often selected either randomly or in a preset way, for example the recent sprayed or unsprayed houses due to refusals). Again, how the peer review has been carried out and the consequences to the SOP of the review process that could explain the large variation or approach method that could affect the IRS practice performance (MC Clauley et al., 1990; Brook, 1973).

Multifaceted strategies for the desired SOP's Behavior Outcome:

WHO Expert Committee on Continuing Education (1990) stressed that continuing capacity building must be designed to meet the learning needs of the IRS teams including the community and SOPs. There has been a need to involve SOPs in identifying and planning for the capacity building experience that include the development and implementation of tools to facilitate learning to take place (for example a manual/job aid to which the SOP can later refer). Capacity building must be seen to be an important part of the IRS work environment rather than as an add-on, or after hours' task that has not been rewarded(Oxman et al.,1995).

In like manner, SOPs have to liaise among themselves once in a while say 3 or 4 times in a week, meet and discuss IRS campaign issues encountered in the days' field practices. They further meet the Community Executive Committee and gather at places of their own choice to share and rectify the experienced issues. The SOPs doing well have to be rewarded with receipts of visit credits by supervising IRS teams and the DHMT and offer letters of acknowledging satisfaction. The SOPs preliminary evaluation have to indicate that SOPs made many IRS practice changes based on the IRS issue discussions. Multi-faceted strategies have been more likely to lead to change in IRS performance for impact.

Be that as it may, evidence has mounted that using a multifaceted approach incorporates a wide range of consciousness-raising among SOPs acceptance taking interventions to positive heights (such as printed Job AIDs, materials and capacity building workshops (Kipping R.R.,2012). The contact meetings and IRS practices as enabling strategies (such as SOP guidelines, meetings, standards guidelines and reminders) as well as support for the change reinforce the SOP behavior. Subsequently this results in a consistent positive change in SOP professional performance.

IRS spray team's strategies to improve quality of IRS practice-QIT:

The development of the District IRS operational committee, RS teams including SOPs and community executive committees as IRS quality structures have been usually part of a larger strategic planning initiative by the DHMT to improve IRS quality of spray performance for each district. A climate of trust and a need for change has to be created (Danes et al.,1989). Short quality improvement capacity building courses have to be offered for general skills(such as IRS team work functioning, team building and IRS campaign leadership, and IRS quality control and improvement) and specific skills (how to move the IRS teams towards consensus, how to do IRS flow charts (Heron J,1993).

In the light of the above, members of the IRS team have to be taught how to brain storm and use a wide variety of IRS tools to examine and monitor the quality of the spray campaign services they provide. These capacity building courses have to be offered initially on a "need to know" basis. The IRS teams might learn how to find bench marks (IRS performance standards external to the DHMT) to which they aspire (WHO,2007). IRS teams might want to do a good IRS performance job and improve the service performance and that IRS program could always be improved (Murray et al.,2000). It has been found that quality improvement works on the premise that processes rather than the teams could get in the way of IRS quality performance. It has been assumed that IRS team building and IRS team work skills could be found in the district health management delivery of services (Hammer W.C et al.,1997).

Quality improvement include brain storming, use of management delivery and paretocharts, cause –effect diagrams and options matrix. The information gathered must be presented to the IRS team which determines what action(s) they would take on the basis of the information and then continues to monitor and obtain feedback about this action that affect quality of IRS performance. The Plan-Do-Check-Act (PDCA) cycle is used to identify and solve IRS problems. Successful IRS Q.I have clear goals, collective environment in which team members know what to expect and how to accomplish tasks and effective IRS leadership (Juran,1889). The teams must have recognition from the district health leadership, organized and educated (Laffel and Blunenthal,1986; Berwick et al.,1990; Burus, Denton et al.,1992).

Improvement of Community Based Indoor Residual Spraying Deliver Model:

IRS teams provide suggestions to improve the IRS quality of services and the success of quality could be crucial to IRS performance success or failure (Qvretreit J,1992). However, if no action has been undertaken and the way the action has been perceived by the DHMT and IRS team leaders and teams could be crucial to quality of IRS performance success or failure. The effectiveness of the IRS quality teams depends upon the quality of IRS team

skills of the District Operational Committee members, the IRS team itself, the SOPs and the DHMT leadership and the climate of management of the district health services (Qvretveit J,2004).

In addition, the District Operational Committee must review the suggestions or recommendations as to whether Job AIDs must be used and how they have to be deployed and what changes if any are needed to adapt them to local conditions as seen fit by the frontliners. This has been found to develop a sense of ownership of these enabling tools that create a climate in which they are more likely to be accepted. On-the Job-training-a wider variety of approaches have to be used to help IRS teams gain more skills on the IRS campaign. These include SOPs, peer supervision or simulations on the structures and management of house hold owners. To gain new IRS team skills through apprenticeship, coaching, mentoring and participation in quality improvement teams, has been usually closely linked to teaching the skill sets needed for the IRS job.

Out-come measurement and Performance review:

The IRS process of performance review accompanied by an interview that focuses on work activities and learning needs, could also provide an impetus to staff and SOP learning. SOP self-assessment and IRS support supervision assessment could result in the development of SOP self-development plan which could include a range of IRS performance activities. There has been a need to uncover or identify the quality of IRS performance outcome (Gigel and Jones,1990). The quality of IRS performance indicators must be shared with SOPs and the community have to be reliable, valid, measurable, specific and relevant (Katz and Green,1992). No single quality of IRSperformance outcome measure must satisfy all community audiences. The example of outcomes measured include the status of morbidity and mortality owners` satisfaction, equipment functional status and perceived IRS performance status for improved quality of life for a particular community.

The information on such outcomes could be built into the malaria information systems of the IRS performance collected periodically or collected for the purpose of quality decision making (e.g. the information needs identified by QI team). Difficulty with tracking the spray able structures and rooms must inhibit the collection of long-term information regarding IRS performance out comes. Sometimes adverse outcomes are considered sentinel events and flagged for immediate review (e.g. the death of an SOP who become hospitalized with a none threatening condition).

Total Quality Management:

The total quality management of IRS performance has three components: Firstly, IRS quality improvement(Blumenthal and Scheck,1995). Secondly, the total management could encompass all or most of the other strategies including good strategic planning that has been facilitated by the availability of high IRS quality information system to guide IRS performance actions in all aspects of IRS campaign activities. Thirdly, the IRS TQ management help create a climate which both predisposes SOPs to engage in behavior that improves the IRS service delivery for impact(Veyera J. Mwilwauke W.I,2020).The IRS campaign that hascreated, managed and utilized high IRS quality information to guide IRS team`s actions has been referred to as "Learning IRS fraternity" for management of quality. The capacity building of levels must prepare SOPs to meet the requirement of SOPs quality spraying performance.

Development of public complaints, disputes, resolution and SOP disciplinary process:

There are many mechanisms to deal with complaints by members of the public about the behavior of SOPs towards them. Often public accountability has been perceived to be lacking (Cohen& Raines,1980). There have been factors which create this perception that include conflict of interest among the people about whom the complaint process exists. More often, the public might not be informed about how IRS teams operate. Complaints about the SOPs behavior on spray swathes and mosquitoes not dying in case of non-knock down chemicals have an impact on the way the community perceives the campaign, if not well informed. However, if they do complain, they might have been not informed of the progress of investigations into their initial concerns, the decision made about the concerns or what actions were taken when legitimate and valid serious concerns had been judged (Finichio et al.,1995).

Further, it has to be known that complaints could take several years to be resolved as they remain in memory (Cohen& Raines,1994). Public complaints must be structured including dispute resolution and disciplinary processes so that both SOPs, IRS teams and the public are satisfied with the way the complaints are handled. Complaint mechanisms have to be in place that address legitimate concerns of the public about complaints process. The Sops

and IRS teams must have trust that the complaint process be fair and that provides them with the opportunity to defend their actions before a decision has been reached.

Feedback to SOPs about IRS campaign changes in standards of IRS practice, practice activities that often result in complaints and the outcomes of disciplinary hearings have been an important part of the professional environment that promote IRS quality improvement. The District Operational Committee, Community Executive Committee & Mobilisers roles have to facilitate and educate HH owners about what to expect from IRS teams and SOPs and how to complain when the expectations are not met. The broader mandate aims to raise public awareness of the committees' roles and confidence that complaints from the public about IRS could be heard.

The behavior change process to achieve quality of IRS performance:

It has been found important for District Operational Committee to develop a vision of improved quality assurance, quality of courses and make suggestions for improvements (PASCAP/PAHO,1994). In addition, the committee has to further brain storm quality issues and develop priorities (PASCAP/PAHO, 1994). Possible improvement alternatives must be identified by brain storming from other similar attempts by quality experts and have to review great processes. The committee could now develop a change strategy and finally develop the quality implementation plan (McCone KeKosso,1994). The committee and people with expertise in the area of concern must review available information from other districts, examine evidence about what works and not working (NIHCE,2007). The attention has to be focused on any process that has not been working well and needs to be altered. Individual members of the IRS team or committee have not to be blamed (Berwick ,1989, Ernst and Young, 1991, The Price Water house change Integration Team, 1995, Car Hard and Trahan,1996).

The IRS teams and SOPs must be assisted to excel in the implementation of quality IRS activities (Berwick ,1990, Goucher and Coffee, 1993). The committee must have to choose or identify potential champions from the supervisors to mentor SOPs for the intended improvement for quality of IRS spray performance. These champions must be interested in change and could serve as mentors, building support for change and serving as role model during the change. Strategies for change must include enabling activities and must provide for feedback on the results of the changes. The IRS quality plan must always be communicated (Gigel and Jones,1990).

The MEO and IRS manager must provide quality leadership to ensure that relevant issues are considered. Recognition, positive feedback and positive behavior for changing must also be considered (Car, Hard and Trahan 1996) as well as how implementation has to be monitored and evaluated. Partnership has to be developed with the Community Executive Committees that represent the community and the technical District Operational Committees and DHMTS in providing enabling activities such as educational materials, supplementary resources and events.

Table 3:- Showing guideline for the Implementation and Management of Quality of IRS performance changes.

Develop plan to monitor the IRS change process	Set up process for detecting problems with implementation (Need for meetings with SOPs in the field at regular intervals as an indicator of progress)	How often do we need information to monitor the introduction of this change? How can we develop information to fine-tune this change?
Develop plan to evaluate the impact of the change	Operationally define how SOPs will provide feedback on the effects of changes	What are the most important questions to answer about this change? How can we develop information to fine tune this change?
Implement change	Communicate clearly and simply to IRS teams to increase support for the changes and allay concerns of affected workers. Provide leadership, obtain feedback and make minor adjustments as necessary	What can I do to enable and support the changes? Do the IRS Teams &SOPs have enough guidance, support reminders, new knowledge and skills needed to accomplish the change?
Fine tune change	Monitor change and make further modifications if necessary	Is this working as planned? Have the teams forgotten to do something that is impending change?
Evaluate change	Determine whether the change occurred as planned; check whether the indicators chosen move in the direction of great quality	How well has this intervention worked? What changes in indicators of quality do we see? Are there any unanticipated outcomes of the change

Consolidate change	Make changes in guidelines as standard operating procedures etc. needed to follow the change to continue	What further steps are needed to sustain the change? Are changes required in the guidelines, procedures, checklists etc.? How can I ensure these changes are made?
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Source: Weger D.E.E.J(2018).

It has been found important to teach SOPs how to interpret indicators that monitor changes so that they could receive adequate feedback about the change(Gauder and Coffee,1993). The SOPs and HH owners must be able to see the rewards of changing. There have been eight Kotters' step to create change: IRS teams must establish a sense of urgency; Create the guiding coalition (form a team of interested parties); Development of a vision and strategy; Promote communication of the IRS vision; Empowering actions (enable change); Generation of short term wins (make prohibitive quality changes that are observed); Consolidation of gains and production of more and measured changes and institutionalization (sustenance) of approaches.

In addition, it has been found important to start with small changes and achieve success than to attempt complex changes that have less chance of success. Different viewpoints should be represented in the evaluation of quality performance questions posed so that consensus could emerge about longer-term guidelines in the area. Change has been found to require careful planning and good leadership(Batalden and Nolan,1994, Kotter,1996; Juran,1989; Ernst and Young Quality Improvement,1991).

The IRS manager must provide leadership by orchestrating the quality for IRS performance change process. He must get first the attention of key people and help work with them to develop ownership of the need for improvement in the quality of IRS campaign systems. The team must communicate this message to gain wider acceptance of the need for change for IRS impact. The managers and committees must show continuous commitment and leadership in order to create and maintain the urgency of the need for quality and the momentum for change. Further, the teams and committees must work through the planning process to ensure that it has included activities and materials that enable change and that changes could be reinforced and sustained by changes in the implementation guidelines (Norashikin Hussein,20014).

Subsequently, safe guards must be in place that would monitor the change process and change could be reinforced when indicators of performance are monitored and provide feedback to the IRS teams, SOPs and HH owners. Behavior change requires continuous, committed and active leadership to succeed to the desired goals. The IRS teams, managers, supervisors should also ensure that the numerous tasks required have been accomplished (Juran,1989; Batalden and Nolan,1994; Carr, Hard and Trahan,1996) and that approach taken to effect the changes has been culturally sensitive. Plenty of opportunities must be provided to learn and practice the new behaviors required and learning Job AIDs must be used (reminders, memory Joggers, such as guidelines etc.).

The commitment to change must be codified in the guidelines(governance) during spray morning briefings and field trips so that they could be maintained overtime(Carr,Hard and Trahan,1996);Roemer,1991). Change requires IRS managers, IRSTeams,SOPs and committees' commitment to ensure that improvement in the new IRS model quality are rewarded and maintained.Changes to improve quality remain very considerably complex in nature (Berwick.D,2004). Their complexity has been influenced by several factors:the number of different types of IRS teams and SOPs involved and the extent of continuous new learning they require; the extent to which other practice activities have been affected;their demands for anew response from the capacity building system or governance changes;the number of parties with astake in the changes planned and the diversity of interest among the parties.

Discussion:-

Every initiative undertaken to improve quality of IRS performance and outcome within the health service delivery system, has its starting point; some understanding of what is meant by "Quality".Quality is not what happens when what you do matches your intentions. It is what happens when what you do matches your customer expectations. Six areas or dimensions of quality require that IRS campaign must be effective; delivering IRS implementation that has been adherent to an evidence based that results in reduced malaria burden for the individuals and communities based on the need; efficient delivering of the IRS campaign in a manner which maximizes financial use and award underutilization and wastage.

In addition, one has to observe equity of access; delivering of IRS implementation that is timely, geographically reasonable and provided in a setting where skills and resources are appropriate to the public health needs and acceptability by HH owners as beneficiaries (Blumenthal and Misheck,1998). This can be achieved by having “Right Supervisors, RightTools and Right Resources”

However, this has to be centered to deliver IRS campaign that takes into account the preferences and aspirations of individual IRS service users and the cultures of their communities. Equitable delivering of IRS campaign has been found not to vary in quality because of personal characteristics such as gender, found not location or socio-economic status. This makes safe delivering of IRS campaign which minimizes malaria risks and harm to the population as users. As a consequence, the IRS campaign needs to engage the whole of primary health services systems that lead responsibilities to rest with team leaders and supervisors.

The IRS campaign implementers must be seen as the whole DHMT, IRS teams, supervisors, committees or individual spray operators. In each case, they have to ideally be committed to broad aims of quality policy framework for the whole health system. Their main concern has ensured that the IRS campaign they provide has the highest possible IRS standards and meets the needs of HH owners, serviceusers, their families and the communities at large. However, improved quality of IRS outcomes has not been delivered by IRS teams and SOPs alone, but by the proactive collaboration of communities. By the same token, families have also been co-providers of appropriate health interventions thus consequently having critical roles and responsibilities in accepting and identifying their own relevant IRS campaign preferences, and in managing their own malaria control interventions with appropriate support from the IRS teams.

The IRS activities need to operate within an appropriate supervisory policy environment for quality of IRS performance and with a proper understanding of HH owner’s need’s and program expectations in order to deliver the best campaign results. Communities and the IRS teams need to influence the overall policy on quality and the way in which IRS campaign services must be instituted to enhance the overall IRS intervention outcomes, Empowered supervision remains a key factor to achieving better results through proactive, and enlightened leaders, supervisors and SOPs.

Supervision:

Good supervision has been a two way process that has been found to support, motivate and enable the development of a good IRS practice for the spray teams(Morrison T,2001).The approach to supervision provides chance for the supervisee and supervisor to reflect on IRS practice and review and prioritize work with Sops, provide guidance and support and identify areas that need development(CWDC,2007).

Further, the benefits of supervision have been the supporting and mentoring of the SOPs to understand the organization of the IRS campaign processes. In addition, supervision ensures the SOP and the IRS teams receive a quality IRS service. If supervision has been well done, communication improves, responsibility becomes shared for achieving quality IRS performance outcomes and SOPs become more motivated and retained . Rates of SOP grievances, sickness and general complaints have to be sorted out during supervisory visits. Good supervision enables setting, agreeing and reviewing the goals and objectives, provide constructive feedback and consistency of IRS patch (Guidelines for the implementation and support supervision,2003).

Besides, self –confidence identifies learning needs and development of possible areas including team working, development of team working and this increases transparency and openness. A SOP has to be clear and know about one’s roles and duties. There have been three “Rs” for an effective supervision system; there must be Rightsupervisors, Right tools,Right resources. It has been important that supervisors are well informed and trained. Refresher training needs must look at them been a major change in the campaign system that requires training such as about the new model (Carol M&Gilbert, M.C,2008).

There has been a need that requires training on support supervision techniques and participatory approach (e.g. field problem identification, problem solving, training communities/committees, time management, two-way communication,coaching, onsite training, mentoring SOPs etc.). There have been identified areas that could be strengthened by supportive supervision, and will therefore require supervisors training? The supervisor has to be assisted with the right tools to standardize the supervision system; supervisory checklist, learning materials and Job AIDs to be used by SOPs during supervisory visits (Taylor P. &P. Clarke,2008).

However, the priority areas in the checklist must be observed and recorded by the supervisor and signed by the supervisee for verification of the visit. The information collected must help the supervisor to decide what correctable action could be taken during the visit and what issues need to be followed up for action in the longer and immediate term. In addition, the checklist must not deter the supervisor from recording and following up on other critical issues that he/she has observed but that have not been included in the checklist. Three 'Ss' for a good quality checklist are: Short; include only priority areas to observe and record during supportive supervision visits; Specific items must be specific with details on what exactly needs to be observed. Simple; additional observation or comments must be easy to complete and flexible to record (Donabedian A, 1988).

Supervision has been the act of watching an SOP behavior or spraying activity and making certain that everything about IRS implementation process has been done correctly and safely and that supervision goes beyond just reporting back but requires that mistakes are corrected there and then. In addition, IRS supervision must be conducted to ensure spray operations are implemented as planned and quality of spray with primary focus on the adequate household preparation, correct insecticide mixing, correct spray techniques, depositing right amount of insecticides. Further, there has been a need to identify and address problems early and gather information to plan future spray cycles (Meath M, 2019).

The use of checklists for information gathering enhances the validity and quality of supervision and the quality of IRS performance. Supervision checklist offer the possibility of verification and instill a discipline of higher performance and provide a cognitive net; that catch mental flaws we all have of memory, attention and thoroughness. Several checklists have been in use such including those concerned with environmental compliance and operations and these are: Home owner preparation and spray operator performance, spray operator morning mobilization and transport vehicle inspection, end day clean-up and store keeper performance. There has been a need for the team leader form and data collection verification tools for monitoring and evaluation of activities. The homeowner preparation checklist ensures that all spray able surfaces are left free of any items that may block insecticides from reaching the surfaces and the safety of residents, domestic areas and environment.

The DOS has been designed to ensure adherence to the key factors that determine spray quality –insecticide, mixing – distance of the nozzle tip from the spray surfaces, speed (Rhythm); swathe (75cm) overlap (5cm). DOS has been found useful ensuring that the safety of spray operations and environmental protection are maintained. For the spray quality to succeed, all movable items must be removed; items must not be left in rooms and not close to, leaning or standing against walls; picture frames and others must not be left hanging on the walls and must not be left to obstruct SOP from proper treating of the walls.

Supervision has been recorded the act of watching a SOP behavior or spraying activity and making certain that everything about IRS implementation process has been done correctly and safely and supervision goes beyond just reporting back but requires that mistakes are corrected IRS supervision must be conducted to ensure spray operations are implemented as planned and quality of spray with primary focused on the adequate household preparatory correct insecticides mixing , correct spray technic depositing right amount of insecticides. They have been a need to identify and address problems early and gather information to plan for future spraying also. The use of checklists for information gathering enhances the quality of supervision and quality of IRS performance. Supervision checklists offer the possibility of identifying spraying gaps and SOP discipline of higher performance and provision of a cognitive net. Several checklists have been in use such as those concerned with environmental compliance and operations and these are; home owner preparation and spray operator performance (Jane B, 2019).

The houses must be cleared of items and moveable items must be adequately covered / protected from insecticide droplets. All rooms must be allowed by HH owners to be sprayed. Importantly, the supervisor must use DOS to ensure the SOP are in compliance with correct wearing of the spray pump using the shoulder strap(s) and ensure that there has been adequate lighting before starting to apply insecticides. A free hand must always be used to hold the flashlight to light the work area in cases of dark rooms. The tip of the nozzle of a spray must be 45cm away from the wall when handling the handle horizontally to the wall (middle position).

By beginning, there has been a need to start spraying at the top of the wall (top position) moving the arm in a right position through the 'middle position' to the 'bottom position'. The correct speed must be maintained when spraying. As SOPs are trained, they must cover 2 meters of wall surface. After covering the first swathe, SOP must take a step to the right and resume spraying from the bottom to the top and must ensure he/she makes a 5cm overlap

with each swath. The SOP must always move towards the right of the surface to be sprayed. The spray pump must always be shaken vigorously after every 5 swathes.

Table:- Showing quality and safety strategies that strengthen supervision for quality of IRS performance.
Indoor Residual Spraying Campaign

Directly Observed Spray Form (DOS Form)

Date-----Province-----District-----Catchment area-----Location-----

Name of Team Leader-----Code of TL-----

Name of SOP	Code of SOP	Insecticide Mixing		Safety			Standard spraying procedures					Contact time to manage Gaps
		Did the SOP mix the insecticide to form a 7.5l solution? (Y/N)	Did the SOP mix with the pump on the plastic sheet? (Y/N)	Is the SOP in full PPE? (Y/N)	Have all belongings, food items, animals, sick persons been removed? (Y/N)	Have all items that cannot be removed been covered with plastic sheet?(Y/N)	There are no leaks from the pumps. If true write "Y". If false write "No"	Is the SOP maintaining the collect speed of spray i.e. 2m of vertical surface in 5 seconds? (Y/N)	Is the SOP spraying with the tip of the nozzle 45cm away from the wall?(Y/N)	Is there a 5cm overlap with each successive swathe? (Y/N)	Is the SOP using a torch to dark rooms?(Y/N)	
e.g Peter	009	0	0	1	0	0	0	1	1	0	1	Signature
John	008	1	0	0	0	0	0	0	1	0	1	Signature

Count "NO" as 1 and "Yes" as 0 when calculating the total

Name of Supervisor-----All Fields: (Y/N)

Name of Data Clerk-----Signature-----Date Data entered-----

Date verified -----

Source: (NMEP/PMI/Vectorlink,2020 IRS campaign approach).

In order to increase the rate of supervision engagement of IRS team workers has been quite a good move where EHTs are in large supply in the districts. Each operation site must have a site supervisor. As consequence, separate the training of the Team Leaders from SOPs and reduce the number of SOPs for the site operations to manageable number of (1:3-5) or lean. A supervision plan must be drawn and be in place with supervisory targets per supervisor. For supervision, one motor bike during supervision and senior IRS team members must be available in the first week of the campaign. There have been some basic factors to consider for impacts and quality of spray campaign: Is the insecticide capable of killing the vector? Does the insecticide have the correct concentration of active ingredients? Has the insecticide been stored under appropriate conditions? Is the insecticide properly mixed? Is the insecticide mixture being sprayed on the surface conducted with the correct technique? Has the recruitment process selected the best hands, who are committed to the spray campaign? Were the spray teams properly trained? Do the spray teams have appropriate and functional equipment to do the work? Is there a mechanism to supervise the spray teams as they spray and are, they given feedback support supervision? Are there mechanisms to ensure that spray operators are not fatigued? Has the target community informed about the interventions? Has the community and the leadership being engaged to ensure ownership of the program (Zambian Open Forum Discussion,2020)

In like manner, there must be committed leadership detailed planning, timely procurement of equipment and supplies, timing of commencement of spray campaign and understanding of the spray season. It has been important also to prioritize supervision and monitoring with the need to resolve field issues and availability of mechanisms to estimate the quality of spray.

Timeliness of IRS Campaign:

When the campaign becomes untimed, concerns arise that the program has been disrupted, distracted, dislocated and disproportionate by various causes and confidence of its effect become doubted by the beneficiaries. The program has to start each day from 7:00hrs to 15:00hrs. Starting time for the campaign every day and appointments with HH owners are very important. Poor time management skills inevitably lead to procrastination; putting important or necessary work until the very last minute. Usually when work has been put off until the last minute usually it remains not been well done as it would have been if one devoted more time to it and this more often compromises quality (Wilson L.M.2020). However, procrastination usually lead to poor productivity when one has been found not to complete tasks in a satisfactory manner. Habitual lateness has been another effect of poor time management skill in IRS campaign.

The habitual lateness could also negatively affect productivity on the IRS campaign and give SOPs a reputation of being less serious or lazy even when that has not been the case. Over extension also has been a problem especially to the Team leaders and supervisors when they take on too much work and do not allocate time in which to complete it. Allocation of rooms for spraying must be determined not to stretch the spray operators so that they reserve energy for the following day. When the team leader delegates duties to SOPs or any other team member, it's usually to save time, increase IRS coverage and strengthen work teams. It has been found that, good IRS team leader knows, however, that this strategy has its disadvantages as well as its advantages.

Inadequate training and capacity building and timeliness:

The IRS teams and SOPs contribute to quality of IRS performance when well trained to perform their jobs according to standard operating procedures. Adequate training has been found to be essential for any program management and could be at any location but must continue with onsite training. At the beginning, in depth training has been very important and the SOPs could learn from the job with intensified supervision. However, if the teams, committees and SOPs are not adequately trained might have difficulty in meeting IRS performance standards while some of the members might be self-motivated. They have to take it upon themselves to learn how to do their assignments better, others might not have this kind of initiative. As a result, they might end up learning by trial and error or by initiating CO-SOPs of varying levels of competency and endangering the community and also having a negative impact to the IRS campaign program (Taylor E.F, GenevaJ, Pelkes D et al., 2013).

Lack of team members & SOPs Development:

The SOPs might never develop the skills necessary to the supervisory positions but could play a major role as peer supervisors (Carroll M. & Gilbert M.C, 2008). Having seasonal workers could be a good idea but could continue investing a lot, year in, year out. It has been found better to build capacity of many SOPs, as one might have a buffer each year. If the SOPs continually learn through morning field seminars and onsite mentoring, they are able to keep the IRS campaign on the cutting edge of the campaign trends. Failure to strongly invest in training could result in a cloistered campaign that have little effect on malaria transmission, let there be continuous learning of SOPs (Taylor P & P Clarke, 2008).

Legal consequences:

As the advancement in IRS campaign been progressing steadily, failure to have adequate training for SOPs does not just impact on them individually, risks could be created for the entire campaign. Mistakes made by SOPs could result in law suits such as poisoning a family from careless arrangement of food stuffs, poor messaging about the exercise and sometimes this might go further to charges of crime negligence (Taylor E, 2014). A poorly trained SOP might fail to uphold basic quality of spray performance leading to serious rebound of malaria and wastage of financial resources (World Bank, 2004). As a consequence, SOPs disclosing of the state of inside of the rooms and what he finds in those rooms while spraying has legal repercussions and the SOP might not have adequate resources to fight a lengthy court battle or with stand multiple investigations. Ensuring that SOPs receive proper training, protects not only the investment in themselves but also the malaria program itself (Laine Petersen, 2019).

Incomplete capacity building Lowers Quality Results:

When IRS managers delegate work, they typically try to identify subordinates or contemporaries who would bring the best attitudes and skills to ensure the IRS job could be done. The IRS managers also try to balance things by spelling out what needs to be done and how to do it. But even with the best laid plans, one always faces the prospect that the work would have not been done properly, or on time. An SOP might meet one's deadline but certain aspects of his/her work do not meet quality of their expectations, or, one might fulfill quality expectations but still fall short of the deadline. This has been always a risk when you delegate work to those who have not been formally trained on how to manage IRS campaign program, or don't have the day-to-day experience as what an IRS manager might bring to the job. The best way to avoid negative outcomes has been to regularly check on IRS progress performance (Heron J, 1993).

Responsiveness must be the essential leadership skill for quality spray campaign:

Being responsive in communication has a very specific, but obvious meaning once one knows what it is. Responsiveness has been absolutely critical for creating better relationships, trust, and rapport with IRS teams during the campaign. Responsiveness in communication has been the degree that what one says, responds clearly and directly to what the other people (IRS teams, SOPs and Supervisors) just said. If one has been responsive, the other person knows you have been paying attention, and care enough about what one is talking about to "stay on that

topic" (Benshoff J.M,1992). The result of conversation has been disjointed and disconnected, with both parties walking away feeling the whole thing was rather pointless, or feeling unhappy with the other person or people affecting the quality of the spray processes.

Recommendations:-

1. The selection of SOPs must be decentralized with technical support at selection and the choice of supervisors must remain objective as well
2. The supervisors must be staff with relevant technical knowledge that have a vision to drive the IRS agenda
3. The number of supervisors per spray teams must be well determined for manageability and quality aspects
4. Deploy two(2) mobilisers per spray team for impact for community mobilization
5. Number of rooms to be sprayed per SOP must be determined and not always remain as per standard as sprayable structure rooms vary. The rooms must be determined or reduced further depending on the structures to be sprayed. This also applies to distances to be covered among structures. The distance to be covered must be short to allow time for cleansing/rinsing of pumps and energy for the following day's work.
6. The curriculum for SOPs and Master Trainers to be revised to incorporate a module on Q.A and Q.I on IRS campaign. Note; relying on standards alone may deceive the campaign as quality is also attached to process of behavior change by bspray teams and spray operators
7. The pumps utilized by SOPs are usually stressed and at times perfection could be compromised, therefore the Supervisor and SOP at each contact time must discuss the status of the pump and be satisfied of its state for quality of IRS performance
8. The IRS teams must be trained in Q.A and Q.I and must always remain as change agents for the process of behavior change for them;supervisors, SOPs and HH owners for quality of IRS performance and good outcome of malaria morbidity for the communities served.
9. Teams to start attempting to utilizeat all costthe Donabedian Model approach for quality assurance for IRS campaign

Conclusion:-

There is a need to evolve IRS organizational and management structures that support the Community-Based IRS Delivery Model design and implementation for quality improvement initiatives and the creationof mechanisms for accountability for quality of IRS performance. However, protocols, guidelines, checklists, standard operating procedures, field forms, Job AIDs and community balanced scored cards were recommended to be used to engender IRSTEams' commitment to quality and provision of a framework that could optimize the quality of IRS performance. Avedis Donabedian provided a solid foundation with his model of the structure-process-outcome in which to think about quality efforts, where his view of structure has to be updated to account for the current interventional tools and IRS management capabilities that drive quality of IRS performance improvement.

We highlighted several key elements of the DHMT(District IRS Operational Committee) that provide an operation definition of structure: Equity, utilization of local CHWs, Community Executive Committee, availability of adequate equipment, strengthenedcommunity health care system,motivational initiatives for SOPs, good state of spray pumps, availability of mobile means forSOPs, communication and performance feedback to the community, availability of reporting forms and adequacy of chemicals, engagement of traditional leaders, increased number of supervisors, capacity building management structures and SOPs in quality of IRS performance, existence of quality assurance mechanisms, pumps preventive maintenance and servicing, field review meetings for identified gaps, provision of protocols,guidelines,utilization of scorecards and information exchange and technology.

Given that quality has to be the cornerstone metric of IRS quality performance, we recommend to begin to adopt the Donabedian model that addresses the challenge of quality of IRS model performance management of CB-IRS Delivery Model perspectives.

Abbreviations:

CB:

IRS Delivery Model: Community-Based Indoor Residual Spraying

CHAs:

Community Health Assistants

CHWs:

Community Health Workers

DHMTs:

District Health Management Teams

DOS:

Directly Observed Supervision

EHOs:

Environmental Health Officer

EHTs:

Environmental Health Technologists

HHs:

House Holds

NHCs:

Neighborhood Committees

NICE:

National Institute for CareExcellence

PAHOP:

An American Health Organization

PASCAP:

P-Perfection, A-Angel,S-Share,C-Charm,A-Activities,P-Past-times

PHC:

Primary Health Care

QA:

Quality Assurance

QI:

Quantity Improvement

RHC:

Rural Health Centre

SOPs:

Spray Operators

TQM:

Total Quality Management

WHO:

World Health Organization

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Author Information[Affiliations]

Dr. Emmanuel HakwiaKooma holds a Doctor of Philosophy(PhD) in Public Health Practice from the University of Central Nicaragua and Masters of Public Health (International Health) from the National Public Health Institute(NPHI), Japan and Saitama. He also holds a Doctor of Business Administration(DBA) from AIU and an MBA from ESAMI. His first Degree is a Bsc in Public Health(Epidemiology).E.H Kooma has a Diploma in Environmental Health Technology and Diplomas in Environmental Health and Meat Hygiene & Other Foods and a Higher Diploma in District Health Management Course(DHMC). He is currently working as a Vector Control Specialist for the National Malaria Elimination Program-Zambia. He has vast experience in public health practice.

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