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Systematic Review of Met and Unmet Need of Surgical Disease in Rural Sub-Saharan Africa

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Abstract

Background

Little is known about the burden of surgical disease in rural sub-Saharan Africa, where district and rural hospitals are the main providers of care. The present study sought to analyze what is known about the met and unmet need of surgical disease.

Methods

The PubMed and EMBASE databases were searched for studies of surveys in rural areas,

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Results

The estimated overall incidence of nonfatal injury is at least 1,690/100,000 population per year.

Morbidity as a result of injury is up to 190/100,000 population per year, and the annual mortality from injury is 53–92/100,000. District hospitals perform 6 fracture reductions (95% CI: 0.1–12)/100,000 population per year and 14 laparotomies (95% CI: 7–21)/100,000 per year. The incidence of peritonitis and bowel obstruction is unknown, although it may be as high as 1,364/100,000 population for the acute abdomen. The annual total need for inguinal hernia repair is estimated to be a minimum of 205/100,000 population. The average district hospital performs 30 hernia repairs (95% CI: 18–41)/100,000 population per year, leaving an unmet need of 175/100,000 population annually.

Conclusions

District hospitals are not meeting the surgical needs of the populations they serve. Urgent intervention is required to build up their capacity, to train healthcare personnel in safe surgery and anaesthesia, and to overcome obstacles to timely

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References

1. Nordberg E (2000) Injuries as a public health problem in sub-Saharan Africa: epidemiology and prospects for control. *East Afr Med J* 77(12 Suppl):S1–43
2. Nordberg EM (1984) Incidence and estimated need of caesarean section, inguinal hernia repair and operation for strangulated hernia in rural Africa. *Br Med J* 289(6437):92

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4. Hofmeyr GJ, Say L, Gulemzoglu AM (2005)
WHO systematic review of maternal mortality
and morbidity: the prevalence of uterine
rupture. *BJOG* 112:1221–1228

5. Taira BR, McQueen KAK, Burkle FM (2009)
Burden of surgical disease: does the literature
reflect the scope of the international crisis?
World J Surg 33:893–898

6. Kobusingye O, Guwatudde D, Lett R (2001)
Injury patterns in rural and urban Uganda. *Inj
Prev* 7:46–50

7. Labinjo M, Juillard C, Kobusingye OC et al
(2009) The burden of road traffic injuries in
Nigeria: results of a population-based survey.
Inj Prev 15:157–162

8. Lett RR, Kobusingye OC, Ekwaru P (2006)
Burden of injury during the complex political
emergency in northern Uganda. *Can J Surg*

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Epidemiology of transport-related injuries in
Ghana. *Accid Anal Prev* 31:359–370

11. Moshiro C, Heuch I, Astrøm AN et al (2005)
Injury morbidity in an urban and a rural area
in Tanzania: an epidemiological survey. *BMC
Public Health* 285:11
12. Nordberg E, Kimani V, Diwan V (2000)
Household survey of injuries in a Kenyan
district. *East Afr Med J* 77:240–244
13. Peltzer K (2008) Injury and social
determinants among in-school adolescents in
six African countries. *Inj Prev* 14:381–388
14. Krabbe CA, Rutten JP, Phiri Y et al (2003)
Prevalence and outcome of paediatric and
adolescent limb fractures in rural Zambia. *S
Afr J Surg* 41:89–91
15. Atijosan O, Rischewski D, Simms V et al

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coloured population of Bishop Lavis. S Afr
Med J 69:349–352

17. Disler PB, Jacks E, Sayed AR et al (1986) The prevalence of locomotor disability and handicap in the Cape Peninsula. Part II. The black population of Nyanga. S Afr Med J 69:353–355

18. Disler PB, Jacks E, Sayed AR et al (1986) The prevalence of locomotor disability and handicap in the Cape Peninsula. Part III. The white population of Fish Hoek. S Afr Med J 69:355–357

19. Belcher DW, Wurapa FK, Neumann AK et al (1976) A household morbidity survey in rural Africa. Int J Epidemiol 5:113–120

20. Courtright P, Haile D, Kohls E (1993) The epidemiology of burns in rural Ethiopia. J Epidemiol Community Health 47:19–22

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Med J 84:525–533

-
23. Ahmed M, Ali Shah M, Luby S (1999) Survey of surgical emergencies in a rural population in the Northern Areas of Pakistan. *Trop Med Int Health* 4:846–857
-
24. Johnson K, Peterman A (2008) Incontinence data from the demographic and health surveys: comparative analysis of a proxy measurement of vaginal fistula and recommendations for future population-based data collection. *DHS Analytic Studies No. 17*
-
25. Moshiro C, Mswia R, Alberti KG, the AMMP Project Team et al (2001) The importance of injury as a cause of death in sub-Saharan Africa: results of a community-based study in Tanzania. *Public Health* 115:96–102
-
26. Coghlan B, Brennan RJ, Ngoy P et al (2006) Mortality in the Democratic Republic of Congo: a nationwide survey. *Lancet* 367:111–

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28. Depoortere E, Checchi F, Broillet F et al (2004) Violence and mortality in West Darfur, Sudan (2003–4): epidemiological evidence from four surveys. *Lancet* 364:1315–1320

29. Admassu A (2000) Analysis of surgical admissions to Debre Markos Hospital. *Trop Doct* 30:185–186

30. Allorto NL, Oosthuizen GV, Clarke DL et al (2009) The spectrum and outcome of burns at a regional hospital in South Africa. *Burns* 35:1004–1008

31. Justin-Temu M, Rimoy G, Premji Z et al (2008) Causes, magnitude and management of burns in under-fives in district hospitals in Dar es Salaam, Tanzania. *East Afr J Public Health* 5:38–42

32. Chopra M, Kettle H, Wilkinson D et al (1997) Paediatric burns in a rural South African

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Trauma in rural Kenya. *Injury* 35:1228–1233

35. Gernaat HB, Dechering WH, Voorhoeve HW (1998) Clinical epidemiology of paediatric disease at Nchelenge, north-east Zambia. *Ann Trop Paediatr* 18:129–138

36. Galukande M, von Schreeb J, Wladis A et al (2010) Essential surgery at the district hospital: a retrospective descriptive analysis in three African countries. *PLoS Med* 7(3):e1000243

37. Lavy C, Tindall A, Steinlechner C et al (2007) Surgery in Malawi—a national survey of activity in rural and urban hospitals. *Ann R Coll Surg Engl* 89:722–724

38. Nabembezi JS, Nordberg E (2001) Surgical output in Kibaale district, Uganda. *East Afr Med J* 78:379–381

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regarding the need for further research. *East Afr Med J* 67(3 Suppl):1–28

-
41. Rahlenbeck S, Hakizimana C (2002) Deliveries at a district hospital in Rwanda, 1997–2000. *Int J Gynaecol Obstet* 76:325–328
-
42. Sani R, Nameoua B, Yahaya A (2009) The impact of launching surgery at the district level in Niger. *World J Surg* 33:2063–2068. doi:[10.1007/s00268-009-0160-x](https://doi.org/10.1007/s00268-009-0160-x)
-
43. Potter AR (1982) Surgery in an African bush hospital. *Med J Aust* 13:469–471
-
44. Willmore WS, Hill AG (2001) Acute appendicitis in a Kenyan rural hospital. *East Afr Med J* 78:355–357
-
45. Loutfi A, Pickering JL (1993) The spectrum of surgery in Ethiopia. *Can J Surg* 36:91–95
-

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repair and operation for strangulated hernia in rural Africa. Br Med J 289:92

-
48. 2008 Population and Housing Census. National Statistics Office of Malawi. http://www.nso.malawi.net/index.php?option=com_content&view=article&id=106&Itemid=6. Accessed 13 Apr 2011
-

49. Shillcutt SD, Clarke MG, Kingsnorth AN (2010) Cost-effectiveness of groin hernia surgery in the Western Region of Ghana. Arch Surg 145:954–961
-

50. Trends in maternal mortality: 1990 to 2008. Estimates developed by WHO, UNICEF, UNFPA and The World Bank. <http://www.who.int/reproductivehealth/publications/monitoring/9789241500265/en/index.html>. Accessed 13 Apr 2011
-

51. Eckhart P (1964) The incidence of strangulated hernia in Busoga, Uganda. East Afr Med J

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(2008) Africa's neglected surgical workforce crisis. *Lancet* 371(9613):627–628

54. Taira BR, Cherian MN, Yakandawala H et al (2010) Survey of emergency and surgical capacity in the conflict-affected regions of Sri Lanka. *World J Surg* 34:428–432.
doi:[10.1007/s00268-009-0254-5](https://doi.org/10.1007/s00268-009-0254-5)

55. Choo S, Perry H, Hesse AA et al (2010) Assessment of capacity for surgery, obstetrics and anaesthesia in 17 Ghanaian hospitals using a WHO assessment tool. *Trop Med Int Health* 15:1109–1115

56. Iddriss A, Shivute N, Bickler S et al (2011) Emergency, anaesthetic and essential surgical capacity in the Gambia. *Bull World Health Organ* 89:565–572

57. Contini S, Taqdeer A, Cherian M et al (2010) Emergency and essential surgical services in

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59. Kushner AL, Cherian MN, Noel L et al (2010)

Addressing the Millennium Development Goals from a surgical perspective: essential surgery and anesthesia in 8 low- and middle-income countries. *Arch Surg* 145:154–159

60. Funk LM, Weiser TG, Berry WR et al (2010)

Global operating theatre distribution and pulse oximetry supply: an estimation from reported data. *Lancet* 376(9746):1055–1061

61. Lubuga S, Macfarlane SB, von Schreeb J et al (2009) Increasing access to surgical services in sub-Saharan Africa: priorities for national and international agencies recommended by the Bellagio Essential Surgery Group. *PLoS Med* 6(2):1–5

62. <http://www.who.int/surgery/globalinitiative/en>. Accessed 7 Mar 2011

63. McCord C, Chowdhury Q (2003) A cost

effective small hospital in Bangladesh: what it

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-
65. PLoS Medicine Editors (2008) A crucial role for surgery in achieving the UN millennium development goals. PLoS Med 5:e182
-
66. Grimes C, Lavy C (2010) A plea for investment in district hospitals. Lancet 376:2073
-
67. Grimes CE, Bowman KG, Dodgion CM et al (2011) Systematic review of barriers to surgical care in low-income and middle-income countries. World J Surg 35:941.
doi:[10.1007/s00268-011-1010-1](https://doi.org/10.1007/s00268-011-1010-1)
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