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Differences in hospital admissions for males and females in northern Uganda in the period 1992—2004: a consideration of gender and sex differences in health care use

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Summary To inform our understanding of male and female health care use, we assessed sex differences in hospital admissions by diagnosis and for in-patient mortality using discharge records for 210 319 patients admitted to the Lacor Hospital in northern Uganda in the period 1992—2004. These differences were interpreted using a gender framework. The overall number of admissions was similar by sex, yet differences emerged among age groups. In children (0—14 years), malaria was the leading cause of admission, and the distribution of diseases was similar between sexes. Among 15—44 year olds, females had more admissions, overall, and for malaria, cancer and anaemia, in addition to delivery and gynaeco-obstetrical conditions (25.7% of female admissions). Males had more admissions for injuries, liver disease and tuberculosis in the same age group. In older persons (≥45 years), women had more admissions for cancer, hypertension, malaria and diarrhoea, while, as for the previous age group, males had more admissions for injuries, liver disease and tuberculosis. This study provides insight into sex- and gender-related differences in health. The analysis and documentation of these differences are crucial for improving service delivery and for assessing the achievement of the dual goals of improving health status and reducing health inequalities.

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1. Introduction

In low-income countries, tackling the burden of disease in vulnerable population groups has become an increasingly important concern (Graham, 2001). In particular, women and children under 5 years of age are considered 'vulnerable' (Diderichsen et al., 2001) because they bear a disproportionately high burden of poor health and have the greatest need for health services (Mbonye, 2001). In addressing this problem, the main goals are those of reducing inequalities in access to health care and of improving population health (Bates et al., 2004a, 2004b; Gwatkin et al., 1999).

The health care system itself, if exclusionary and inequitable, can contribute to social inequalities and reinforce other sources of poverty (Mackintosh, 2001). Moreover, in addition to socio-economics, it is well known that sex and gender can lead to differences in vulnerability to illness, in access to health care and in the impact of illness at both the individual and household level. In this context, the term 'sex' is used when describing differences that are primarily biological in origin, whereas 'gender' is used in reference to differences due to social conditions or cultural and religious beliefs and norms that shape the experiences of males and females (WHO, 2002a).

Sex and gender can act alone in determining differentials in the burden of disease (Krieger, 2003). While many health conditions seem to be more closely linked to either sex or gender, most are shaped by both. Cancer of certain reproductive organs can present only in either males or females, but gendered behaviours may affect an individual's risk for new cancers, delay in diagnosis or even increased chances of survival. Domestic violence is closely linked to gender dynamics, but women's smaller size relative to men, a biologically determined sex difference, may contribute to injuries sustained by women. Furthermore, poverty and social exclusion interact with sex and gender and contribute to the excess disease burden in ways that have not been thoroughly explored (Breen, 2002).

Of note is the fact that aspects of sex do not vary substantially in different cultural and societal contexts, while aspects of gender may vary greatly. The distinct roles and behaviours of men and women in a given culture, dictated by that culture's gender norms and values, give rise to gender differences (WHO, 2002a). Gender norms and values, however, also give rise to gender inequalities; that is, differences between men and women that systematically empower one group to the detriment of the other. Both gender differences and gender inequalities can give rise to inequities between men and women in health status and access to health care. Thus, men and women are differentiated by gender (sociocultural) characteristics on the one hand and by sex (biological) characteristics on the other. This means that gender issues are not just of concern to women. Men's health, too, is affected by gender divisions in both positive and negative ways. These differences are reflected in the patterns of health and illness found among men and women in different societal contexts (Buvinić et al., 2006).

Evidence documenting the multiple connections between gender, sex and health is growing, with sex and gender differences recognized as playing an important role in a range of diseases. In fact, sex-related biological differences may affect both susceptibility and immunity, while gender differences in patterns of behaviour and access to resources may influence the degree of exposure to infection (such as HIV/AIDS) and injury, including road traffic accidents and war-related injuries. In particular, several studies highlight the disadvantage suffered by women, who are faced with multiple roles, limited possibility to make decisions, poor access to health services and treatment, and therefore poor health outcomes (Allottey and Gyapong, 2005).

A greater understanding of these mechanisms and the development of strategies for reducing inequities in accessing quality health services, including differences between men and women, may lead to fairer, effective and sustainable health systems and help to address the intolerable burden of communicable disease currently borne by the world's poorest population groups (Theobald et al., 2006).

To evaluate inequities, detailed and reliable data are needed from local health care facilities (Braveman and Gruskin, 2003; Petit and van Ginneken, 1995; Wurthwein et al., 2001). However, until very recently, efforts to collect these data in low-income countries have been insufficient. Most health information systems and disease control programmes in resource-poor contexts do not collect or analyse data by age, sex or socio-economic status, and very few studies in Africa have focused on differences in health between males and females (Malama et al., 2002; Nabyonga et al., 2005; Taegtmeyer et al., 2006; Tolhurst and Nyonator, 2006; Uganda Ministry of Health, 1999).

In many sub-Saharan African countries, the health care resources are severely limited, and it is necessary to make the best possible use of those resources that are available. This is also the case for information management, and the cost of obtaining health information must be weighed against its use. In particular, useful data, including sociodemographic data (i.e. age, sex, occupation and residence) and data on the type of service, diagnosis and outcome, are often recorded as part of clinical care and are included in routine information systems. However, these data are seldom analysed or used for decision-making or health-related actions at facility level (i.e. for planning, quality assurance and hospital management purposes) or national level (i.e. for policy development and performance monitoring), although they may provide indications of the distribution of health care delivery and health status among vulnerable groups.

The objective of the present study was to inform our understanding of male and female health care use by identifying sex differences in hospital admissions by diagnosis and for in-patient mortality using discharge records from a referral hospital (St. Mary's Hospital, Lacor) in the Gulu District, an area of northern Uganda that has been severely affected by war, epidemics and social disruption. These differences are expected to shed light on the health care needs of the population when interpreted according to our understanding of sex and gender described above.

2. Materials and methods

According to the 2002 census, the Gulu District has a population of 475 260 (Uganda Bureau of Statistics, 2005). Since

1986, the District has been affected by civil war. Approximately 70% of the population has been internally displaced in protected camps, and during the night thousands of 'night commuters' leave their homes and villages and sleep in sites considered to be safe, such as larger towns and hospitals (UNOCHA, 2002). The District's infrastructures are dilapidated, and the health referral system has collapsed. The poverty and socio-economic disruption are reflected in the main health indicators (e.g. an infant mortality rate of 172 per 1000 live births, compared with the national average of 97, and a maternal mortality rate of 700 per 100 000 live births vs. the national average of 506) (Uganda Conflict Action Network, 2006; Uganda Ministry of Health, 1999).

St. Mary's Hospital, Lacor (referred to as 'Lacor Hospital') is a private non-profit facility, part of the Ugandan National Health System. The hospital offers a full range of services, including initiatives for health promotion and disease prevention and curative and rehabilitative care (including specialist services), and it is a training centre for different cadres of medical personnel. The hospital has four wards: medicine, surgery, paediatrics and obstetrics-gynaecology. During the study period, the number of beds increased, from 356 in 1992 to 474 beds in 2004 (Lacor Hospital, 2006). The hospital has a policy of promoting access to health care for the neediest and most vulnerable social groups. This translates into services being provided at subsidized prices, with flat-rate fees for all; however, given the difficult social and economic environment in which the hospital works, care is not denied to those who cannot afford the fee. Moreover, the flat-rate fee for admission is only 1 US$ for children under 6 years of age and 2 US$ for pregnant women. The user fees at Lacor Hospital are currently less than one-third of the sector average, and they cover only 20% of the hospital's expenditure (Giusti, 2002).

For the present study, we conducted a retrospective analysis of the discharge records for patients admitted to Lacor Hospital in the period 1992—2004. The diagnostic procedures in the hospital are standardized; when appropriate, clinical diagnoses are supported by laboratory tests, X-rays and other diagnostic tools (e.g. diagnosis of malaria is always confirmed by laboratory tests). The data from the discharge records are routinely entered into a computerized database by trained and authorized personnel; the data in the database are anonymous (i.e. they are not linked to the identity of individual patients). During the study period, the procedures for collecting and storing data did not change. We analysed the principal cause of hospital admission recorded on the discharge records for 210 319 (99.8%) of the 210 660 patients for whom this information was available, including 14 732 (99.5%) of the 14 805 patients who died in the hospital. The completeness of data set was high (i.e. information on sex and age was missing for only 12 and 95 patients, respectively). For the mortality analysis, the principal cause of hospital admission was considered as the reason for admission among deaths. The principal cause of admission was coded according to the reporting system of the Ugandan Ministry of Health, which uses the International Classification of Diseases (10th revision) (WHO, 1992). A descriptive analysis of the distribution of causes of admission and death by age and sex was performed using the SPSS statistical package (SPSS Inc., Chicago, IL, USA). All cases of admission were considered eligible for inclusion in the analysis. Statistical tests were not used, because differences reported are actual observed differences among the full set of admissions rather than estimates of true differences in a larger population. Results are not generalizable to the community outside the hospital, as data are not available on people who did not access the hospital for care.

3. Results

The number of hospital admissions progressively increased, from 12 702 in 1992 to 30 681 in 2004, constituting a 2.5-fold increase, although it should be considered that there was a one-third increase in the number of hospital beds. The paediatric ward accounted for most of the increase in admissions (from 5266 in 1992 to 18 985 in 2004).

With regard to age group, there was a peak in admissions for infants and children (0—4 years old) and a second low-grade peak for younger adults (Figure 1). Children aged 0—4 years accounted for 54.1% of admissions (113 779 of the total 210 319), yet they represented only 18.8% of the general population (Uganda Bureau of Statistics, 2005). Half of the admissions in this age group were for infants (0—1 year). Persons 15—34 years of age accounted for another quarter (25.7%) of admissions out of a 33.5% of the general population.

The ten leading causes of admission and their distribution by sex are shown in Table 1. The total number of admissions was slightly higher for females, and malaria was the leading cause for both sexes. Apart from admissions for delivery and gynaeco-obstetrical conditions (16.2% among females), the leading causes were similar by sex, yet with some important

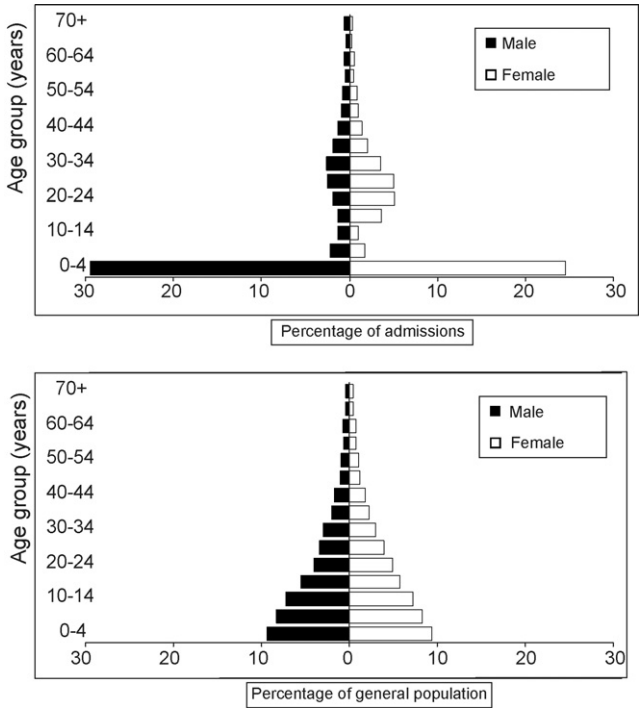

Figure 1 Percentage of admissions at Lacor Hospital (1992—2004) by sex and age class, compared to the percentage of the Ugandan population by sex and age class (2002 census) (Uganda Bureau of Statistics, 2005).

Table 1 Number of admissions by sex for the ten leading causes of admission, Lacor Hospital, 1992—2004

Cause	Males		Females		Total[a]		M:F ratio
	No. admissions	%	No. admissions	%	No. admissions	%	
Malaria	30 596	30.2	29 060	26.7	59 662	28.4	1.05
Delivery and gynaeco-obstetrical conditions	0	0.0	17 673	16.2	17 674	8.4	0.00
Pneumonia	9024	8.9	7691	7.1	16 715	7.9	1.17
Diarrhoea	5608	5.5	4989	4.6	10 598	5.0	1.12
Tuberculosis	5184	5.1	4003	3.7	9187	4.4	1.30
Malnutrition	5028	5.0	4100	3.8	9128	4.3	1.23
Septicaemia	3270	3.2	2830	2.6	6100	2.9	1.16
Cancer	1882	1.9	2980	2.7	4862	2.3	0.63
Injuries	3431	3.4	1267	1.2	4698	2.2	2.71
Measles	2245	2.2	2111	1.9	4357	2.1	1.06
Other diseases	34 998	34.6	32 337	29.7	67 338	32.0	1.08
Total	101 266	100.0	109 041	100.0	210 319	100.0	0.93

[a] Includes admissions for which sex is not known.

differences: women had more admissions for cancer (M:F ratio = 0.63) and fewer for injuries (M:F ratio = 2.71).

For patients 0—14 years of age, although the number of admissions was higher for males, the distribution of diseases was similar between sexes (Table 2). Of the admissions in this age group, 89.8% were for children aged 0—4 years. Malaria was the most frequent cause in the 0—14-year group (43.1%); the next five leading causes (i.e. pneumonia, malnutrition, diarrhoea, septicaemia and measles) accounted for one-third (31.8%) of admissions.

Among adults aged 15—44 years (Table 2), delivery and gynaeco-obstetrical conditions represented the leading cause (25.7% of admissions), whereas, when considering only 35—44 year olds, tuberculosis was the leading cause (12.0%). It is notable that after delivery, tuberculosis and malaria, the next most common reasons for admission were injuries and AIDS. In the 15—44-year age group, although the number of females in the general population exceeded the number of males by 9.6%, the total number of admissions for women ($n = 44\,008$) was almost double that for men, mostly because of admissions for delivery and gynaeco-obstetrical conditions ($n = 17\,512$) and inflammatory pelvic disease ($n = 1290$). This affected the overall admission profile, especially among young adult females, with gynaeco-obstetrical conditions accounting for over half (50.2%) of total admissions in 15—24 year olds and one-third (37.7%) in 25—34 year olds.

For 15—44-year-old women, the number of admissions was also higher for malaria (M:F ratio = 0.45), cancer (M:F ratio = 0.37) and anaemia [M:F ratio = 0.27 (datum not shown in table)], whereas males had more admissions for injuries (M:F ratio = 3.55), liver disease [M:F ratio = 2.08 (datum not shown in table)] and tuberculosis (M:F ratio = 1.3).

With regard to AIDS, although the number of admissions in the 15—44-year age group was similar between sexes (1297 for males vs. 1205 for females), there was a higher number of admissions among females in the younger age groups (M:F ratio = 0.59 in 15—24 year olds); the ratio reached unity in 25—34 year olds (M:F ratio = 1.02) and then increased in 35—44 year olds (M:F ratio = 1.52).

For persons 45 years of age and older (Table 2), cancer was the leading cause of admission, and differently from the other two age groups, the leading 10 causes included hypertensive disease, inguinal hernia, fracture of the femur and liver disease. Although the number of admissions was similar by sex (7895 for males vs. 7536 for females), out of a general population slightly overbalanced in favour of women (+11.5%), men had a higher number of admissions for tuberculosis, inguinal hernia, AIDS, femur fracture and liver disease, whereas women had more admissions for cancer, hypertensive disease, malaria and diarrhoea. This profile is similar to that found for the 15—44-year age group, with the exception of AIDS, for which the number of admissions in persons over 45 years of age was twice as high for males as for females.

Concerning the trend in male—female (M:F) ratio during the period 1992—2004, most diagnoses showed fluctuations over time without major variations (Table 3). In particular, the M:F ratio for pneumonia, tuberculosis and malnutrition was consistently above 1, while the M:F ratio for cancer was less than 1 in the study period (except in 2001 with a M:F ratio = 1.01). However, some exceptions were found to this general pattern. For example, an increase in M:F ratio for injuries was observed in 1997 (M:F ratio = 3.68), 1998 (M:F ratio = 4.40) and 2000 (M:F ratio = 3.45), followed by a decrease in 2003 and 2004 (with an M:F ratio lower than 2). The measles admissions declined over time due to the increase in measles immunization coverage, with only 12 admissions (nine among males and three among females) being observed in 2004; therefore, the small number of admissions justifies the anomalous finding in this year (M:F ratio = 3.0).

The distribution of in-hospital deaths, the proportional mortality rate (PMR) (defined as the proportion of deaths from a given cause out of the total number of deaths) and the case fatality rate (CFR) (defined as the proportion of deaths out of cases for a specific disease) for the ten leading causes of death are shown in Table 4. Most in-hospital deaths (59.7%) occurred among 0—4-year-old children. More than half of the in-hospital deaths in this

Table 2 Number of admissions by sex for the ten leading causes of admission by age group (<15, 15–44, ≥45 years), Lacor Hospital, 1992–2004

Cause	Males		Females		Total[a]		M:F ratio
	No. admissions	%	No. admissions	%	No. admissions	%	
<15 years							
Malaria	29 002	41.8	25 623	44.6	54 630	43.1	1.13
Pneumonia	7480	10.8	6018	10.5	13 498	10.6	1.24
Malnutrition	4985	7.2	4037	7.0	9022	7.1	1.23
Diarrhoea	4472	6.5	3374	5.9	7847	6.2	1.33
Septicaemia	3097	4.5	2636	4.6	5733	4.5	1.17
Measles	2204	3.2	2059	3.6	4264	3.4	1.07
Anaemia	1488	2.1	1351	2.4	2839	2.2	1.10
Other upper respiratory tract diseases	1387	2.0	1196	2.1	2583	2.0	1.16
Meningitis	1286	1.9	1015	1.8	2301	1.8	1.27
Infection of skin and subcutaneous tissue	1078	1.6	940	1.6	2018	1.6	1.15
Other diseases	12 838	18.5	9192	15.9	22 031	17.4	1.40
Total	69 317	100.0	57 441	100.0	126 766	100.0	1.21
15–44 years							
Delivery and gynaeco-obstetrical conditions	0	0.0	17 512	39.8	17 512	25.7	0.00
Tuberculosis	3417	14.2	2625	6.0	6042	8.9	1.30
Malaria	1349	5.6	3018	6.9	4367	6.4	0.45
Injuries	2467	10.3	695	1.6	3162	4.6	3.55
AIDS	1297	5.4	1205	2.7	2502	3.7	1.08
Pneumonia	1129	4.7	1270	2.9	2399	3.5	0.89
Diarrhoea	924	3.8	1251	2.8	2175	3.2	0.74
Cancer	511	2.1	1391	3.2	1902	2.8	0.37
Meningitis	653	2.7	639	1.5	1292	1.9	1.02
Inflammatory disease of female pelvis	0	0.0	1290	2.9	1290	1.9	0.00
Other diseases	12 270	51.1	13 112	29.8	25 383	37.3	0.94
Total	24 017	100.0	44 008	100.0	68 026	100.0	0.55
≥45 years							
Cancer	758	9.6	1175	15.6	1933	12.5	0.65
Tuberculosis	708	9.0	440	5.8	1148	7.4	1.61
Pneumonia	410	5.3	401	5.3	811	5.3	1.02
Hypertensive disease	304	3.9	450	6.0	754	4.9	0.68
Malaria	238	3.0	412	5.5	650	4.2	0.58
Diarrhoea	210	2.7	363	4.8	573	3.7	0.58
Inguinal hernia	403	5.1	166	2.2	569	3.7	2.43
AIDS	309	3.9	154	2.0	463	3.0	2.01
Femur fracture	260	3.3	149	2.0	409	2.7	1.74
Liver disease	246	3.1	162	2.1	408	2.6	1.52
Other diseases	4049	51.3	3664	48.6	7714	50.0	1.10
Total	7895	100.0	7536	100.0	15 432	100.0	1.05

[a] Includes admissions for which sex is not known.

age group occurred among infants (0–1 year). A second peak (21.2% of all hospital deaths) was found for persons 20–39 years of age, constituting a shift of 5 years with respect to the second peak in admissions. In fact, of the 10 leading causes of death, eight were in the leading 10 causes among 0–14 year olds, and the remaining two (tuberculosis and AIDS) were among the leading causes among adults. Malaria and malnutrition were the leading causes of in-hospital mortality, accounting for a quarter of all deaths; whereas meningitis, AIDS and malnutrition were the most severe conditions, as shown by the high CFRs.

Table 3 Trend in male-to-female ratio of admissions for the leading causes of admission, Lacor Hospital, 1992–2004

Cause	Male-to-female ratio of admissions												
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Malaria	0.92	1.09	1.13	1.06	1.13	1.10	1.01	0.95	1.09	1.07	1.07	1.04	1.04
Pneumonia	1.09	1.24	1.05	1.56	1.28	1.09	1.20	1.12	1.14	1.21	1.27	1.22	1.07
Diarrhoea	1.34	0.96	1.12	1.68	0.96	0.99	0.96	1.12	1.09	1.26	1.14	1.11	1.17
Tuberculosis	1.33	1.32	1.42	1.36	1.23	1.48	1.37	1.20	1.28	1.31	1.26	1.08	1.29
Malnutrition	1.21	1.15	1.30	1.37	1.27	1.34	1.08	1.18	1.37	1.29	1.11	1.24	1.22
Septicaemia	0.94	0.95	1.70	1.00	1.31	1.16	1.14	0.91	1.22	1.11	1.30	1.19	1.19
Cancer	0.54	0.51	0.55	0.58	0.45	0.65	0.59	0.69	0.56	1.01	0.95	0.94	0.78
Injuries	3.13	2.38	1.85	1.94	2.62	3.68	4.40	2.83	3.45	2.14	2.91	1.58	1.83
Measles	1.27	0.92	1.17	0.95	0.98	0.90	1.04	1.14	1.15	1.50	1.50	1.20	3.00
Other diseases[a]	0.76	0.70	0.78	0.73	0.68	0.73	0.73	0.66	0.64	0.69	0.69	0.73	0.64
Total	0.87	0.83	0.93	0.92	0.95	1.01	0.96	0.86	0.90	0.92	0.96	0.97	0.93

[a] Includes admissions for delivery and gynaeco-obstetrical conditions.

Table 4 In-hospital deaths, proportional mortality rate (PMR) and case fatality rate (CFR) by sex for the ten leading causes of in-hospital death, Lacor Hospital, 1992–2004

Cause	Males			Females			Total[a]		
	No. deaths	PMR (%)	CFR (%)	No. deaths	PMR (%)	CFR (%)	No. deaths	PMR (%)	CFR (%)
Malaria	1064	13.0	3.6	954	14.5	3.4	2018	13.7	3.5
Malnutrition	877	10.8	21.2	780	11.9	22.9	1657	11.2	21.9
Pneumonia	811	9.9	9.4	631	9.6	8.6	1442	9.8	9
Diarrhoea	573	7.0	10.8	474	7.2	10.0	1047	7.1	10.5
Meningitis	583	7.1	30.2	458	7.0	27.6	1041	7.1	29
Tuberculosis	581	7.1	11.7	395	6.0	10.3	976	6.6	11.1
AIDS	505	6.2	30	349	5.3	24.5	854	5.8	27.5
Septicaemia	367	4.5	11.9	326	5.0	12.3	693	4.7	12.1
Measles	353	4.3	16.4	338	5.1	16.9	691	4.7	16.6
Anaemia	289	3.5	17.4	251	3.8	12.1	540	3.7	14.5
Other diseases	2151	26.4	6.5	1621	24.6	3.4	3773	25.6	4.7
Total	8154	100.0	8.5	6577	100.0	6.3	14 732	100.0	7.3

[a] Includes admissions for which sex is not known.

Males accounted for a higher number of deaths in all age groups (55.3%). In persons between 15 and 44 years of age, the in-hospital mortality for all causes was twice as high among males as among females (M:F ratio ranging from 2.56, among 15–19 years old, to 1.90, among 40–44 years old) because of the high number of admissions among females for delivery and other gynaeco-obstetrical conditions, which have a negligible lethality.

4. Discussion

We have attempted to shed light on the differences between males and females in the use of health care services and in disease patterns by analysing data from hospital discharge records. However, there are limitations to these data: they are not designed for research purposes; they may be incomplete, illegible or missing; and the same person may be counted more than once for the same diagnosis. Moreover, given that hospital-based studies are prone to selection bias (Berkelman et al., 2002), no community-wide inferences should be made (Steinwachs, 1998). Furthermore, hospital statistics reflect the possibility of accessing health care and the health-care seeking behaviour of the population in the catchment area, and they are of limited use in disentangling biological differences from those that are created by the social construct of gender: for this purpose, population-based studies are more appropriate.

The field of women's health extends beyond mere reproductive health or the biological differences between women and men, given that there is growing recognition that both social and biological factors strongly influence differentials in health between males and females (Goldman and Hatch, 2000). Poverty is also an important factor in determining the disease profile. In fact, the highest poor:rich mortality ratio has been reported for complications of pregnancy and for infectious/parasitic diseases in childhood (Gwatkin, 2001), contributing to making women and children under 5 years of age 'vulnerable'. Health services often fail to reach vulnerable groups, and the underutilization of health services among women has been well documented in a number of African countries. High user fees also inhibit access to

these services, so that health benefits are mainly limited to better-off groups (Kawachi, 2000).

Lacor Hospital has shown its capacity to reach those in need of health care: it is located in a rural area, provides outreach services in protected camps, runs two health centres in rural areas, and ensures a continuum of care from the community to the referral hospital. The Hospital serves a largely poor population incapacitated by insurgency and disease, and it applies low flat-rate or null fees. This is also important when considering that the cost to the patient largely determines who has access to health care facilities (Whitehead et al., 2001), affecting not only equity but also the degree to which the user profile and disease patterns derived from hospital statistics reflect the population's demographic and epidemiological profile. Of note is the fact that the flat-rate policy, while aiming at ensuring access to hospital services for the poor and vulnerable, makes the hospital largely dependent on external aid, therefore posing a problem of long-term financial sustainability.

In our study, we found that female admissions accounted for over half (51.8%) of total admissions (M:F ratio = 0.93). Of note is the fact that, even after the exclusion of the admissions for delivery and gynaeco-obstetrical conditions, the M:F ratio of hospital admissions was quite balanced (M:F ratio = 1.11) compared with other hospitals in sub-Saharan Africa, where males represent a disproportionately high percentage of users (M:F ratio = 1.7) (Mudiayi et al., 1997) or women present later for diagnosis, with a higher proportion of mortalities and disabilities (Connolly and Nunn, 1996; Peters and Eshiet, 2002).

We also found that differences between sexes vary with age. Whereas males and females have basically similar health problems in infancy and childhood, striking differences emerge in adult life. Our results indicate that women suffer disproportionately from their reproductive role; for men, although our data cannot be generalized to the general population, the finding of more admissions for injuries and liver disease could reflect their involvement in civil conflicts and greater exposure to accidents, occupational hazards and individual at-risk behaviour, such as alcohol consumption. In general, role gender socialization and the association of 'masculinity' with risk-taking behaviour, acceptance of risk and a disregard of pain and injury may be factors leading to hazardous actions on the part of men, including, for example, excessive consumption of alcohol, drug use and risky driving (WHO, 2002c).

In this light, currently available cost-effective public health interventions would potentially have greater benefits, in terms of reducing morbidity and mortality, for women, given that several causes of hospital admissions for men may be, as mentioned, more related to occupational and health-related behaviours, which are more difficult to change (Mohamed et al., 1992; Wang et al., 2002). In particular, risks for maternal mortality are largely preventable, and interventions for reducing these risks and premature childbirth are cost-effective. These interventions should include preventive services, such as the prevention and control of malaria and anaemia during pregnancy, which are common problems not only in Lacor Hospital but also in most low-income countries and which contribute to poor outcome in both the mother and child (Geelhoed et al., 2006; Menendez, 1995). Interventions should also include curative services, such as increasing the use of hospital services for high-risk deliveries, which require emergency obstetrical care (Barnum and Kutzin, 1993; Olsen et al., 2005).

Our finding that the leading cause of admission for 15–44-year-old women was delivery and gynaeco-obstetrical conditions reflects the priority that Lacor Hospital places on cost-effective motherhood services. In fact, inpatient care is part of the Hospital's more extensive strategy of combining prenatal care (focusing on maternal risks and the prevention and treatment of complications) and improved access to emergency obstetrical care, ensuring a continuum of care during pregnancy and delivery and after birth. In the period 1992–2004, the Hospital's antenatal clinic was visited by 192 480 women, in addition to the 28 727 women admitted to the gynaecology and obstetrics ward (Lacor Hospital, 2006). As a result of these activities, maternal mortality has been low, with a decrease in the CFR from 1.5% in 1993 to 0.1% in 2004. Moreover, most of the few maternal deaths have been related to late referral, especially during the escalation of civil conflict in 1997 (CFR = 0.7%) and 2002 (CFR = 0.7%). Nonetheless, in-hospital mortality reflects only a small proportion of the deaths related to pregnancy, childbirth and the puerperium in the population; the number of such deaths is still unacceptably high in the Gulu District, with an estimated maternal mortality of 700 per 100 000 live births (Uganda Conflict Action Network, 2006). In general, while the hospital is committed to providing reproductive health services to women and to expand its outreach services, it may have a limited impact on preventing ill health if risks and practices (such as early pregnancies, short birth intervals and repeated pregnancies) are embedded in the social context of women's lives. Gender roles that focus narrowly on women's role as procreators and as mothers, as well as poor health due to the social disruption and long-term war occurring in northern Uganda, lead to increased risk of reproductive morbidity, which is largely out of the control of the hospital and can be only partially tackled by providing quality reproductive health services.

Degenerative conditions contribute to increasing the disease burden in adult/older age groups, with cancer being the leading cause of admission in persons 45 years of age and older, especially among females. Of note is the finding that cancer of the uterine cervix (43.0%) and breast (16.8%) were the most important causes of cancer morbidity at Lacor Hospital among 15–44-year-old women, which is consistent with reports from many low-income countries (Yang et al., 2004). Poor knowledge of the basic symptoms of uterine cervix and breast cancer, and the fact that African women are not in the habit of undergoing routine gynaecological examinations, has resulted in diagnosis being made in advanced stages of disease (Kidanto et al., 2002). Effective screening methods, such as the Pap test and mammography, should be promoted, although it would be necessary to overcome the problems of the cost of these tests and the lack of trained personnel for performing them.

With regard to HIV/AIDS, in the early 1980s HIV-positive men greatly outnumbered women, whereas women currently represent nearly half of the HIV-infected population, indicating an increased 'feminization' of the HIV/AIDS pandemic (DeLay, 2004). Furthermore, in sub-Saharan Africa, women represent nearly 60% of the infected

population and are more affected at younger ages compared with men: in 2005, 4.6% of 15–24-year-old women were HIV-positive, compared with 1.7% of same-age men (UNAIDS/UNFPA/UNIFEM, 2004; UNAIDS/WHO, 2005). The data on HIV/AIDS-related admissions at Lacor Hospital seem to be consistent with available data on HIV prevalence. The increasing impact of HIV/AIDS among women can be attributed not only to biological factors (e.g. greater susceptibility) but also to socio-economic and cultural factors, such as poverty, lower educational levels, lower social status and less power in sexual decision-making (Taegtmeyer et al., 2006; Uganda AIDS Commission, 1997; UNAIDS/UNFPA/UNIFEM, 2004; UNAIDS/WHO, 2005). To confront this issue, it would be necessary to further promote prevention among young women and set standards and targets for achieving equity in access to antiretroviral treatment for females.

Of note is the fact that the two leading causes of admissions among infectious diseases in the 15–44-year age group showed different patterns, with tuberculosis being more frequent among adult males (M:F ratio = 1.3) and malaria more frequent among adult females (M:F ratio = 0.45). Higher incidence and prevalence of tuberculosis among adult males is described in most settings, but the reasons are poorly understood (WHO, 2002b). Higher notification rates among adult males may be related to biological differences (sex differences) in the epidemiology of tuberculosis and in the progression from infection to disease, as well as to differences in the societal roles of men and women (gender differences) that influence risk of exposure and/or access to care (WHO, 2002b). Concerning the patterns of malaria, it is well known that higher malaria incidence and mortality are observed among women, especially of childbearing age (Allottey and Gyapong, 2005). Recent evidence suggests that pregnant women are more 'attractive' to mosquitoes and are therefore more likely to be bitten, increasing their exposure to malaria (Dobson, 2000).

Among adult males, injuries were the second leading cause of admissions at Lacor Hospital. In sub-Saharan countries, this phenomenon is becomingly increasingly common, due to adult males' involvement in civil conflicts, road accidents and exposure to occupational hazards (Balogun and Abereoje, 1992; Kobusingye and Lett, 2000; Meel, 2004; Mutasingwa and Aaro, 2001; Nordberg, 2000). Of note is the fact that a high increase in M:F ratio for injuries was observed during the most acute periods of civil war in 1997 (M:F ratio = 3.68), 1998 (M:F ratio = 4.40) and 2000 (M:F ratio = 3.45), with a subsequent increase in war-related injuries mainly among adult men, while a decline in M:F ratio was observed in 2003 and 2004 (with an M:F ratio lower than 2), when the intensity of the civil war (and the admissions for war-related injuries) also decreased. These findings are important not only for surveillance and action, but also for planning and implementing emergency surgical and orthopaedic services to care for the victims of war-related injuries and landmines. Of note is the fact that injuries represent a burden on health services not only in terms of admissions, bed days and surgical services, but also in the form of primary care, out-patient care and rehabilitation, given that injuries require complex interventions, and serious injuries can result in significant disabilities and the need for long-term care.

In general, differences are observed in gender-related patterns of injuries: in fact, while males are more likely to be injured and killed by a stranger (Peek-Asa et al., 2002), females are overwhelmingly more likely to be victims of domestic violence inflicted by an intimate partner, including rape and sexual assault, physical battering and psychological abuse (Desjarlais et al., 1995). This is particularly true in a war-affected area, with the majority of the population living under extreme conditions of promiscuity and overcrowding in displaced camps, where women are more exposed to violence. Worldwide it is estimated that approximately 25–50% of women report being a victim of physical abuse from men (Heise et al., 1995) and 60% of murders of women are linked to domestic violence (WHO, 1997). Moreover, in northern Uganda, women have increasingly been assuming the role of head of the family; they travel more for business and may become more exposed to road accidents and firearm injuries; thus the admissions for these causes among women may increase in the future.

In conclusion, this study highlights the differences between males and females in the use of health care services and in disease patterns, including sex-related conditions (i.e. uterine cancer and conditions related to maternity) and gender-related conditions (i.e. HIV/AIDS and injuries). Of note is the fact that the admission pattern was similar between females and males in childhood, while, for adults, females had more admissions for malaria, anaemia and cancer, and males had more admissions for injuries, liver disease and tuberculosis. As these differences are dynamic, driven by the interplay of biology, social organization and health systems, their analysis and documentation are crucial for assessing the achievement of the dual goals of improving population health and reducing health inequalities. Their analysis is also important to improve service delivery as well as to support the development of evidence-based and gender-sensitive strategies for effective prevention and care for both men and women.

Dedication

This manuscript is dedicated to Dr Matthew Lukwiya, Medical Superintendent of Lacor Hospital, who died of Ebola in December 2000 and who conceived the core issues discussed in this paper during his presentation on vulnerable groups at the 'Workshop on investing in health in Northern Uganda', held on 18 June 1999 in Kampala, Uganda.

Authors' contributions: SA, MF, DC, MO and SD developed the study concept and design; SA, MF, BN, NF, BC, RI, EOA, BP, ZY, MO and SD contributed to the execution of the study and interpretation of data; SA, MF and SD performed the data analysis; SA, MF, BN and SD drafted the manuscript. All authors critically revised the manuscript and approved its final version. MF and SD are guarantors of the article.

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