Formal Assessment of Teamwork Among Cancer Health Care Professionals in Three Large Tertiary Centers in Nigeria

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PURPOSE

There are strategies to bring quality cancer care to underserved patients, but poor use of the principles of teamwork is a major barrier to achieving quality services. The intent of this study was to assess teamwork as perceived by health care workers caring for patients with cancer.

METHODS

We conducted a survey among health care professionals in cancer care at 3 tertiary centers in southwestern Nigeria from July to November 2016. Respondents rated teamwork using the Safety Attitudes Questionnaire; we focused on the teamwork climate subscale comparing health care providers and institutions using analysis of variance and on collaboration using logistic regression.

RESULTS

Three hundred seventy-three professionals completed the survey: 177 physicians (47%), 51 nurses (14%), 21 pharmacists (6%), 31 laboratory technicians (8%), and 88 others (24%); 5 (1%) participants had missing professional information. The average teamwork climate score across all professionals in the study was 70.5 (SD = 24.2). Pharmacists rated the teamwork climate the lowest, with a mean score of 63.9 (SD = 29.5); nurses and laboratory technicians rated teamwork higher, with means of 74.5 (SD = 21.7) and 74.2 (SD = 27.1), respectively; and physicians rated teamwork 66.0 (SD = 23.6). Collaboration with other health care providers was reported as poorer by physicians compared with nurses and pharmacists.

CONCLUSION

Although overall teamwork scores were consistent with ambulatory studies in the United States, important subgroup variations provide targets for intervention. Physicians rated collaboration as poor both intra- and interprofessionally. Pharmacists rated interprofessional teamwork with nurses as poor. Efforts to transform cancer care must focus on building trust among the key stakeholders. This is critical in low-resource settings, which must maximize the use of limited resources to improve patient outcomes.

INTRODUCTION

Cancer is among the most common causes of morbidity and mortality worldwide, with 57% of new cancer cases and 65% of cancer deaths occurring in low- and middle-income countries. It has been projected that by 2030, 70% of new cancer cases will occur in the developing world. The reported cancer incidence in Africa may not be accurate because of a lack of cancer registries, misdiagnoses, and a lack of referral systems; as such, the GLOBOCAN database provides only estimates. The exponential rise of the cancer burden in Africa can be attributed to the adoption of westernized lifestyles, longer life expectancy, increased education leading to health-seeking behavior, a higher prevalence of infectious diseases (especially the presence of viral oncogenes such as HIV, hepatitis, and human papillomavirus), and poor resources.
to, poverty, limited funds, poor health infrastructure, a lack of adequate clinical expertise, and a shortage of health care workers, among others.6,7 Cancer care delivery is complex and needs collaboration and teamwork among health care professionals. Effective teamwork makes medical systems more responsive to change, and thus, teamwork in these environments must be maximized. Teamwork is also important in the provision of cancer care because patients with cancer commonly receive complex and potentially toxic interventions involving many different health care professionals. The division of labor among medical, nursing, and other health practitioners is essential because no single professional can deliver a complete service of appropriate cancer care. Therefore, in low-resource settings, teamwork within the limited workforce should be maximized. In this article, we describe the teamwork climate and collaboration among Nigerian physicians, nurses, pharmacists, laboratory technicians, and other health care professionals to help design future interventions to improve outcomes for patients with cancer.

METHODS

Setting and Study
A cross-sectional survey was conducted in three tertiary academic hospitals: Lagos State University Teaching Hospital (LASUTH), the University of Lagos (LUTH), and the University of Ibadan (UCH), all located in the southwestern part of Nigeria. These hospitals were chosen because of their convenience and easy accessibility to the investigators; because they had a relatively similar structure for delivering care to patients with cancer; and because they were in the same region of Nigeria, with minimal cultural differences with regard to tribe, language, and religion. Designated oncology units or oncology providers such as oncology nurses and oncology pharmacists were not well defined in these environments, and most patients with cancer were managed by general surgeons, gynecologists, urologists, dentist/oral maxillofacial surgeons, nurses, and pharmacists, with no extensive special training in oncology. As such, all health care professionals who were involved in the care of patients with cancer were eligible to participate in this survey. Full- and part-time staff who worked in the units before the study took place were also eligible. In addition, all personnel within clinical areas, who either influenced or were influenced by the working environment, were eligible. All the institutions’ review boards approved the study.

Provider Survey
The teamwork climate was assessed using the Safety Attitude Questionnaire (SAQ), a validated tool developed by Sexton et al8 that has been used to characterize interprofessional teamwork and other parameters such as job satisfaction, perceptions of management, safety climate, working conditions and stress recognition in different settings and in different countries. The SAQ tool was developed to measure health care quality and safety, allowing institutions to compare themselves with other institutions, to aid in prompting interventions, and to measure the effectiveness of these interventions. It is a refinement of the Intensive Care Unit Management Attitudes Questionnaire,9 which was also derived from the Flight Management Attitudes Questionnaire, a questionnaire used in commercial aviation created after researchers found that most airline accidents were caused by teamwork breakdown, inability to speak up, lack of communication, and poor leadership.10,11 Only 25% of the Flight Management Attitudes Questionnaire was retained, and the new SAQ was generated by discussions with health care providers and subject matter experts; 2 conceptual models (Vincent et al’s12 framework for analyzing risk and safety and Donabedian’s conceptual model for assessing quality13) were used, and these generated new items covering multiple subsets, such as safety climate, teamwork climate, stress recognition, perception of management, working conditions, and job satisfaction. Different versions of SAQ have been adapted and used in multiple medical settings, such as in intensive care units, operating rooms, general inpatient surgical or medical wards, or ambulatory clinics.14-16 This tool was found to have the strongest validity evidence and has been adapted for use across multiple settings and learner levels; it has been used in different parts of the world and in different languages.17-19

The tool used in this study was the SAQ short-form scale (Data Supplement), which was a double-page questionnaire.
with 36 questions at the level of a sixth-grader in the Nigerian education system. The questionnaire took at least 10 minutes to complete, and responses to the questions used a 5-point Likert scale (1 = disagree strongly, 2 = disagree slightly, 3 = neutral, 4 = agree slightly, 5 = agree strongly), which was converted to a 100-point scale: 1 = 0, 2 = 25, 3 = 50, 4 = 75, and 5 = 100 (Data Supplement).

The questions (Data Supplement) were grouped into 6 subgroups: (1) teamwork climate, (2) safety climate, (3) job satisfaction, (4) stress recognition, (5) perceptions of management, and (6) working conditions. Five items in the survey were not part of the scales, but they assessed direct collaboration among providers. In addition, respondents rated the quality of collaboration they had experienced with other professionals using a 5-point ordinal response scale (1 = disagree strongly to 5 = agree strongly). According to Sexton et al,8 the percentage of respondents within a clinical area reporting “agree slightly” or “agree strongly” for each of the items within a given scale were charted as the percent positive for each SAQ factor. For the purposes of this article, we will focus only on teamwork climate and collaboration among health care professionals.

Questionnaires were hand delivered to participants in the clinical areas where they were providing care to patients with cancer; the questionnaires were self-administered. Permission from the heads of departments was sought before approaching each participant, and the surveys were returned within an average time of 24 hours. Because of the lack of a defined cancer center and the multiple roles played by providers in addition to caring for patients with cancer, the total numbers of providers working in the medical environments were unknown, thereby precluding us from having an adequate knowledge of participation rate. With that being said, one institution, LASUTH, had a high participation rate (97%); this high participation rate was a result of the use of key opinion leaders and of the willingness of medical students who delivered the instruments and waited for the completion of the self-administered surveys. In other institutions, the participation rates were unknown.

Data Analysis
Demographic data derived from the survey were summarized using descriptive statistics. We combined all physicians, including consultants, residents, medical officers, and house officers, into one entity. We also identified all cadres in nursing, pharmacology, and laboratory technology and grouped all other health care workers such as clerks, physiotherapists, and so forth, into one entity (others). The first six questions assessed the teamwork climate for which we calculated the correlation matrix. We noticed that question 2, which was negatively worded and reversely scored, was not as reliable an item as the other items. This statement was, “In this clinical area, it is difficult to speak up if I perceive a problem with patient care.” The correlation coefficients between this item and the other five items were all below 0.07 in absolute value, suggesting that the understanding of this item was different from the other items. A decision was made collectively by the investigators to exclude item 2 from the teamwork climate evaluation. The Cronbach’s α reliability coefficient of the remaining 5 items of teamwork climate was 0.81 (as opposed to Cronbach’s α values below 0.69 if item 2 was kept and each other item was removed, 1 at a time). Cronbach’s α coefficient is a measure of internal consistency (reliability) and is used when multiple Likert questions in a survey/questionnaire form a scale. Even though item 2 had lower internal consistency when added to the other items, the face validity of the question was consistent with the known culture of the institutions; as such, this question, which measured “easy to speak up,” was analyzed and reported separately. We used linear models and logistic regression models to test for significant differences in teamwork scores and ratings of good collaboration and barriers encountered among health care professionals.

RESULTS

Participation Characteristics
A total of 373 eligible providers in the three institutions returned the survey: 177 physicians (48%), 51 nurses (14%), 21 pharmacists (6%), 31 laboratory technicians (8%), and 88 other professionals (24%) working in the health care environment; five participants had missing professional information. Other characteristics of the participants are provided in Table 1.

Teamwork Climate
Overall, the average teamwork climate score assessed across all professionals and in all institutions was 70.5 (SD = 24.2).

Teamwork Assessment by Specialty
Pharmacists and physicians in this study rated teamwork climate the lowest, with mean scores of 63.9 (SD = 29.5) and 66.0 (SD = 23.6), respectively, followed by nurses and laboratory technicians, who rated teamwork higher, with mean scores of 74.5 (SD = 21.7) and 74.2 (SD = 27.1), respectively. Other professionals rated teamwork the highest, with a mean score of 76.5 (SD = 23.3; Table 2).

Teamwork Assessment by Institution
Generally, LASUTH reported the highest teamwork scores, with an average of 78.1 (SD = 18.1), followed closely by UCH, with an average of 76.7 (SD = 18.1), whereas LUTH registered the lowest teamwork scores, with an average of 59.0 (SD = 29.1; Table 2).

Ease of Speaking Up When Problems Are Perceived
In the teamwork climate section, question 2 measured “easy to speak up,” and was phrased as follows: “In this clinical area, it is difficult to speak up if I perceived a problem with patient care.” The recorded Likert responses
were dichotomized as follows: agree strongly and agree were coded as “yes,” whereas neutral, disagree slightly, and disagree strongly were coded as “no” (after the scores were reversed coded, and thus, the item measured ease of speaking up). See the Data Supplement for additional details. The overall percentage of the medical personnel who found it easy to speak up was 35.8% ($P<.01$). When stratified by profession, 27.3% of physicians, 49.0% of nurses, 47.6% of pharmacists, 41.9% of laboratory technicians, and 38.6% of other health care workers found it easy to speak up when they perceived a problem with patient care ($P = .02$; Fig 1). When stratified by institution, 33.7% of professionals in UCH, 29.2% of professionals in LUTH, and 67.5% of professionals in LASUTH found it easy to speak up when a problem was perceived with patient care ($P<.01$; Fig 2). We further assessed the variation in ease of speaking up across years of practice. We found that 22.0% of professionals who had been hired recently (within less than 6 months) reported that it was difficult to speak up if they perceived a problem with patient care, compared with 57.1% of professionals with long-term service of more than 21 years (Data Supplement).

**Collaboration Among Health Care Workers**

Health care workers, particularly physicians, nurses, and pharmacists, rated collaboration inter- and intraprofessionally, whereas other health care workers could rate collaboration only with physicians, nurses, and pharmacists but not with other professions (Figs 3 and 4).

### Collaboration Assessment by Specialty

Overall, 54.9% of physicians reported good collaboration among themselves, 52.9% of physicians reported good collaboration with nurses, and 44.9% of physicians had good collaboration with pharmacists. A large percentage of nurses reported good collaboration among themselves (85.7%) and good collaboration with physicians (75.6%), whereas good collaboration with pharmacists was reported by a lower percentage of nurses (69.4%). A large percentage of pharmacists reported good collaboration among themselves (76.2%) and with physicians (76.2%), whereas good collaboration with nurses was reported by only 57.1% of pharmacists.

### Collaboration Assessment by Institution

Collaboration among health care providers with physicians, nurses, and pharmacists was also assessed according to institution. At UCH, 72.7% of health care workers experienced good collaboration with physicians, 70.5% experienced good collaboration with nurses, and 63.5% experienced good collaboration with pharmacists. In sharp contrast, at LUTH, 46.8% of health care workers experienced good collaboration with physicians, 48.8% experienced good collaboration with nurses, and only 38.6% experienced good collaboration with pharmacists. At LASUTH, 62.5% health care workers experienced good collaboration with physicians, 57.5% experienced good collaboration with nurses, and only 52.5% experienced good collaboration with pharmacists (Fig 4).

### Table 1.

| Characteristic   | Physicians (n = 177) | Nurses (n = 51) | Pharmacists (n = 21) | Lab Technicians (n = 31) | Other (n = 88) |
|------------------|----------------------|----------------|----------------------|-------------------------|---------------|
| **Sex**          |                      |                |                      |                         |               |
| Male             | 91 (51.7)            | 3 (5.9)        | 8 (42.1)             | 17 (56.7)               | 31 (35.6)     |
| Female           | 85 (48.3)            | 48 (94.1)      | 11 (57.9)            | 13 (43.3)               | 56 (64.4)     |
| **Experience**   |                      |                |                      |                         |               |
| < 6 months       | 20 (11.3)            | 2 (3.9)        | 4 (19)               | 8 (26.7)                | 7 (8.0)       |
| 6-11 months      | 22 (12.4)            | 3 (5.9)        | 3 (14.3)             | 5 (16.7)                | 7 (8.0)       |
| 1-2 years        | 20 (11.3)            | 4 (7.8)        | 3 (14.3)             | 4 (13.3)                | 18 (20.4)     |
| 3-4 years        | 65 (36.7)            | 11 (21.6)      | 5 (23.8)             | 2 (6.7)                 | 20 (22.7)     |
| 5-10 years       | 28 (15.8)            | 7 (13.7)       | 4 (19)               | 5 (16.7)                | 15 (17.0)     |
| 11-20 years      | 17 (9.6)             | 9 (17.6)       | 0 (0)                | 3 (10.0)                | 11 (12.5)     |
| ≥ 21 years       | 5 (2.8)              | 15 (29.4)      | 2 (9.6)              | 3 (10.0)                | 10 (11.4)     |
| **Institution**  |                      |                |                      |                         |               |
| LASUTH           | 16 (9.0)             | 10 (19.6)      | 3 (14.3)             | 4 (12.9)                | 7 (8.0)       |
| LUTH             | 57 (32.2)            | 12 (23.6)      | 11 (52.4)            | 7 (22.6)                | 43 (48.9)     |
| UCH              | 104 (58.8)           | 29 (56.9)      | 7 (33.3)             | 20 (64.5)               | 38 (43.1)     |

**Note.** Data are presented as No. (%).

**Abbreviations:** LASUTH, Lagos State University Teaching Hospital; LUTH, University of Lagos; UCH, University of Ibadan.
DISCUSSION

Although the overall teamwork ratings in our study could be relatable to studies performed in the developed world, there were outstanding differences in subgroup analysis. In our study, physicians perceived teamwork as poor when compared with nurses ($66.0 \text{ vs } 74.5, P = .03$), pharmacists perceived teamwork as poor when compared with other health care providers ($63.9 \text{ vs } 76.5, P = .04$), and laboratory technicians, nurses, and other health care providers perceived a better teamwork climate overall. This is in contrast with that which has been reported in previous studies performed in the United States, in which physicians rated teamwork higher, both intraprofessionally and with others.\textsuperscript{14,16,20,21} Teamwork climate as reported by health care professionals was also noted to differ across institutions, with a significantly smaller average for LUTH compared with UCH ($59.0 \text{ vs } 76.7, P < .01$) and compared with LASUTH ($59. \text{ vs } 78.1, P < .01$).

This study provides a snapshot of the teamwork climate, which is an aggregation of providers’ attitudes. The negative attitude reported by physicians in this study may have been caused by the recognition of the poor health care system, poor patient outcomes, and overwork. In Nigeria, there is a high patient/physician ratio, and providers are often overwhelmed, burnt out, and dissatisfied.\textsuperscript{22} Even though our study showed an overall poor perception of teamwork climate and collaboration for physicians, Iyoke et al\textsuperscript{23} conducted a study among obstetricians and gynecologists in Nigeria that showed a positive attitude of physicians toward interdisciplinary teamwork. Interdisciplinary teamwork is an important component in delivering quality cancer care, and therefore, should be maximized in the developing world with minimal resources. The benefits of maximizing interdisciplinary teamwork include improved patient outcomes, fewer medical errors, increased patient safety, and a reduction in the fatigue often experienced by health care professionals.

The poor collaboration with other members of the teams as reported by physicians is concerning because delivering quality cancer care is complex and requires multidisciplinary collaboration across the whole spectrum of medical personnel. The lack of collaboration between physicians and other health care professionals must be addressed in the future, because improving collaboration would certainly improve patient outcomes. Because of


table2.png

| Specialty/Institution | No.  | Mean | SD   | P    |
|-----------------------|------|------|------|------|
| Specialty             |      |      |      |      |
| Physician             | 177  | 66.0 | 23.6 | < .01|
| Nurse                 | 51   | 74.5 | 21.7 |      |
| Pharmacist            | 21   | 63.9 | 29.5 |      |
| Lab technician        | 31   | 74.2 | 27.1 |      |
| Other                 | 88   | 76.5 | 23.3 |      |
| Total (5 missing)     | 373  | 70.5 | 24.2 |      |
| Institution           |      |      |      |      |
| LASUTH                | 40   | 78.1 | 18.1 | < .01|
| LUTH                  | 130  | 59.0 | 29.1 |      |
| UCH                   | 203  | 76.7 | 18.1 |      |
| Total                 | 373  | 70.5 | 24.2 |      |

NOTE. P values are based on the F test.

Abbreviations: LASUTH, Lagos State University Teaching Hospital; LUTH, University of Lagos; UCH, University of Ibadan.

**FIG 1.** Percentages of health care workers who find it easy to speak up when perceiving a problem with the care of patients with cancer ($P = .02$). Lab techs, laboratory technicians.
the reduced number of clinical experts in the developing world, the importance of collaboration among medical teams, such as tumor boards and multidisciplinary medical meetings, should increase to ensure continuity of improved health care services across all specialties. The favorable collaboration reported by nurses who seemed to collaborate well both intra- and interprofessionally was seen uniformly across all institutions. Although there is still room for improvement, this clearly shows that nurses perceived supportive and collaborative relationships among themselves and with other medical professionals. The reasons for nurses reporting higher rates of good collaboration intra- and interprofessionally is not obvious but may be a result of the general rehabilitation practice and task-shifting approaches used in low- and middle-income countries addressing shortages of physicians. Furthermore, it is worthwhile to explore the reasons for higher rates of good collaboration noted for nurses compared with other health care providers. Pharmacists perceived a high rate of good collaboration with physicians (76.2%) and also intraprofessionally (76.2%) but a lower rate of good collaboration with nurses (57.1%). The collaboration between nurses and pharmacists in cancer care delivery is important because these two

![Collaboration with physicians, nurses, and pharmacists as perceived by all health care workers, reported as percentages (P = .002). Lab techs, laboratory technicians.](image-url)
professional groups must collaborate to ascertain the best cancer therapies, acting as checks and balances when toxic agents such as chemotherapy are delivered to patients. Studies have shown that close collaboration among pharmacists, nurses, and physicians can identify chemotherapeutic errors and benefits, and as a result, can improve outcomes for patients with cancer.25 Other health care workers, such as physiotherapists and clerks, seemed to perceive an average rate of good collaboration with physicians (64.0%) and nurses (62.8%) but a lower rate of good collaboration with pharmacists (52.3%); this finding is particularly interesting because over the past 5 years, the Nigerian health care system has experienced incessant strikes and counterstrikes carried out by professional bodies against one another and against the government. One cannot but be concerned about the effects of these strikes on collaboration among professionals in general, and among medical providers in particular. Sociologist Andrew Abbot has argued that conflict is endemic among professions in which scopes of practice overlap and groups strive to stake claims to an area of expertise.26 That being said, professional conflicts in the Nigerian system have been reported as possibly being caused by the perception of the superiority of some professions over others.27,28 However, it is important to work together as a team, acknowledging that all professions bring valid knowledge and expertise equally valuable and essential to society in general, and to the health care system in particular. Providing care for patients with cancer requires excellent teamwork, and this demands health and social care professionals to communicate well with each other and to work together.

The three institutions considered in this study are located in the same part of the country, thereby reducing cultural differences with respect to ethnicity, religion, and way of life. Institutional differences are known to exist across the nation, and this is why it is important to have a basic understanding of the system before implementation of cancer care interventions to achieve maximum health outcomes with limited resources. Our study clearly showed differences in teamwork climate and collaboration among health care professionals, most especially for physicians and pharmacists. These differences must be addressed, with interventions tailored to the respective institutions. There is ample evidence that interventions aimed at enhancing the teamwork climate among health care providers improve patients’ outcomes,29,30 increase providers’ satisfaction,31 possibly reducing their burnout; and improve clinical performance32,33 and patients’ safety34 across different clinical environments. This evidence holds true particularly in oncology clinical settings, where patients’ care depends critically on good collaboration and coordination among medical teams.35 Therefore, efforts to transform cancer care need to focus on improving teamwork interventions, because this will build trust among health care providers; without sufficient trust, team members will expend a large amount of time and energy protecting, checking, and inspecting each other as opposed to collaborating to provide value-added outcomes.36 In addition, improving teamwork is critical in low-resource settings, where there is a need to maximize the synergistic use of limited resources to improve patient outcomes.

As we are beginning to push for improvement in cancer care in these environments and planning to involve Nigeria in global clinical trials,37 this study will be invaluable as the
knowledge of baseline teamwork and collaboration will direct future interventions. As a result, clinical trials in one center may need more frequent and intense interventions for improving teamwork than in others.

Our study has several limitations. Before the study, we did not have direct knowledge about the number of health care providers in this area, because most centers in Nigeria did not have designated oncology units, wards, or health care professionals. Indeed, most professionals were involved in care for other diseases; therefore, our findings may not exhaustively reflect the experience of cancer care providers, and the differences in the effects may also be confounded by other types of diseases that are prevalent in these institutions. We also cannot rule out the self-selection bias inherent in voluntary survey research, which may also bias our findings. Whether the groups selected in this survey have higher or lower teamwork and collaboration perceptions compared with a random sample from the population of all health care professionals in Nigeria cannot be ascertained at this moment.

This study clearly identifies different perceptions of teamwork and collaboration among health care professionals by specialty and by institution. Excellent teamwork is the foundation on which quality cancer care is built worldwide. Without this, cancer care in Africa will continue to have poor outcomes that do not reflect the efforts that have been put in over the past decade. Interventions should take place as soon as possible, and their effects can be measured by patient outcome, increased reporting of medical errors and near misses, initiation and improvement of tumor boards, multidisciplinary rounds, and patient satisfaction, among others.

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