

Characterising hospitals' suitability for medical officer internship training in Kenya: analysis of the Kenya Harmonized Health Facility Assessment

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Abstract

Background

Kenya has significantly expanded its medical school numbers and internship training hospital numbers to address its workforce gap. The majority of newly accredited internship hospitals are first-level referral/district hospitals, which are considered to have shortage of staff, medications, have limited service capacity and are described as “not organized for training purpose”. Using data from the Kenya Harmonized Health Facility Assessment (KHFA) 2018, we characterise the readiness and capacity of 61 internship hospitals to understand whether they are suitable to provide internship training for medical doctors.

Methods

We used secondary data from KHFA 2018, which sampled 61 out of all 74 internship hospitals in Kenya. Comparing against the minimum requirement outlined in the national guidelines for medical officer interns, we filtered and identified 166 indicators from the KHFA survey questionnaire and grouped them into 12 domains. An overall readiness and capacity index was calculated as the mean of 12 domain-specific scores for each facility. We compared the readiness and capacity of each domain and overall between Level 4 small hospitals, Level 4 large hospitals and Level 5 & 6 hospitals.

Results

The average overall capacity and readiness index is 69% for all internship training centres. Hospitals have moderate capacity and readiness (over 60%) for most of the general domains, though there is huge variation between hospitals and only 29 out of 61 hospitals have five or more specialists assigned, employed, seconded or part-time - as required by the national guideline. Quality and safety score was low across all hospitals with an average score of 40%. As for major specialties, all hospitals have good readiness and capacity for surgery and obstetrics-gynaecology, while mental health was poorest in comparison. Level 5 & 6 facilities have higher capacity scores in all domains when compared with Level 4 hospitals.

Conclusion

Major gaps exist in staffing, equipment and service availability of Kenya internship hospitals. Level 4 hospitals are more likely to have a lower readiness and capacity index, and should be reviewed and improved to provide appropriate and well-resourced training for interns and to utilise appropriate resources to avoid improvising .

Background

In Kenya as in many countries, doctors are first trained for 5 or 6 years in medical school (typically 2 or 3 years pre-clinical, 3 years clinical). This is followed by a mandatory one-year internship prior to receiving a license to practice from the national regulatory board, i.e. the Kenya Medical Practitioners and Dentists Council, overseen by the National Ministry of Health (1). The Kenyan medical internship included supervised rotation in 4 major departments (surgery, internal medicine, paediatrics and child health, and obstetrics and gynaecology [OBGYN]) but since 2020 mental health and community health practice became added requirements. The competencies medical interns are expected to develop are outlined in national guidelines and log books (2). After successfully completing internship and subsequent licensure individuals can practice medicine unsupervised as general medical officers.

Medical internships are undertaken in specific hospitals approved for this purpose after evaluation by the Kenya Medical Practitioners and Dentists Council, and all hospitals should meet and maintain their minimum requirements. These sites are an essential component of the health and education system producing a country's future physicians (3). Ensuring internship training hospitals are well-staffed and equipped is important so that medical graduates can be supervised and supported to consolidate their knowledge and skills, including of common clinical procedures, and become competent medical doctors (4).

As with other African countries, medical schools in Kenya are expanding to meet human resources for health gaps. The number of Kenyan medical schools has expanded dramatically from 2 in 2004 to 12 in 2018 (5), meanwhile the number of medical doctors graduating almost doubled from 287 in 2006 to 573 in 2018 (6,7). Correspondingly, the number of internship training centres recognised by the Ministry of Health and regulators increased from 6 to 74 over the past 15 years and includes private or mission/faith-based hospitals. (8,9). Many new training centres that were formerly district hospitals but are now county hospitals in Kenya (at Level 4 of its health system) became recognised as internship centres alongside more established regional and national hospitals (at Level 5 and 6 respectively). However, Level 4 hospitals may have shortages of staff, limited diagnostic () facilities,

and frequent stockout of medications and diagnostics reagents, and are “not organized for training purposes” according to a qualitative study in Kenya (8).

Previous studies conducted in Kenya between 2012 and 2014 highlighted poor working conditions and experiences for interns at district hospitals, however they were limited in scale (all including less than 10 hospitals) and did not compare hospitals at different levels and sizes (8,10,11). Using data collected from the Kenya Harmonized Health Facility Assessment 2018 (KHFA), we address the question ‘what capacity do facilities offering internship training have?’ To do this we characterise the readiness and capacity of 61 internship hospitals contrasting findings across levels of hospitals and with the minimum requirements outlined in the national guidelines for medical officer internship training (2).

Methods

Data sources

This is a secondary data analysis using data from the 2018 Kenya Harmonized Health Facility Assessment (KHFA). Details of the KHFA and its methodology are publicly available (12). KHFA used the Kenya Health Master Facility List (MFL) as the sampling frame, randomly sampled 2,980 out of 10,535 health facilities in Kenya, but purposely included all secondary hospitals, public primary hospitals and maternity and nursing homes. Sixty one out of seventy four internship training centres were sampled in KHFA. The survey included over 3000 questions covering five main modules on resource availability, management and finance, readiness, quality and safety of health care, and data verification (information systems). Data were collected through facility audit, observation and validation, provider interview and record review. To supplement the KHFA data we extracted: the inpatient bed number in 2020 from the MFL (13); the total delivery count between 2018 to 2020 from the national Kenya Health Information System (previously District Health Information Software-2 [DHIS2]); and verified key human resources for health data for six hospitals with incomplete information through direct contact with hospitals.

Domains and indicators

We focus on the ‘structure’ component of the Donabedian quality of care framework to characterise hospitals. Specifically, we explore staffing, equipment and service availability and whether they fulfil the minimum requirement outlined in the Kenyan National Guidelines for Internship Training of Medical and Dental Officer Interns (2019) and the National Guidelines and Log Book for Medical Officer Interns (2019) (2). For example, the guidelines require that each internship training centre: i) has a minimum of 5 medical specialists, covering paediatrics & child health, general surgery, internal medicine, obstetrics-gynaecology (OBGYN) and family medicine, ii) is fully operational on a 24-hour basis including accident & emergency, diagnostic and pharmacy services, iii) enables interns to observe and/or perform certain procedures to fulfill competency for each specialty. Examples of the latter in surgery include a total of 36 competency procedures such as appendicectomy or repair of inguinal hernias. This requires that these services be provided by internship training centres (2).

Two authors (ME, YZ) initially filtered out 277 indicators from the 3000 questions from KHFA to identify those most relevant to the minimum criteria defined by the national internship guidelines. Two authors (BO, FW) who are medical school faculty and who supervise medical officer interns subsequently reviewed these indicators identifying those felt to be most useful to characterizing hospitals as contexts for internship training by. A final list of 166 indicators was agreed by all four authors and selected for further analysis as “signal indicators” of the minimum requirements for internship training centres. All the indicators were converted into binary responses with 1 representing “met/available” and 0 representing “not met/unavailable”. We grouped indicators into 12 logical domains described in brief in Table 1 with further detail of all indicators available in additional file 1.

Analysis

For each domain, we calculated a score as a percentage based on the number of indicators with a score of 1 (met/available) divided by the total number of indicators (those met/available + those not met/unavailable). We generated an overall readiness and capacity index as the unweighted mean of all 12 domain scores for each facility. We stratified the 61 included internship training centres into three categories based on hospital administrative level and inpatient bed number. Kenya has a six service-level system based on the essential package for health, whereas Level 1 refers to community-level, Level 2 dispensaires and clinics, Level 3 health centres, Level 4 primary facilities including district hospitals, Level 5 secondary provincial hospitals and Level 6 tertiary and national hospitals. We first grouped all internship hospitals that are Level 5 & 6 together (bed number 174-1455, n=15) as historically they have been better resourced; for the the internship hospitals that are level 4, we divided them based on bed number

into: Level 4 small hospitals (bed number 82-176, n=23) and Level 4 large hospitals (bed number 176-320 n = 23). Data analysis was conducted using Stata version 16 (Stata Corporation, Texas, USA).

Results

The average overall capacity and readiness index is 69% for all internship training centres. Hospitals have moderate capacity and readiness (over 60%) for most of the general domains, though there is huge variation between hospitals and only 29 out of 61 hospitals have five or more specialists assigned, employed, seconded or part-time - as required by the national guideline. Quality and safety score was low across all hospitals with an average score of 40%. As for major specialties, all hospitals have good readiness and capacity for surgery and obstetrics-gynaecology, while mental health was poorest in comparison. Level 5 & 6 facilities have higher capacity scores in all domains when compared with Level 4 hospitals.

Discussion

Our analysis on the readiness and capacity of Kenya internship training hospitals suggested that in 2018 the overall staffing, equipment and service availability was inadequate when compared with the regulator's requirements. Level 4/district, smaller hospitals (23 of the 61 assessed) were more likely to have fewer human resources, equipment and specialty services, and less likely to meet quality and safety indicators. The implication is that hospitals with lower capacity may either have to improvise to offer core services or refer patients to other facilities. This could significantly influence the quality of training as interns might not be able to fully consolidate their knowledge and skills.

Over half of the internship training hospitals did not have five or more specialists as required by the regulator, the medical council, which suggests inadequate training and supervision of medical officer interns. Internal medicine specialists and anaesthesiologists were most often lacking suggesting that in many centres non-specialist but licensed general medical or specialist clinical officers fill these roles. Even in these larger Kenyan hospitals such personnel will also likely therefore be leading provision of care for severe COVID-19. Where medical officers are themselves also scarce, medical officer interns may become the only "in-house" doctor on call and be forced to take on full responsibility for patient care potentially threatening patient safety if interns are forced to care for serious, acute medical and surgical conditions without appropriate supervision (8, 14, 15). The likely challenges to provision of high quality safe care are further suggested by poor scores of all but tertiary hospitals against organisational indicators of quality and safety practice. In fact guidelines or instruction for quality and safety were rarely present and there seemed very limited evidence that quality and safety indicators are monitored, reviewed, reported and acted upon. These findings are consistent with reports highlighting challenges with patient safety in low- and middle-income country (LMIC) hospitals (16).

Internship hospitals appear most able to provide appropriate essential resources and capacities in the major disciplines of surgery and OBGYN. Challenges were especially noted in the disciplines of internal medicine and paediatrics and neonatology. Many facilities lack ECG machines, CT scans, defibrillators, equipment used for peritoneal or hemo-dialysis, and lumbar puncture kits. More specific to neonatal and child health were lack of capacity in ability to provide exchange transfusion, neonatal CPAP and intraosseous access. Capacity to offer mental health and neurological care, only listed as internship requirements in 2020, was especially low most particularly in Level 4 small hospitals. Kenya has a severe shortage of psychiatrists and neurologists as well as psychiatric nurses (17). For facilities without capacity in the major disciplines now including mental health and neurology services it is likely that hospitals are forced to refer patients elsewhere or improvise approaches to care in order to serve patients. Interns' training experience is therefore likely to be very varied and more attention may therefore need to be paid to planning how interns can be provided with adequate training in all specialties if this is a key long-term aim.

Kenya has dramatically increased its medical training volume hoping to produce 9,000 new graduate medical physicians by 2030 to narrow its staffing gap (5). More hospitals especially at county-level (district hospitals) are accredited as internship training centres. These hospitals are usually smaller in size and more likely to be distant from the well-established university tertiary hospitals in major cities that scored much higher across domains in our analysis. Rural rotations and residencies have been recommended by the WHO to increase health worker retention (18). Students or interns in these settings may also be more likely to learn hands-on clinical procedures and be actively engaged in patient care (19) as opposed to tertiary hospitals where the presence of more specialists and general medical officers may result in interns undertaking more administrative work. However, the prerequisite of good internship training is that the hospitals are adequately staffed and equipped and ready to deliver teaching and training. Our data suggested that this is not always the case and are consistent with previous qualitative research suggesting that district hospitals provided limited learning with limited suitability as internship sites (8).

The potential consequences of poor training and supervision during internship are therefore worth consideration. As well as failing to consolidate knowledge and skills in major specialties interns may also develop burnout and stress-related psychological problems more rapidly (8). These stresses and being forced to take significant clinical responsibility in poorly-resourced hospitals may push medical officer interns to leave the profession or the public sector which is often most resource constrained as soon as they are licensed/registered (20). This will likely worsen the internal and external brain-drain undermining universal health coverage and equity and limiting any benefits from public investment in medical education (20). Inadequate support and supervision also threatens patient safety by creating the conditions for significant medical errors to occur. Even in settings without a 'blame culture' such errors can have profound effects on the health workers as well as the patients further exacerbating workers' psychological distress (21, 22). We must also remember that today's medical officer interns will become tomorrow's general medical officers who are often then responsible for the training of the next cohorts of interns and other health worker cadres (23). Therefore, poor internship training

for medical officers continuously compromises the quality of training and skills that are passed on and this may be a particular challenge to patient safety and healthcare quality that rely so heavily on effectively functioning teams (24).

Our analyses have clear implications for Kenya policy-makers. The regulator requires internship hospitals to maintain the minimum requirement of staff and be able to offer a core set of quality services with self-report against such requirements at least once a quarter. Our data would suggest many internship hospitals in Kenya might not continuously achieve these minimum requirements. Should this prevent interns from being licensed or should interns be reallocated to centres meeting regulatory requirements? While more stringent and regular audit and re-accreditation of internship training centres might be conducted by the regulatory council to ensure that only the hospitals that meet the minimum requirements are allowed to receive and train interns, adequate mitigation measures need to be in place so that interns themselves are not disadvantaged further. More widely, our findings point to the need to carefully consider the potential consequences of rapidly expanding medical training and of appropriate planning and financing for new internship centres, especially in rural areas.

Several limitations should be noted for the current analysis. To start with, our analysis was only limited to the 61 internship training hospitals sampled by KHFA, mostly public hospitals. A total of 13 hospitals were not sampled in KHFA and are either private hospitals or mission hospitals, therefore comparison by hospital ownership was not feasible. Second, aside from the KHFA's own limitation on data missing, we noted data inaccuracy and inconsistency in KHFA data we retrieved. We made efforts to clean these data especially on human resources through correspondence input though we were unable to validate all the number from the KHFA survey. Third, to assess the readiness and capacity of internship training hospitals we selected 166 signal indicators from the 3000 questions from KHFA survey. Our criteria were to ensure that the indicators selected are the minimum requirement and should be achievable (i.e. should be "1" for all indicators). Our selection was guided by the national guidelines and agreed by four authors, three of whom have experience supervising interns. However, we acknowledge that this process is somewhat subjective. Fourth, we only focused on the structural and organizational features of internship training hospitals. We did not include indicators on process or outcome indicators due to limited data availability. Ideally these should be considered while evaluating internship training hospitals. Last but not least, the KHFA data was collected in a snapshot in 2018 prior to Covid-19. The appointment and posting of specialists may fluctuate from time to time but Covid-19 specifically could have led to the government investing in hospital infrastructure, equipment and emergency hiring to improve their response capacity to Covid. Therefore it is possible that the readiness and capacity of Kenyan internship training centres has improved since 2018 (25). Despite these limitations our data do suggest important shortcomings in internship training centres in Kenya. We suggest other LMICs that are rapidly expanding their medical training should also evaluate their internship training sites to explore the generalisability of our findings.

Conclusion

We assessed the readiness and capacity of 61 Kenyan internship training hospitals using data from KHFA 2018. Our results highlighted major gaps in staffing, equipment and service availability with particular weaknesses in areas exploring organisational arrangements to support quality and safety. Smaller hospitals are more likely to have a lower readiness and capacity index, and should be given much greater support so they can provide appropriate and well-resourced training for medical interns allowing them to become fully competent medical doctors.

Declarations

Additional file 1: Microsoft word document (.doc); 166 Indicators included for each general domain and speciality domain

Additional file 2: Microsoft word document (.doc); All indicator heatmap by hospital bed number

Additional file 3: Microsoft word document (.doc); Comparing internship hospitals sampled in KHFA and others

Ethics approval and consent to participate: The Kenya Ministry of Health, Division of Monitoring and Evaluation, sought approval for, planned and execute the 2018 Kenya Harmonized Health Facility Assessment. Permission was then granted to use these data for the secondary analysis reported here with the purpose of improving quality of health service provision in Kenya.

Consent for publication: Not applicable.

Availability of data and materials: The data that support the findings of this study are available from Kenya Ministry of Health but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. All requests for further use of these data can be made through and with the permission of the Kenya Ministry of Health.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: YZ and ME conceived of the analysis. YZ, BO, FW and ME contributed to data analysis. YZ wrote the first draft of the manuscript. BO, FW, HK, DG, CN and ME provided critical feedback on the first draft of the manuscript. All authors read and approved the final manuscript.

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Abbreviations

CPAP, continuous positive airway pressure

CT, computerised tomography

DHIS2, District Health Information Software-2

IPC, infection prevention and control

IQR, inter-quarter range

KHFA, Kenya Harmonized Health Facility Assessment

LMIC, low- and middle-income country

MFL, Kenya Health Master Facility List

OBGYN, obstetrics and gynaecology

PCR, polymerase chain reaction

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Tables

Table 1. Domain and indicator summary

Category	Domain	Number of indicators	Example indicators	Indicator and domain conversion
Human resources	(a) Human resource for health	6	q251c_04 & q251c_23: Total staff assigned, employed, seconded (including part time) – Paediatricians, Neonatologists	All the indicators were converted into binary responses with 1 representing “available” and 0 representing “unavailable”. For most indicators on availability, we defined available as “onsite, observed, non-expired and functional”. For tests that are reported to be available offsite, or tests that are observed but expired, and for equipment reported available but not observed, or not available now, we labeled them as “unavailable”. We also considered an indicator to be unavailable if the health facility did not answer this question, usually because its filter questions were answered no.
Diagnostics and supportive care	(b) Laboratory test (including 4 sub-domains, rapid test, basic lab test, infectious diseases test, advanced lab test)	31	q6307a_6: TB test availability - Xpert MTB/RIF rapid diagnostic testing for tuberculosis	
	(c) Oxygen and respiratory support	10	q2250b_10: Please tell me if the pulse oximeter are available anywhere in the outpatient service area and are functional.	
	(d) General equipment	8	q4981b_1: Electrocardiogram (ECG) Equipment available and functioning today	
Service continuity and safety	(e) 24/7 availability	8	Q4885a: Is emergency medicine specialist or general medical practitioners always available 24-hours for emergency service, either onsite in emergency unit or not onsite in emergency unit but on-call inside facility?	
	(f) Infectious prevention and control	9	q7220: Does this facility have guidelines or protocols for cleaning the facility such as the floors, counters, and beds?	
	(g) Quality and safety	24	K7172: How frequently does the quality assurance committee meet? - Monthly	
Major specialties	(h) Surgery (including 2 sub-domains, equipment/medicine and service)	20	q5113b_07: Functioning of basic surgical equipment - EKG electrodes	
	(i) Internal medicine (including 2 sub-domains, equipment/medicine and service)	12	q2615: Do providers in this facility diagnose and/or manage diabetic patients?	
	(j) Obstetrics-gynaecology (including 2 sub-domains, equipment/medicine and service)	11	q4515a_1: Parenteral administration of antibiotics (IV or IM) for mothers carried out	
	(k) Paediatrics (including 2 sub-domains, equipment/medicine and service)	20	q4660: Is KMC (Kangaroo mother care) for premature/very low birth-weight babies used in this facility?	

Due to technical limitations, Table 2 is only available as a download in the supplementary files section.

Table 3. Human resources for health cadres by hospital characteristics

	Level 4 small hospitals (n=23)	Level 4 large hospitals (n=23)	Level 5 & 6 hospitals (n=15)	Total (n=61)
Medical officer	12 (6, 18)	14 (10, 20)	29 (21, 58)	14 (10, 26)
Medical specialist	2 (1, 7)	4 (1, 11)	16 (2, 26)	4 (1, 11)
Clinical officer	20 (13, 26)	25 (15, 33)	35 (21, 44)	25 (15, 33)
Nurse and midwife	206 (95, 248)	150 (113, 210)	336 (267, 534)	210 (114, 323)
Medical laboratory technologist	13 (11, 14)	14 (11, 18)	23 (19, 46)	14 (12, 20)
Radiographer	4 (3, 5)	4 (2, 6)	9 (6, 22)	5 (3, 7)
Allied health professional	11 (3, 14)	14 (10, 17)	29 (24, 44)	14 (6, 24)

Note: Data are presented as median (interquartile range), allied health professional refers to physical therapist, occupational therapist, orthopedic technician, paster technician, nutritionists and dieticians

Figures

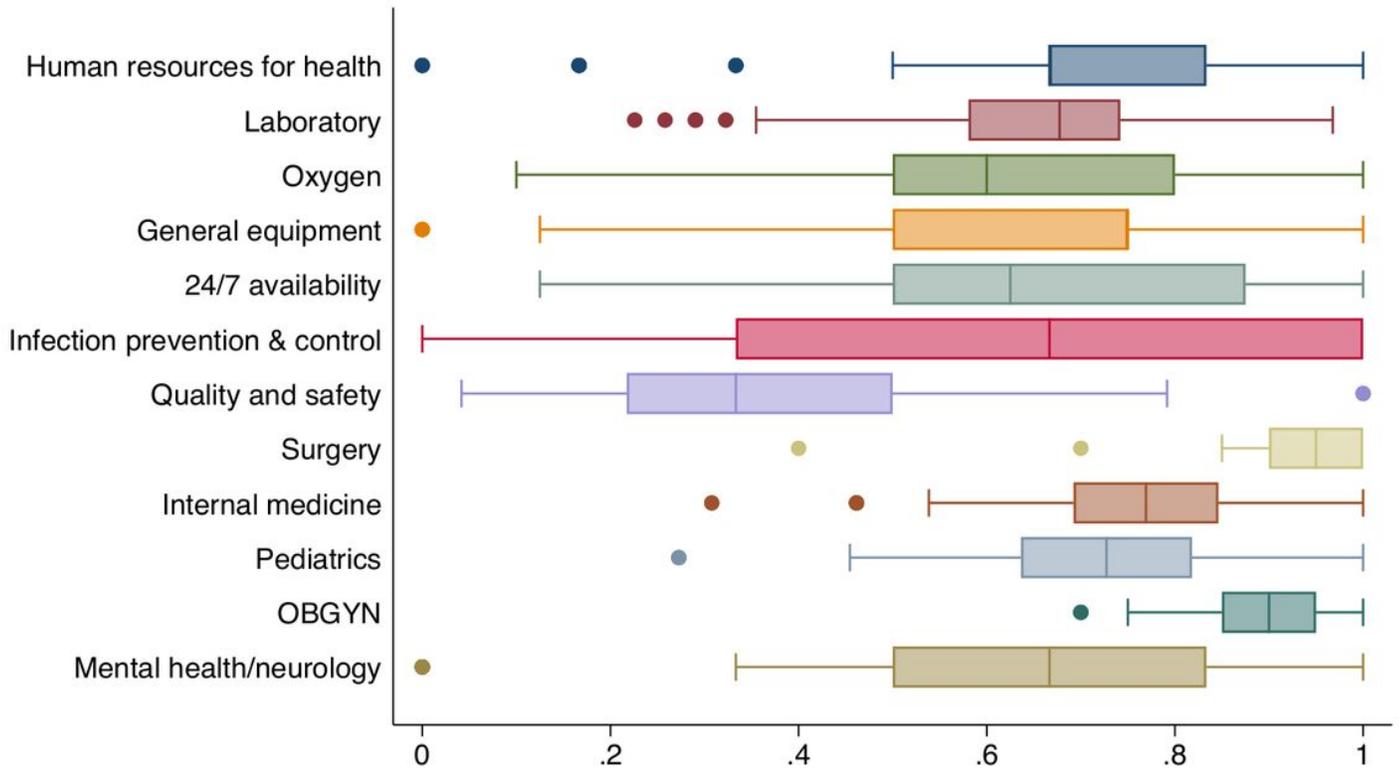


Figure 1

Distribution of capacity and readiness score by domain

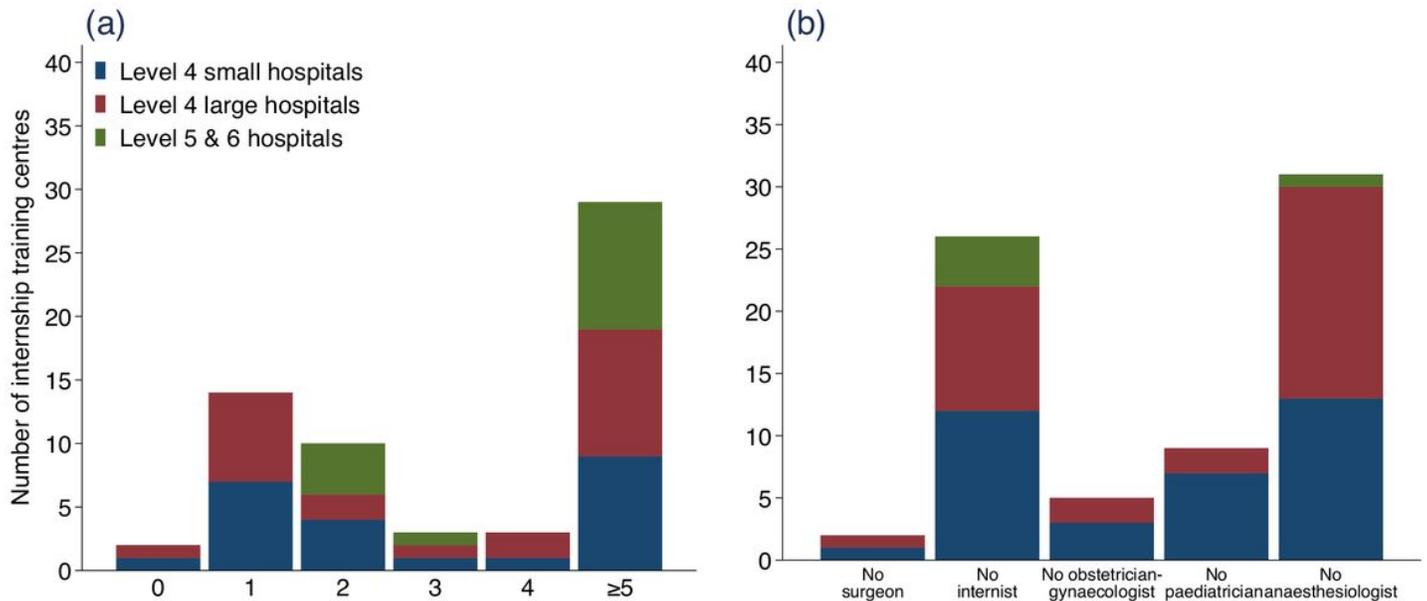


Figure 2

Number of internship training centres with different numbers of specialists (a) and with no surgeon, internists, obstetrician-gynaecologist, paediatrician and anaesthesiologist (b) Note: We have combined different types of surgeons (general surgeons, paediatric surgeons, orthopaedic surgeons, cardiothoracic surgeon, ENT surgeons, plastic surgeons, neuro-surgeons, urological surgeons) into “surgeon” category. Similarly, specialist physicians (internists), oncologist, neurologist, cardiologist, critical care, gastroenterologist, palliative care specialist, nephrologists, rheumatologist, medical endocrinologist into “internist” category, and paediatricians and neonatologists into “paediatrician” category.

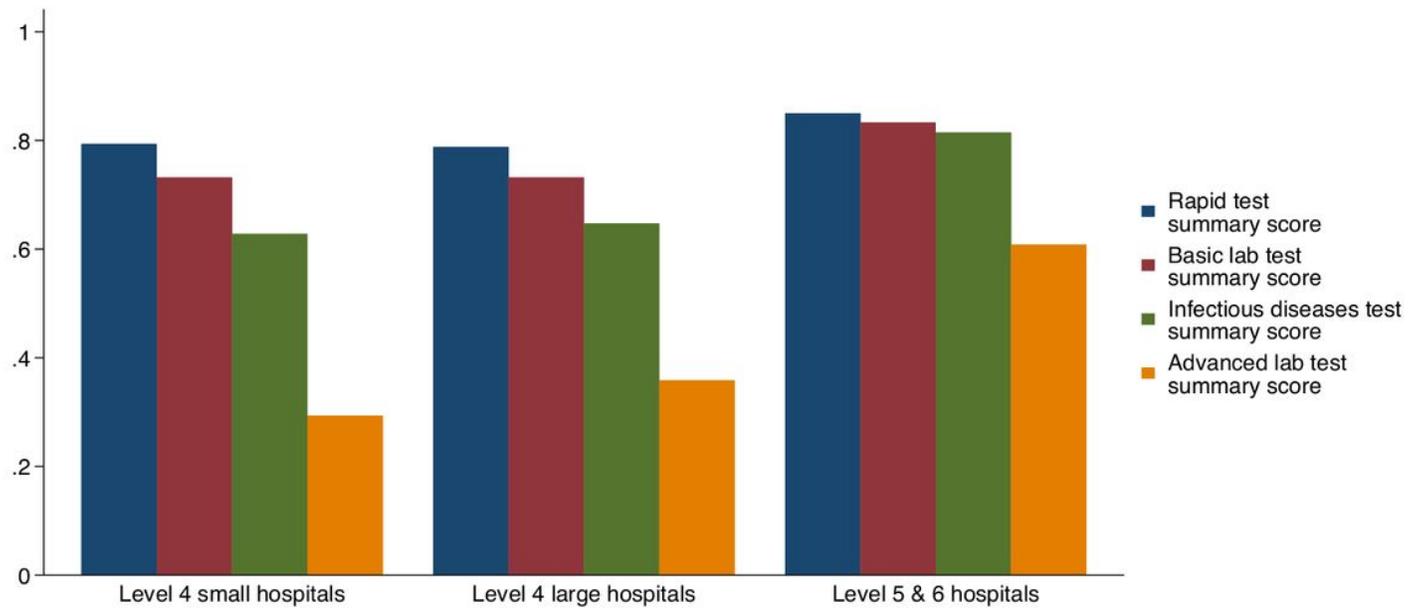


Figure 3

Average lab test score by sub-domain and hospital characteristics

Supplementary Files

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