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# An Assessment of Factors Affecting Job Satisfaction and Retention of Science/ Medical Laboratory Professionals in North Central Nigeria

**Godwin, M. Mafuyai**
Assistant Chief Technologist, Department of Chemistry, University of Jos, Nigeria
**Magdalene, S. Ayuba**
Principal Technologist, Department of Chemistry, University of Jos, Nigeria
**Samuel, N. Atsen**
Principal Technologist, Department of Chemistry, University of Jos, Nigeria

***Abstract:***
*Effective implementation and sustainability of quality laboratory programmes in Nigeria relies on the development of appropriate staff retention strategies. Assessing the factors responsible for job satisfaction and retention is key for tailoring specific interventions aiming at improving the overall impact of Science Laboratory Technology and Medical Laboratory programmes. A survey was developed to assess these factors among 241 laboratorians working in the laboratory in Universities/Teaching Hospitals in Nigeria. Lack of professional development was the major reason for leaving the previous job for 23% of interviewees who changed jobs in the past five years. Professional development/training opportunities was indicated by almost 88% (212/241) of total interviewees as the most important or a very important factor for satisfaction at their current job. Similarly, regular professional development/opportunities for training were the highest rated incentive to remain at their current job by 85% (206/241). Laboratory professionals employed in the private sector were more likely to change jobs than those working in the public sector (P = 0.002). The findings will be use for developing specific strategies for human resources management, in particular targeting professional development, aiming at improving laboratory professionals within the Nigerian University laboratory programme and hence its long-term sustainability.*

***Keywords:*** *Laboratory professionals, Job satisfaction, Retention, Nigeria*

## 1. Introduction

One of the major challenges in implementing science programmes in Nigeria is the reliability of science and medical laboratory services. The complimenting support of laboratories is essential for a wide range of innovations and testing purposes, both from research [Petti, *et al.,* 2006] and public health perspectives [Amos, *et al.,* 2005]. Numerous global initiatives in Nigeria have focused on science laboratory harmonization and standardization [Nkengason, *et al.,* 2010], and on laboratory accreditation [Gershy- Damet, *et al.,* 2010]. As a result, many programmes over the last decade have concentrated on the building of quality laboratory services through the training of laboratory professionals, upgrading infrastructure and providing science/medical facilities such as, installing new instruments and equipment, and strengthening supply chain systems [PEPFAR, 2011, ]. However, the first barrier mitigating quality improvement at any level is the human capacity development, which continues to be the impediment in implementing scientific programmes [USAIDS, 2011, Ayangwe and Mtonga, 2007]. The need to have trained technologists/scientist personnel though adequately addressed in numerous programmes [Henderson and Tulloch, 2008, Perkenhen, *et al.,* 1997], are often not integrated into the training into human resources management at the laboratory facility level.

The quality of laboratory operations is driven by technical skills, quality management systems and the motivation of the human resources. The technical competence of the personnel plays important role in ensuring strict adherence to the numerous procedures of the total testing processes as defined by the quality management system [WHO, 2006]. To achieve proficiency, laboratory professionals need both targeted training and an appropriate working environment to turn acquired knowledge into technical skills. Numerous efforts have focused on expanding basic coverage of HIV care and treatment, which has resulted in the widespread introduction of new technology throughout Nigeria. The expanded HIV testing capacity and standardization of science laboratories at different levels of sciences, especially in terms of the amount of equipment and in technology acquisition demands, additional skills for laboratory professionals. Many laboratory programmes that have implemented new technology have not effectively supported the process of developing technical skills with appropriate training and incentives. Due to lack of exposure and adequate training on new automation, laboratory professionals have considered the introduction of new technology as additional work instead of being able to do more work more efficiently. The laboratory scale-up poses challenges if technologies are implemented without supporting and training the laboratory professionals**.** The direct consequences of this is that there is suboptimal service provided to students and patients(ISLT ACT, 2002).

High labour turnover lead to periods of understaffing in the laboratory, creating increased workloads for remaining staff. Overworked laboratory professionals are more likely to ignore Good Laboratory Practice, thereby increasing the number of mistakes and accidents which affect the quality of services provided. The magnitude of the high turnover rates which may be due to brain drain is not well understood, hence, the need for monitoring science laboratory professionals' movement within and outside specific programmes.[ ISLT, 2003].

High turnover of laboratory professionals is a drain on programme funds, as more time and resources need to be devoted to advertise, interview, hire, and train new laboratory professionals. High employee-turnover also makes introducing new techniques and research protocols [Simundic, *et al.,* 2011, Crucitti, *et al.,* 2010], quality improvement systems, and policies difficult to implement because new staff lack prerequisite training and do not have the foundation on which to perform.

The research assessed the factors affecting Job satisfaction and incentives for the retention of laboratory professionals at the supported sites in seven states in Nigeria. The survey and its results will be useful for developing targeted strategies for human resources management aiming at improving laboratory professionals' retention and therefore, the long-term sustainability of University laboratory research, teaching and diagnostic purposes.

**2. Methods**

The survey was carried out between March, 2014 and June, 2014, laboratory professionals working at science laboratory facilities in Nigeria, participate in the survey. For the purpose of this survey, laboratory professionals were defined as anyone working in the laboratory, including: laboratory technicians, laboratory technologists, medical laboratory scientists, laboratory assistants, and microscopists. Based on the level of education the laboratory technologists and medical laboratory scientists were categorized as highly trained laboratory professionals and the others as less-highly trained laboratory professionals.

A 10-question, English-language survey was developed to gather socio-demographic data and to appraise the important aspects central to job satisfaction and retention. The factors for inclusion in the survey were selected based on literature review and experience of science laboratory technologist/laboratory scientist in Nigeria. There was not much variation in the factors across the states. For the purpose of this survey, salary was excluded for two main reasons: first, it is not usually reflected as the main factor in staff motivation [Stevens, *et al.,* 2003, Mathauer and Imhoff, 2006]; second, raising salaries of laboratory workers must be sustained by fixing the rise into the complex national pay structure strictly related to country-specific factors [Vande and Benders, 1995]. The choice of having these specific five components for job satisfaction only was dictated by the feasibility of implementing targeted interventions in these areas within the limited timeframe. Laboratory professionals were first asked to rate the factors, important to their current job satisfaction.

The five categories covered professional development/training opportunities; benefits (such as health insurance, overtime compensation, cell phone airtime, developmental loan, food/house allowance, and adequate retirement benefits); vacation/time off; working environment/working conditions; and appreciation and recognition from management and/or hospital administration. A five-point rating scale consisted of: most important; very important; not very important; somewhat important; and least important.

The same rating scale was used again to ask participants what incentives would make them most likely to stay at their current job. The five categories of incentives included regular training and professional development; addition of benefits (such as health insurance, overtime compensation, cell phone airtime, developmental loan, food/house allowance, and adequate retirement benefits); increased appreciation and recognition from management and/or hospital administration; increased vacation/paid time off; and laboratory upgrades (such as improved infrastructure and safety, new equipment, and automated technologies) (Christiane, 2010, Brian,2013).

The survey was administered in English. Prior to administering the survey, all questions were reviewed and thoroughly explained in English when required. The participation in this study was completely voluntary and refusing to participate did not impact laboratory professionals' position or personal rights at the health facility. There were no direct benefits for the participants. The survey questions and results were completely confidential and personal information, such as name and address, were not collected.

**3. Results**

*3.1. Demographics of Laboratory Professionals*

A total of 283 laboratory professionals completed the survey. Forty-two incomplete questionnaires were excluded from the analysis. The frequency distribution for 241 laboratorians, according to demographic and work-related variables, is shown in Table 1. A total of 68% (163/241) of participants were male and 32% (79/241) were female. Fifty-one percent (123/241) of the participants had either Laboratory Technologist or Medical Laboratory Scientist HND/B.Sc./M.Sc./Ph.D. and were referred to as highly trained laboratory professionals. Respondents had an average age of 38 years, with the youngest laboratory professional interviewed being 25years of age and the oldest 62 years of age.

| Demographic variables | Total (n = 241) | Less highly trained laboratory technicians (n = 118) | Highly trained laboratory technicians (n = 123) |
|---|---|---|---|
| Gender | | | |
| Male | 169 (68%) | 77 (65.2%) | 89 (72.4%) |
| Female | 79(32%) | 41 (34.7%) | 41 (27.6%) |
| Age group, years | | | |
| < 25 | 21 (8.7%) | 13 (11.0%) | 11 (6.4%) |
| 25 to 29 | 46 (19.1%) | 32 (27.1%) | 26 (21.1%) |
| 30 to 34 | 56 (23.2%) | 23 (19.5%) | 41 (33.3%) |
| 35 to 39 | 62 (25.7%) | 26 (22.0%) | 16 (13.0%) |
| 40 to 44 | 26 (10.8%) | 9 (7.6%) | 13 (10.7%) |
| 45 to 49 | 12 (5.0%) | 5 (4.2%) | 6 (4.9%) |
| >50 | 18 (7.5%) | 10 (8.5%) | 10 (8.1%) |
| Level of facility | | | |
| University teaching hospital | 67 (27.8%) | 44(37,3%) | 38 (30.9%) |
| University laboratory | 117 (48.5%) | 57 (48.3%) | 74 (60.2%) |
| Health care centres | 33 (13.7%) | 9 (7.6%) | 6 (4.9%) |
| Others | 24 (10.0%)) | 8 (6.8%) | 5 (4.0%) |
| Years in professional working experience | | | |
| <1 | 18 (7.5%) | 8 (6.8%) | 8 (6.5%) |
| 1-2 | 22 (9.1%) | 11 (9.3%) | 18 (14,6%) |
| 2-3 | 29 (12.0%) | 27 (22.9%) | 22(17.9%) |
| 3-5 | 38 (15.8%) | 23 (19.5%) | 29 (23.6%) |
| >5 | 134 (55.6%) | 49 (41.5%) | 46 (37.4%) |
| Laboratory jobs held in the past 5 years | | | |
| 1 | 88 (36.5%) | 8 (6.8%) | 44 (35.8%) |
| 2 | 79 (32.8%) | 12 (10.2%) | 51 (41.5%) |
| 3 | 39 (16.2%) | 21(17.8%) | 13 (10.6%) |
| 4 | 14 (5.8%) | 32 (27.1%) | 5 (4.0%) |
| 5 | 21 (8.7% ) | 45 (38.1%) | 10 (8.1%) |

*Table 1: Total demographic sub-group frequency distribution and job-related variables*

In terms of professional experience, 44% (107/241) of the participants had less than 5 years of working experience in the Science/medical laboratory field. Forty-six percent 46%(112/241) of the laboratory professionals were employed in the public sector, whereas those hired in the private sector, non-governmental, faith-based, or private laboratories, 54%(129/241): 76% (184/241) of the participants worked in University Laboratories and University Teaching hospital laboratories, or equivalent. The remaining 24%(57/241) laboratory professionals held jobs at Health Care Laboratories or non-governmental Laboratories.

A total of 64% (153/241) of laboratory professionals switched jobs at least once over the past 5 years, and among those, 86% (134/156) indicated the reason for leaving their last job; only 14% (22/156) said this was due to relocation. The frequency distributions for reasons for leaving the previous job are shown in Table 2, with lack of professional development being the major motive for changing jobs. Male workers were more inclined to change jobs whereas female laboratory professionals were more likely to stay at their current positions.

| Reason for leaving last job | Total (n = 156) | Less highly trained laboratory technicians (n = 72) | Highly trained laboratory technicians (n = 82) |
|---|---|---|---|
| Relocation/left area/family preferences | 22 (14%) | 10 (14%) | 15 (18%) |
| Excessive/unequal workload | 6 (4%) | 8 (11%) | 1 (1%) |
| Lack of appreciation/recognition from management | 19 (12%) | 7 (5%) | 11 (14%) |
| Poor working conditions | 21 (13%) | 10 (14%) | 8 (10%) |
| Lack of benefits | 32 (21%) | 12 (22%) | 20 (24%) |
| Lack of professional development | 56 (36%) | 25 (34%) | 27 (33%) |

*Table 2: Total and sub-group frequency distribution by reasons for leaving last job*

Professional development/opportunities for training were rated highest for job satisfaction by almost 88% (212/241) of interviewees. The second and third highest rated categories were benefits and working environment/working conditions: these were selected as most/very important by 52% (126/241) and 44% (106/241) of the participants respectively. Appreciation and recognition from management and/or hospital administration was the second least selected factor and it was indicated as most/very important by 22% (54/241) of participants. Vacation/time off was rated as most/very important by only 6% (14/241) of laboratory professionals. The rating for job satisfaction factors in the whole sample is shown in Table 3.

| Rating of job satisfaction factors | Professional development | Working environment | Benefits | Appreciation from management | Vacation/time off |
|---|---|---|---|---|---|
| Most/very important | 212 (88.0%) | 106 (44.0%) | 126 (52.3%) | 60 (24.9%) | 14 (5.8%) |
| Not very important | 26 (10.8%) | 69 (28.6%) | 37 (15.3%) | 82 (34.0%) | 76 (31.5%) |
| Least important/somewhat important | 3 (1.2%) | 66 (27.4%) | 78 (32.4%) | 99 (41.1%) | 151 (62.7%) |

*Table 3: Rating of factors important for job satisfaction*
*N=241 respondents*

Among the incentives important for job retention the category that included regular professional development/opportunities for training was the highest rated for staying at a current position by 85.5% of total interviewees (206/241). The second highest rated category was addition of benefits indicated as most/very important by 48.5% (117/241), and laboratory upgrades was chosen by 49.4% (119/241) of the participants.

A total of 28.2% (69/241) of laboratorians indicated increased appreciation and recognition from management and/or administration as most/very important in keeping them at their current job. The least rated incentive was increased vacation/paid time off, which was selected as most/very important by only 3.3% (8/241) participants. The rating for job retention incentives for the whole sample is shown in Table 4

| Rating of job retention incentives | Professional development | Benefits | Laboratory upgrades | Appreciation from management | Vacation/time off |
|---|---|---|---|---|---|
| Most/very important | 206 (85.5%) | 112 (48.5%) | 119 (49.4%) | 68 (28.2%) | 8 (3.3%) |
| Not very important | 20 (8.3%) | 62 (25.7%) | 69 (28.6.0%) | 77 (32.0%) | 80 (33.2%) |
| Least important/somewhat important | 15 (6.2%) | 67 (27.8%) | 53 (22.0%) | 96 (39.8%) | 153 (63.5%) |

*Table 4: Rating of incentives important for job retention*
*N = 241 respondents.*

Weighted Cohen's kappa coefficients (κ) were calculated to assess agreement between factors for job satisfaction and incentives for job retention among highly trained and less highly trained laboratory professionals (Tables 5 and 6). The degree of agreement between these factors was important to tailor the interventions for the two groups of participants.

| Factors important to job satisfaction | Incentives to stay at current job | | | | |
|---|---|---|---|---|---|
| | Regular professional development | Increased appreciation/recognition | Addition of benefits | Increased vacation/paid time | Laboratory upgrades |
| Professional development | 87.6 (0.28)* | - | - | - | - |
| Appreciation/ recognition | - | 83.1 (0.53)** | - | - | - |
| Benefits | - | - | 79.3 (0.34)** | - | - |
| Vacation/time off | - | - | - | 80.3 (0.55)** | |
| Working environment | - | - | - | - | 73.2 (0.42)** |

*Table 5: Agreement and kappa statistics between factors important for job satisfaction and incentives to stay at current job for less highly trained laboratory personnel*

| Factors important to job your satisfaction | Incentives to stay at current job | | | | |
|---|---|---|---|---|---|
| | Regular professional development | Increased appreciation/recognition | Addition of benefits | Increased vacation/paid time | Laboratory upgrades |
| Professional development | 79.6 (0.55)** | - | - | - | - |
| Appreciation/ recognition | - | 94.3 (0.24)* | - | - | - |
| Benefits | - | - | 98.3 (0.31)** | - | - |
| Vacation/time off | - | - | - | 69.2 (0.43)** | |
| Working environment | - | - | - | - | 72.0 (0.42)** |

*Table 6: Agreement and kappa statistics between factors important for job satisfaction and incentives to stay at current job for highly trained laboratory personnel*
*Results are presented as % agreement (kappa coefficient)*

The agreement between satisfaction factors and incentives was estimated using the Landis and Koch classification [McCoy, *etal.,* 2008], whereby kappa coefficients of 0.21 to 0.40 indicate fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 substantial agreement and 0.81 to 1.00 almost perfect agreement. According to this classification, kappa coefficients for agreement between factors for job satisfaction and job incentives for less highly trained laboratory professionals were almost perfect for the categories of professional development, appreciation from management, and vacation/time off. For the categories of benefits and working environment/working conditions, the kappa coefficients were substantial for this group. For highly trained laboratory professionals agreements was almost perfect for the categories appreciation from management, and vacation/time off, and was substantial for the remaining three factors.

**4. Discussion**

In the group over 45 years of age, only 23% (7/30) were female workers, whereas in the age group 25 to 29 years, women represented 55% (33/60) of this specific population. The decrease in number of female workers over time was not affected by the type of Laboratory facility nor the title earned, because the distribution of all laboratory professionals was very similar between the two genders across Laboratory facilities.

The years of laboratory experience seemed to be an important determinant for changing jobs, with 57% (66/115) of those who changed jobs in the past five years having between two and four years of experience. It was likely that less highly qualified laboratory professionals were more inclined to stay at their current job because their experience and educational level was less marketable and therefore, they had limited employment opportunities. On the other hand, highly trained laboratorians did not change their job as frequently because, most likely, their current job already matched their experience and educational level. In the states where the survey was carried out, laboratory professionals tend to continue their studies while working, thereby explaining the correspondence between working experience and educational level at the time of relocation.

Laboratory professionals employed in the private sector were more likely to change jobs than those working in the public sector ($P$ = 0.002). The lower workforce turnaround found in government facilities was dependent on state-specific factors, mainly salary scale, benefits, and allowances [Christiane,2010]. In some states the government employment is permanent with accumulated benefits received on retirement, when leaving before retirement results in loss of all benefits. In addition to these elements, an important role was played by the career prospects available in the public compared to the private sector, this because those in the public sector have Job security which is an evident that reduces Job satisfaction and commitment (Rosow and Zager, 1985).

Regardless of the satisfaction factors and incentives under consideration, the degree of agreement should be taken into account in the development of corrective actions and policies. As an early warning indicator, policy makers should consider those areas where moderate agreement between satisfaction factors and incentives has been observed. This approach would likely improve the adoption and implementation of national policies at each Research facility by tailoring them to the specific findings observed locally. Therefore, this factors should be improved upon as they are the top five Job Satisfaction and Retention incentives (Christiane, 2010)

A limitation of this study was that it did not comprise many laboratories in rural settings, because the majority of the Science and laboratory facilities included in this survey were in urban and pre-urban areas. At these levels of the system, demographics and some factors, such as working environment, working conditions and benefits, does not differed substantially from those present in other settings and upper level laboratories.

Besides this, factors that might influence the behaviour of local labour markets among states were not considered, and their impact on willingness to seek other jobs should be explored further. In the states assessed laboratory professionals' salaries in the public sector were higher than those in the private sector and between 46% and 23% of those paid by non-governmental organizations [Landis and Koch, 1977]. This difference in salary scale probably contributed to the deficiency of laboratory Science Professionals in the private sector in the states. It was likely that policies based on rural area incentives of 25% of salary and other benefits contributed to higher staff turnover in the public sector than in the private sector [Herbst, *et al,*. 2011]. In addition to government strategies, donors' interventions also may influence domestic labour markets. In some states there was loss of laboratory staff at lower level of facilities from one state to the other [Labiran, 2008]. The fluctuations of public sector budget affected allocations to human resources in particular for recruitment, incentives, retention and capacity building [Chankova, *et al.,* 2009].

Despite the different strategies adopted to address local needs, national labour markets have similar dynamics due to the chronic problem of understaffed research facilities. In this scenario it is likely that the mobility of laboratory professionals was not significantly influenced by determinants such as socio-economic factors and educational background.

**5. Conclusions**

This is the study assessing satisfaction of laboratory professionals within laboratory programmes in seven states of Nigeria. It contributed to the evidence that specific strategies for human resources management are part of the necessary activities for implementing quality science/ medical laboratory programmes, particularly in areas where new technologies are available for diagnostic purposes.

Based on the data collected, the first type of intervention should focus on the need for training and professional development to bridge this gap. In particular, new approaches for in-service training should be applied to reduce education-related absences from the workplace. Building capacity and training laboratory professionals without disrupting Laboratory services is achievable by promoting blended learning techniques aimed at augmenting traditional learning. Blended learning has the advantages of reducing cost and reaching a greater number of students.

A serious intervention aimed at improving the retention of laboratory professionals should encompass a more structured strategy for human resource management research facility level. In-service trainings should be integrated into professional development plans without compromising any incentive other than the proficiency certificate upon completion. The overall goal of retraining laboratory professionals is to improve their competency through the continuous improvement of Good Laboratory Practices in their routine work. Highly motivated staff adheres more strictly to laboratory procedures defined by the Laboratory Quality Management System with the ultimate outcome of improving the quality of Science/medical laboratory services. Strict adherence to Laboratory ethics and diagnostic protocols supports management of services and also reduces waste of resources. Laboratory professionals who comply with standard operating procedures make fewer errors with lower volumes of invalid and repeated experimental results.[ ISLT, ACT, 2003]

Another intervention should address gender-specific factors affecting reasons for leaving the job over time. It is therefore important to explore better these factors and develop flexible retention plans accordingly. Without integrating new strategies for laboratory professionals' retention, the numerous investments in expanding research and diagnosis will continue to have a substantial drain on resources due to the repetitive re-hiring, and re-training of new staff within the same laboratory.

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**7. References**

1. Petti CA, Polage CR, Quinn TC, Ronald AR, Sande MA: Laboratory medicine in Africa: a barrier to effective health care. Clin Infect Dis 2006, 42(3):377-382. PubMed Abstract | Publisher Full Text
2. Amos B, Kisakye A, Makewa D, Mudhune S, Mwamtemi H, Nansera D, Ngwiri T, Wamae M, English M: Behind the data: establishing the Network for Surveillance of Pneumococcal Disease in the East African Region.
3. Clin Infect Dis 2009, 48:S162-S171. PubMed Abstract | Publisher Full Text | PubMed Central Full Text
4. Nkengasong JN, Nsubuga P, Nwanyanwu O, Gershy-Damet GM, Roscigno G, Bulterys M, Schoub B, DeCock KM, Birx D: Laboratory systems and services are critical in global health: time to end the neglect? Am J Clin Pathol 2010, 134:368-373. PubMed Abstract | Publisher Full Text
5. Gershy-Damet GM, Rotz P, Cross D, el Belabbes H, Cham F, Ndihokubwayo JB, Fine G, Zeh C, Njukeng PA, Mboup S, Sesse DE, Messele T, Birx DL, Nkengasong JN: The World Health Organization African region laboratory accreditation process: improving the quality of laboratory systems in the African region. Am J Clin Pathol 2010, 134:393-400. PubMed Abstract | Publisher Full Text
6. PEPFAR President's emergency plan for AIDS relief: fact sheet: celebrating life: latest PEPFAR treatment results [http://www.pepfar.gov webcite]. Accessed 10 October 2011
7. World Health Organization: Antiretroviral Therapy for HIV Infection in Adults and Adolescents in Resource-Limited Settings: Towards Universal Access: Recommendations for a Public Health Approach. Geneva, Switzerland: World Health Organization; 2006.
8. [http://www.who.int/hiv/pub/guidelines/artadultguidelines.pdf webcite]. Accessed 10 October 2011
9. UNAIDS: Financial resources required achieving universal access to HIV prevention, treatment and support. 2007. [http://data.unaids.org/pub/Report/2007/20070925_advocacy_grne2_en.pdf webcite]. Accessed 5 October 2011
10. Manafa O, McAuliffe E, Maseko F, Bowie C, MacLachlan M, Normand C: Retention of health workers in Malawi: perspectives of health workers and district management. Hum Resour Health 2009, 7:65. PubMed Abstract | BioMed Central Full Text | PubMed Central Full Text
11. Marchal B, De Brouwere V, Kegels G: Viewpoint: HIV/AIDS and the health workforce crisis: what are the next steps?

12. Trop Med Int Health 2005, 10:300-304. PubMed Abstract | Publisher Full Text
13. Dieleman M, Cuong PV, Anh LV, Martineau T: Identifying factors for job motivation of rural health workers in North Viet Nam. Hum Resour Health 2003, 1:10. PubMed Abstract | BioMed Central Full Text | PubMed Central Full Text
14. Anyangwe SC, Mtonga C: Inequities in the global health workforce: the greatest impediment to health in Sub-Saharan Africa. Int J Environ Res Public Health 2007, 4:93-100. PubMed Abstract | Publisher Full Text | PubMed Central Full Text
15. Henderson LN, Tulloch J: Incentives for retaining and motivating health workers in Pacific and Asian countries. Human Resour Health 2008, 6:18. BioMed Central Full Text Liverpool School of Tropical Medicine: Effective health care alliance programme (EHCAP). [http://www.liv.ac.uk webcite]. Accessed 8 October 2011
16. Pakenham-Walsh N, Priestly C, Smith R: Meeting the information needs of health workers in developing countries. Br Med J 1997, 314:90. Publisher Full Text
17. World Health Organization: World report on knowledge for better health. Geneva: World Health Organization; 2004. [http://www.who.int/rpc/meetings/world_report_on_knowledge_for_better_health.pdf webcite]. Accessed 12 October 2011
18. Simundic AM, Bilic-Zulle L, Nikolac N, Supak-Smolcic V, Honovic L, Avram S, Beregovaja E, Dobreanu M, Guimaraes JT, Kovacs GL, Singh NM, Sierra-Amor RI, Sypniewska G, Zima T: The quality of the extra-analytical phase of laboratory practice in some developing European countries and Mexico - a multicentric study. Clin Chem Lab Med 2011, 49:215-228. PubMed Abstract | Publisher Full Text
19. Crucitti T, Fransen K, Maharaj R, Tenywa T, Massinga Loembé M, Murugavel KG, Mendonca K, Abdellati S, Beelaert G, Van Damme L: Obtaining valid laboratory data in clinical trials conducted in resource diverse settings: lessons learned from a microbicide phase III clinical trial. L. PLoS One 2010., 5 Publisher Full Text
20. Stevens W: Good Clinical Laboratory Practice (GCLP): the need for a hybrid of good laboratory practice and good clinical practice guidelines /standards for medical testing laboratories conducting clinical trials in developing countries. Qual Assur 2003, 10:83-89. PubMed Abstract
21. Mathauer I, Imhoff I: Health worker motivation in Africa: the role of non-financial incentives and human resource management tools. Hum Resour Health 2006, 4:24. PubMed Abstract | BioMed Central Full Text | PubMed Central Full Text
22. Verlander EG, Evans MR: Strategies for improving employee retention. Clin Leadersh Manage Rev 2007, 21:E4.
23. Van de Looij F, Benders J: Not just money: quality of working life as employment strategy.
24. Health Manpower Manage 1995, 21:27-33. Publisher Full Text
25. McCoy D, Bennett S, Witter S, Pond B, Baker B, Gow J, Chand S, Ensor T, McPake B: Salaries and incomes of health workers in Sub-Saharan Africa. Lancet 2008, 371:675-681. PubMed Abstract | Publisher Full Text
26. Landis JR, Koch GG: The measurement of observer agreement for categorical data. Biometrics 1977, 33:159-174. PubMed Abstract | Publisher Full Text
27. Herbst CH, Vledder M, Campbell K, Sjöblom M, Soucat A: The human resources for health crisis in Zambia an outcome of health worker entry, exit, and performance within the national health labor market. World Bank Working Paper No. 214. Washington D.C: The World Bank; 2011.
28. Labiran A, Mafe M, Onajole B, Lambo E: Human Resources for Health Country Profile – Nigeria. Africa Health Workforce observatory.2008. [http://www.hrhobservatory.afro.who.int/images/Document_Centre/nigeria_country_profile.pdf webcite]
29. Chankova S, Muchiri S, Kombe G: Health workforce attrition in the public sector in Kenya: a look at the reasons. Hum Resour Health 2009, 7:58-65. PubMed Abstract | BioMed Central Full Text | PubMed Central Full Text
30. The United Republic of Tanzania Ministry of Health and Social Welfare: Human resource for health strategic plan 2008–2013; 2008. [http://www.unfpa.org/sowmy/resources/docs/library/R223_MOHTanzania_2008_HRH_Strategic_Plan_2008_2013.pdf webcite]
31. Prospective and Challenges of science laboratory technology (SLT) Profession in Nigeria. Lecture delivered at the 27th Annual National Conference/Scientific workshop held at Ife . Imo state, Nigeria.2011.
32. Christiane, L, (2010): Top Job Satisfaction Factors (online) Retrieved from: http//www.coach4u.net/coach4u-bhag/top-s-job-satisfaction-factors.hlml
33. Rosow S.R. and Zager H. (1985): Determinant of Job satisfaction among Health Administration Professionals in Kuwait, Health Information management.
34. Brian, H.(2013): Improved workforce productivity and customer sat. Free Whitepaper www.cornerstoneondemand.com.
35. Institute of Science Laboratory Technology (ISLT), Act 2003. NO.12 , Federal Republic of Nigeria Official Gazette. Printed and Published by The Federal Government Press, Lagos FGP170/82003,2,000(OL75).

**ANNEXURE**

**Dear Respondent,**

The Researcher is a Laboratory Technologist in University of Jos Nigeria, carrying out research on the Factors Affecting Job Satisfaction and Retention of Laboratory Technologist/Medical Laboratory Professionals in Nigeria.

It is purely an academic exercise therefore; all information supplied will be treated with utmost confidentiality.

1. Age: a. < 25, b. 25-29, c. 30-34, d.35-39, e. 40-44, f. 45-49, g. > 50
2. Gender: a. {M} b. {F}
3. Occupation/field of speciality: a. Technologist/ Scientist b. Technician/laboratory Assistance.
4. Type of Laboratory: a. Private laboratory. b. Public laboratory. c. others
5. Professional Experience: a. < 1, b. 1-2, c. 2-3, d. 3-5, e. > 5
6. Laboratory responsibility held in the past 5 years: a. 1, b. 2, c. 3, d. 4, e. 5
7. Reasons for leaving last job:
    a. relocation/left area or family preference
    b. Excessive/unequal workload.
    c. lack of appreciation/recognition from management
    d. poor working conditions
    e. lack of benefits f. lack of professional development

8. Rating factors important for job satisfaction:
    i. Professional development:
        a. Most/very important
        b. Not very important
        c. Least important
    ii. Benefits: a. Most/very important b. Not very important c. Least important
    iii. Working environment: a. Most/very important b. Not very important. c. Least important
    iv. Appreciation from management: a. Most/very important b. Not very important
        c. Least important
    v. Vacation/time off: a. Most/very important b. Not very important c. Least important

9. Rating of incentive important for job retention:
    i. Professional development: a.Most/very important b. Not very important c. Least important
    ii. Benefits: a. Most/very important b. Not very important c. Least important
    iii. Laboratory upgrades: a. Most/very important b. Not very important c. Least important
    iv. Appreciation from management: a. Most/very important b, Not very important c. Least important
    v. vacation/time off: a. Most/very important b. Not very important c. Least important

10. Incentive to stay at current job: a. Regular professional development
    b. Increased appreciation/recognition c. Addition of benefits
    d. Increased in vacation/paid time e. Laboratory upgrade