



## Fostering interest in research: evaluation of an introductory research seminar at hospitals in rural Rwanda

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<http://dx.doi.org/10.5588/pha.14.0093>

**Settings:** Partners In Health Rwanda, in collaboration with the Ministry of Health, leads a multipronged approach to develop research capacity among health workers, particularly in rural areas.

**Objectives:** To describe the characteristics of participants and to assess the impact of an introductory research seminar series in three district hospitals in rural Rwanda.

**Design:** This was a retrospective cohort study of seminar participants. Data were sourced from personnel records, assessment sheets and feedback forms.

**Results:** A total of 126 participants, including 70 (56%) clinical and 56 (44%) non-clinical staff, attended the research seminar series; 61 (48%) received certification. Among those certified, the median assessment score on assignments was 79%. Participants read significantly more articles at 6 and 12 months (median 2 and 4 respectively, compared to 1 at baseline,  $P < 0.01$ ). There was also a significant increase ( $P \leq 0.05$ ) in self-reported involvement in research studies (28%, baseline; 59%, 12 months) and attendance at other research training (36%, baseline; 65%, 12 months).

**Conclusion:** The introductory research seminar series provided an important opportunity for engagement in research among clinical and non-clinical staff. Such an activity is a key component of a comprehensive research capacity building programme at rural sites, and serves as an entry point for more advanced research training.

The 2013 World Health Report highlighted the need for health workers in low- and middle-income countries to be both producers and consumers of health research, and called for the expansion of research capacity beyond academia and into the public sector.<sup>1</sup> Although considerable investment has been made globally to train health workers in research, few of these efforts have reported on program output. The limited existing publications on research capacity building efforts from sub-Saharan Africa in particular focus on activities aimed at developing specific skills such as data analysis and protocol and/or paper writing.<sup>2–10</sup>

A collaborative priority between the Rwanda Ministry of Health (MOH) and Partners In Health (PIH), a non-governmental organisation working in Rwanda since 2005, is to develop research capacity among public sector health workers, particularly in rural areas. To that end, PIH leads a research capacity building process at sites across three MOH health districts, with the following three primary aims: 1) increasing con-

sumption of research literature among health workers; 2) improving specific research skills; and 3) building research leadership. These activities have been coupled with efforts to create research infrastructure and opportunities for health workers to conduct research projects, creating a comprehensive and inclusive environment for research.

This paper focuses on one activity in the PIH research capacity building programme, an introductory research seminar series, which strives to develop a foundation and interest in research among health workers in Rwanda. Not all health workers will produce research. However, research consumption at all levels is critical to understanding the relevance of research, enabling research implementation, and translating findings into policy and practice.<sup>11–13</sup>

This study aimed to identify the characteristics of participants successfully completing the research seminar series and to assess the impact of this training on interest and participation in research among those who successfully completed the training.

### METHODS

#### Study setting and population

Rwanda is a small sub-Saharan African country with approximately 10.5 million people.<sup>14</sup> There are 40 public district hospitals in the country, managed by teams of hospital administrative staff, doctors, nurses and support staff.<sup>15</sup> Human resource numbers and capacity in these hospitals are constrained, and few opportunities exist for professional development. This retrospective cohort study was conducted at the three PIH-supported public district hospitals in rural Rwanda, two in the Eastern Province (Rwinkwavu and Kirehe Hospitals) and one in the Northern Province (Butaro Hospital). All participants enrolled in an introductory research seminar series, which ran from September 2012 to July 2013, were included in this study.

#### Research seminars

MOH and PIH participants were selected by hospital medical directors and PIH district directors, respectively, and included clinical and non-clinical staff. Selection was based on known participant interest in research or the priority of PIH or MOH for the participant to have increased research knowledge. Four seminar series ran in parallel—one conducted at each district hospital and one additional series at Rwinkwavu Hospital for cross-site PIH staff (those based in Rwinkwavu who travel between all three

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#### KEY WORDS

operational research; SORT IT; research capacity; capacity building

Received 10 September 2014

Accepted 12 November 2014

PHA2014;4(4):271–275  
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**TABLE 1** Criteria for certification, assessment of participant understanding of research article content and measures of changes in research participation in an introductory research seminar series offered in three rural district hospitals, Rwanda, 2012–2013

Objectives	Criteria
Successful completion and certification	Attendance at 8 or more (of 10) sessions and completion of at least 8 (of 9) homework assignments; there was no assignment for the introductory session Participants unable to attend planned sessions were offered the option of make-up assignments
Understanding of research article content through monthly assessment	After a given seminar session, a new article related to the same research topic was given as homework Understanding was assessed using seven multiple-choice questions and an open-ended question The average grade across all assignments was reported; all questions were scored for a total of 100 points
Reading of articles	At baseline, 6 months and 12 months, participants provided a self-report on the average number of articles read per month in the previous 6 months; reported numbers included reading of any articles (as part of or in addition to the training), with article defined as something appearing in a medical or research journal
Involvement in research studies and research training	At baseline, 6 months and 12 months, participants provided a self-report on engagement in a research project and attendance at other research-related training

sites). The series consisted of 10 sessions over an 11-month period (approximately one session per month), each lasting 2–3 h. All sessions were coordinated and delivered primarily by the PIH-Rwanda Research Advisor, a PhD-level biostatistician. The series was developed specifically for delivery in Rwanda by emphasising national and regional articles relating to clinical delivery and health systems. All three sites have access to internet, and research articles are generally available either through Open Access or Hinari. Articles specific for this training were provided directly to the participants.

Reading material, presentations and assignments for each session were standardised across sites. Expected seminar outputs included the understanding of basic aspects of study designs, interpretation of research findings and the gradual building of capacity to critically review medical research articles. Participation in the series was voluntary and no financial compensation was given for attendance. Participating physicians received Continuing Professional Development credits from the Rwanda Medical Council, Kigali, Rwanda. Certification was based on minimum attendance requirements and performance on homework assignments, evaluated using a monthly tool with multiple-choice and open-ended questions. Participants completed routine training assessments at baseline, 6 months and 12 months. The assessments included self-report on research participation, including reading of articles, participation in research studies and participation in additional research training (Table 1).

#### Data and analysis

Data variables related to study objectives were sourced from personnel records, assessment sheets and participant feedback forms. Data were single-entered into EpiData (version 1.4.2.0, EpiData Association, Copenhagen, Denmark). Differences between certified (i.e., completed the minimum requirements to receive the course certificate) and non-certified participants (i.e., those who did not complete the minimum require-

ments) were assessed using Fisher's exact test (categorical variables) and Wilcoxon rank-sum test (continuous variables); relative risks (RRs) and 95% confidence intervals (CIs) are reported. Changes in the number of articles read (Wilcoxon signed-rank test) and research participation (McNemar's test) were compared to baseline at 6 and 12 months, with levels of significance at 5%. Summary of these outcomes excluded individuals who did not complete the assessment or assessment item, and only individuals who completed both baseline and the follow-up (either 6 months or 12 months) were included in the statistical comparisons.

#### Ethics statement

Technical approval was received from the PIH Rwanda Research Committee and the Rwanda National Health Research Committee (Kigali, Rwanda). The latter determined the study as non-human subjects research. This study also met the Médecins Sans Frontières (Geneva, Switzerland) Ethics Review Board criteria for analysis of routinely collected programme data, and the requirements of the Ethics Advisory Group of the International Union Against Tuberculosis and Lung Disease (Paris, France).

## RESULTS

A total of 126 participants enrolled in the seminar series, including 70 (56%) clinical staff (i.e., doctors, nurses, pharmacists) and 56 (44%) non-clinical staff (i.e., programme directors, administrative staff, logistics support) (Table 2). Sixty-one participants (48%) successfully completed the series and received a completion certificate. Individuals from PIH were 70% more likely to receive a certificate than MOH staff (RR 1.7, 95%CI 1.2–2.5). Clinical staff had a 40% lower rate of certification than non-clinical staff (RR 0.6, 95%CI 0.4–0.9). Two thirds of the participants were men. Only 21% of enrolled participants were women; men were marginally more likely to complete the seminar than women (RR 1.6, 95%CI 0.9–2.8).

#### ACKNOWLEDGEMENTS

This research was supported through an operational research course that was jointly developed and run by the Operational Research Unit (LUXOR), Médecins Sans Frontières, Brussels Operational Centre, Luxembourg; the Centre for Operational Research, International Union Against Tuberculosis and Lung Disease (The Union), Paris, France, and The Union South-East Asia Regional Office, New Delhi, India. Additional support for running the course was provided by the Institute for Tropical Medicine, Antwerp, Belgium; the Center for International Health, University of Bergen, Bergen, Norway; the University of Nairobi, Nairobi, Kenya, and Partners In Health, Kigali, Rwanda.

This course is under the umbrella of the World Health Organization (WHO-TDR) SORT IT programme (Structured Operational Research and Training Initiative) for capacity building in low- and middle-income countries.

We acknowledge the participation of the seminar participants in the seminar series and their contribution to this research through the completion of the course evaluation forms. We thank R Van Den Bergh for his support in data analysis.

Funding for the Research Seminar Series course was provided by the PIH-Rwanda Research Department.

Funding for the operational research course was provided by Médecins Sans Frontières Luxembourg, Brussels Operational Centre, Luxembourg, the Bloomberg Philanthropies, New York, NY, USA, and the Department for International Development, London, UK. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Conflicts of interest: none declared.

**TABLE 2** Characteristics and factors associated with completion and certification of an introductory research seminar series in three rural district hospitals, Rwanda, 2012–2013

	Total	Received certificate n (%)	RR (95%CI)	P value
Total	126	61 (48)		
Site				0.15
Kirehe	40	18 (45)	Reference	
Butaro	35	16 (46)	1.0 (0.6–1.7)	
Rwinkwavu (hospital)	28	11 (39)	0.9 (0.5–1.5)	
Rwinkwavu (cross-site)*	23	16 (70)	1.5 (1.0–2.4)	
Sex				0.09
Female	27	9 (33)	Reference	
Male	99	52 (53)	1.6 (0.9–2.8)	
Education level				0.44
Secondary school	5	1 (20)	0.4 (0.1–2.3)	
Two years in university	31	16 (52)	1.0 (0.7–1.5)	
Bachelor degree	83	42 (51)	Reference	
Masters and above	7	2 (29)	0.6 (0.2–1.9)	
Employer				<0.01
Rwanda Ministry of Health	70	25 (36)	Reference	
Partners In Health	56	36 (64)	1.7 (1.2–2.5)	
Type of staff				<0.01
Non-clinical	56	35 (63)	Reference	
Clinical	70	26 (37)	0.6 (0.4–0.9)	
Left employment at site during the 12 months				0.16
No	112	57 (51)	Reference	
Yes	14	4 (29)	0.6 (0.2–1.3)	

\* Participants working for Partners In Health based in Rwinkwavu, but supporting all three sites.

RR = relative risk; CI = confidence interval.

Among those who completed the series, 37 participants (61%) attended the minimum eight sessions, while 24 (39%) did not attend all the sessions but completed make-up assignments to receive certification. Among certified clinical and non-clinical staff, respectively 50% (13/26) and 37% (13/35) would have failed certification without the make-up assignments. The median number of make-up assignments completed was 1 (interquartile range [IQR] 1–2). Of the 61 individuals who received certification, 60 (95%) had an average score of >50% on the monthly article comprehension assessments; the median of the average scores for these 61 participants was 78.6% (IQR 69–84).

For those who completed the training, there was a significant increase in the median number of articles read per month at 6 months (median 2, IQR 2–3,  $P < 0.01$ ) and 12 months (median 4, IQR 2–6,  $P < 0.01$ ) compared to baseline (median 1, IQR 0–2) (Table 3). There was also a significant increase in self-reported involvement in research studies and attendance at other research training sessions.

## DISCUSSION

This is the first study to focus on building foundational research capacity of front-line health workers and support staff at the district hospital level in rural Africa. Individuals who successfully completed the research training demonstrated through their assignments a sound ability to consume research, a first and important step in translating research into action or stimulating new research ideas. There was also an increase in the self-reported number of articles read and participation in research studies and training, an encouraging proxy of increased interest. The training

was based at rural hospitals, which are often neglected for professional development activities. Furthermore, both clinical and non-clinical participants were deliberately included, as evidence-based decision making is relevant in both spheres and a supportive environment in which to improve policy and practice based on research findings requires engagement from all health cadres.

This research also identified training gaps. Only 48% of participants received certificates; participants were selected by site leadership, and failure to complete the series may reflect lack of interest among some. Clinical and MOH staff were also less likely to complete the series, likely attributable to an inability to leave clinical duties. Women were less likely to enrol for the course and were marginally less likely to complete training. Finally, due to the length of the training, >10% of participants left their working site during the training course. However, many were still able to meet requirements to reach certification, returning to the site on training days. Nonetheless, the low completion rate reflects the on-going challenge of long training programmes in rural settings. Based on this research, we made several adaptations to subsequent offerings of this programme. First, to address high attrition levels from the series, interested individuals will apply and leadership will then select from this self-selected pool. The course will be offered bi-weekly, instead of monthly, to reduce the length of training. Finally, flexibility in the training approach is critical, and in future we will develop complementary materials so that participants who miss sessions can review the content offsite in a structured, self-guided format.

There were several limitations to the study, primarily due to the use of routine programme data and course evaluations. There

**TABLE 3** Reading of research articles and involvement in research studies and other research training among certified participants of a research seminar series in three rural district hospitals, Rwanda, 2012–2013

	Participants <i>n</i>	<i>n</i> (%)	<i>P</i> value
Reported articles read, median [IQR]			
Baseline	56	1 [0–2]	Reference*
6 months	52	2 [2–3]	<0.01
12 months	47	4 [2–6]	<0.01
Involvement in research studies			
Baseline	57	16 (28)	Reference†
6 months	53	29 (55)	<0.01
12 months	46	27 (59)	0.01
Attendance at other research training			
Baseline	56	20 (36)	Reference†
6 months	53	33 (62)	0.02
12 months	46	30 (65)	0.05

\*Wilcoxon signed-rank test.

†McNemar's test.

IQR = interquartile range.

was no a priori cut-off for assessment scores required for passing and this should be considered for future courses. Data on number of articles read and participation in research activities were self-reported and may be subject to desirability and recall biases. However, these are likely minimised by using participants as internal controls. Finding objective ways to assess interest in and understanding of research is challenging, and identifying more objective measures will help advocate for such training. We will continue to follow these participants to measure more tangible, long-term output, such as co-authorship of manuscripts and abstracts. Finally, given that this study only uses data obtained through routine training assessments, we do not know the outcomes for individuals who enrolled but did not complete the course or outcomes for individuals who were not selected for the course. The results show adequate progress among trainees who completed the programme, but it is difficult to make direct attribution. Future courses will aim to better isolate the impact of training from other factors.

Many articles have stated the importance of research for effective development and health care delivery,<sup>16–18</sup> and others have noted that research from sub-Saharan Africa is under-represented.<sup>19–23</sup> The few documented research training programmes in the region focus on developing specific, tangible research skills. While such programmes are important, we believe that simultaneously investing in developing a broad interest in, and fundamental understanding of, research in rural settings is a critical first step towards improving health care delivery and research capacity. Given our experiences, we

would advocate for other organisations to consider this type of training as a key step towards building a robust research environment.

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**Contexte :** Partners In Health Rwanda, en collaboration avec le Ministère de la Santé, mène une approche multiple afin de développer les capacités de recherche du personnel de santé, surtout dans les zones rurales.

**Objectifs :** Décrire les caractéristiques des participants et évaluer l'impact d'une série de séminaires d'introduction à la recherche dans trois hôpitaux de district ruraux du Rwanda.

**Schéma :** Etude rétrospective de cohorte des participants au séminaire. Les données ont été recueillies à partir de dossiers personnels, de formulaires d'évaluation et de rétroaction.

**Résultats :** Des 126 participants qui ont assisté à la série de séminaires de recherche, 70 (56%) étaient cliniciens et 56 (44%) personnel non-clinicien. Soixante et un (48%) ont obtenu leur certificat. Parmi ces derniers, le score médian d'évaluation des

travaux était de 79%. Les participants lisaient beaucoup plus d'articles à 6 et 12 mois (médiane = 2 et 4 respectivement, comparé à 1 au départ,  $P < 0,01$ ). On notait également une augmentation significative ( $P \leq 0,05$ ) de l'implication dans des travaux de recherche rapportée par les intéressés eux-mêmes (28% au départ contre 59% à 12 mois) ainsi que de la participation à d'autres formations relatives à la recherche (36% au départ contre 65% à 12 mois).

**Conclusion :** La série de séminaires d'introduction à la recherche a fourni une opportunité majeure d'engagement dans la recherche du personnel clinicien et non clinicien. Une telle activité est un élément clé d'un programme complet de renforcement des capacités de recherche dans les zones rurales et sert de point d'entrée pour des formations à la recherche plus avancées.

**Marco de referencia:** La organización Partners In Health de Rwanda, en colaboración con el Ministerio de Salud, dirige un proyecto multidimensional de creación de capacidad de investigación, dirigida a los profesionales que se ocupan de la salud, especialmente en las zonas rurales.

**Objetivos:** Describir las características de los participantes y evaluar el efecto de la realización de una serie de seminarios introductorios a la investigación, en tres hospitales distritales de zonas rurales en Rwanda.

**Método:** Fue este un estudio retrospectivo de cohortes de los participantes a los seminarios. Se obtuvieron datos a partir de los registros personales, las hojas de evaluación y los formularios de retroalimentación.

**Resultados:** Participaron a la serie de seminarios 126 personas, de las cuales 70 pertenecían al personal asistencial (56%) y 56 a personal de otras esferas (44%). Sesenta y un participantes

recibieron la certificación (48%). De las personas certificadas, la mediana de puntuación de la evaluación fue 79%. Los participantes leyeron más artículos a los seis y a los doce meses de la intervención (mediana = 1 y 4 respectivamente;  $P < 0,01$ ) que al comienzo de la misma (mediana = 1;  $P \leq 0,05$ ). Se observó además un aumento significativo de la intervención autorreferida en estudios de investigación (28% al comienzo y 59% a los 12 meses) y de la participación en otras capacitaciones científicas (36% al comienzo y 65% a los 12 meses).

**Conclusión:** La serie de seminarios introductorios a la investigación ofreció al personal asistencial y a otros miembros del personal una importante oportunidad de participar en las actividades científicas. Este tipo de intervención constituye un componente primordial del programa integral de creación de capacidad de investigación en los centros rurales y representa una puerta de entrada a las capacitaciones científicas más avanzadas.