

Timely Access to Maternal, Neonatal and Child Healthcare for rural communities in Rwanda: Job satisfaction of Community Health Workers delivering Community Based Maternal, Newborn and Child Healthcare

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Research

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Abstract

Background

In Rwanda, although there has been progressing in health care delivery as expressed in the reduction in maternal and child mortality, rates are still high and geographically variable. For the improvement of equitable access to health services for maternal, newborn and child healthcare (MNCH), community-based maternal, newborn and child healthcare (CBMNCH) depends on the use of “community health workers” (CHWs). However, the CHW program faces challenges that disrupt the quality delivery of a full package of services. Yet little is known about the satisfaction of CHWs in delivering CBMNCH.

Methods

This quantitative cross-sectional study involved a survey of 500 sampled CHWs delivered CBMNCH in three selected rural districts of the southern province, Rwanda. Ordinal regression was used to examine the determinants of CHWs` job satisfaction.

Results

Multivariate analysis shows that the determinants of job satisfaction were motivation (OR = 8.59, $p < 0.001$), formal training in CBMNCH (OR = 2.24, $p < 0.05$), individual supervision (OR = 6.19, $p < 0.001$), and peer support (OR = 2.66, $p < 0.01$), knowledge about CBMNCH (OR = 0.51, $p < 0.05$), access to essential materials (OR = 0.32, $p < 0.05$), and incentives (OR = 0.53 ($p < 0.01$)).

Conclusion

The findings indicated that the managers of CHW programs and other stakeholders need to improve the working conditions of CHWs to enhance their job satisfaction, to enable the effective provision of CBMNCH.

Background

Poor access to health care services are resulting in high maternal, neonatal, and child mortality and morbidity, especially in middle and low-income countries like Rwanda¹. Besides, inequitable access to health care services partly explains the disparity in a rural-urban dichotomy in morbidity and mortality in many countries^{2,3}. Residents in urban areas tend to have improved health outcomes compared to their counterparts in rural communities^{2,3}. In several parts of the developing world, there is a deficiency of skilled health professionals. For instance, sub-Saharan Africa remains below the WHO recommended a limit of 2.3 medical doctors, midwives, and nurses, per thousand individuals⁴. Medical doctors are particularly unevenly distributed among urban and rural communities, with deficiencies being considerably more intense in rural communities⁴. In response, CHWs are being depended upon in some countries around the world to address the issue of deficiency health providers by enhancing the provision of primary health care services and promoting health in rural settings or underserved communities^{5,6}. The concept of universal health coverage as espoused by the Alma Atta Commission, and subsequently adopted by the WHO is well placed to reduce inequalities in health access⁶. Some countries are endeavouring to close the healthcare gap through universal health coverage, which guarantees reliable and timely access to improved health access regardless of geography and socioeconomic circumstances⁷. It has, therefore, been argued that enhancing equitable access to quality medical services, needs global and national investments that bring health care services closer to those in most need⁸.

In line with the need to improve universal health coverage to deprived communities, the role of CHWs in rural areas in developing countries cannot be overemphasized. A significant priority in health policy is that essential health care services should be accessible geographically: close to where individuals live and work⁸. CHWs are mostly residents in these rural communities. Therefore, the decentralization of healthcare services to remote and rural settings through CHWs has the advantage of geographical proximity and readily accessible within rural settings which also helps bridge socio-cultural and linguistic barriers to health care delivery^{9,10}. In a meta-analysis of maternal and child health by Kassebaum et al.¹¹, explained the positive impact of CHWs on reducing maternal and child mortality between 1990–2003 in varying contexts. However, although child mortality reduced about half since the 1990s, and maternal mortality dropped 1.3% every year since 1990¹¹; still over 17,000 children are reported to die annually from preventable causes¹². Stillbirth rates have not significantly changed, and many women are losing their lives due to perinatal-related complications¹².

In Rwanda, a country known as “the land of a thousand hills,” in Eastern Africa on a highland plateau averaging 1,200 to 2,000 m in elevation, the concept of CHWs is not new. With a commitment to provide universal healthcare as part of its Vision 2020 Strategy, the Rwandan government has implemented a national CHWs program since 2007 as a bridge between local communities and the health care system¹³. Each village (around 100– 250 family units) has one CHW (female), called an “ASM” (Animatrice de santé Maternelle), explicitly focused on follow up of women during pregnancy and after birth, and newborn. They provide Community-Based Maternal, Neonatal, and Child healthcare (CBMNCH)¹⁴.

Although there has been some progress in health care delivery as expressed in the reduction in maternal and child mortality, rates are still high and geographical variables^{15,16}. According to the recent Rwanda Demographic and Health Survey 2014–2015, the annual number of maternal deaths per 100,000 women ages 15–49, was 210. The maternal death rate accounted for 15% of all deaths to women age 15–49. In other words, about 1 in 6 Rwandan women who died in the five years preceding the DHS-2014/2015 died because of pregnancy or pregnancy-related causes. Overall, the infant mortality rate is 32 per 1,000 live births¹⁵.

Since its inception, community-based interventions have been generally seen to have fundamentally contributed towards current health achievements in Rwanda¹⁷. However, in the same way as other African nations, the CHWs program in Rwanda still faces huge difficulties that upset the delivery of the quality of the comprehensive package of services. These difficulties extend from the low limit capacity of CHWs to insufficient resources to sustain routine community health activities¹⁷. Based on this background, to strengthen its CHWs program, Rwanda Ministry of Health in partnership with Western Ontario University introduced in 2016 the "Training, Support, Access Model" (TSAM) project in the six districts with high MNCH needs amongst others include Rulindo, Gakenke, and Gicumbi in the northern province and Muhanga, Ruhango and Gisagara in the southern province. One of the key objectives of TSAM is to improve MNCH through community-based interventions using appropriately trained, mentored, and supported CHWs¹⁸. This project has implemented in the northern province and is now scaling up in the southern province. Unfortunately, there is little baseline knowledge about CHWs job satisfaction prior to intervention in southern province.

Methods

The study aimed to provide insight into the satisfaction of CHWs in the provision of CBMNCH for timely access to maternal, neonatal, and child healthcare in rural communities, Rwanda. The quantitative cross-sectional study was conducted in three selected districts in the southern province including Gisagara, Ruhango, and Muhanga district (working area of TSAM in the south). The study population comprised CHWs delivering CBMNCH within study areas. With the collaboration between the TSAM project and MoH Rwanda, through Rwanda Biomedical Centre (RBC), the sampling frame was obtained from the RapidSMS database. At the time of the survey, the database included 1388 CHWs who were actively providing CBMNCH in the three study districts. With a confidence level of 95% and a error probability, 0.05 applied to the population of 1388 CHWs, a sample size of 301 CHWs was calculated as the minimum sample threshold for unbiased findings for this study. Even though the estimated minimum sample size was 301, we oversampled by 200 to give the sample size more power, therefore, a sample of 500 CHWs was used for this study. Because the population size was not equal in each district, at the district level, the sample size was calculated based on district proportionate allocation sampling technique, "probability proportional to size"¹⁹.

Systematic random sampling was used to select the study sample from the total population of CHWs¹⁹. For data collection, a comprehensive questionnaire for CHWs was developed. This questionnaire was designed from previous CHW studies in Rwanda and elsewhere and it is, therefore, not a standardized instrument, but it was presented to the team of TSAM experts to discover whether the content is relevant in comparison with the context to ensure its content validity. Then, the research was presented to two Ethics Committees (Western University and the University of Rwanda) for approval. Participation in the research was voluntary. Thus, potential participants had to sign a consent form. The survey was conducted from June 2019 to September 2019.

Job satisfaction is a dependent variable. The Cronbach's alpha was used to generate satisfaction scales by aggregating questions which were asked CHWs to rate their satisfaction on the job as maternal health service providers in rural communities. Scores to these questions were estimated based Likert scale, (5) strongly agree, (4) agree, (3) neutral, (2) disagree, and (1) strongly disagree.

Drawing insights from the literature on satisfaction in health service research²⁰⁻²², we introduced two sets of explanatory variables, namely structural and individual-level factors. Structural factors included CHW's motivation (1 = low; 2 = Middle; 3 = high), knowledge level CHW (1 = Low; 2 = Middle; 3 = High), amount of supervision received from a health centre (1 = never; 2 = Once a year; 3 = Few times a year; 4 = Once a month), formal training on CBMNCH (1 = no; 2 = yes), peer support (1 = no; 2 = yes), access to assessment tools (1 = all are available; 2 = few are missing; 3 = many are missing; 4 = All are missing), average time spent to travel to the health centre (1 = Less than 60 minutes; 2 = 60-120 minutes; 3 = more than 120 minutes), number of households CHW is responsible for (1 = less than 125 households; 2 = 125-160 households; 3 = 160-200 households; 4 = more than 200 households), the average number of clients served in a month (1 = less than 14 clients; 2 = 14-20 clients; 3 = more than 20 clients), years of experience (1 = 0-3 years; 2 = 4-6 years; 3 = 7-9 years; 4 = 10 years and above years), and received in-kind payment for CHWs services (1 = yes; 2 = no), membership in Profitable cooperatives (1 = yes; 2 = no). For individual-level factors, we included age (1 = 35 and below; 2 = 36-49; 3 = 50 and above), marital status (1 = married; 2 = other), level of education (1 = primary; 2 = above primary), occupation (1 = smallholder/non-professional farming; 2 = other), household size (1 = less than 5 members; 2 = 5-7 members; 3 = 8 members and above), and socioeconomic status (Ubudehe category) (1 = category 1; 2 = category 2; 3 = category 3). According to the Rwandan Ubudehe categorization, category 1 comprises people with no means to own or rent homes of their own and can hardly put food on the table, the second category comprises people who have limited part-time jobs and either own cheap houses or can pay rent, the third category comprises people who do not need help from the Government for survival, and the fourth category comprises people deemed rich such as government officials from the level of director upwards, and large business owners²³.

Regarding data analysis, we employed univariate, bivariate, and multivariate analyses to understand the factors associated with job satisfaction among CHWs. While our dependent variable (job satisfaction) is ordinally coded (1 = Low; 2 = Middle; 3 = High), therefore, we employed the ordinal logistic regression, which is suitable for an ordered dependent variable. Models were built sequentially. We accounted for structural variables in Model 1 and individual-level variables in Model 2. Findings were reported in odds ratios (ORs) where ORs larger than 1 indicate higher odds of being satisfied on the job, while ORs smaller than 1 indicates lower odds of being satisfied.

Results

Univariate

Table 1 shows findings from univariate analysis. In terms of job satisfaction, we found that 35%, 31% and 34% of CHWs were highly, moderately, and lowly satisfied respectively. In terms of job performance, 32.2%, 35.2, and 32.6% of CHWs reported high, moderate, and low job performance, respectively. Nearly

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half (47.8%) of CHWs were highly motivated. Also, 35.2% of surveyed CHWs had high knowledge about MNCH, 34.6% of them had moderate, and 30.2% of them had low knowledge. 24.2% of CHWs did not receive any individual supervision from the HC since they started to work as CHW, while 46.6% of CHWs receiving individual supervision at least once a year. Besides, 59.8% of CHWs reported that they have never received feedback for patients transferred to a Health Center. In terms of training, 73.8% of CHWs received formal training in CBMNCH; 58.2% of them received formal training before working as CHWs. There was a good collaboration among CHWs, with 89% of them reporting having received peer support. Regarding the availability of materials, only 21.4% of CHWs reported that they have all the necessary registers and education tools they need for their work, and only 27.2% of CHWs reported they that have all the necessary assessment tools.

Overall, CHWs reported they do not have protective materials. As per their mandate, CHWs were sometimes required to accompany clients to a Health Center. The results show that the average travel time to HC was 94 minutes. Also, the mean number of households that CHW is responsible for is 172 households, with CHWs reporting serving an average of 27 clients per month. About 80% of CHWs had over four years of working experience. Only 15.2% of CHWs received in-kind payment for their services. 31.8% of CHWs were members of a local level for profit cooperative. In terms of socioeconomic status, the results show that 6.4% of the sample are in "Ubudehe" category 1, whereas 40% and 56% are in "Ubudehe" category 2 and "Ubudehe" category 3, respectively. Also, 22% of CHWs were 35 years or less, while 39% and 39% were aged between 36-49 years and 50 years and above, respectively. All CHWs received basic education with about 23% of them having more than primary education, while the majority (77%) had primary education level. In terms of primary occupation, 95% of CHWs are smallholder farmers. 87.4% of CHWs were married, and about half of them belonged to households with over seven members.

Bivariate

Table 2 shows findings from the bivariate analysis. Broadly, some structural and individual-level factors were significantly associated with increased job satisfaction among CHWs. At the structural level our findings show that CHWs highly performed on the job (OR=11.91, $p<0.001$) or highly motivated (OR=15.85, $p<0.001$), were more likely to have high job satisfaction compared to CHWs poorly performed or with low motivated respectively. Individual supervision (OR=6.53, $p<0.001$) was associated with higher odds of job satisfaction. CHWs who received formal training on CBMNCH (OR=2.28, $p<0.001$) and peer support (OR=1.82, $p<0.01$) had higher odds of reporting high job satisfaction. Lacking assessment tools (OR=0.38, $p<0.001$) was associated with lower odds of job satisfaction.

Increased years of experience (OR=2.76 $p<0.001$) were significantly associated with higher odds of job satisfaction. Lacking in-kind payment (OR=0.32, $p<0.001$) was associated with lower odds of job satisfaction. Among the individual-level variables included in the analysis, education was the only significant predictor of job satisfaction: those with more than primary education (OR=1.69, $p<0.01$) had higher odds of job satisfaction compared to their counterparts with primary education.

Multivariate

Table 3 shows findings from multivariate analysis. Findings were largely consistent with bivariate results. At the structural level, we found that CHWs highly motivated (OR=8.59, $p<0.001$) had significantly higher odds of job satisfaction compared to those with low motivation. CHWs highly performed on the job (OR=7.08, $p<0.001$) had significantly higher odds of reporting high job satisfaction compared to CHWs lowly performed. However, CHWs with a high level of knowledge about CBMNCH (OR=0.51, $p<0.05$) had lower odds of satisfaction compared to their counterparts. CHWs who were supervised once every month (OR=6.19, $p<0.001$) had higher odds of being satisfied compared to those who never received supervision. CHWs with formal training (OR=2.24, $p<0.05$) had higher odds of being satisfied compared to their counterparts. CHWs who received peer support (OR=2.66, $p<0.01$) had higher odds of being satisfied compared to CHWs without peer support. CHWs who lacked assessment tools had lower odds (OR=0.32 ($p<0.05$)) of being satisfied compared to CHWs with all required tools. CHWs who do not receive in-kind payment for their work performance were more likely to be unsatisfied compared to CHWs who received in-kind payment (OR=0.53, $p<0.01$).

Discussion

Health workers' job satisfaction plays a key role in the quality of health service delivery. Given the specific responsibilities of CHWs in the context of Rwanda where they fill an important gap in health service delivery, understanding the predictors of their job satisfaction is key in proffering policy solutions for improving the quality of their work. Overall, CHWs satisfaction was found to be significantly associated with mainly structural level factors including level of motivation, role performance, individual supportive supervision, formal training, access to required materials, peer support and in-kind benefits from the community, among others. This finding emphasizes the important role of overarching structural factors in guaranteeing CHWs job satisfaction in the context of Rwanda. However, overall, the results of this study indicate that the proportion of CHWs who are highly satisfied with their work is more than those who may be dissatisfied. These findings were found to be largely consistent with the studies of Ding et al.²⁴ and Mpemberi et al.²⁵ also emphasize the role of structural factors in guaranteeing the job satisfaction of health workers.

Given the evidence of a link between job satisfaction and performance, researchers often use workers' performance as a proxy to measure their job satisfaction as workers who are high performers also tend to report higher job satisfaction^{26,27}. Consistent with this observation and a recent study by Khatri, Mishra, and Khanal²⁸, the middle and high performing CHWs workers in this study had a higher likelihood of reporting job satisfaction compared to CHWs who reported low performance. Earlier, studies^{29,30} have highlighted a bidirectional relationship between job satisfaction and performance where 11.8% of health workers' performance was explained by their job satisfaction. In this regard, in evaluating CHWs job satisfaction in Rwanda, stakeholders can achieve this through performance appraisals, and where CHWs performance is seen to be below a set target, appropriate measures can be put in place to address any outstanding issues that may be adversely affecting their job satisfaction.

Furthermore, the finding that motivation was a significant predictor of CHWs satisfaction may not be too surprising. Specifically, community health workers with middle to high motivation were more likely to belong to a high category of job satisfaction compared to those with poor motivation. This finding is consistent with the current literature's suggests that motivation, whether intrinsic or extrinsic, plays a key role in health workers' job satisfaction^{25,34-37}. Besides, Lambrou et al.³¹ also found that intrinsic factors measured by internal thought processes and perceptions about motivation, and extrinsic factors measured by monetary rewards and recognition for work done, greatly influenced health workers' job satisfaction. However, CHWs' motivation and its link to their job satisfaction could also be due to the overwhelming community recognition of their work^{16,33}. Similar links were revealed by a study conducted by Liverpool School of Tropical Medicine Centre for Maternal and Newborn Health, in collaboration with UNICEF and Rwanda Biomedical Center (RBC), where most CHWs exhibit intrinsic motivation as recruitment into the program was mostly voluntary with no financial compensation. In this regard, only individuals with a desire to help address persistent maternal and child health care challenges in the community opted to be trained and commissioned as officers despite insufficient remunerations³². It is therefore imperative for the Rwandan government to effectively harness this high level of motivation to ensure the delivery of high-quality health services in rural communities by CHWs.

The findings further revealed that CHWs with high knowledge about their primary mandate, specifically, maternal, newborn and child health care were less likely to report job satisfaction. Although this finding may seem counter-intuitive, it is possible that CHWs with high knowledge of their mandates and conscious of the important function they serve in the healthcare delivery chain are dissatisfied with some existing inefficiencies impeding their ability to effectively discharge or execute their mandates in reducing maternal and child mortality. Consistent with this observation, Mathauer and Imhoff³⁴ have revealed that, where health workers are unable to perform their duties because of bureaucracies and other delays in accessing the necessary tools to perform their duties, they become frustrated and often report job dissatisfaction.

Both quantitative and qualitative literature have discussed the importance of supportive supervision on job satisfaction among health care workers in several contexts³⁸⁻⁴⁰. According to previous studies, the supervision of community health workers in developing countries is critical to ensure that they perform well, deliver quality services and be motivated⁴¹⁻⁴³. Consistent with these scholarships, findings from this study revealed that lack of supervisory support negatively affects CHWs

decisions and feelings as they perceive their work is valued and appreciated and through this, enhance their greater work satisfaction⁴⁴. In addition to supervision from superiors, Hill et al.³⁸ have also emphasized the importance of community and peer supervision for CHW which was also found to be associated with improved work performance. Earlier studies in Rwanda identified sufficient supervision as a major barrier affecting effective service delivery by CHWs¹⁶. Thus, this finding suggests that stakeholders of the CHWs program might need to pay particular attention to this critical to improving supportive supervision.

In addition to supportive supervision, training of CHWs before the commencement of their duties and other in-service training is seen as particularly useful in enhancing their knowledge and skills for service provision. Training as an indispensable tool in the work of community health workers is useful in the transfer of useful skills and information for the effective delivery of health services to hard-to-reach populations^{44,45}. CHWs, therefore, consider training as an essential component in achieving their mandate as health workers. Among others, CHWs explained that more frequent training improved their efficiency, confidence, and knowledge base as most of them are not originally trained as a health professional. They feel empowered and respected within their respective communities when they receive training from superiors who are active health service professionals with many years of work experience¹⁶. To this regard, it may not be surprising that in this study CHWs who received formal training in CBMNCH were more likely to be in a high category of job satisfaction compared to those who have never received formal training in CBMNCH. Therefore, CHWs who received limited or no training were less likely to be satisfied with their job given its adverse influence on the effective delivery of their mandates as community volunteers. These findings further suggest that stakeholders in the CHWs program should focus on making the training of CHWs more frequent to give them opportunities to improve their knowledge and skills. This will likely lead to better performance of their assigned tasks which could also improve their feeling of accomplishment (satisfaction) from their work.

Furthermore, in the health delivery literature, peer support is a crucial factor in the retention of health workers as they share knowledge and discuss how to surmount challenges in the performance of their daily duties. In this study, peer support, as one of the facets of job satisfaction, was also examined and it was found to be a predictor of job satisfaction for CHWs. CHWs who had good peer support were more likely to be in the high category of job satisfaction compared to their counterparts. These results were consistent with other studies such as Jayasuriya et al.⁴⁶, who found relationships with colleagues and other forms of peer support to be a strong predictor of job satisfaction. Similarly, other scores of scholars^{47,48} from a qualitative enquiry approach have shown inter-personal relationships as an important ingredient in health workers' motivation. This finding is very useful for policy consideration among CHWs stakeholders as they can target strengthening peer support activities as this is currently not implemented in the study context.

Access to working materials and other essentials is necessary for meeting targets and effective discharge of responsibilities for health workers particularly in the context of developing countries. Therefore, although financial rewards are important for motivating, retaining and ensuring health worker satisfaction, the presence of adequate resources in the form of supplies and essentials is very useful in improving the morale and work satisfaction of health workers significantly⁴⁹. In this context, it may not be too surprising for this study revealed that CHWs who had limited access to assessment tools which is important in the discharge of their duties were less likely to report being satisfied with their jobs compared to those that had regular access to these materials. Other studies^{50,51} have reported the same findings. These suggest that it is necessary to sufficiently equip CHWs to perform their work and that in turn could improve their work satisfaction.

While financial rewards and motivation are linked to health worker job satisfaction and retention in many contexts^{33,42,43}, in Rwanda, the community health workers were not paid or received little or no remuneration. However, CHWs are encouraged to form cooperatives where they initiate income

generation activities and profits from these initiatives may be used by CHWs as financial compensation for their work. Thus, cooperatives serve as the main source of financial remuneration for CHWs. The findings reveal that CHWs who perceived their cooperatives to be profitable, implying they may be gaining some financial rewards from their cooperatives were more likely to report job satisfaction compared to those who did not belong to a profitable cooperative. In this regard, it can be argued that although the CHW program was established voluntarily, financial remuneration may still be playing a key role in CHWs job satisfaction as reported by earlier studies^{25,43,52}. Furthermore, CHWs who received payment in kind for their services were more likely to have job satisfaction compared to those that were not receiving any payments from community members. Given the voluntary base of services rendered by CHWs to their community, payments in kind make CHWs feel appreciated for their work, explaining why they are more likely to have better job satisfaction^{16,34}. Based on these findings, it may be critical for stakeholders of the CHW program in Rwanda to rethink how they can provide a suitable financial incentive to CHWs to engender strong feelings of governmental support and in turn, better job satisfaction.

In general, work satisfaction revolves around feelings and attitudes that an individual has with regards to their work that motivates them to fulfil an anticipated target or achievement⁵². Given the multiplicity of factors that are associated with health workers' job satisfaction, this study argues that in the context of Rwanda, CHWs can be satisfied with some aspects of their job and the same time remain dissatisfied with other aspects that fail to meet their expectations. Therefore, this study suggests a holistic approach in considering all the possible factors associated with work satisfaction of CHWs.

Whilst this study provides greater insights into the CHWs' job satisfaction in the provision of CBMNCH services for timely access to MNCH in rural communities Rwanda, there are some limitations. First, the study was conducted in high need districts, making it difficult to extrapolate the finding to the rest of the country. Second, given that respondents were asked to recall most of the responses, some of the responses may be subject to recall bias which may influence the reliability of the collected data. However, the likelihood of recall bias was reduced by reducing the recall period to a maximum of 12 months. Lastly, given the cross-sectional nature of this data, findings are only restricted to statistical associations and therefore, causal-effect could not be inferred.

Conclusion

The findings of this study provide in-depth insight into the current job satisfaction of CHWs in the provision of CBMNCH in rural communities, Rwanda. The findings indicated that there a high need for the managers of CHW programs and other stakeholders to improve the working conditions of CHWs to enhance their job satisfaction, to enable effective provision of CBMNCH. This study was conducted before the intervention of the TSAM project in the study areas. Therefore, it would be useful to do a post-intervention analysis to do a comparative study examining the impact of TSAM intervention on job satisfaction of CHWs regarding the provision of CBMNCH in Rwanda.

Abbreviations

CBMNCH
Community Based Maternal, Neonatal, and Child Healthcare
CHW
Community Health Worker
HC
Health Center
MNCH
Maternal, Neonatal, and Child Health
ORs
Odd Ratios
RBC
Rwanda Biomedical Center
SMS
Short Message Service
TSAM
Training, Support, and Access Model
UNICEF
United Nations Children's Fund
UR
University of Rwanda
UWO
University of Western Ontario
WHO
World Health Organization

Declarations

Ethics approval and consent to participate

Ethical approval for the study was obtained from both the Research Ethics Board at the University of Western Ontario, Canada, and the College of Medicine and Health Sciences Institutional Review Board (IRB), at the University of Rwanda. The authorization to conduct the study locally was granted through the districts' administrative authorities. Before the study, informed written consent was obtained from CHWs with the option to withdraw at any time during the study.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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The Training, Support, and Access Model (TSAM) project provided the fund regarding only logistic issues to facilitated fieldwork activities (data collection). There was no funding body in the design of the study, analysis, interpretation of data and writing the manuscript.

Authors' contributions

All authors designed the full protocol of the study. JBB collected, analyzed, and interpreted data and wrote the manuscript. IL read and approved the final manuscript

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Tables

Table 1: Description of general characteristics of surveyed CHWs (n=500)		
Variables	Frequency	Per cent
CHW's satisfaction		
Low	170	34.00
Middle	155	31.00
High	175	35.00
CHW's performance		
Low	163	32.60
Middle	176	35.20
High	161	32.20
CHW's motivation		
Low	153	30.60
Middle	111	22.20
High	236	47.20
CHW's knowledge		
Low	151	30.20
Middle	176	35.20
High	173	34.60
Individual supervision from HC		
Never	121	24.20
Once a year	233	46.60
Few times a year	108	21.60
Once a month	38	7.60
Receiving contra-reference		
No	299	59.8
Yes	201	40.2
Formal training on CBMNCH		
No	369	73.80
Yes	131	26.20
Peer support		
No	55	11.00
Yes	445	89.00
Access to assessment tools		
All are available	136	27.20
Few are missing	126	25.20
Many are missing	65	13.00
All are missing	173	34.60
Access to registers and education tools		
All are available	107	21.40
Few are missing	224	44.80
Many are missing	167	33.40
All are missing	2	0.40
Access to protective materials		
All are missing	500	100.00
Average time spent to travel to HC		
Less than 60 minutes	77	15.40
60-120 minutes	213	42.60
Over 120 minutes	210	42.00
Number of Households that CHW is responsible for		
Less than 125 households	122	24.40
125-160 households	106	21.20
160-200 households	155	31.00
Over 200 households	117	23.40
The average number of clients served in a month		
Less than 14 clients	160	32.00
14-20 clients	155	31.00
Over 20 clients	185	37.00
Years of experience		
0-3 years	105	21.00
4-6 years	92	18.40
7-9 years	93	18.60
10 years and above	210	42.00
Receive in-kind payment for performing community health work		
Yes	76	15.20
No	424	84.80
Profitable cooperatives		
Yes	159	31.80
No	341	68.20
Socioeconomic status category (Ubudehe category)		
Category 1	32	6.40
Category 2	200	40.00
	268	53.60

Age in years		
35 years old and below	111	22.20
36-49 years old	196	39.20
50 years old and above	193	38.60
Marital status		
Married	437	87.40
Others	63	12.60
Education		
Primary education	387	77.40
More than primary education	113	22.60
Occupation		
Nonprofessional Farming	476	95.20
Other	24	4.80
CHW's Household size		
Less than 5 members	108	21.60
5-6 members	133	26.60
7-8 members	135	27.00
Over 8 members	124	24.80

Table 2: Estimates for bivariate ordered logistic regression predicting the variability of CHWs' job satisfaction in service provision of CBMNCH (n=500)

Variables	Bivariate OR(SE)
CHW's performance	
Low	1.00
Middle	7.10(1.52) ***
High	11.91(2.80) ***
CHW's motivation	
Low	1.00
Middle	5.80(1.48) ***
High	15.82(3.74) ***
CHW's knowledge	
Low	1.00
Middle	1.20 (0.23)
High	0.84 (0.17)
Individual supervision from HC	
Never	1.00
Once a year	1.28 (0.26)
Few times a year	1.31 (0.32)
Once a month	6.53 (2.18) ***
Formal training on CBMNCH	
No	1.00
Yes	2.28 (0.43) ***
Peer support	
No	1.00
Yes	1.82 (0.40) **
Access to assessment tools	
All are available	1.00
Few are missing	1.04 (0.22)
Many are missing	0.58 (0.19)
All are missing	0.38 (0.09) ***
Access to registers and education tools	
All are available	1.00
Few are missing	1.92 (0.43) **
Many are missing	2.23 (0.52) **
All are missing	0.64 (0.62) ***
Average time spent to travel to HC	
Less than 60 minutes	1.00
60-120 minutes	1.33 (0.33)
Over 120 minutes	1.47 (0.36)
Number of Households that CHW is responsible for	
Less than 125 households	1.00
125-160 households	0.77 (0.17)
160-200 households	0.92 (0.20)
Over 200 households	0.85 (0.19)
The average number of clients served in a month	
Less than 14 clients	1.00
14-20 clients	1.22 (0.32)

Over 20 clients	0.83 (0.16)
Years of experience	
0-3 years	1.00
4-6 years	2.41 (0.59) ***
7-9 years	2.63 (0.70) ***
10 years and above	2.76 (0.61) ***
Receive in-kind payment for performing community health work	
Yes	1.00
No	0.32 (0.07) ***
Profitable cooperatives	
Yes	1.00
No	1.29 (0.22)
Socioeconomic status category (Ubudehe category)	
Category 1	1.00
Category 2	0.84 (0.30)
Category 3	0.79 (0.28)
Age in years	
35 years old and below	1.00
36-49 years old	1.16 (0.22)
50 years old and above	2.62(0.86)
Marital status	
Married	1.00
Others	10.05 (0.25)
Education	
Primary education	1.00
More than primary education	1.69 (0.30) **
Occupation	
Nonprofessional Farming	1.00
Other	0.61 (0.21)
CHW's Household size	
Less than 5 members	1.00
5-7 members	0.87 (0.16)
8 members and above	0.61 (0.20)

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Estimates for multivariate ordered logistic regression predicting the variability of CHWs` job satisfaction in service provision of CBMNCH (n=500)

Variables	Model 1 OR(SE)	Model 2 OR(SE)
CHW` s performance		
Low	1.00	1.00
Middle	4.23 (1.16)***	4.06 (1.14)***
High	7.82 (2.11)***	7.08 (2.00)***
CHW` s motivation		
Low	1.00	1.00
Middle	3.67 (1.13)***	3.70(1.14)***
High	8.41(2.39)***	8.59(2.45)***
CHW` s knowledge		
Low	1.00	1.00
Middle	0.83(0.21)	0.78(0.20)
High	0.55(0.15)*	0.51(0.15)*
Individual supervision from HC		
Never	1.00	1.00
Once a year	1.17(0.31)	1.24(0.35)
Few times a year	1.15(0.38)	1.25(0.43)
Once a month	6.71(3.31)***	6.19(3.06)***
Formal training on CBMNCH		
No	1.00	1.00
Yes	2.17(0.75)*	2.24(0.82)*
Peer support		
No	1.00	1.00
Yes	2.72(0.96)**	2.66(1.00)**
Access to assessment tools		
All are available	1.00	1.00
Few are missing	0.85(0.26)	0.88(0.29)
Many are missing	0.37(0.15)*	0.41(0.17)*
All are missing	0.35(0.10)***	0.32(0.10)***
Access to registers and education tools		
All are available	1.00	1.00
Few are missing	2.13(0.63)**	2.27(0.69)**
Many are missing	2.36(0.77)**	2.63(0.89)**
All are missing	4.08(2.63)***	5.75(4.96)***
Average time spent to travel to HC		
Less than 60 minutes	1.00	1.00
60-120 minutes	1.13(0.35)	1.23(0.40)
Over 120 minutes	1.57(0.48)	1.68(0.53)
Number of Households that CHW is responsible for		
Less than 125 households	1.00	1.00
125-160 households	0.89(0.27)	0.95(0.29)
160-200 households	1.29(0.36)	1.32(0.38)
Over 200 households	0.72(0.23)	0.66(0.22)
The average number of clients served in a month		
Less than 14 clients	1.00	1.00
14-20 clients	1.19(0.32)	1.11(0.30)
Over 20 clients	0.91(0.23)	0.87(0.23)
Years of experience		
0-3 years	1.00	1.00
4-6 years	0.98(0.38)	1.04(0.42)
7-9 years	0.75(0.33)	0.83(0.37)
10 years and above	0.78(0.32)	0.87(0.38)
Receive in-kind payment for performing community health work		
Yes	1.00	1.00
No	0.56(0.18)*	0.53(0.17)*
Profitable cooperatives		
Unprofitable	1.00	1.00
profitable	1.80(0.43)*	1.83(0.45)*
Socioeconomic status category (Ubudehe category)		
Category 1		1.00
Category 2		0.89(0.37)
Category 3		0.68(0.28)
Age in years		
35 years old and below		1.00
36-49 years old		0.71 (0.22)
50 years old and above		1.88(0.88)
Marital status		
Loading [MathJax]/jax/output/CommonHTML/jax.js		1.00

Others		0.63(0.298)
Education		
Primary education		1.00
More than primary education		1.38(0.33)
Occupation		
Nonprofessional Farming		1.00
Other		0.56(0.26)
CHW's Household size		
Less than 5 members		1.00
5-7 members		1.16(0.30)
8 members and above		0.76(0.35)
Log pseudo-likelihood	-388.54599	-382.3989
Wald X2	256.33 ***	260.73 ***
Pseudo R2	0.2918	0.3030
N	500	500

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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