Non-financial incentives and professional health workers’ intentions to stay in public district hospitals in Rwanda: A cross-sectional study [version 2; peer review: 1 approved, 1 approved with reservations]

Celestin Ndikumana1, Joshua Kwonyike2, Ruth Tubey2

1College of Arts and Social Sciences, University of Rwanda, Butare, Rwanda
2Institute of Development Studies, Moi University, Eldoret, Kenya

Abstract
Background: Evidence shows that human resources are one of the major pillars of the healthcare system. As a result, retaining the health workforce has been associated with provision of the quality healthcare services. However, the challenge of retaining the health workforce has been an issue of concern in Rwanda. The purpose of this study was to assess the level of availability and provision of non-financial incentives, and their associations with professional health workers’ intentions to stay.

Methods: A cross-sectional survey research design with a quantitative approach was used. With a population of 469 health workers from four district hospitals, the study considered a sample of 252 individuals. The study measured the perceived levels of availability and provision of non-financial incentives in terms of working conditions, training and development, career development, and intentions to stay. Logistic regression was used to assess the associations between predictors and the outcome variable with 95% confidence intervals and 5% of confidence level, and results were reported using odds ratios.

Results: The findings of the study show that perceiving an average and high level of working conditions was associated with professional health workers’ intentions to stay (OR: 9.70, P<0.001 and OR: 5.77, P=0.001, respectively). Similarly, an average and high perceived level of availability of career development programs predicted health workers’ intention to stay (OR: 13.98, P<0.001 and OR: 12.26, P=0.038, respectively). In the same way, health workers who rated availability of training and development programs as high had more odds of staying (OR 1.025; P=0.014) than their counterparts who rated such programs as low.

Conclusion: There is a need for health care institutions and health...
planners at higher level to strategically boost health workers’ intentions to stay through non-financial packages including efficient and equitable training of health workers, manageable workload and initiate strong career development programs.

**Keywords**
non-financial incentives, intentions to stay, health workers, Kigali

---

**Corresponding author:** Celestin Ndikumana (cndikumana@cartafrica.org)

**Author roles:** Ndikumana C: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Software, Writing – Original Draft Preparation, Writing – Review & Editing; Kwonyike J: Methodology, Supervision, Validation, Visualization; Tubey R: Methodology, Resources, Supervision, Validation

**Competing interests:** No competing interests were disclosed.

**Grant information:** The authors acknowledge the support by the Consortium for Advanced Research Training in Africa (CARTA) which funded this study. CARTA is jointly led by the African Population and Health Research Center and the University of the Witwatersrand and funded by the Wellcome Trust (UK) (Grant No: 087547/Z/08/Z), the Department for International Development (DFID) under the Development Partnerships in Higher Education (DelPHE), the Carnegie Corporation of New York (Grant No: B 8606), the Ford Foundation (Grant No: 1100-0399), Google.Org (Grant No: 191994), SIDA (Grant No: 54100029) and MacArthur Foundation (Grant No: 10-95915-000-INP).

The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

**Copyright:** © 2019 Ndikumana C et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**How to cite this article:** Ndikumana C, Kwonyike J and Tubey R. Non-financial incentives and professional health workers’ intentions to stay in public district hospitals in Rwanda: A cross-sectional study [version 2; peer review: 1 approved, 1 approved with reservations] Wellcome Open Research 2019, 3:41 https://doi.org/10.12688/wellcomeopenres.14501.2

**First published:** 17 Apr 2018, 3:41 https://doi.org/10.12688/wellcomeopenres.14501.1
Amendments from Version 1

The second version of this paper has been produced in line with the comments that have been provided by the reviewers. In the introduction, therefore, the different categories of interventions to improve retention of health workers have been explored before tackling the issue of non-financial incentives, and the justification of why the study focuses on such incentives has been provided. As far as methodology is concerned, details on why the study focuses on the district hospitals in the urban area have been explained and the intention to stay has been contextualized as a major predictor of retention. Clarifications on the type of scale that has been used and how the original scores have been transformed in low, average and high categories through a calculated composite index of each indicator have been made. The issues regarding the response rate have also been addressed by providing the related details. In this part also, the data analysis method was clarified by rewriting the part of data analysis.

For the results of the study, more and deep analysis of the data was performed. As for this, the status of intentions to stay and the perceived levels of availability of non-financial incentives were provided in terms of work conditions, training and development opportunities, and career development programs. To this end, two tables (one for the status of intentions to stay and another for perceived levels of non-financial incentives) were provided. As for discussion and conclusion, this part was rewritten in order to show the originality of the work, and the contribution of the study to the health system in the study setting. In this view, recommendations were suggested to health institutions and higher levels of administration.

Above all, the paper has been proofread to improve language issues as suggested by the reviewer.

Any further responses from the reviewers can be found at the end of the article.

Introduction

The health system in Rwanda has undergone major changes, ranging from traditional healing system to modern practices, including current technological innovations in the health sector. With the atrocities of the Genocide against the Tutsi at the end of the 20th century, the Rwandan health system, in terms of infrastructure and human capital, was almost completely destroyed. It is within the last two decades that the system recovered through different interventions that were designed to develop the infrastructure and building up a comprehensive scheme to provide healthcare institutions with the health workforce capable of responding to the growing healthcare provision needs.

The development of a multi-sectorial capacity building program has resulted in the establishment of human resources for health programs for better healthcare service delivery in Rwanda. In addition to the existing teaching institutions that train the health personnel, the health system administration developed partnerships with foreign healthcare organizations to provide staff with the necessary expertise and engage foreign experts with their Rwandan counterparts for a better healthcare service practical activities. This involves foreign medical and surgical residencies, nursing programs, health professional trainings and support in hospital administration. In addition to this, the Rwandan Economic Development and Poverty Reduction Strategy had in its main goals some programs which targeted to provide the health system with the adequate personnel. As result of these interventions, the number of professional health workers, including doctors and nurses, increased to such an extent that by 2012 there was one doctor and one nurse to a population of 16,001 and 1,291, respectively. Moreover, the Rwandan Ministry of Health updated the policy strategic plan of human resources for health, and some education programs were introduced to strengthen the provision of the health workforce, including a Master’s program in family and community medicine and many others.

Despite considerable efforts to improve the healthcare system in terms of human resources for health in Rwanda, retaining the health workforce in public district hospitals has been an issue of concern in the recent years. In fact, the high rates of staff turnover in public district hospitals have become a big challenge for the health system in the country, as retaining key health personnel who can continue to deliver healthcare services, resulting in better health outcomes, continues to be a big issue. As a result of this challenge, healthcare institutions—especially district hospitals as major units of health care service provision—continue to have repetitive costs related to hiring health workforce and which may have significant effects on the quality of health care and safety of patients. In view of the above, a study investigating the associations between non-financial incentives and intentions to stay in the service among professional health workers in public district hospitals was undertaken.

The WHO report suggests key evidence-based recommendations that can be put in place in order to attract, recruit and retain health workers, especially in the rural areas. The report states that such interventions include educational programs focusing on training health professionals near rural community, regulatory schemes like subsidizing health and medical education, financial packages, and personal and professional support for health workers. It comes out to consider that a good number of these schemes relate to non-financial packages that are provided to health workers for retention purposes. In fact, non-financial incentives focus on the improvements in conditions of work in terms of safe and supporting work environment, career development programs, and health workers’ training and development. Such incentives also include appreciation and public recognition measures, meeting new challenges, caring attitudes from the employer, support for outreach activities and facilitation for professional networks.

As result of this, health workers expect in addition to the benefits in monetary value, enhanced schemes concerning better living conditions, clear professional relationships with employers, fulfillment of training and development needs, and career development programs that make them feel secured in the job.

The issue of retention of health workers has been investigated in a number of studies and most of them have focused on financial incentives, and the health system in Rwanda has
devised different strategies aiming at dealing with the challenge of the health personnel including performance-based pay and other financial packages\textsuperscript{11}. This study will examine the human resource management approach to respond to the challenge of turnover of health workers through non-financial incentives.

There is a body of evidence in the literature of human resources for health showing that non-financial incentives affect health workers' intentions to stay and lead to institutional increased retention rate\textsuperscript{14-25}. Ronnie & Longmore\textsuperscript{14} investigated human resource management practices including non-financial incentives and their associations with the retention of doctors in a medical complex in the Eastern Cape, South Africa. On the basis of qualitative responses, the study revealed that poor working conditions led to frustrations among medical doctors in the hospitals, which hindered the healthcare institutions' staff retention capacity. In the same way, frustration of the health personnel caused by lack of training opportunities and career progression was associated with lower retention of staff in Malawi\textsuperscript{26}.

Similarly, two studies were conducted in the health care setting in Kenya. One assessed factors affecting retention of healthcare workers in Trans-Nzoia County\textsuperscript{27}, and it was realized that nurses' intentions to stay or leave healthcare facilities were associated with the institutions' capacity to integrate different human resource management practices, including training and development of the health personnel, effective policies aimed at improving working conditions and improved work–life balance. Another one investigated the factors that affect motivation and retention of health workers in three different regions\textsuperscript{28} and the authors recommended the establishment of policies for provision of non-financial intervention measures along with other benefits in order to retain health workers.

In an study which assessed the determinants of retention of health workers in rural hospitals in Zimbabwe\textsuperscript{29}, researchers recommended the that there was a need to focus on proactive measures, interventions and strategies that address pertinent issues around the retention of health professionals at varied stages of their careers. The study suggested that health care institutions should promote professional career aspirations, and initiation of equitable training and development schemes among health workers. In a recent study conducted in Sierra Leone, researchers investigated into the issues of intention to stay among health workers\textsuperscript{17}. Findings from life stories showed that motivation of health professionals could be increased through more focused non-monetary intervention policies in order to increase the overall retention of health workers.

Another two studies in this area were conducted in Nigeria. The first one investigated the factors contributing to the attraction and retention of qualified health workers\textsuperscript{13}, and its findings showed that motivating health workers importantly resulted from the institutional capacity to improve their working conditions and provide opportunities for career development. The second study assessed factors that affect retention of nurses in Lagos\textsuperscript{19} and its conclusions suggested a number of schemes including safety measures, bringing injuries to the lowest minimum, communicating with health workers and assisting those who work alone, and providing financial assistance for health workers to attend conferences as part of strategy to upgrade their knowledge, clear policies on leave provision and promotion for health workers. Researchers sought to investigate the determinants of job retention among health workers in Vietnam\textsuperscript{20}, and they realized that lack of supervision and new opportunities to upgrade professional competencies affected retention levels among health workers. It was therefore recommended that upgrading knowledge and maintaining required skills through in-service training could be the core foundation in retaining health workers. It was also shown that the working environment with availability of medical equipment and supplies was associated with reduced turnover intentions among health workers.

**Methods**

**Setting**

The study was implemented in Kigali City, Rwanda. Rwanda has four main provinces and Kigali City. Each province has Districts as the main units of local administration. Kigali City is administered at the level of province as it has districts as well. With a population of more than one million, Kigali is the capital and largest city of Rwanda. Its geographic situation is in the centre of the country and the city has been considered the economic, cultural and transport hub of Rwanda since 1962, the period of independence. Being the capital city of the country, Kigali enjoys a good distribution of health facilities. There are two referral hospitals in Kigali, four district hospitals, one military hospital which also serves for the public and currently 29 health centers.

The issues around the distribution of the health personnel can be classified depending on whether the health system considers public or private health sector, rural areas or urban areas, and primary or tertiary levels of the health system\textsuperscript{21,22}. With different types of health services offered to people in the capital city of the country, Kigali attracts different categories of professional health workers who are employed in the four public district hospitals available in the city, than any other area in the country. In this view, availability and variability of data among respondents was expected in this area of study. In addition, the study was conducted in the district hospitals as the major units of health care service provision in the country, which is supposed to have all categories of health workers and where the levels of attrition among the health personnel were found to be high in the recent past years.

**Design**

The study used a cross-sectional survey with a quantitative research approach. The choice of the design was based on the nature of the problem being studied, requiring professional health workers' views on the level of availability and provision of non-financial incentives and their perceived levels of intentions to stay in (or leave) the hospitals, and therefore the researcher’s intention to get the respondents’ opinions from a representative sample at one point of time.
Population and sample

There are four public district hospitals in Kigali. The study was conducted in three hospitals because one of them did not meet the requirement of having served as a district hospital for one year at the time the study was being conducted. The study respondents were doctors, nurses, midwives, pharmacists and dentists as health professionals to be considered in the literature according to the International Standards Classification of Occupations. To determine the sample, four main steps were undertaken. Firstly, purposive sampling was used to consider all dentists and pharmacists, considering that their number was small and based on the importance of their contribution to the study. Secondly, Slovin’s formula was used to determine the total sample from the remaining population, including doctors, nurses and midwives. Thirdly, the principle of proportionate allocation was used to determine the number of respondents from each of the three hospitals. The proportionate allocation was also used to determine the number of doctors, nurses and midwives, from each hospital. Lastly, simple random sampling was used to determine individual study participants among doctors, nurses and midwives, in each hospital. As a result, 252 participants from the total number of 469 professional health workers, including doctors, nurses, midwives, dentists and pharmacists from three district hospitals were selected to constitute the sample of the study. For the matter of consistency, health workers who were on duty as internees and those who were in the probationary period (less than 6 months on duty) were not considered to participate in the study. The study participants were directly contacted by the researcher and the research assistants in the different departments of the hospitals, and each respondent was given up to up to 3 weeks to complete survey the questionnaire.

Instrument, measurement and data collection

The study used a survey questionnaire as the data collection tool to assess the level of availability and provision of non-financial incentives and intentions to stay. The study instruments were designed and pilot-tested with 23 professional health workers from public district hospitals in the Southern Province, and adjustments to the survey instrument were made accordingly. Intention to stay was considered as a major determinant of retention and was defined as the health worker’s willing to remain in the health care service provision facility for the next three years as result of available and provided non-financial packages. Working conditions were measured in terms of workload management practices and fairness, flexibility in working hours, the status of health institution facilities and equipment (e.g. offices, wards, theaters, wash rooms), appropriate lightning, mechanisms for noise reduction in the health care facilities, flexibility in the lifestyle changes and job-life balance, availability of safety measures for the health personnel and their equipment, and job security. Training and development was measured by existence of training and development policy, fairness in provision of training and development opportunities among professional health workers, line managers’ support to facilitate sharing health workers’ new skills and techniques with other staff members, and aligning training and development opportunities with promotion opportunities. The indicator of career development was measured through availability of professional health workers’ self-assessment tools to facilitate career development, job rotation programs, career planning workshops and recognition for high achievement. The survey questionnaire was built on the four-point Likert scale in order to allow respondents to make definite choices without simply giving socially pleasing answers instead of expressing the reality. During the data collection process, the survey questionnaire was distributed through the different departments. The data collectors ensured to have contact details of the respondents in each department. The filled questionnaires were collected through respective departments and especially in the collective ordinary work meetings, which facilitated the return of all distributed questionnaires.

Data analysis

Statistical analysis of the data was conducted by support a data management and analysis software, of STATA 13.1. Descriptive statistics were used to report the respondents’ socio-demographic characteristics and perceived levels of intentions to stay. In order to determine professional health workers’ levels of perception on the availability and provision of non-financial incentives in the hospitals, a single composite variable was computed from all indicators of each of the predictor (either working conditions, training and development or career development). Using an equal cut off, three levels from a computed composite variable were fixed for each predictor, which allowed to determine whether each of the indicators of non-financial incentives was rated low, average or high in the hospital. Multiple logistic regression was used to show associations between predictors and the outcome variable with 95% confidence intervals and 5% level of confidence. Results were reported by use odds ratios in the adjusted model considering other factors age, gender, marital status, tenure in the health care service provision facility, tenure in the health care service provision occupation and education level, due to their potential to confound with the associations between covariates and the outcome variable.

Ethical approval and consent

The research ethical clearance was obtained from the University of Rwanda Institutional Review Board (016RPGS017). Before undertaking the study in each hospital, research authorization was sought from and provided by each hospital research and ethical committee (1072/MSK/DH/2017; 247/HOPKIBAG/2017; 483/KH/17). Before starting the survey, respondents were provided with detailed explanation of the purpose of the study. Respondents were also assured of full confidentiality and voluntary participation and a written informed consent was provided before participation in the study.

Results

Demographic characteristics of respondents

The socio-professional characteristics of respondents show that there is a slight difference in the proportion of male and female respondents (53.1% and 46.9%, respectively). The dominant age group is between 31 and 45 years (59.3% of respondents); 17.7% of respondents are 30 years old or younger.
and those above 46 years make 23.1% of respondents. Results also show that the majority of respondents have a university degree as more than 53% had a bachelor’s or master’s degree, or a PhD. The remaining have a university diploma or less. No dentist nor pharmacist are educated beyond the bachelor’s degree. As for respondents’ marital status, the majority of them (72%) were in the category of married people, either still living with a partner, widowed, divorced or separated. While 70% of respondents were found to have been health professionals for 3 years or more, the proportion of those that had worked in their current institution for that time is 45.7%. Foreigners made up only 5.4% of the total respondents. Socio-professional characteristics of respondents are summarized in Table 1.

Intentions to stay
Health workers who had the intents to stay for the next three years were 51.44 percent; close to half of respondents did not have any intentions to stay. A big number of both medical specialists and general medical doctors have intentions to stay (67.35%). While slightly more than half of nurses and midwives had intentions to stay (51.63%), it was also revealed from respondents’ views that the lowest levels of intentions to stay were identified among dentists and pharmacists as they stood at the respective percentage of 31.25 and 32.00.

Availability and provision of non-financial incentives
In general, work conditions were perceived to be at the average level by a big number of respondents among dentists (64.00%), midwives and nurses (57.52%), and doctors (42.86%). While work conditions were rated low by majority of pharmacists (68.75%), the relatively high rate of such conditions was perceived by 24.49 percent among doctors followed by nurses and midwives (18.30%), pharmacists (12.50%) and dentists (8.00%). Availability and provision of training and development opportunities in the hospitals was generally rated low by a

| Table 1. Social and demographic characteristics of respondents. |
|---------------------------------------------------------------|
| **Individual characteristics** | **Type of work, %** |
|                                | Doctors (n=49) | Nurses/midwives (n=153) | Dentists (n=25) | Pharmacists (n=16) | Total (n=243) |
| Sex                            |               |                         |                 |                   |               |
| Male                           | 53.1          | 54.3                    | 44.0            | 56.25             | 53.1          |
| Female                         | 46.9          | 45.7                    | 56.0            | 43.75             | 46.9          |
| Age groups, years              |               |                         |                 |                   |               |
| ≤30                            | 12.2          | 24.2                    | 0.0             | 0.0               | 17.6          |
| 31–45                          | 67.4          | 52.9                    | 68.0            | 81.2              | 59.3          |
| ≥46+                           | 20.4          | 22.9                    | 32.0            | 18.8              | 23.1          |
| Education                      |               |                         |                 |                   |               |
| Diploma and less               | 34.7          | 46.4                    | 72.0            | 37.5              | 46.1          |
| Bachelor’s Degree              | 61.2          | 39.9                    | 28.0            | 62.5              | 44.4          |
| Masters and PhD                | 4.1           | 13.7                    | 0.0             | 0.0               | 9.5           |
| Marital Status                 |               |                         |                 |                   |               |
| Single                         | 42.9          | 26.1                    | 8.0             | 31.3              | 28.0          |
| Married and others             | 57.1          | 73.9                    | 92.0            | 68.7              | 72.0          |
| Number of years in the service |               |                         |                 |                   |               |
| <3                             | 20.4          | 32.7                    | 20.0            | 50.0              | 30.0          |
| ≥3                             | 79.6          | 67.3                    | 80.0            | 50.0              | 70.0          |
| Number of years in the facility|               |                         |                 |                   |               |
| <3                             | 53.1          | 43.1                    | 44.0            | 50.0              | 45.7          |
| ≥3                             | 46.9          | 56.9                    | 56.0            | 50.0              | 54.3          |
| Nationality                    |               |                         |                 |                   |               |
| Rwandan                        | 83.7          | 98.7                    | 88.0            | 100.0             | 94.7          |
| Non-Rwandan                    | 16.3          | 1.3                     | 12.0            | 0.0               | 5.3           |
A considerable number of respondents among pharmacists (56.25%), dentists (56.00%) and doctors (48.98%). Majority of dentists (72.00), pharmacists (68.75%), nurses and midwives (56.21%), and doctors (44.90%) rated career development programs as low. Finally, it was observed that none of the dentists nor pharmacists rated training, development and career development as high. Table 3 describes perceived levels of non-financial incentives in the hospitals.

Associations between non-financial incentives and intention to remain in the work

Although working conditions are not significantly associated with health workers’ intentions to stay in the hospitals, there are significant associations between training and development and career development programs, and health workers’ intentions to stay in the hospitals. In fact, health workers who perceived an average level of availability and provision of opportunities for training and development in the hospitals were likely to stay (OR=1.47; P=0.031) compared with their counterparts who perceived such opportunities as low. Perceiving training and development opportunities in the hospitals as high was associated with more odds of staying (OR=1.56; P=0.004) than perceiving them as low. In addition, health workers who perceived an average level of opportunities nearly 15 times more likely to stay (OR=14.50; P<0.001) compared with those who rated career development opportunities as low. In the same way, there was a more likelihood of remaining among health workers who perceived opportunities for career development as high (OR=15.88; P=0.010), than their counterparts who rated it as low (Table 4).

By considering the indicators of non-financial incentives as the predictors of health workers’ intentions to stay, statistical significant associations were found between training and development and career development, and intentions to stay (Table 2). As the relationship between these covariates and the outcome variable may be affected by other confounders, the latter were uploaded in the model in order to control for them. Results in the adjusted model show that all predictors were associated with the outcome variable. In fact, perceiving an average and high level of working conditions in the hospital was associated with health workers’ intentions to stay (OR=9.70; P<0.001; OR=5.77; P=0.001). In addition, professional health workers who rated availability and provision of opportunities for training and development as high were more likely to stay (OR 1.025; P=0.014) than their counterparts who rated

Table 2. Perceived levels of intentions to stay among health workers.

| Intentions to stay | Area of work, % |
|--------------------|-----------------|
|                    | Doctors (n=49) | Nurses/midwives (n=153) | Dentists (n=25) | Pharmacists (n=16) | Total (n=243) |
| With no intentions to stay | 32.65 | 48.37 | 68.00 | 68.75 | 48.56 |
| With intentions to stay | 67.35 | 51.63 | 32.00 | 31.25 | 51.44 |

Table 3. Perceived levels of availability and provision of non-financial incentives in the hospitals.

| Variables | Area of work, % |
|-----------|-----------------|
|           | Doctors (N=49) | Nurses/Midwives (N=153) | Dentists (N=25) | Pharmacists (N=16) | Total (N=243) |
| Work conditions | | | | | |
| Low | 22.65 | 24.18 | 28.00 | 68.75 | 29.22 |
| Average | 42.86 | 57.52 | 64.00 | 18.75 | 52.67 |
| High | 24.49 | 18.30 | 8.00 | 12.50 | 18.11 |
| Training and development | | | | | |
| Low | 48.98 | 39.87 | 56.00 | 56.25 | 44.45 |
| Average | 38.78 | 45.75 | 44.00 | 43.75 | 44.03 |
| High | 12.24 | 14.38 | 0.00 | 0.00 | 11.52 |
| Career development | | | | | |
| Low | 44.90 | 56.21 | 72.00 | 68.75 | 56.38 |
| Average | 38.78 | 31.37 | 28.00 | 31.25 | 32.51 |
| High | 16.33 | 12.42 | 0.00 | 0.00 | 11.11 |
them as low. Moreover, perceiving an average and high level of availability of career development programs in the hospitals was associated with a likelihood of staying in the hospital (OR=12.48; P<0.001 and OR=12.26; P=0.038) than perceiving such programs as low in the hospitals. Other factors that were found to be positively statistically associated with intentions to stay include having a bachelor’s degree (OR=0.41; P=0.021) compared with having a diploma or less; being a nurse or a midwife (OR=0.27; P=0.023), a dentist or pharmacist (OR=0.09; P=0.003) compared with being a general medical doctor or specialist; and having stayed in the health care service provision facility for 3 years or more (OR=0.14; P=0.003) compared with having stayed in the institution for less than three years (Table 5).

### Discussion

The study findings show that health workers with intentions to leave made a slightly big number compared with those who had intentions to stay. The movement of health workers being a concern for health systems in sub-Saharan Africa as the findings of this study provide the insights of such a pattern in the region as it was found out in other studies conducted in this area. As opposed to general assumptions that intentions to leave would be observed among doctors more than other categories of health workers including nurses and midwives, the present study has shown high levels of intentions to stay among general medical doctors and specialists. Although it is not clear why it was found to be the case in this study, the study conducted in Malawi stated that such a pattern was justified by the fact that health workers with low qualifications are attracted by high salaries non-governmental organisations.

The present study found that working conditions, training and development, and opportunities for career development are positively associated with health workers’ intentions to stay. In fact, a similar study by Lehmann et al. revealed that the working environment is a determinant of health workers’ intentions to stay and health institutions’ capacity to retain health workers. In addition, studies conducted by Odhiambo et al., Gilles, Burnard and Peyremann-Bridevaux have shown that manageable workload, job security and supervisor support among other interventions led to reduced health workers’ intentions to leave. Moreover, a more recent study conducted in Kenya assessed factors that predict attraction of the health personnel and boost retention of primary health care workers and the findings stressed the role of work conditions on retention of health workers. Work conditions also relate to the health institutions’ capacity to provide the necessary health infrastructure like medical equipment in order to facilitate health workers perform their tasks, which also reduces stress and makes health workers feel confidence in performance of assigned tasks. Studies by Dussalt and Franceschini, Aluku and Mullei also confirmed that the health infrastructure in terms of medical equipment and supplies, coupled with workload-management policies and supervision, reduces turnover intentions among health workers.

As far as career development is concerned, health workers expect support from management so as to see themselves moving to higher positions, changing jobs and tasks within the same organization in order to avoid the routine. In this view, it has been confirmed in previous research that the more health workers are facilitated to make their career growth dreams realized, the more they are likely to be committed to their job and become loyal to their institutions, which translates into high rates of intentions to stay. In addition to this, career growth in terms of health workers’ promotional opportunities leads to high levels of job satisfaction.

The study findings also show that efficient training and development programs in the health care institutions could be positive determinants of intentions to stay, which are a major predictor of retention. Previous studies argued that apart from being facilitated to learn new skills for them to remain updated in their different areas of work, they should also be given

---

### Table 5. Associations between non-financial incentives and intentions to stay.

| Intentions to stay predictors | Odds ratio | 95% confidence interval | P-value |
|------------------------------|------------|-------------------------|---------|
| Working conditions (vs low)  |            |                         |         |
| Average                      | 0.90       | 0.50–1.61               | 0.730   |
| High                         | 0.78       | 0.79–9.74               | 0.070   |
| Training and development (vs low) |          |                         |         |
| Average                      | 1.47       | 0.24–0.93               | 0.031   |
| High                         | 1.56       | 0.00–0.40               | 0.004   |
| Career development (vs low)  |            |                         |         |
| Average                      | 14.50      | 5.54–37.93              | 0.000   |
| High                         | 15.88      | 1.91–13.14              | 0.010   |
opportunities to practise what they learnt during their training sessions, as lack of such opportunities was associated with intentions to leave. With regard to this, a study conducted in Malawi argued that continuous education is considered as one of the primary motivation schemes that should be undertaken to make health workers remain in their current roles.

**Conclusion**
Health worker retention is a noteworthy issue for ensuring a strong, well-functioning healthcare system. In this view, the retention of professional health workers enhances better quality healthcare services. This study explored the associations between non-financial incentives and intentions to stay among professional health workers employed in public district hospitals in Rwanda. The findings of this study revealed statistically significant associations between professional health workers’ perceptions on the level of availability and provision of non-financial incentives in the hospitals and intentions to stay.

The study findings show that professional health workers’ intentions to stay varie across different categories of respondents. In this view, there is a need to strategically boost intentions to stay among professional health workers. It is also realized from the findings that availability of training and development programs, career development programs and work conditions are rated low by a considerable number of health workers who participated in the study. As intention to stay is a major determinant of retention and the fact that non-financial incentives indicators explored in this study have been found to be positive determinants of intentions to stay

| Intentions to stay predictors | Odds ratio | 95% confidence interval | P-value |
|------------------------------|------------|------------------------|---------|
| Sex (vs male)                |            |                        |         |
| Female                       | 0.73       | 0.30–1.76              | 0.480   |
| Age group, years (vs ≤30 years) |          |                        |         |
| 31–45                        | 0.44       | 0.14–1.39              | 0.160   |
| ≥46                          | 0.26       | 0.07–1.00              | 0.050   |
| Marital status (vs single)   |            |                        |         |
| Married and others           | 0.98       | 0.30–3.23              | 0.980   |
| Education (vs diploma and less) |       |                        |         |
| Bachelor’s Degree            | 0.41       | 0.18–0.90              | 0.021   |
| Others                       | 3.12       | 0.48–20.04             | 0.224   |
| Type of work (vs doctors)    |            |                        |         |
| Nurses and midwives          | 0.27       | 0.08–0.83              | 0.023   |
| Others                       | 0.09       | 0.02–0.44              | 0.003   |
| Experience in the service (vs <3 years) | 3.91 | 0.88–17.43 | 0.073 |
| ≥3                           |            |                        |         |
| Experience in the facility (vs <3 years) | 0.14 | 0.03–0.51 | 0.003 |
| ≥3                           |            |                        |         |
| Working conditions (vs low)  |            |                        |         |
| Average                      | 9.70       | 3.14–29.95             | 0.000   |
| High                         | 5.77       | 15.41–2.16             | 0.001   |
| Training and development (vs low) |       |                        |         |
| Average                      | 1.19       | 0.46–3.06              | 0.708   |
| High                         | 1.025      | 0.00–0.22              | 0.014   |
| Career development (vs low)  |            |                        |         |
| Average                      | 13.98      | 4.17–3.94              | 0.000   |
| High                         | 12.26      | 1.29–12.01             | 0.038   |
among health workers in the study setting, it is important for the health care institutions give more strategic value to interventions aiming at boosting retention of health workers through different non-financial packages. Such interventions would focus on improving work conditions especially in equitable workload policies and flexibility in working hours, the improvement of supervision schemes within the health care institution, and devising training programs that enhance the health workers’ skills for their motivation to remain in the health care facilities. It could be of great merit also for higher levels of governance of the health system to devise long term strategies for career development programs as such practices positively affect health workers’ intentions to stay and increase institutional retention capacity.

**Supplementary material**

**Supplementary File 1. Questionnaire used in the study.**

Click here to access the data.

**References**

1. MINISANTE: Health Sector Policy. Kigali: Government of Rwanda; 2005. Reference Source
2. RDB: Rwanda Skills Survey. Kigali: Government of Rwanda; 2012. Reference Source
3. Binagwaho A, Kyamanywa P, Farmer PE, et al.: The human resources for health program in Rwanda—new partnership. N Engl J Med. 2013; 369(21): 2054–9. Published Abstract | Publisher Full Text
4. Mbanjumucyo G, DeVos E, Pulfrey S, et al.: State of emergency medicine in Rwanda 2015: an innovative trainee and trainer model. Int J Emerg Med. 2015; 8: 20. Published Abstract | Publisher Full Text | Free Full Text
5. The Ministry of Finance and Economic Planning: Economic Development and Poverty Reduction Strategy II. Kigali: The Republic of Rwanda; 2013. Reference Source
6. MINISANTE: Third Health Sector Strategic Plan: July 2012–2018. Kigali-Rwanda: Republic of Rwanda; 2012. Reference Source
7. Ministry of Health: Health Sector Annual Report: July 2014–June 2015. Kigali: The Government of Rwanda; 2015. Reference Source
8. Friederike P: Health Worker Motivation and the Role of Performance Based Finance Systems in Africa: A Qualitative Study on Health Motivation and the Rwandan Performance Based Finance Initiative in District Hospitals. Destin Development Studies Institute. 2009(8-89). Reference Source
9. Lievens T, Sameels P, Butera JD, et al.: Diversity in Career Preferences of Future Health Workers in Rwanda. Where, Why, and for How Much? World Bank Working Paper; No 189. Africa human development series (World Bank. © World Bank). 2010. Reference Source
10. World Health Organisation: Increasing access to health workers in remote and rural areas through improved retention: Global policy recommendations. Geneva: WHO Press; 2010. Reference Source
11. Kihiragasa M, Waghaile VY: Impact of Financial and Non-financial Rewards on Employee Motivation. International Research Journal of Management and Commerce. 2014; 1(6): 61–74. Reference Source
12. Yousaf S, Latif M, Aslam S, et al.: Impact of Financial and non Financial Rewards on Employee Motivation. Middle-East Journal of Scientific Research. 2014; 21(10): 1776–86. Reference Source
13. Rusa L, Nginarheba Joe D, Janssen W, et al.: Performance-based financing for better quality of services in Rwandan health centres: 3-year experience. Trop Med Int Health. 2006; 11(7): 830–7. PubMed Abstract | Publisher Full Text
14. Longmore B, Ronnie L: Human resource management practices in a medical complex in the Eastern Cape, South Africa: Assessing their impact on the retention of doctors. S Afr Med J. 2014; 104(5): 368–71. PubMed Abstract | Publisher Full Text
15. Ojakaa D, Olango S, Jarvis J: Factors affecting motivation and retention of primary health care workers in three disparate regions in Kenya. Hum Resour Health. 2014; 12: 53. PubMed Abstract | Publisher Full Text | Free Full Text
16. Nyandoro ZF, Masanga GG, Munyoro G, et al.: Retention oh Health Workers in Rural Hospitals in Zimbabwe: A case study of Makonde District, Mashonaland West Province. International Journal of Research in Business Management. 2016; 4(6): 27–40. Reference Source
17. Wate HR, Samai M, Witter S: Retention of health workers in rural Sierra Leone: findings from life histories. Hum Resour Health. 2016; 14: 3. PubMed Abstract | Publisher Full Text | Free Full Text
18. Ebubu OM, Campbell PC: Attraction and retention of qualified health workers to rural areas in Nigeria: a case study of four LGAs in Ogun State, Nigeria. Rural Remote Health. 2011; 11(1): 1515. PubMed Abstract
19. Oyemunde MO, Ayeri DO: Exploring Factors Influencing Recruitment and Retention of Nurses in Lagos State, Nigeria within Year 2008 and 2012. Open J Nurs. 2014; 4(8): 590–601. Publisher Full Text
20. Daneshkohan A, Zarei E, Mansouri T, et al.: Factors affecting job motivation among health workers: a study from Iran. Glob J Health Sci. 2014; 7(3): 153–60. PubMed Abstract | Publisher Full Text | Free Full Text
21. Thu NT, Wilson A, McDonald F: Motivation or demotivation of health workers providing maternal health services in rural areas in Vietnam: findings from a mixed-methods study. Hum Resour Health. 2015; 13: 91. PubMed Abstract | Publisher Full Text | Free Full Text
22. Kabene SM, Orchard C, Howard JM, et al.: The importance of human resources

**Data availability**

The raw data for this study are available on OSF: https://doi.org/10.17605/OSF.IO/7RXP3th.

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).

The dataset has been provided in the excel format and the explanations of abbreviations within the dataset have been provided in an accompanying legend. The details on the measures of both independent and outcome variables have been also provided, along with data analysis process and statistical tests.
management in healthcare: a global context. Hum Resour Health. 2006; 4: 20.

23. El-Jardali F, Tchaghchaghian V, Jamali D: Assessment of human resources management practices in Lebanese hospitals. Hum Resour Health. 2009; 7(89): 84. PubMed Abstract | Publisher Full Text | Free Full Text

24. Songstad NG, Reidal OB, Massay DA, et al.: Perceived unfairness in working conditions: the case of public health services in Tanzania. BMC Health Serv Res. 2011; 11: 34.

25. Bonenberger M, Akins M, Akeoongo P, et al.: The effects of health worker motivation and job satisfaction on turnover intention in Ghana: a cross-sectional study. Hum Resour Health. 2014; 12: 43. PubMed Abstract | Publisher Full Text | Free Full Text

26. Manafa O, McAluliffe E, Maseko F, et al.: Retention of health workers in Malawi: perspectives of health workers and district management. Hum Resour Health. 2009; 7: 65.

27. Butali DN: Factors Affecting Retention of Human Resources for Health in TRANS-NZIOA County, Kenya. International Journal of Recent Research in Commerce Economics and Management. 2015; 2(4): 143–70. Reference Source

28. Gikuyu CN: Perceived Relationship between Non-financial Rewards and Employee Motivation at Impact Marketing (K) Limited. [Masters Thesis]. In press, 2014. Reference Source

29. Nagai M, Abraham S, Okamotoa M, et al.: Perceived Relationship between Non-financial Rewards and Employee Motivation at Impact Marketing (K) Limited. [Masters Thesis]. In press, 2014. Reference Source

30. International Labour Organization: International Standard Classification of Occupations: ISCO-08. Geneva, Switzerland: International Labour Office; 2012. Reference Source

31. Boone HN, Boone DA: Analyzing Likert Data. Journal of Extension. 2012; 50(2). Reference Source

32. Amin ME: Social Science Research: Conception, Methodology and Analysis. Kampala: Makerere University; 2005. Reference Source

33. Sisson DA, Stocker HR: Analyzing and Interpreting Likert-Type Survey Data. The Delta Pi Epsilon Journal. 1989; 31(2): 81–5.

34. Nowlack SM, Kahn BE, Dhar R: Coping with Ambivalence: The Effect of Removing a Neutral Option on Consumer Attitude and Preference Judgments. The Journal of Consumer Research. 2002; 29(3): 319–34. Publisher Full Text

35. Doval D: Migration of Nurses from Sub-Saharan Africa: A Review of Issues and Challenges. Health Serv Res. 2007; 42(3 Pt 2): 1373–8. PubMed Abstract | Publisher Full Text | Free Full Text

36. Siyam A, Dal Poz MR: Migration of health workers: the WHO code of practice and the global economic crisis. Geneva, Switzerland: World Health Organization; 2014. Reference Source

37. Schmeidekrantz K, Perera M, Scheil E, et al.: Predictors of Workforce Retention Among Malawian Graduate Students of a Scholarship Program: A Mixed-Methods Study. Glob Health Sci Pract. 2015; 3(1): 85–96. PubMed Abstract | Publisher Full Text | Free Full Text

38. Kopetsch T: The migration of doctors to and from Germany. J Public Health. 2009; 17(1): 33–9. Publisher Full Text

39. Lehmann U, Dieleman M, Marteau T: Staffing remote rural areas in middle- and low-income countries: A literature review of attraction and retention. BMC Health Serv Res. 2008; 8: 19. PubMed Abstract | Publisher Full Text | Free Full Text

40. Gilles I, Barnaud B, Peytreman-Bridevaux I: Factors associated with healthcare professionals’ intent to stay in hospital: a comparison across five occupational categories. Int J Qual Health Care. 2014; 26(5): 158–66. PubMed Abstract | Publisher Full Text

41. Odihambo J, Rwabweleri FC, Rusangwa C, et al.: Health worker attrition at a rural district hospital in Rwanda: a need for improved placement and retention strategies. Pan Afr Med J. 2017; 27: 168. PubMed Abstract | Publisher Full Text | Free Full Text

42. Zum P, Dal Poz MR, Stilwell B, et al.: Imbalance in the health workforce. Hum Resour Health. 2004; 2(1): 13. PubMed Abstract | Publisher Full Text | Free Full Text

43. Dieleman M, Cuong PV, Ahv LV, et al.: Identifying factors for job motivation of rural health workers in North Viet Nam. Hum Resour Health. 2003; 1(1): 10. PubMed Abstract | Publisher Full Text | Free Full Text

44. Dieleman M, Toonen J, Touré H, et al.: The match between motivation and performance management of health sector workers in Mali. Hum Resour Health. 2006; 4: 2. PubMed Abstract | Publisher Full Text | Free Full Text

45. Awases A, Gbary A, Nyoni J, et al.: Migration of health professionals in six countries: a synthesis report. Brazzaville: WHO; 2004. Reference Source

46. Dussault G, Franceschini MC: Not enough there, too many here: understanding geographical imbalances in the distribution of the health workforce. Hum Resour Health. 2006; 4: 12. PubMed Abstract | Publisher Full Text | Free Full Text

47. Aluku NCM: Factors influencing retention of health workers in primary health care facilities in Kakamega county, Kenya. [Masters thesis]. In press; 2012. Reference Source

48. Mulie K, Mudhune S, Wafalu J, et al.: Attracting and retaining health workers in rural areas: investigating nurses’ views on rural posts and policy interventions. BMC Health Serv Res. 2010; 10 Suppl 1: S1. PubMed Abstract | Publisher Full Text | Free Full Text

49. McCarthy G, Tyrrell MP, Cronin C: National Study of Turnover in Nursing and Midwifery. Dublin, Ireland: Department of Nursing Studies. University College Cork, National University of Ireland Cork; 2002. Reference Source

50. Willis-Shattuck M, Bidwell P, Thomas S, et al.: Motivation and retention of health workers in developing countries: a systematic review. BMC Health Serv Res. 2008; 8: 247. PubMed Abstract | Publisher Full Text | Free Full Text

51. Engeda EH, Birhanu BM, Alene KA: Intent to stay in the nursing profession and associated factors among nurses working in Amhara Regional State Referral Hospitals, Ethiopia. BMC Nurs. 2014; 13: 24. PubMed Abstract | Publisher Full Text | Free Full Text

52. Cavanagh SJ, Coffin DA: Staff turnover among hospital nurses. J Adv Nurs. 1992; 17(11): 1369–76. PubMed Abstract | Publisher Full Text | Free Full Text

53. Ayalew F, Kols A, Kim YM, et al.: Factors Affecting Turnover Intention among Nurses in Ethiopia. World Health Popul. 2015; 16(2): 62–74. PubMed Abstract | Publisher Full Text

54. Engeda EH, Birhanu AM, Alene KA: Intent to stay in the nursing profession and associated factors among nurses working in Amhara Regional State Referral Hospitals, Ethiopia. BMC Nurs. 2014; 13: 24. PubMed Abstract | Publisher Full Text | Free Full Text

55. Getie GA, Betre ET, Hareri HA: Assessment of Factors Affecting Turnover Intention among Nurses Working at Governmental Health Care Institutions in East Gojjam, Amhara Region, Ethiopia. 2013. Am J Nurs Sci. 2015; 4(3): 107–12. PubMed Abstract | Publisher Full Text

56. Ndirumana C, Joshua K, Ruth T: Non-financial incentives and professional health workers’ intentions to stay in public district hospitals in Rwanda: a cross-sectional study. 2018. http://www.doc.gov/10.17605/OSFJQ/7RXP3
Open Peer Review

Current Peer Review Status: 🟢

Version 2

Reviewer Report 28 October 2019

https://doi.org/10.21956/wellcomeopenres.16789.r36623

© 2019 Nagai M. This is an open access peer review report distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Mari Nagai
National Center for Global Health and Medicine, Tokyo, Japan

I read the revised paper and am almost happy to approve it. The author did a great effort to respond my request.

However, I have two suggestions (one is critical) to the author to revise the following paragraph related to Table 5 before the final approval.

"As the relationship between these covariates and the outcome variable may be affected by other confounders, the latter were uploaded in the model in order to control for them. Results in the adjusted model show that all predictors were associated with the outcome variable. In fact, perceiving an average and high level of working conditions in the hospital was associated with health workers' intentions to stay (OR=9.70; P<0.001; OR=5.77; P=0.001). In addition, professional health workers who rated availability and provision of opportunities for training and development as high were more likely to stay (OR 1.025; P=0.014) than their counterparts who rated them as low. Moreover, perceiving an average and high level of availability of career development programs in the hospitals was associated with a likelihood of staying in the hospital (OR=12.48; P<0.001 and OR=12.26; P=0.038) than perceiving such programs as low in the hospitals. Other factors that were found to be positively statistically associated with intentions to stay include having a bachelor's degree (OR=0.41; P=0.021) compared to having a diploma or less; being a nurse or a midwife (OR=0.27; P=0.023), a dentist or pharmacist (OR=0.09; P=0.003) compared with being a general medical doctor or specialist; and having stayed in the health care service provision facility for 3 years or more (OR=0.14; P=0.003) compared with having stayed in the institution for less than three years (Table 5)."

**Bold part:** It should be NEGATIVELY associated, because OR is LESS than 1. For example, "being a nurse or a midwife has HIGH risk of not to retain at the district hospital compared to medical doctors. Please check all these predictors once again. Once the author confirm the results, the discussion part should be also revised accordingly.

**Italic part:** Add 95% CI such as "OR=0.41; (95%CI, 0.23, 0.59), P=0.021" to show the reader that it does not cross 1 = statistically significant.
Lastly, it would be very interesting to follow up these targets for coming several years (=prospectively) to identify who actually left the district hospital, where they went, and why. Then the authors can write another article to compare with this paper. I am especially interested in the destination of the current employees. Do they go to abroad (brain drain), NGOs or private sectors, higher level hospitals, or lower level hospitals, or even rural health facilities? Was that their own will, or somebody asked them to move? Then the authors can provide further practical and effective recommendations based on the real evidence to Ministry of health or other relevant stakeholders to retain health workers in this district hospital.

**Competing Interests:** No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.
4. Authors also need to provide a paragraph on the limitations of the study and some justification (the importance) on why this study needs to be published.

5. All other comments are embedded in the manuscript available for download [here](#).

**Is the work clearly and accurately presented and does it cite the current literature?**
Yes

**Is the study design appropriate and is the work technically sound?**
Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**
Yes

**If applicable, is the statistical analysis and its interpretation appropriate?**
Yes

**Are all the source data underlying the results available to ensure full reproducibility?**
Yes

**Are the conclusions drawn adequately supported by the results?**
Partly

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Health systems research, health care financing, human resource

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

Reviewer Report 18 May 2018

https://doi.org/10.21956/wellcomeopenres.15786.r33058

© 2018 Nagai M. This is an open access peer review report distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Mari Nagai
National Center for Global Health and Medicine, Tokyo, Japan

The topic is interesting because understanding the perception of non-financial incentives is critical to improve the retention of health workers.

However, this article has critical weakness mainly at interpretation of data analysis.
Introduction
Strength: Authors well explored earlier studies and identified the possible factors influencing the health worker's decision of retention.
Comments:
- Suggest to start more comprehensive interventions to improve retention (for example, refer the categories of interventions in "Increasing Access to Health Workers in Remote and Rural Areas Through Improved Retention: Global Policy Recommendations" issued by WHO in 2010), then focus on non-financial incentives.
- Describe why this research focuses only on non-financial incentives without exploring financial incentives or other interventions.

Methods
- Further explanation is necessary why the district hospitals in capital city were selected for this study instead of less attractive health facilities for health workers. It is well known that the uneven distribution of health workers in nations in three axes: the public health sector in contrast to the private health sector; rural areas in contrast to urban areas; and primary levels in contrast to tertiary levels. The targeted health facilities in this study are located in urban and not primary levels.
- Please describe the definition of “intention to stay (retention)“ in this study. Health workers could have intention to stay at the current workplace for several more years, or ten more years or until retirement. All of them can be categorized as “intention to stay” but incentives to prolong their stay should be different from shorter duration of stay to longer (including until retirement) duration of stay.
- Further describe how the participants responded the survey questionnaire to rate their working conditions, training and development, and career development. For example, were they asked to scale from 1 to 5 per each question? How the authors assured the objectivity of the self-rating by respondents? How the authors transform from the original rating scores to “low, average, high” categories?
- Describe the response rate and justify if the low response rate affected the sampling method if applicable.

Results
In general, analysis and interpretation of data are insufficient.
- Table 1
  Suggest separating nurses and midwives. Their working conditions, training opportunities and career development are often different. If the authors have reason to merge these two types, please describe.

- Table 2
  Show number of respondents (= n) in each category in low-average-high for working conditions, training and development, and career development).

- Table 3 and the main text
  - Show number of respondents (=n) in each cell.
  - There is no explanation at all in the main text about the influence by sex, age, marital status, education, type of work, experience in the service and experience in the facility which are shown in Table 3. For example, as far as Table 3 shows, bachelor’s degree
holders, nurses and midwives or others, experience in the facility more than 3 years have statistically significantly low intentions to stay, but there is no analysis on these results in the main text.
- Other possible confounders are not analyzed. For example, name of health facilities (no need to show the real name, but health workers working at district hospital A could have more intention to stay than hospital B for some reasons), type of work (how about the difference between nurses and midwives), position of work (management position or lower position even in the same type of work), place of work (out-patient unit or in-patient unit), etc, and the reasons of statistical differences if any.

Discussion and conclusion
- After reading this paper, the readers would ask “so what”? The authors (and readers) have known that: 1) comprehensive intervention is necessary to improve retention of health workers; 2) non-financial incentive is one of the interventions; and 3) Working conditions, training and development, and career development are part of the non-financial interventions. In this context, the current draft of this paper does now show anything new. I strongly suggest authors to explore the data more deeply to show any new information for readers.
- Please describe any policy recommendations based on this study. Different recommendations could be shown to ministry of health, provincial or district health managers, hospital managers or health workers themselves.

References
1. Nagai M, Abraham S, Okamoto M, Kita E, et al.: Reconstruction of health service systems in the post-conflict Northern Province in Sri Lanka. *Health Policy*. 2007; 83 (1): 84-93 PubMed Abstract | Publisher Full Text

Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Partly
**Competing Interests:** No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 23 May 2018

Celestin Ndikumana, University of Rwanda, Butare, Rwanda

Dear Nagai,
Thank you for having taken your time to read and review my work.
I will have to go through your comments and suggestions thoroughly for better improvement of this article.
With too much appreciation,
Celestin

**Competing Interests:** No competing interest.

---

**Comments on this article**

Version 1

Author Response 06 Jun 2018

Celestin Ndikumana, University of Rwanda, Butare, Rwanda

Dear Charles,

Thank you for your comments some of which will be taken into consideration for the improved version of this article, like the limitations to related to the fact that training opportunities may have different outcomes. But as you have mentioned, one of them is job satisfaction which affects the intentions to stay/leave.

Some clarifications on the queries regarding how the analysis was carried out: (1) a composite variable was created for each of the three indicators of non-financial incentives (working conditions, training opportunities and career development) because each of them had more than one items to measure it. Hence working conditions had 11 items, training and development and career development had 6 items each. So as the analysis was not based on each individual item measure of the indicators (which couldn't have provided enough information on it), we created a composite variable combining all items of the indicator in order to have a full picture of the perceived level of availability and provision of non-financial incentives (through the 3 indicators). Using the composite variable we were also able to determine whether a perceived level of availability and provision of each indicators in the hospital was low, average or high. (2) The age variable was initially designed in narrow categories but during the analysis some categories were
combined to avoid very wide confidence levels interval in the logistic regression model. (3) The adjusted model accounted for other non-work factors that like gender, marital status, experience in the health care service, etc for precision on the indicators of non-financial incentives that affect the outcome variable.

Finally, although intentions to stay may not fully explain retention of employees in an institution, it has been proved to be one of its major predictors.

Thank you.

**Competing Interests:** No competing interests were disclosed.

Reader Comment 26 Apr 2018

**Charles Normand,** Trinity College Dublin, Ireland

This is a useful addition to the evidence on the effects of non-financial incentives for retention of health workers in low and middle income countries. While there are obvious limitations (such as being from only one province) the research has been conducted in line with similar studies. Some of the limitations also apply to other studies in the field. For example, it is now a common finding that opportunities for professional development are important, but it is not clear whether this is more related to the performance of the job and related satisfaction or whether it is explained by the effect of further training on the options to leave the current job.

I would like to see a little more detail of how the analysis was carried out, the reasons for using the composite variable and the justification of analysing age in very wide categories (when presumably the age is available as a continuous variable), since this might reduce the heterogeneity in the data. I was also not entirely clear what had been done in the adjusted model - it would be useful to have a little more detail on what was done and why.

A general problem in studies of this sort is that intentions are often different from outcomes, but it is not reasonable in a study of this scale to expect a full comparison of incentives and actual retention/ quitting outcomes.

**Competing Interests:** None