

Original Article

Survey of Basic Laparoscopic Training Exposure of Nigerian Postgraduate Trainees

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ABSTRACT

Background: The practice of laparoscopy involves the use of training models that are different from conventional open surgery. These concepts are not captured in the traditional models of surgical residency training. Residency training in surgery has been seen as an ample opportunity for early introduction and training in laparoscopy. **Objectives:** This study aimed to assess the level of exposure and training experience of some surgical resident doctors in accredited training institutions in Nigeria on laparoscopy. **Methodology:** A cross-sectional survey was conducted among the resident doctors undergoing revision course in surgery at the National Orthopaedic Hospital, Igbobi, Lagos, and Lagos University Teaching Hospital, Lagos, in March 2018. Using the quantitative method of data collection, a pre-tested structured questionnaire was used to collect information on the demography and training exposure of the residents in laparoscopy. **Results:** A total of 54 of 96 residents surveyed returned the questionnaire, giving a response rate of 56%. There were 53 (98.1%) males and 1 (1.9%) female. The age range of the respondents was between 30 and 46 years, with a mean of 34.2 ± 3.96 years. Thirty-two (59.3%) respondents had spent at least 2 years training in surgery. Thirty-six (66.7%) respondents had not participated in more than four laparoscopic procedures during their rotation. Forty-six percent of respondents reported that their experience in laparoscopy was mainly by observation of the procedures. Forty-nine (90.7%) of respondents surveyed had not attended any training program in laparoscopy. Eighty-one (81.0%) of respondents had a strong motivation and desire for future practice of laparoscopy. **Conclusion:** This study revealed that few Nigerian postgraduate trainees sampled in the survey were exposed and had training experience in laparoscopy.

KEYWORDS: Basic, laparoscopy, Nigerian residents, postgraduates, simulation, training

INTRODUCTION

Laparoscopy (minimal access surgery) is a surgical procedure that uses minimal incisions on the abdomen for access to perform diagnostic or therapeutic procedures.

In recent times, surgical practice has experienced a paradigm shift with the evolution of laparoscopic surgery. Many surgical procedures hitherto done as open are now being performed through minimal access routes. The huge gain in popularity of laparoscopic surgery can be attributed to its benefits to the patients, namely less

postoperative pain, early recovery from surgery, early return to work, and better cosmesis. For procedures such as cholecystectomy, laparoscopy is now the accepted gold standard among surgeons.^[1]

Laparoscopy, however, has several other attributes that must be considered before its wholesale adoption

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in place of conventional open surgery. Laparoscopic surgery has a steep learning curve and in inexperienced hands has a narrow margin of safety.^[2,3] However, acquiring surgical competency in laparoscopy can be challenging and requires an intensive learning period.^[4] These shortcomings are of concerns to the surgeons and have led to the recommendation and adoption of compulsory simulation-based training outside the operating room environment prior to exposure to live patients to minimize complications.

Structured surgical simulation has not yet been formally adopted into the postgraduate surgical training curriculum in Nigeria. Surgeons in many centers, however, have increasingly embraced this innovation, and trainees have been at the vanguard of advocacy for this shift, in line with modern surgical practices. Available reports indicate the practice of laparoscopy in some Nigerian postgraduate training centers.^[5-7] There is paucity of information on the level of exposure and participation of Nigerian postgraduate trainees in laparoscopy. This study, therefore, aimed at assessing the level of exposure and training experience of surgical residents in accredited training institutions in Nigeria in basic laparoscopy. This was to document training trends in laparoscopy and make appropriate recommendations.

METHODOLOGY

A cross-sectional survey consisting of a 23-stem semi-structured pretested questionnaire was self-administered on the resident doctors from various parts of Nigeria who participated in the annual revision course in surgery at the National Orthopaedic Hospital, Igbobi, Lagos, and the Lagos University Teaching Hospital, Lagos, between March 5 and 11, 2018.

Approval for the study was obtained from the Local Ethics Committee of the Lagos University Teaching Hospital and the Faculty of Surgery, National Postgraduate Medical College of Nigeria.

Information on demographic and professional characteristics of the residents, previous exposure and experience in laparoscopy, knowledge of basic laparoscopy, motivation, and future plans to acquire laparoscopic skills as obtained by the questionnaire were entered into excel data sheet for analysis. Data analysis was done using IBM SPSS Statistics for Windows, version 23.0, IBM Corp., Armonk, NY, USA. Results were expressed in proportions. The association between dependent and independent variables was determined by Chi-square test, and $P < 0.05$ was considered as statistically significant.

RESULTS

Demographic characteristics and future career interest of the residents

A total of 54 (56%) resident doctors who registered for the revision course completed and returned the questionnaire. The respondents comprised 53 (98.1%) males and only 1 (1.9%) female. The age range of the respondents was 30–46 years, with a mean of 34.2 ± 3.96 years. Forty-eight (88.9%) of the respondents were from Federal/State Teaching Hospitals, whereas 6 (11.1%) were from Federal Medical Centers.

Background training experience of residents

Thirty-two (59.3%) respondents had completed at least 2 years training in surgery [Figure 1]. Regarding their surgical rotation, 53 (98.1%) respondents had completed at least 6 months rotation in general surgery, 47 (87%) respondents had done at least 3 months rotation in pediatric surgery, and 41 (75.9%) respondents had trained for at least 3 months in urology.

Current status of laparoscopic facilities in Nigerian postgraduate training centers

Forty-seven (87%) respondents had laparoscopic equipment in their centers. Forty-one (75.9%) respondents indicated the practice of laparoscopic surgery at their centers. General surgery accounted for 61% of their laparoscopic exposure [Figure 2].

Exposure to basic laparoscopic skill training

Forty-nine (90.7%) respondents had not attended any training program in laparoscopy. Fifty (92.6%) respondents had never practiced on a trainer box (dry laboratory). Only six (11.1%) respondents were aware of any local training program in laparoscopy.

Operating room training experience

Thirty-six (66.7%) respondents have participated between one and four laparoscopic procedures during their rotation [Figure 3]. Observation of laparoscopic procedures accounted for the majority of training

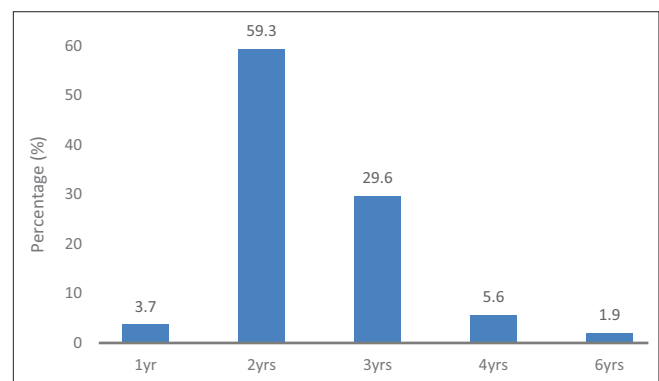


Figure 1: Postgraduate year of residents

experience in 25 (46.3%) respondents. Twenty-three (42.6%) respondents functioned as assistants to the operating surgeon [Figure 4]. Two (3.7%) respondents had performed laparoscopic surgery under supervision.

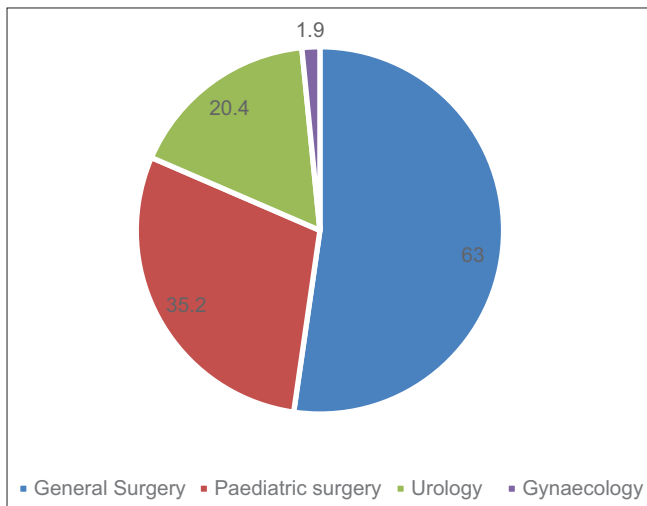


Figure 2: Current practice of laparoscopy in various surgical specialties

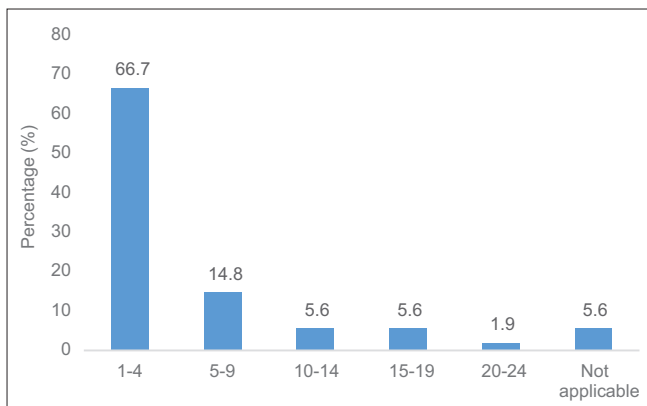


Figure 3: Estimated number of procedures participated by the residents

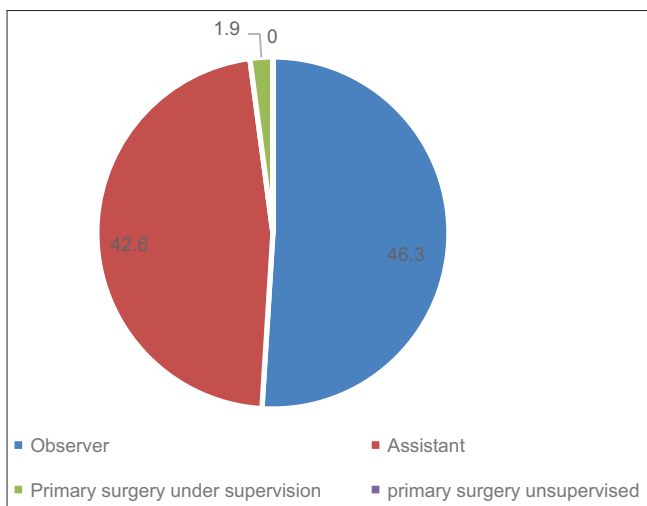


Figure 4: Level of participation in laparoscopic procedures

No respondent had performed laparoscopic surgery without supervision. Three (5.6%) respondents did not answer this question. There was no statistical correlation between the postgraduate year and the number of laparoscopic procedures participated in by the respondents ($r = 0.11$; $P = 0.746$).

Obstacles to adoption of laparoscopy

Twenty-five (46%) respondents reported that hindrance to the practice of laparoscopy was due to lack of trained personnel. Twenty-one (38.9%) respondents opined that the barrier to the practice of laparoscopy was due to lack of equipment, while 16 (29.6%) respondents identified low motivation of surgeons as an obstacle to adoption of laparoscopy. Lack of institutional support was reported by 27 (50%) respondents.

Self-appraisal of respondents on laparoscopy

When asked to self-assess their overall knowledge on laparoscopy, 24 (40.7%) respondents regarded their general knowledge on laparoscopy as average, whereas 22 (37.2%) respondents described their knowledge as below average. Three (5.1%) respondents, however, indicated their level of knowledge on laparoscopy as very poor. We had no answer to this question from the remaining ten respondents in the survey.

Future plans and motivation

In determining the level of motivation of the residents and plan for a future practice in laparoscopy, 44 (81.0%) of 59 respondents desired a future practice in laparoscopy. Thirty-six (66.7%) respondents preferred overseas training.

DISCUSSION

Training to be a surgeon takes some time and can be competitive and tedious. The original training model of William Halsted (1904) “see, do, teach” which has produced generations of good surgeons has little or no place in modern laparoscopic surgical practice.^[8,9] Laparoscopic surgery is known to have a steep learning curve and tendency toward more complications when compared to open surgery.

This study revealed that many of the respondents may have observed a laparoscopic procedure in the past, but majority of the respondents (90.7%) had neither undergone any previous structured training in laparoscopy nor had any previous experience with laparoscopic trainer boxes. Despite the existence of a few previously held laparoscopic workshops in the country, only 11.2% of the respondents had any knowledge of a local training program. Majority of the respondents also demonstrated poor knowledge of training models in laparoscopy such as laparoscopic

trainer boxes (20.4%), virtual simulators (14.8%), and wet laboratory/live animal models (7.4%). None of the respondents was aware of any cadaveric training model. This is not surprising as there is currently a dearth of training opportunities available locally, and laparoscopic trainer boxes may not be widely available in our training institutions. Furthermore, experience in basic laparoscopy is not currently considered a mandatory requirement for eligibility at the postgraduate surgical examination in Nigeria. Therefore, having to seek for laparoscopic training experience may not have attracted enough attention from the residents.

Simulation models for training in laparoscopy are broadly classified into three: bench, live animal, and cadaveric models. Bench-top models use synthetic materials or non-live animal tissue to teach surgical procedures or assess technical performance and include physical (inanimate, e.g., laparoscopic trainer boxes), computer-based, virtual reality, and hybrid simulators.^[10] Laparoscopic trainer boxes have been found to be cheap and accessible, whereas virtual reality models give a more objective assessment of the learning curve, but in terms of efficacy for laparoscopic training, both models have been found to be equally effective.^[11] Animal (mostly porcine) and cadaveric training models have also been developed to facilitate learning. However, these are more expensive, more difficult to organize, and may raise ethical issues.^[12] These are not widely available in Nigeria.

Basic laparoscopic procedures as defined by the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) include diagnostic laparoscopy, laparoscopic appendectomy, and cholecystectomy. All other laparoscopic operations are defined as “advanced.”^[13] SAGES classification was designed to facilitate graduated learning of psychomotor skills of laparoscopy by the surgeons. This is supported by the finding that motion analysis of steps of basic laparoscopic procedures has been found to provide the foundation for learning more advanced procedures. Many complex laparoscopic procedures have been deconstructed into specific movement tasks which can be practiced on simulators outside the operating room. Laparoscopic simulation is known to facilitate the acquisition of psychomotor skills needed for safe conduct of laparoscopic surgery in the operating room.

Forty-seven (87%) of respondents claimed that they have laparoscopic equipment in their center. Surprisingly, this finding did not have a direct correlation to the overall case volume reported by the respondents. However, the study did not further investigate the functionality of these equipment and the personnel involved in their

use. We noted that major exposures to laparoscopy were in the procedures done by the general (61.1%) and pediatric (35.2%) surgeons. It is worrisome that about two-thirds (66.7%) of these respondents have not participated in more than four laparoscopic procedures during their surgical rotations prior to the time of this study. This raises some concerns as to low-level exposure in laparoscopy by the residents in our training institutions and brings forward the need to increase case volumes to overcome the learning curve. Cooper *et al.* had shown a direct relationship between the volume of surgery and the learning curve in minimal access surgery utilization.^[14]

There were multiple responses as to the possible reasons for the current low caseloads in laparoscopy as perceived by the respondents. These include lack of support by training institutions (46.3%), lack of trained personnel (38.9%), lack of appropriate equipment (38.9%), and low motivation of surgeons to practice laparoscopy. Some of the aforementioned limitations and other barriers to the practice of surgery and laparoscopy have been identified by some researchers in the country. For instance, incidental reporting of problems during laparoscopic surgery by Ismaila *et al.*^[15] in Jos indicated malfunctioning/nonfunctioning equipment in 16 (76.2%) of 21 cases. In an audit of laparoscopic surgeries at Ile-Ife, Adisa *et al.*^[16] noted the relative apathy of Nigerian surgeons to the practice of laparoscopy. Perhaps, limited application of laparoscopy to the commonly encountered advanced intra-abdominal pathologies in Nigeria made it a less preferred treatment option among surgeons.^[16] There is a probability that barriers and constraints to the practice of laparoscopy still exist in many other Nigerian postgraduate training institutions. Despite our local challenges, this study revealed a high level of motivation and plan for future practice of laparoscopy among the respondents. Majority of these respondents, however, preferred overseas training.

We recommend the need for institutions to invest in training of surgeons in laparoscopy and provide a conducive environment and appropriate equipment to facilitate the practice at the end of such training. An effective training program that keeps residents motivated requires relevant curriculum content, personnel, and resources for optimal flexible training strategies.^[17] Lectures on laparoscopic surgeries are given during revision courses in surgery. We suggest that a dedicated short-term hands-on training of residents as currently done in basic surgical skills should be incorporated into the training curriculum of residents to further enhance their understanding of the core concepts of laparoscopy. Residents' participation in the National

Workshops on laparoscopy will be beneficial to their training as well.

CONCLUSION

Exposure and participation of Nigerian postgraduate trainees who completed this survey on laparoscopy is low. Access to training is greatly limited. There is, however, a high level of motivation and desire by the trainees to improve their knowledge and skills in laparoscopy with the expectation that this will be backed by good institutional support. There is a crucial need to add laparoscopy to the training curriculum of postgraduate training in Nigeria. Relevant industries have important roles to play in sustaining and supporting educational activities of existing training centers in laparoscopy.

Limitation of the study

The responses from this survey were those of surgical trainees captured by the survey, and bias in responses cannot be ruled out. The opinions expressed in the survey cannot be taken to be representative of all residents in training in Nigeria.

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Conflicts of interest

There are no conflicts of interest.

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