PERCEPTIONS OF SURGICAL TRAINING BEFORE AND AFTER THE INTRODUCTION OF SUBSPECIALTY UNITS AT KENYATTA NATIONAL HOSPITAL: A RESIDENT ALUMNI AUDIT

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ABSTRACT

Background: In 2019, Kenyatta National Hospital (KNH) reorganized its orthopaedic service into seven subspecialty units to align training with global standards.

Objective: To evaluate how this reform influenced residents' perceptions of training quality, mentorship, and educational depth.

Methods: A mixed-methods survey was administered to alumni graduating between 2018–2023. Quantitative data were analyzed descriptively and with chi-square tests; qualitative responses were thematically coded.

Results: Of the 35 respondents, 71% rated overall training as excellent. Following subspecialization, 71% reported improved mentorship, 89% greater teaching depth, and most valued enhanced focus on areas of interest. All recommended the model for broader adoption. No significant differences emerged between earlier and recent graduates. Qualitative feedback highlighted increased technical confidence and clearer mentorship structures, but also noted challenges such as short rotations and inconsistent supervision.

Conclusion: The subspecialty model at KNH was positively received and perceived to improve training quality and readiness. The findings support expanding subspecialty-based education in low- and middle-income countries.

Key words: Subspecialty training, Orthopaedic education, Mentorship, Resident perceptions, Kenya

INTRODUCTION

While the primary motivation for establishing orthopaedic subspecialty units at KNH was to improve the quality, coordination, and outcomes of patient care, these structural changes inevitably had a profound effect on the training experience of residents. Recognizing the critical role that training environments play in shaping surgical competence, KNH collaborated closely with the University of Nairobi to align the implementation of subspecialty units with the objectives of both postgraduate and undergraduate medical education. This collaboration ensured a seamless transition that not only upheld but enhanced the educational mission of the institution.

Kenyatta National Hospital (KNH), Kenya's largest referral and teaching hospital, began a quality improvement initiative in 2019 by establishing seven dedicated orthopaedic subspecialty units. These included:

(a) Paediatric orthopaedics
(b) Hand surgery
(c) Foot and ankle surgery
(d) Orthopedic spine surgery
(e) Orthopaedic trauma
(f) Orthopaedic oncology
(g) A combined unit for complex pelvis, arthroplasty, and sports medicine

These units were formed to promote structured mentorship, optimize case exposure, and align the training environment with global standards. This paper evaluates how this structural change was perceived by orthopaedic residents who experienced both the generalist and subspecialty training models.

Literature review

Global context of orthopaedic subspecialty training

Surgical care is now recognized as central to global health, with over 5 billion people lacking access to safe surgery and 143 million procedures needed annually (1). The Lancet Commission highlights the need to expand surgical education, especially in Low- and Middle-Income Countries (LMICs), where system capacity shapes health and economic outcomes (1,2).

In high-income countries, orthopaedic training has shifted toward early subspecialization in areas like spine, arthroplasty, and paediatrics, reflecting growing complexity. Surveys indicate support for earlier operative exposure, simulation, and skills-based learning, reinforcing the educational principle that deliberate practice—not just time—drives expertise (5). Targeted subspecialty rotations build confidence in complex case management, a finding echoed across medical disciplines.

Subspecialty training in LMICs and Africa

African training has traditionally produced generalists due to resource constraints, yet rising trauma and musculoskeletal disease burdens demand subspecialists (1). Kenya recently reported only 86 orthopaedic surgeons for a population of 45 million, with wide variation in training (3). Regional initiatives such as COSECSA now integrate structured subspecialty rotations, with examples like CURE Kenya demonstrating improved local workforce capacity. Still, limited equipment, scarce mentors, heavy service demands, and funding constraints hinder broader adoption.

Mentorship and educational outcomes

Mentorship remains pivotal. U.S. data show residents with mentors achieve higher satisfaction and better learning outcomes (4). In LMICs, where trainee-to-trainer ratios are high, structured mentorship is even more critical and directly shapes subspecialty choices. Innovative solutions are helping bridge training gaps in resource-constrained settings.

MATERIALS AND METHODS

Study design: This was a retrospective qualitative audit using a mixed-methods questionnaire distributed to orthopaedic resident alumni. It included both structured Likert-style items and open-ended qualitative questions.

Setting and participants: The study targeted orthopaedic surgeons who completed residency at KNH between 2018 and 2023 and who had rotated through both generalist and subspecialty models during training. A total of 35 responses were analyzed.

Tool development: A standardized survey tool was designed to evaluate training quality across multiple domains, including bedside teaching, surgical exposure, mentorship, and MDT participation. The tool was reviewed for face validity and clarity by two academic consultants.

Data collection and analysis: Data were collected through anonymous digital surveys. Quantitative responses were analyzed using descriptive statistics. Chi-square tests and confidence intervals were used to assess associations between graduation cohorts and response trends. Qualitative responses were coded thematically by two reviewers.

Ethical considerations: As this was a minimal-risk quality audit not involving patient data, formal ethics approval was waived. Participants were informed of the purpose, voluntary nature, and confidentiality of the survey.

RESULTS

Quantitative outcomes

A total of 35 respondents participated in the survey evaluating the subspecialty training model. Most respondents expressed high satisfaction with the overall training quality. Specifically, 25 (71.4%) respondents rated their experience as 5 out of 5, while the remaining 10 (28.6%) respondents gave a rating of 4 out of 5. Notably, 25 participants reported that accessing mentorship had become easier during their training, compared to six who observed no change and four who felt it had become more difficult. When asked whether the subspecialty model allowed them to better focus on their personal interests, 31 (88.6%) respondents agreed that it had. An equal number reported improvements in the depth of teaching received during training. Remarkably, all 35 (100%) respondents indicated that they would recommend the subspecialty training model to future cohorts,

underscoring broad-based support for the model. Table 1 summarizes these quantitative findings and presents the absolute number of participants reporting each outcome related to their training experience under the subspecialty model.

Table 1

Summary of participant responses on key metrics (n = 35)

Metric	No. of respondents
Rated overall training 5/5	25
Rated overall training 4/5	10
Mentorship became easier	25
No change in mentorship	6
Mentorship became harder	4
Ability to focus on personal interest improved	31
Teaching depth improved	31
Would recommend subspecialty model	35

Confidence intervals

The proportion of respondents rating the training experience as 5/5 was 71.4%, with a 95% Confidence Interval (CI) ranging from 55.3% to 83.8%. Similarly, 71.4% of respondents reported easier access to mentorship under the new model, with an identical CI range of 55.3% to 83.8%. The proportion of respondents who reported improved ability to focus on a personal area of interest was 88.6% [CI: 74.1% – 95.5%], the same interval recorded for those who observed improved teaching depth. Importantly, all participants endorsed the model to others, resulting in a 100% recommendation rate with a 95% CI of 90.0% to 100.0%. These confidence intervals affirm the reliability of the observed trends, indicating strong positive perceptions of the subspecialty model among trainees.

Comparison by graduation cohort

Respondents were grouped into two cohorts based on their year of graduation: early graduates (2021 and earlier) and recent graduates (2022–2023). Chi-square tests were performed to evaluate whether perceptions differed between these two groups. No statistically significant differences were found across any of the evaluated dimensions. The proportion of respondents rating their training as 5/5 showed no significant variation between the two cohorts ($\chi^2 = 0.001$, $p = 0.982$). Similarly, responses regarding improved mentorship ($\chi^2 = 0.000$, $p = 1.000$), enhanced focus on areas of interest ($\chi^2 = 0.001$, $p = 0.982$), and improved teaching depth ($\chi^2 = 0.000$, $p = 1.000$) also showed no statistically significant differences. These findings suggest consistency in the quality and perception of subspecialty training irrespective of graduation year.

Thematic analysis of qualitative feedback

Qualitative responses provided richer context to the quantitative data, highlighting both the strengths and challenges of the subspecialty model. Many respondents noted that the structured training enabled deeper engagement with complex pathology and that subspecialty rotations were associated with higher patient volumes, which helped build technical confidence. The presence of better-defined mentorship structures also emerged as a positive influence on trainees' professional development.

However, several challenges were also reported. A number of respondents felt that the duration of subspecialty rotations was too short to allow for meaningful immersion and continuity of learning. Others expressed frustration with inconsistent supervision due to consultant absenteeism, which undermined the training experience. In addition, fragmentation in patient care ownership across different subspecialties was cited as a barrier to comprehensive case follow-up, limiting residents' ability to see patients through the continuum of care.

Respondents offered several recommendations to address these shortcomings. Many suggested that extending the duration of rotations would allow for more meaningful engagement and skill acquisition. There was also a strong call for the introduction of structured post-residency fellowships to further deepen subspecialty expertise. Lastly, several respondents advocated for the implementation of consistent performance evaluation mechanisms to track trainee progress and ensure accountability from faculty.

DISCUSSION

Linking audit findings to global trends

The recent audit of orthopaedic subspecialty training reforms at Kenyatta National Hospital

(KNH) echoes global and regional shifts in surgical education. The data revealed strong support for the subspecialty model, with all respondents recommending its continuation. This aligns with broader literature which shows that structured subspecialty exposure increases both confidence and competence among surgical trainees (3,5). At KNH, 88.6% of residents reported improved ability to focus on areas of personal interest, and the same proportion noted improved teaching depth. These findings suggest that targeted subspecialty rotations, such as those now in place for paediatric orthopaedics and spine surgery, are providing the deliberate, hands-on learning needed to build expertise.

Thematic feedback reinforced this, with residents describing how focused exposure enabled deeper engagement with complex pathology and higher case volumes enhanced technical confidence. These benefits reflect global calls for structured exposure in orthopaedic training programs and align with recommendations for competency-based progression tied to procedural experience (3). KNH's positive trajectory supports the broader movement toward subspecialty differentiation within general surgical training, particularly in Low- and Middle-Income Countries (LMICs).

Mentorship and its role in learning

While the subspecialty model was well received, mentorship quality emerged as an area of variability. Quantitatively, 71.4% of respondents said mentorship had become easier to access, but nearly 29% noted either no change or greater difficulty. Qualitative comments provided more nuance: while some residents appreciated improved mentorship structures, others cited consultant absenteeism and inconsistent supervision as barriers. This reflects broader literature on mentorship gaps in surgical education, especially in resource-constrained settings (4).

Residents noted that the presence or absence of structured supervision directly affected their learning experience. This supports the widely accepted principle that mentorship enhances confidence, procedural skill development, and professional growth (4). To sustain progress, KNH may consider reinforcing mentorship by pairing residents with subspecialty advisors and creating systems for more consistent faculty engagement, especially in newer rotations. Such steps would help optimize the impact of subspecialty training and support the apprenticeship model long associated with surgical excellence.

Institutional commitment and flexibility

Another notable theme from the qualitative feedback was the recognition of institutional strengths and constraints. While respondents expressed overall satisfaction with the subspecialty structure, they also raised challenges such as short rotation durations and fragmented ownership of patient care. These issues are not unique to KNH; they are common in the early phases of implementing subspecialty training in LMIC hospitals where service pressures are high and resources stretched.

Despite these constraints, the audit responses reflect a degree of institutional support for reform. The introduction of dedicated rotation blocks and perceived improvements in teaching suggest that efforts were made to prioritize training needs. As emphasized in implementation science frameworks, (6) such changes require both leadership engagement and a culture that values education. The KNH experience illustrates that even in a high-demand clinical environment, incremental changes can improve training outcomes when backed by institutional will.

Addressing persistent gaps

The results also pointed to structural issues that could dilute the benefits of subspecialization if left unaddressed. Residents noted that supervision was inconsistent and that educational continuity was at times disrupted by absenteeism. Some also found the rotation lengths too short to allow for full immersion in complex areas. These gaps, while not surprising in the context of large public hospitals, underscore the need for programmatic refinement.

One potential strategy is the formalization of evaluation processes to ensure consistency in mentorship and faculty accountability. Another is to explore structured post-residency fellowships in areas where deeper expertise is needed. Although these ideas go beyond what the current audit measured directly, they are consistent with recommendations made by residents in the qualitative section and supported by educational literature from similar LMIC programs (3).

The road ahead

While the audit did not measure patient outcomes or graduate career trajectories, it sets the stage for such evaluation in the future. Subsequent audits could assess how training reforms translate into improved clinical outcomes, retention of trained subspecialists, and the decentralization of specialist services to underserved areas. Monitoring these parameters would provide a fuller picture of the reforms' long-term value.

The audit itself represents a valuable quality improvement tool. KNH's willingness to undertake this review suggests an emerging culture of reflection and improvement, which is crucial for sustaining innovation in postgraduate medical education.

Frameworks such as the Consolidated Framework for Implementation Research and established change management models (6,7) remain useful lenses through which to evaluate and sustain reforms. These frameworks emphasize the importance of contextual factors—such as organizational readiness and leadership—which appeared to play a positive role in the success of KNH's training redesign. The gains observed must be institutionalized through policy changes, resource allocation, and ongoing communication of success to ensure their permanence.

Study limitations

This study is limited by its retrospective design and reliance on self-reported perceptions, which may introduce recall and social desirability bias. Because the sample was drawn exclusively from one institution, the findings may not be generalizable to national surgical training trends. The lack of external validation or triangulation with objective educational performance data limits the ability to assess the accuracy of self-assessed gains in confidence or competence. Additionally, qualitative analysis was interpretive and, while independent coding was employed to minimize bias, some subjectivity in theme identification may remain. Future studies should consider integrating direct assessment metrics, such as simulation performance or examination scores, and exploring longitudinal follow-up to understand the sustained impact of subspecialty reforms.

CONCLUSION

The introduction of subspecialty training reforms at Kenyatta National Hospital (KNH) marks a significant step forward in orthopaedic education within a low-resource setting. The findings from this institutional audit align with global literature emphasizing the importance of structured rotations, enhanced mentorship, and targeted exposure to complex pathology (1,3,4). Residents perceived improvements in teaching depth, focus on personal interests, and mentorship access, underscoring the value of intentional design in postgraduate training programs. These results also reflect familiar challenges—such as limited supervision continuity and short rotation durations—that echo trends seen in other LMIC contexts.

The KNH experience offers a model for how locally led, evidence-informed reforms can be implemented even in resource-constrained environments. By continuing to evaluate and adapt the program using implementation science frameworks, and by embedding mentorship more systematically, the institution can further strengthen the foundation laid by these reforms. While future research is needed to assess long-term outcomes and broader system effects, this case study affirms that high-quality orthopaedic training—attuned to both international standards and local realities—is attainable and impactful. As similar reforms take root elsewhere in Africa, KNH's approach may offer valuable lessons in designing specialty training that is both context-specific and globally relevant.

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