

**Theatre procedures performed at Knysna hospital in the Eden district of the
Western Cape and their application to post graduate training of family
physicians.**

Student:

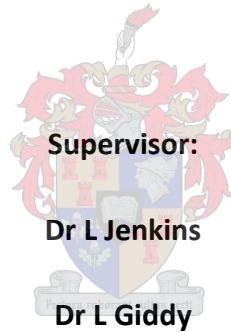
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I, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree. I also declare that ethical approval for the study was obtained from the Health Research Ethics Committee of Stellenbosch University (Reference number:S12/08/215).

Signature:

Date: 10 August 2014

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Abstract

Background

Family physicians are trained to enable them to staff community health centres and primary care hospitals. Part of this training is teaching them procedural skills for anaesthetics and surgery. Knysna hospital is a training facility for family medicine registrars and this article aims to evaluate if sufficient learning opportunities exist in Knysna hospital's theatre to teach family medicine registrars procedural skills.

Methods

A descriptive study was undertaken of the number and type of procedures performed in Knysna hospital theatre for a one year period, and compared with the required skills, as stipulated in the national training outcomes, for the discipline.

Results

Three thousand seven hundred and forty one procedures were performed during the study period. Anaesthesia was the most common procedure, followed by caesarean section. There were adequate opportunities for teaching most core skills.

Conclusions

There were sufficient opportunities for a registrar to be taught all the core skills that are exclusive to theatre. Further research is needed to evaluate Knysna hospital as a training facility for all procedural skills.

Introduction

Knysna hospital is a 96 bed district hospital situated in the Eden district of the Western Cape Province. It provides comprehensive hospital and clinic based primary care services to a population of roughly 120000 people that reside within its drainage area.^{1,2} The doctors who provide the service are led by two family physicians and comprise a mixture of medical officers (MOs) of varying experience and community service MOs. Three registrars in family medicine are in full time registrar training posts at the hospital.

The official recognition of family medicine as a specialty by the Colleges of Medicine of South Africa (CMSA) and the Health Professions Council of South Africa (HPCSA) in 2007, has necessitated that core competencies and minimum skills levels be established.³ This is in keeping with international norms to ensure uniformity in the training and expected competencies of specialist family physicians.^{4,5}

The objectives of postgraduate family medicine training have been well described, namely that “There is to be a compulsory, full-time four- year training programme for registrars in Family Medicine which should result in a well-trained cohort of Family Physicians suitable to staff Community Health Centres (CHC) and Primary Care Hospitals in the future”.⁶

As early as 1987 it was identified that healthcare in Africa required the training of a “district hospital doctor” who has a wide range of procedural skills.⁷ More recently, in the local context, there have been extensive reports on the skills and knowledge requirements of doctors who work in district hospitals in the Western Cape.^{8,9,10}

The South African national Department of Health published the expected package of care required for a district hospital in a 2002 policy document. This was supplemented in 2009 by the Western Cape District Package of Care.^{11,12} The required skills in the national and provincial district packages of care are similar to the skills and competencies expected of a family physician.³

Family physicians and medical officers in district hospitals need to be competent in a range of surgical and anaesthetic procedures and there is a need for ongoing training.^{7,8,9,10} The registrar training program as offered by Stellenbosch University (SU) had a two year period of rotation through the major disciplines in a regional hospital, with training largely supervised by consultants from outside the speciality of family medicine, and two years spent in a primary care hospital and a CHC. The current thinking by local family medicine educators has gravitated more towards a fulltime training post at the district hospital and CHC with focussed rotation in level two facilities should the need arise.¹³

Family medicine educators in South Africa consider it imperative “That training would take place in Community Health Centres (CHC), Level 1 (District or Primary Care orientated) hospitals and where necessary, in Level 2 (regional hospitals).”⁶

Postgraduate training within the primary care context “provides opportunity for the registrar to gain experience in community-oriented primary care, ambulatory care, the care of families, continuity of care, and promotive, preventive and rehabilitative health care.”¹⁴

The aim of this study was to evaluate the Knysna hospital as a training facility for the theatre skills as expected of a family physician in South Africa by:

1. Counting the surgical procedures performed in the theatres at Knysna hospital for a one year period from 1 February 2011 until 31 January 2012;
2. Identifying opportunities for teaching family medicine registrars procedural skills; and
3. Comparing the identified learning opportunities to the standard national skills list for family medicine training.

Methods

All surgical and anaesthetic procedures done at Knysna Hospital between 1 February 2011 and 31 January 2012 were recorded from the entries made into the theatre record. When counting the procedures every subentry was counted as a procedure. For instance a Caesarean section and tubal ligation while a single entry in the theatre record was counted as three procedures:

1. Anaesthetic (Spinal/general)
2. Caesarean section and
3. Tubal ligation.

Data was recorded in an Excel 2007™ spreadsheet (annexure A). Skills and procedures were used as interchangeable terms in the context of this paper and are meant to convey similar meaning. Each procedure was counted and tabulated according to the experience level of the doctor who performed the procedure. Doctors with a minimum of five years' experience or a specialist qualification were identified as teachers and all procedures performed by a teacher were categorised as a learning opportunity. Five years' experience was decided on as an arbitrary level of experience in order to ensure that the teacher would have sufficient experience to enable skills transfer.

The agreed national skills list for family medicine was used to match those procedures being performed with those required according to the list.³ Every procedure on the skills list that is done in theatre was tabulated. This includes several procedures that are not generally done in theatre but may need either a general anaesthetic or a more controlled environment. The skills list differentiate procedures as either core, supervised or elective skills and the same definitions was used in this paper.

Core skills – “skills that should be performed independently at the end of training”.

Supervised skills – “skills that should be performed under supervision during training”.

Elective skills – “these can be taught in specific programs but are not required as part of national training. Other elective skills not listed here may also be relevant to individual students/settings”.³

The literature suggests that a skill needs to be performed 15-25 times in order to obtain proficiency.^{15,16,17,18} The average value of 20 was used for the purpose of this study. Given the four year duration of the family medicine training programme all procedures that occurred as learning opportunities five times during the year that we reviewed was regarded as adequate to enable training to competence in four years. Some of the procedures performed at Knysna hospital were not applicable to family medicine training and were excluded from the assessment of learning opportunities.

The article focuses only on the availability of learning opportunities and made no attempt to determine whether these opportunities were utilised. A procedure that was performed outside the theatre in the wards, out-patient department (OPD) or emergency centre (EC) was not included in the data set and was not considered in the analysis.

Results

A total of 3741 surgical and anaesthetic procedures were done in the period from 1 February 2011 to 31 January 2012. Of these, 3737 were identifiable and 4 were unknown or illegible in the theatre record. One hundred and twenty six different procedures were recorded with the frequency varying from 1 to 1202 per year. The full list of procedures is included in annexure A. The different procedures are listed according to their classification as either core, supervised or elective skills.³

Core skills

Forty seven core skills are potentially performed in theatre. Figure 1 is a graphical representation. Thirteen are exclusively theatre procedures at Knysna hospital that are not performed in the wards, the OPD or the EC. These are listed below:

1. Caesarean section
2. Evacuation of uterus
3. Tubal ligation
4. Debridement of wounds or burns

5. Check Boyle's machine
6. General anaesthetic
7. Inhalation induction
8. Intravenous induction
9. Monitor patient during anaesthesia
10. Recover patient in recovery room
11. Reverse muscle relaxation
12. Set airflows- Magill's, circle T-piece
13. Spinal anaesthetic

Checking of the anaesthetic Boyle's Machine was not counted in the theatre record while there were sufficient learning opportunities to enable training of a registrar for the remaining 12 skills. All the core skills that occurred only in theatre had adequate learning opportunities.

Procedures that can be done interchangeably in theatre or elsewhere for which there were sufficient learning opportunities inside theatre were as follows:

1. Incision and drainage of perianal haematoma
2. Penile block
3. Circumcision
4. Excision of sebaceous cyst (other lumps or bumps),
5. Cauterisation or cryotherapy,
6. Skin biopsy (excision or punch)
7. Inserting intrauterine contraceptive device
8. Dilatation and curettage
9. Drainage Bartholin abscess or cyst
10. Incision and drainage of abscess
11. Closed reduction of fracture
12. Excise a ganglion
13. Administering oxygen,
14. Control of airway and mask ventilation,

15. Endotracheal intubation and ventilation of patient
16. Ketamine anaesthesia,
17. Ventilation of a patient with a Bag-Mask-Valve device.

The remaining 17 procedures that can be done inside or outside theatre did not have sufficient learning opportunities within the theatre and are listed below:

1. Lymph node excision biopsy
2. Proctoscopy
3. Drain a hydrocoele
4. Insert a suprapubic catheter
5. Incision and drainage of chalazion
6. Suture an eyelid
7. Remove foreign body ear
8. Remove foreign body nose
9. Epistaxis (Cautery and packing)
10. Drain peritonsillar abscess
11. Manual removal of placenta
12. Suturing third degree tear
13. Reduce elbow dislocation
14. Reduce hip dislocation
15. Reduce radial head dislocation
16. Reduce shoulder dislocation
17. Ring block (digit)

All the core skills along with the number of learning opportunities for each are available in annexure B.

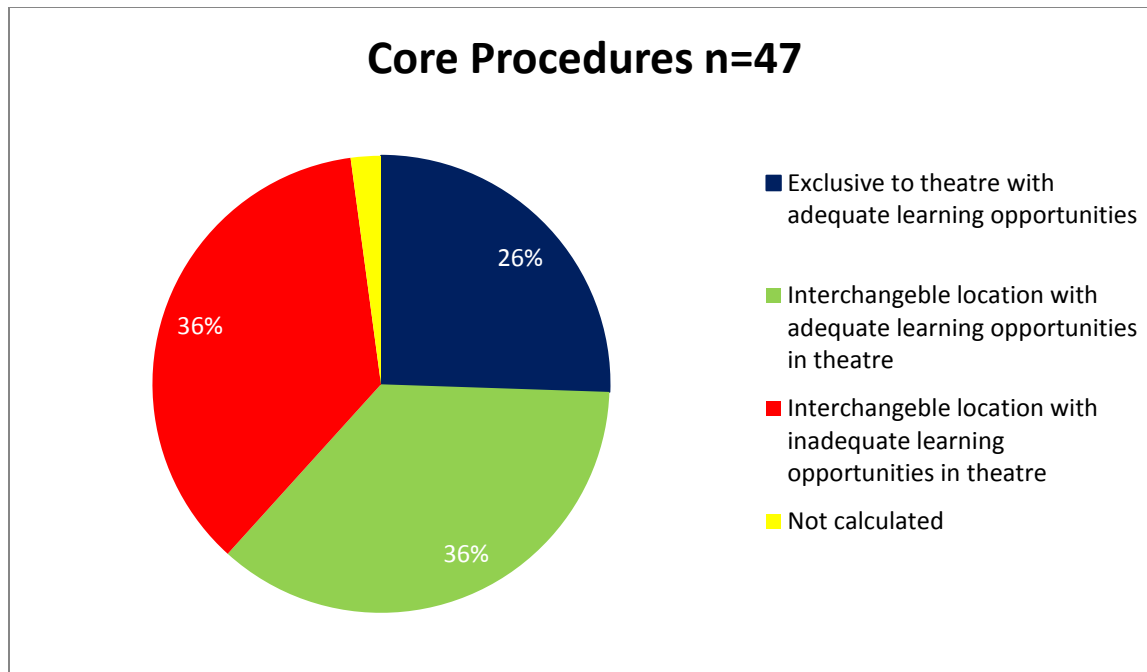


Figure 1. Core procedures performed in theatre at Knysna hospital.

Supervised skills:

Supervised skills are skills that should be performed under supervision during training.³ Eighteen different skills that are classified as supervised can occur in theatre. Five of the 18 skills occurred often enough as learning opportunities in theatre to facilitate training in a four year registrar training period. All of these are restricted to theatre at Knysna hospital. These skills were as follows:

1. Appendicectomy
2. Vasectomy
3. Skin graft
4. Laparotomy for ectopic pregnancy
5. Termination of pregnancy

The procedural skills that are restricted to theatre at Knysna hospital that did not occur often enough to facilitate training were:

1. Hydrocoelectomy
2. Amputation of fingers

3. Fasciotomy
4. Biers' block
5. Brachial block
6. Epidural anesthesia.

There were no procedures that were done both inside and outside theatre for which there were adequate learning opportunities inside theatre.

There were inadequate learning opportunities in the theatre for these seven skills listed below. All of these procedures can be done inside or outside theatre.

1. Pleural biopsy
2. Reduction of nose fracture
3. Injection of keloids
4. Phenol ablation of ingrown toenail
5. Relieve cardiac tamponade.
6. Tracheostomy
7. Debridement of open fractures

Annexure C shows all supervised procedures in table form.

Elective skills

Elective skills can be taught in specific programs but are not required as part of national training. Other elective skills not listed here may also be relevant to individual students/settings.³The list below is exclusively theatre procedures that had sufficient opportunities to enable teaching a registrar to become proficient with the procedure.

1. Hernia repair
2. Bilateral sub capsular orchidectomy
3. Cataract removal
4. Tonsillectomy and adenoidectomy
5. Colposcopy
6. Hysterectomy
7. Loop electrosurgical excision procedure (LEEP)for cervix
8. Explorative laparotomy (for trauma or bowel obstruction)
9. Open reductions, pins and screws of fractures
10. Repair nerves and tendons

Some skills had sufficient learning opportunities inside theatre but are not restricted to theatre.

1. Prostate biopsy
2. Dental extraction

All procedures considered elective skills are shown in Annexure D.

Discussion

A wide variety of different procedures (126) were performed in Knysna hospital's theatre during the study period. Sixty four (50.8%) of these procedures are part of the Western Cape level 1 package of care.¹² The rest are mostly procedures that were performed by outreaching specialists from George regional hospital or by specialists who had sessional appointments at the time.

General anaesthesia was the procedure performed most often (1202 times). This was expected since most other procedures would need anaesthesia in order to make their performance possible. Of the surgical procedures, obstetric and gynaecological procedures dominated. Of the less common procedures there were a significant number that do not fall within the district hospital package of care, or that which is required of a family physician.^{3,12} These included abdominoplasty, facelift, functional endoscopic sinus surgery (FESS) and thyroidectomy. These procedures were performed by specialist surgeons in their respective fields. A number of procedures were performed in especially plastic surgery and otorhinolaryngology that are designated level 3 (tertiary care hospitals) procedures. These related to specific level 3 outreach for ENT and a historic local arrangement with a plastic surgeon that allowed him use of the theatre for his private patients.

Some of the procedures performed occurred frequently and presented high volumes of learning opportunities so that proficiency can be taught within one year. These relatively common procedures were mostly those procedures designated for Level 1 facilities, for example general anaesthetics and caesarean sections. Level 2 procedures generally occurred less often and level 3 procedures were mostly done less than 5 times with the exception of tympanoplasty (10) and breast augmentation (6).¹²

Of the 47 procedures considered core skills that can be done in theatre, 34 (72%) were not exclusively theatre procedures but happened interchangeably in theatre, the wards, OPD or the EC. This interchangeability of the core skills between theatre and elsewhere illustrates the flexibility required from family physicians. This is congruent with the directives of the (now disbanded) Family Medicine Education Consortium (FaMEC) that graduates must be competent to work in both the ambulatory primary care as well as the hospital-based generalist environment.¹⁹ Twenty nine of the 47 procedures occurred often enough as learning opportunities in theatre to enable training of a registrar. One skill, checking a Boyle's machine, was not counted and could not be commented on.

Seventeen core procedures that are performed both in theatre and other procedure rooms were not performed often enough in theatre to be classified as sufficient learning opportunities. There was a lack of data with regards to how often these procedures were done outside theatre and fell outside the scope of this research.

There were 18 supervised skills that happened in theatre. The definition of supervised skills is ambiguous concerning the level of proficiency and independence the registrar should display in performing the procedure. If the requirement is for the registrar to only perform the procedure once with expert guidance, as the definition suggests, a single learning opportunity would suffice and the number of procedures that had adequate learning opportunities will increase. We intended to explore to what extent registrars can be taught proficiency, however, and therefore we have not altered our definition of adequate learning opportunities.

During the year in review, five of the 18 procedures had enough learning opportunities to enable a registrar to become proficient in a four year training period. Of the remaining 13 procedures six were exclusive to theatre but did not occur often enough for a registrar to become proficient to perform the procedure independently. Seven of the procedures can be performed in theatre or elsewhere.

Elective skills, by definition, are skills that a registrar chooses to learn for personal reasons or because there is a local need for a skill. If a procedure is repeated often enough to enable training, there is presumably a need for that skill in the local context. The availability of sufficient learning opportunities can therefore be used to inform a decision about learning a skill.

Limitations

This paper quantifies learning opportunities inside theatre and excludes data on procedures done outside theatre. Therefore it is not possible to evaluate Knysna hospital as a training facility for family physicians on the basis of this paper alone.

Conclusion

Knysna hospital provides adequate training opportunities for most of the theatre skills regarded as core skills for family medicine training in South Africa. Most of the procedures considered supervised skills did not occur often enough to enable training. Elective skills that are directed by local service needs can be taught adequately.

Because procedures done outside theatre were not included, further research is needed to evaluate Knysna hospital as a training facility for all procedural skills expected of a family physician.

Conflicts of Interests

Dr du Plessis is a registrar in family medicine at Knysna Hospital.

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Contributions by authors

Dr du Plessis performed data collection and compiled the original manuscript. Dr Jenkins and Dr Giddy provided expert opinion and revision of the manuscript. All authors read and contributed to the final manuscript.

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Annexure A.

Procedure	Learning opportunity	Non-Learning opportunity
Abdominoplasty	1	0
Acromioplasty	4	0
Amputation of finger or toe	4	6
Anal fistulectomy	13	0
Anterior vaginal repair	2	0
Appendicectomy	20	3
Axillary dissection for hidroadenitissuperativa	1	0
Bilateral brachioplasty	1	0
Bilateral orchidectomy	5	4
Biopsy of mouth/soft palate	1	0
Biopsy of tongue	1	0
Breast Augmentation	6	0
Burrhole	0	1
Carpal tunnel release	9	0
Cautery of turbinates	2	0
Cautery of warts	6	3
Cesarean Section	150	179
Circumcision	101	17
Closed reduction of fracture	6	2
Colposcopy ± LLETZ	117	0
Cone Biopsy	1	0
Debridement	17	19
Dentectomy	134	0
diagnostic dilatation and curetage	6	2
Diagnostic laparoscopy (gynae)	2	0
ECCE & IOL (cataract surgery)	90	0
Evacuation of uterus	58	53
Evacuation of uterus (TOP)	50	13
Examination under anesthesia (ear)	10	0
Examination under anesthesia (post sexual assault)	1	0
Examination under anesthesia (Vagina)	2	0
Excision biopsy (skin)	29	8
Excision meibomian cyst	1	1
Excision of ganglion	12	0
Excision of lipoma	5	4

Excision of Pilonodal sinus	1	0
Excision of sebaceous cyst	10	0
Excision stitch granuloma	3	0
Excision tiroglossal cyst	1	0
Exploration and suturing of wound (face)	2	0
Exploration of scrotum and orchidopexion	3	0
Exploration of stab wound neck	3	0
Explorative laparotomy	19	5
Explorative thoracotomy	4	0
Facelift and blepharoplasty	5	0
Functional endoscopic sinus surgery	1	0
General anaesthetic	1014	188
Grommets	22	3
Haemorrhoidectomy	10	0
Hemicolectomy	1	0
Histerotomy	1	0
Hydrocoelectomy	3	0
Hystero-salpingogram	5	0
Incision and drainage	23	19
Incision and drainage ± marsupialisation of Bartholin cyst	10	10
Incision and drainage of perianal hematoma/abscess	9	10
Incisional hernia repair	5	0
Inguinal hernia repair	25	0
Injection of hemorrhoids	1	0
Interval Tubal ligation	13	4
IUCD insertion	5	0
Laparoscopic sterilization	7	0
Laparoscopic cholecystectomy	15	0
Laparotomy for ectopic pregnancy	16	23
Lateral sphincterotomy	1	0
Lengthening Achilles tendon	2	0
Lower limb amputation	8	1
Lumpectomy/breast biopsy	32	3
Lymph node biopsy	4	2
Manual Removal of placenta	2	2
Mastectomy	6	0
Mastoidectomy	5	0
McDonald suture	3	0
Microlaryngoscopy	5	0
Myomectomy	2	0
Nasal polypectomy	2	0
Open reduction ± internal fixation	6	0
Ossiculoplasty	3	0

Otoplasty	1	0
Ovarian cyst excision	4	0
Parotidectomy	1	0
Penile block	78	0
Pericardiocentesis	0	1
Post Partum tubal ligation	115	107
Post tonsillectomy bleed	1	0
Procedural sedation	64	23
Prostate biopsy	7	6
Recanalisation of salivary duct	1	0
Reduction of dislocated shoulder	2	2
Reduction of prolapsed uterus	1	1
Release trigger finger	8	0
Removal foreign body (ear)	3	3
Removal foreign body (foot)	1	0
Removal foreign body (throat)	4	0
Removal knife blade (thigh/face)	2	0
Removal of circumcision ring device	0	1
Removal of extra digit	1	0
Removal of Mallencott Inter costal drain	1	0
Removal screws and plates (ortho)	5	1
Removal toenails	2	2
Review of tracheostomy	3	0
Secondary suturing of facial nerve	1	0
Septoplasty	2	0
Sigmoidoscopy	4	0
Spinal Anesthetic	162	128
Split skin graft	6	5
Stapedectomy	5	0
subtotal hysterectomy	3	0
suprapubiccatheterization	0	2
Suturing 3rd degree tear	3	4
Suturing cervical tear	1	0
Suturing of skin wounds (children)	3	0
Tendon repair	14	1
Tension-free vaginal tape	6	0
Thyroidectomy	1	0
Tonsillectomy	67	35
Total abdominal hysterectomy	17	1
Tracheostomy	2	0
Trendellenburg procedure	2	0
Tympanoplasty	10	0
Umbilical hernia repair	9	0

Unknown	0	4
Vaginal fistula repair	1	0
Vaginal hysterectomy	7	0
Vaginal polypectomy	1	0
Vasectomy	9	0
Washout of open fractures	1	1
Total	2828	913

Annexure B

Core Clinical skills performed in theatre	More than 20 learning opportunities	More than 5 learning opportunities	Insufficient learning opportunities	Procedures that happen inside theatre and elsewhere
Lymph node excision biopsy			4	*
Incision and drainage of perianal hematoma		9		*
Proctoscopy			0	*
Penile Block	78			*
Circumcision	101			*
Drain a Hydrocoele			0	*
Insert a suprapubic catheter			2	*
Incision and drainage of chalazion			3	*
Suture an eyelid			0	*
Remove foreign body ear			3	*
Remove foreign body nose			0	*
Epistaxis (Cautery and packing)			0	*
Drain peritonsillar abscess			0	*
Excise sebaceous cyst (other lumps/bumps)		10		*
Cryotherapy/Cauterization		6		*
Skin biopsy	29			*
Caesarian section	150			
Evacuation of uterus	58			
Manual removal of retained placenta			2	*
Repair of third degree tear			3	*
Intra uterine contraceptive device		5		*
Dilatation and curettage		6		*
Drainage Bartholin abscess or cyst		10		*
Tubal ligation	128			
Debride wounds or burns		17		
Incision and drainage of abscess	23			*
Closed reduction of fractures		6		*
Reduce elbow dislocation			0	*
Reduce hip dislocation			0	*
Reduce radial head dislocation			0	*
Reduce shoulder dislocation			2	*
Excise a ganglion		12		*
Ring block			0	*
Administer Oxygen	1014			*
Check Boyle's Machine	Not counted			
Control airway, mask ventilation	1014			*
General anesthetic	1014			

Inhalation induction	134			
Intravenous induction	880			
Intubation and ventilation of patient [#]	>500			*
Ketamine anesthesia	64			*
Monitor Patient during anesthetic	1240			
Recover patient in recovery room	1240			
Reverse muscle relaxation [#]	>500			
Set airflows- Magills, circle, T-piece	1014			
Spinal Anesthetic	162			
Ventilate patient with mask and hand	1014			*

The manner in which the airway was secured or if muscle relaxant was used was not noted for every anaesthetic in the theatre record. Data for this was extrapolated from discussion with the anaesthetist.

Annexure C

Supervised skills for theatre	More than 20 learning opportunities	More than 5 learning opportunities	Insufficient learning opportunities	Procedures that happen inside theatre and elsewhere
Appendicectomy	20			
Pleural Biopsy			0	*
Hydrocoelelectomy			3	
Vasectomy		9		*
Reduction of nose fracture			0	*
Inject Keloids			0	*
Phenol ablation of ingrown toenail			2	*
Skin graft		6		
Laparotomy for Ectopic pregnancy		16		
Termination of pregnancy (If no moral objection)	50			*
Relieve cardiac tamponade			1	*
Tracheostomy			2	*
Amputations – fingers			4	
Debridement of open fractures			1	*
Fasciotomy			0	
Biers Block			0	
Brachial block			0	
Epidural anesthesia			0	

Annexure D

Elective Skills for theatre	More than 20 learning opportunities	More than 5 learning opportunities	Insufficient learning opportunities	Procedures that happen inside theatre and elsewhere
Anal sphincterotomy			1	
Gastroscopy			0	*
Hernia repair	39			
Injection of hemorrhoids			1	
Rubber banding of hemorrhoids			0	
Anal dilatation			0	
Sigmoidoscopy			4	
Liver biopsy			0	*
Bilateral sub capsular orchidectomy		5		
Cystoscopy			0	
El Ghorap shunt for priapism			0	
Prostate Biopsy		7		
Varicolectomy			0	
Orchidectomy and anchoring of torted testis			3	
Cataract removal	90			
Evisceration of eye			0	
Tonsillectomy and adenoidectomy	67			
Cervical cerclage for incompetence			3	
Cone Biopsy of cervix			1	
Cervical polyp removal			1	
Colposcopy	117			
Hysterectomy	27			
LEEP for cervix	93			
Laparotomy for stabbed abdomen		19		
Laparotomy for bowel obstruction				
Burr holes			1	
Open reductions, pins and screws		6		
Repair nerves and tendons		15		
Dental extraction	134			*
Wiring of teeth for mandibular fractures			0	