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SURGICAL OUTPUT IN KIBAALE DISTRICT, UGANDA

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## SURGICAL OUTPUT IN KIBAALE DISTRICT, UGANDA

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### ABSTRACT

**Background:** The output of major surgeries in eastern Africa is low and varies considerably between hospitals and regions. This study in rural Uganda relates surgical output to number of hospital beds, number of in-patient admissions, number of new out-patient visits, estimated catchment area population and number of doctors and nurses. This was to facilitate comparison between institutions and areas and to determine surgical resource needs.

**Objectives:** To describe the quantitative output of surgery in a Ugandan district and to demonstrate the use of standardised indicators for the purpose of comparison, monitoring, resource needs assessment and planning.

**Data sources:** Retrospective review and analysis of inpatient and outpatient records at Kagadi district hospital, Kibaale district, Western Uganda, the only hospital providing major surgery in the district.

**Study selection:** Data on all recorded major and minor surgical operations in the hospital during two complete calendar years, 1996 and 1997.

**Data synthesis:** In 1996 and 1997 there were 331 and 309 major operations performed respectively in Kagadi hospital, Kibaale district. This output corresponded to 3.3 and 3.1 per 100 beds; 270 and 270 per 1,000 in-patient admissions; 328 and 267 per year per 10,000 new out-patient visits; 166 and 155 per 100,000 catchment area population; 83 and 77 per doctor; 27.6 and 25.8 per nurse. Minor surgery output at the same hospital in 1996 and 1997 were 185 and 190 respectively. This corresponded to 183 and 164 per 10,000 new outpatient visits and 93 and 95 operations per 100,000 catchment area population.

**Conclusions:** The output of surgery in the district was very low in comparison with Europe and North America but within the range common in Eastern Africa. For planning and performance review purposes the most useful indicators are surgical output per 100 beds per year; per 1000 inpatient admissions; per doctor and per nurse per year because they measure workload against available resources. Output per 100,000 estimated catchment area population is useful in relating output to need. These indicators are recommended to be incorporated in district and hospital performance reviews and in annual reports.

### INTRODUCTION

Surgery is an important part of health service provision, particularly in hospitals where all major surgery is taking place. The estimated need for surgery in sub-Saharan Africa is at least 1,000 operations per 100,000 people per year(1) but only 70-200 per 100,000 are being done(2). Studies show that major operation rates in Europe and N.America are 10 and 100 times higher than in sub-Saharan Africa or between 5,000 and 9,000 annually per 100,000 population(2). A review of major surgical outputs in Europe, North America and Africa showed outputs which varied from 884 to 2,300 per 100,000 in Europe/ North America compared to 44 to 157 per 100,000 in

Africa(3). A study in Kenya of population based surgical output by age, sex and type of operation indicated a major surgery rate of 263/100,000 / year(4). Results from other studies have been published by Smith(5), Watters and Bayley(6) and by Loutfi and Pickering(7). It appears that no population based study of surgical output has been done in Uganda. The aim of this study was to present the output of major surgery in Kibaale District in Uganda, apply various standardisation methods and explore how to incorporate these in district and hospital reports and plans.

Kibaale is a remote district with a poor road network and estimated populations of 273,257 (1996) and 282,875 (1997). The estimated catchment area population for

Kagadi hospital based on homesteads of hospital in-patients and out-patients was 200,000 people.

The district has 26 health units: one hospital, two health centers, four dispensary-maternity units and 19 sub-dispensaries without maternity services or admission facilities. Half of all health workers in the district were nurse aides with no formal medical training but only training on the job. One third of the population lived within five kilometers of a health unit. Only 11.3% of child deliveries were assisted by a trained health worker, 20.3% of mothers delivered themselves and the remaining 68.4% of deliveries were assisted by formally untrained people, mainly traditional birth attendants.

Kagadi hospital has 100 beds and is the only hospital in the district. In 1996 and 1997 it had four general medical officers, four registered nurses, eight enrolled nurses, six midwives and 33 nurse aides.

#### MATERIALS AND METHODS

Kagadi hospital records of major and minor surgical operations, patient admissions and new out patient visits for 1996 and 1997 as well as the District Medical Officer's reports were studied. The hospital catchment area population was estimated on the basis of the location of homesteads of patients admitted, of out-patients attending during a six months period and the 1996 and 1997 population estimates of parishes where patients came from. Surgical output of major or minor surgical operations per 100 beds per year; per 1,000 in-patient admissions; per 10,000 new out-patient visits; per 100,000 catchment area population per year; per doctor and per nurse per year was calculated. Minor surgeries performed at facilities other than Kagadi hospital were not included in the study.

*Definition and classification:* There is no universally accepted definition of the concept of surgical operation. Velez-Gil *et al*(8) defined it as "procedures done in an operating room to an anaesthetised patient for the purpose of diagnosis, cure or palliation". They also classified operations into four levels of complexity using the California Relative Values Weighting System. Inguinal hernia repair, hydrocele operation, leg or arm amputation and tonsillectomy are examples of procedures usually considered major operations, while cervical dilation and curettage, wound suture, finger or toe amputation, skin grafting and external fixation of fracture are classified as minor(2).

#### RESULTS

From January to December 1996, there were 331 major operations performed at Kagadi Hospital, the most common ones being Caesarean section (147 cases), hernia repair (60 cases), laparotomy (29 cases), and hysterectomy(19 cases). The 1997 total was slightly lower and the top five operations remained the same (Table 1). The corresponding estimated annual rates per 100,000 included in the table, with rates between 8 and 75 for the five commonest procedures. The number related to beds, admissions, out-patient visits, doctors and nurses are shown in Table 2.

**Table 1**

*Major operations carried out in 1997 and 1998*

Type of operation	Year		Rate per 100,000 catchment population	
	1996	1997	1996	1997
Caesarian section	147	114	73.5	57.0
Herniorrhaphy	60	96	30.0	48.0
Laparotomy	39	39	19.5	19.5
Tubal ligation	29	12	14.5	6.0
Hysterectomy	19	16	9.5	8.0
Splenectomy	6	1	3.0	0.5
Orchidectomy	5	5	2.5	2.5
Amputations	4	1	2.0	0.5
Fistulectomy	4	4	2.0	2.0
Appendicectomy	3	3	1.5	1.5
Hydrocoelectomy	3	7	1.5	3.5
Haemorrhoidectomy	3	6	1.5	3.0
Aspiration (Liver)	2	0	1.0	0.0
Colporrhaphy	2	3	1.0	1.0
2nd degree suture	3	0	1.0	0.0
Repair of bladder	1	0	0.5	0.0
Marsupialisation	1	0	0.5	0.0
Cleft lip repair	0	1	0.0	0.5
Urethroplasty	0	1	0.0	0.5
<b>Total</b>	<b>331</b>	<b>309</b>	<b>165.5</b>	<b>154.5</b>

**Table 2**

*Major operations related to number of beds, in-patient admissions, new out-patient (OPD) visits, number of doctors and nurses*

Year	Number of major operations				
	100 beds	1,000 admissions	10,000 new OPD visits	Doctors per year	Full time nurse per year
1996	3.3	270	328.0	82.8	27.6
1997	3.1	270	266.7	77.3	25.8

**Table 3**

*Minor operations carried out in 1996 and 1997*

Operation	1996	1997
Incision and drainage	94	92
Surgical toilet and suture	34	40
Evacuation of uterus	15	14
Suprapubic cystostomy	6	8
Excisions	5	12
Dilation and curettage	4	2
Biopsy	3	1
Manual removal of placenta	2	3
Perineorrhaphy	2	4
Skin grafting	1	2
POP application/removal	14	9
Excision of lipoma	3	0
Circumcision	1	2
Sequestrectomy		
<b>Total</b>	<b>185</b>	<b>190</b>

**Table 4**

*Minor operations performed at Kagadi Hospital related to new out patient (OPD) visits, catchment area population, number of doctors and nurses*

Year	Number of minor operations per			
	10,000 new OPD visits	100,000 catchment pop	Doctors per year	Full time nurse per year
1996	183.3	92.5	46.3	15.4
1997	164.0	95.0	47.5	15.8

The number of minor operations was 185 and 190 during 1996 and 1997 respectively, with incision and drainage (usually of abscesses wound suture and evacuation of uterus as the commonest operations (Table 3).

Minor operations have also been related to the number of OPD visits at the hospital, the number of doctors and nurses (Table 4). Although the estimated number of operations per 100,000 people in the catchment area have also been included in the table, it is important to note that minor surgeries done at other health facilities in the catchment area were not included.

## DISCUSSION

The levels of surgical output in different areas are linked to variations in disease patterns, different care seeking behaviour, socio-economic conditions (e.g. educational level, Gross National Product), levels of awareness of surgical care and differences in health care resources such as staffing levels, money, time, materials and equipment(1). Because of the peripheral location of Kagadi hospital in the district, surgical output per 100,000 of catchment area population may not reflect the surgical service needs of the district.

However, this indicator can be used to determine the surgical needs of the catchment area population and the extent to which such needs are met. Therefore surgical output figures would be useful to health care planners if outputs are related to the population served so that planners

can determine needs and the extent to which they are met and develop strategies for meeting needs better in future. Surgical output needs should be standardised to allow for comparison between areas and different service providers. Standard definitions, major surgical output indicators and catchment area population estimates are needed. There is also a need for further research on actual surgical services output, qualitatively and quantitatively.

Health planners need to identify health needs of their catchment area population, determine the extent to which needs are met and plan how to deal with unmet needs. Indicators of major surgical operations annually per 100 beds, per 1000 in-patient admissions, per 10,000 out-patient visits, and per doctor and nurse annually can be used to determine workload and resources needed to meet needs. Because of the difficulty of getting accurate catchment area populations and the unknown extent to which people from the catchment area seek surgical services elsewhere, it is possible to determine approximately, but not exactly, surgical output per 100,000 catchment area population.

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