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]

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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

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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 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.
devised different strategies aiming at dealing with the challenge of the health personnel including performance-based pay and other financial packages\(^1\). 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\(^1\). Ronnie & Longmore\(^4\) 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\(^2\).

Similarly, two studies were conducted in the health care setting in Kenya. One assessed factors affecting retention of healthcare workers in Trans-Nzoia County\(^5\), 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\(^2\) 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\(^6\), 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\(^7\). 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\(^8\), 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\(^9\) 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\(^10\), 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 inhas 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\(^11\). 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 30. 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 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 31–33 in order to allow respondents to make definite choices without simply giving socially pleasing answers instead of expressing the reality 34. 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/HOP/KIBAG/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. 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.

<table>
<thead>
<tr>
<th>Individual characteristics</th>
<th>Doctors (n=49)</th>
<th>Nurses/midwives (n=153)</th>
<th>Dentists (n=25)</th>
<th>Pharmacists (n=16)</th>
<th>Total (n=243)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53.1</td>
<td>54.3</td>
<td>44.0</td>
<td>56.25</td>
<td>53.1</td>
</tr>
<tr>
<td>Female</td>
<td>46.9</td>
<td>45.7</td>
<td>56.0</td>
<td>43.75</td>
<td>46.9</td>
</tr>
<tr>
<td>Age groups, years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤30</td>
<td>12.2</td>
<td>24.2</td>
<td>0.0</td>
<td>0.0</td>
<td>17.6</td>
</tr>
<tr>
<td>31–45</td>
<td>67.4</td>
<td>52.9</td>
<td>68.0</td>
<td>81.2</td>
<td>59.3</td>
</tr>
<tr>
<td>≥46+</td>
<td>20.4</td>
<td>22.9</td>
<td>32.0</td>
<td>18.8</td>
<td>23.1</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma and less</td>
<td>34.7</td>
<td>46.4</td>
<td>72.0</td>
<td>37.5</td>
<td>46.1</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
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<td>39.9</td>
<td>28.0</td>
<td>62.5</td>
<td>44.4</td>
</tr>
<tr>
<td>Masters and PhD</td>
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<td>13.7</td>
<td>0.0</td>
<td>0.0</td>
<td>9.5</td>
</tr>
<tr>
<td>Marital Status</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>42.9</td>
<td>26.1</td>
<td>8.0</td>
<td>31.3</td>
<td>28.0</td>
</tr>
<tr>
<td>Married and others</td>
<td>57.1</td>
<td>73.9</td>
<td>92.0</td>
<td>68.7</td>
<td>72.0</td>
</tr>
<tr>
<td>Number of years in the service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3</td>
<td>20.4</td>
<td>32.7</td>
<td>20.0</td>
<td>50.0</td>
<td>30.0</td>
</tr>
<tr>
<td>≥3</td>
<td>79.6</td>
<td>67.3</td>
<td>80.0</td>
<td>50.0</td>
<td>70.0</td>
</tr>
<tr>
<td>Number of years in the facility</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3</td>
<td>53.1</td>
<td>43.1</td>
<td>44.0</td>
<td>50.0</td>
<td>45.7</td>
</tr>
<tr>
<td>≥3</td>
<td>46.9</td>
<td>56.9</td>
<td>56.0</td>
<td>50.0</td>
<td>54.3</td>
</tr>
<tr>
<td>Nationality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rwandan</td>
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<td>98.7</td>
<td>88.0</td>
<td>100.0</td>
<td>94.7</td>
</tr>
<tr>
<td>Non-Rwandan</td>
<td>16.3</td>
<td>1.3</td>
<td>12.0</td>
<td>0.0</td>
<td>5.3</td>
</tr>
</tbody>
</table>
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.

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...
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).

### 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\(^{13,18}\), 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\(^{13,23,27}\). 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\(^{38}\), 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\(^{36}\) 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.\(^{39}\) 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.\(^{40}\), Gilles, Burnard and Peytreman-Bridevaux\(^{41}\) 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\(^{41}\) 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\(^{42-45}\). Studies by Dussalt and Franceschini\(^{46}\), Aluku\(^{47}\) and Mullei et al.\(^{48}\) 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\(^{49-51}\). In addition to this, In addition, career growth in terms of health workers’ promotional opportunities leads to high levels of job satisfaction\(^{52}\).

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

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### Table 4. Associations between non-financial incentives and intentions to stay.

<table>
<thead>
<tr>
<th>Intentions to stay predictors</th>
<th>Odds ratio</th>
<th>95% confidence interval</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working conditions (vs low)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>0.90</td>
<td>0.50–1.61</td>
<td>0.730</td>
</tr>
<tr>
<td>High</td>
<td>0.78</td>
<td>0.79–9.74</td>
<td>0.070</td>
</tr>
<tr>
<td>Training and development (vs low)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>1.47</td>
<td>0.24–0.93</td>
<td>0.031</td>
</tr>
<tr>
<td>High</td>
<td>1.56</td>
<td>0.00–0.40</td>
<td>0.004</td>
</tr>
<tr>
<td>Career development (vs low)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>14.50</td>
<td>5.54–37.93</td>
<td>0.000</td>
</tr>
<tr>
<td>High</td>
<td>15.88</td>
<td>1.91–13.14</td>
<td>0.010</td>
</tr>
</tbody>
</table>
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 vary 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.

**Table 5. Adjusted logistic regression model of associations between non-financial incentives and intentions to stay.**

<table>
<thead>
<tr>
<th>Intentions to stay predictors</th>
<th>Odds ratio</th>
<th>95% confidence interval</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (vs male)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.73</td>
<td>0.30–1.76</td>
<td>0.480</td>
</tr>
<tr>
<td>Age group, years (vs ≤30 years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31–45</td>
<td>0.44</td>
<td>0.14–1.39</td>
<td>0.160</td>
</tr>
<tr>
<td>≥46</td>
<td>0.26</td>
<td>0.07–1.00</td>
<td>0.050</td>
</tr>
<tr>
<td>Marital status (vs single)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married and others</td>
<td>0.98</td>
<td>0.30–3.23</td>
<td>0.980</td>
</tr>
<tr>
<td>Education (vs diploma and less)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>0.41</td>
<td>0.18–0.90</td>
<td>0.021</td>
</tr>
<tr>
<td>Others</td>
<td>3.12</td>
<td>0.48–20.04</td>
<td>0.224</td>
</tr>
<tr>
<td>Type of work (vs doctors)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurses and midwives</td>
<td>0.27</td>
<td>0.08–0.83</td>
<td>0.023</td>
</tr>
<tr>
<td>Others</td>
<td>0.09</td>
<td>0.02–0.44</td>
<td>0.003</td>
</tr>
<tr>
<td>Experience in the service (vs &lt;3 years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3</td>
<td>3.91</td>
<td>0.88–17.43</td>
<td>0.073</td>
</tr>
<tr>
<td>Experience in the facility (vs &lt;3 years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3</td>
<td>0.14</td>
<td>0.03–0.51</td>
<td>0.003</td>
</tr>
<tr>
<td>Working conditions (vs low)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>9.70</td>
<td>3.14–29.95</td>
<td>0.000</td>
</tr>
<tr>
<td>High</td>
<td>5.77</td>
<td>15.41–2.16</td>
<td>0.001</td>
</tr>
<tr>
<td>Training and development (vs low)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>1.19</td>
<td>0.46–3.06</td>
<td>0.708</td>
</tr>
<tr>
<td>High</td>
<td>1.025</td>
<td>0.00–0.22</td>
<td>0.014</td>
</tr>
<tr>
<td>Career development (vs low)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>13.98</td>
<td>4.17–3.94</td>
<td>0.000</td>
</tr>
<tr>
<td>High</td>
<td>12.26</td>
<td>1.29–12.01</td>
<td>0.038</td>
</tr>
</tbody>
</table>
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 the 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.

Data availability
The raw data for this study are available on OSF: https://doi.org/10.17605/OSF.IO/7RXP35.

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.

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

Click here to access the data.

References

Open Peer Review

Current Peer Review Status: ? ✔️

Version 2

Reviewer Report 28 October 2019

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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.

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**Taiwo Akinyode Obembe**

1 Department of Health Policy & Management, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, Nigeria

2 University of Witwatersrand, Johannesburg, South Africa

The study is a well-conducted study and very strong article with respect to the dwindling and erratic human resource constraints plaguing the greater Sub-Saharan Africa. The authors however need to pay attention and work on the following areas:

1. Authors need to employ the services of an English consultant to improve on the minor grammatical errors within the write-up. It is obvious that English is not the primary language of the authors.

2. A systematic guide using the strobe checklist will enable the authors not leave out important information such as response rate and sample size within the methods.

3. The authors need to account for the missing 9 respondents in the results, which is in contrast to the 252 participants stated in the methods. If the data by these 9 respondents were incomplete and as a result were discarded at analysis, authors should still explicitly state it.

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.
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**


**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.
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.

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**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 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