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Comparative Analysis of Rural Health Demographics in 2 East African Communities During Medical Camps: Volunteers' Perspectives'

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Abstract

Malawian and Zambian governments have made efforts to improve healthcare for rural dwellers but possible differences or similarities in health demographics may inform targeted interventions and volunteers may have a greater role to play in improving health outcomes. **Aims and Objectives**: To compare of basic health and social demographics observed during 4-day medical camps in 2 rural communities in Zambia and Malawi to determine any significant differences or similarities. **Method:** About 12 and 10 local and international volunteers at medical camps (at a temporary rural health post or community hall) in rural Zambia and Malawi respectively treated 488 patients in total, with basic health and social demographic data collected and results analyzed. **Results:** The mean age of patients seen in Malawi and Zambia were 34.5 and 38.9 years respectively, with 39% and 40% of patients in Malawi and Zambia respectively being within the 18 to 44 years age group, and mostly females (59.7% in Malawi and 65.7% in Zambia). Most were non-infectious diseases (97.3% in Zambia, 95% in Malawi), mostly musculoskeletal (17.0% in Malawi and 30.5% in Zambia), while medications prescribed were mostly analgesics (35.7% in Malawi and 29.9% in Zambia). Only a small proportion of patients were referred to local secondary facilities or district hospitals, 51 (28.7%) in Malawi and 59 (19.9%) in Zambia respectively. Chi square test shows a significant difference ($P < .001$) in diseases in both countries, but there was no statistically significant difference between the mean age of patients seen in both countries, using the independent *t*-test ($P = .365$). **Conclusion:** This study highlights statistically significant demographic differences between the 2 communities and possible reasons for these, and how volunteers' roles in rural healthcare in the East African communities could be further evaluated.

Keywords

rural health, primary care, community health, health demographics, East Africa, volunteer

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Background

Zambia and Malawi are countries in East Africa with relatively very low GDP per capita income (about $1000 and $500 respectively) with majority of the population ravished with poverty. As at 2016, Current Health Expenditure (CHE) as a percentage of GDP were 9.8% and 4.5% for Malawi and Zambia respectively.

Life expectancy at birth is relatively low, about 61 and 61.4 years for Males and Females in Malawi respectively, and 60.2 and 64.4 years for Males and Females respectively in Zambia in 2016.[1]

However, in 2017 the under 5 Mortality per 1000 births are relatively high at 55 in Malawi and 60 in Zambia respectively, according to the WHO.[1]

There is a high prevalence of communicable diseases like Malaria, Tuberculosis, and HIV which are widespread in both countries.

A study evaluated standards of treatment of childhood febrile illness in rural Zambia identified the commonest

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presentations as Upper Respiratory Tract Infections (46%), diarrhea (31%), and Malaria (10%).[2] After identifying key factors that are determinants of quality healthcare, several initiatives to improve quality of health care have been embarked upon over the years in the 3 countries, but health care indices for the poor and especially rural dwellers are still relatively unimpressive.

These include improved sanitation, poverty alleviation, maximizing and harnessing the potentials of volunteer health workers, government collaboration with NGOs including their involvement with provision of antiretroviral therapy for HIV positive patients.

What is Already Known About This Subject

Several studies reveal the peculiarities and challenges of access to healthcare as well as determinants of quality health care in rural areas in both developed and developing countries.

There is evidence that health indicators are better in urban than in rural areas, which has prompted governments to prioritize rural health services improvement, however this urban advantage seemed to be declining as an interesting study in children's healthcare in Malawi revealed.[3,4]

A South African study highlighted the role malnutrition plays in influencing the quality of healthcare in rural school children.[5]

Another study from Ghana examining the determinants of access to improved sanitation revealed only 14% of the population had access to improved sanitation facilities with huge disparity between rural (8%) and urban (19%) dwellers.[6] Within a 12-year period, HIV prevalence amongst urban dwellers was found to have increased with a higher proportion compared to rural dwellers in young men in Zambia.[7]

Some Zambian studies analyzed the effect of user fee removal in rural areas in Zambia on their access to public health facilities for childbirth.[8]

Distance traveled to a healthcare facility can influence health outcomes especially in the rural areas. NGOs and voluntary organizations have a major role to play to supplement government efforts.[9,10]

After conducting medical camps in both countries in 2015 and 2017, recommendations obtained from comparative analysis of the data obtained from this study may help to induce change if implemented by relevant stakeholders. Volunteers in this study were similar in both countries' camps, and were medical doctors, nurses, community health workers, and dispensers from the United Kingdom, Zambia, and Malawi who undertook this venture from a purely humanitarian perspective to explore how volunteers can contribute to positive patient health outcomes.

The aim of the study is to compare health demographics between 2 rural East African communities and identify any statistically significant correlations, similarities, or differences.

Methodology

Study Setting Area

Two communities in rural East Africa: Chalendewa, Malawi and Lwimba, Zambia were chosen and identified for the medical camps.[11]

Chalendewa (Latitude 14° 5′ 21″ South; Longitude 33° 45′ 47″ East) is a small town located in the Central region of Malawi, a distance of about 8 km south of Lilongwe, the capital city.

Lwimba (Latitude 15° 28′ 59″ South; Longitude 28° 43′ 59″ East) is a village about 80 km Southeast of Lusaka, the Zambian capital city, and is located in Chongwe District, Lusaka Province.

Study Period

The study was conducted in August 2015 and September 2017 respectively, for an average period of 4 days at each location.

Study Population and Design

A total of about 488 patients (non-randomized) were treated at a community hall and rural health post in each country respectively, where there were no health facilities nearby.

The sample size was based on the number of patients who were able to attend both medical camps for treatment over the 4 days study periods in both camps.

They were treated for general ailments like those presenting at primary care settings in cities anywhere in the world, and those with complex cases were referred to the nearest district health centers. The diseases were diagnosed purely by symptomatic methods as diagnostic facilities were limited in both rural locations.

The medical camps were conducted with the ethical approval of both countries' Ministries of Health as well as local community leaders and all participants were anonymized and de-identified.

Data Collection Tool

This was a simple questionnaire designed by the corresponding author.

Basic demographic data collection of age, sex, reasons for visiting health post, medications prescribed, and referrals made to local district hospital were recorded during consultations by the volunteer doctors and nurses themselves. The 2 sets of data were analyzed comparatively using the chi square test to test the null hypothesis to establish a relationship between the 2 data sets.

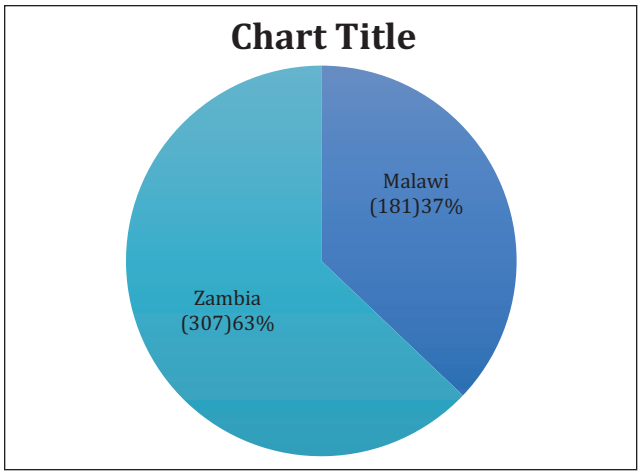

Figure 1. Pie chart showing proportions of patients seen in Malawi and Zambia.

Data Analysis

Data from the questionnaire were collated, tabulated, and analyzed using the *chi square test and the independent t-test.*

Results

Socio-Demographic Characteristics of the Study Participants in Malawi and Zambia

As indicated in Figure 1, a total of 488 patients were treated at both medical camps, 181 (37.1%) in Malawi and 307 (62.9%) in Zambia. Of all the cases managed by the volunteers, the majority were non-infectious diseases (97.3% in Zambia, 95% in Malawi).

Data analysis showed similarities in the demographic data in both communities, with Table 1 showing that women(females) were the largest proportion of patients,[12] 108 (59.7%) in Malawi and 209 (65.7%) in Zambia, while the largest age group that attended the medical camp were adults (18-44 years old), 71 (39%) in Malawi and 126 (40%) in Zambia (Table 1).

However, the mean age of patients seen in Malawi and Zambia were 34.5 and 38.9 years respectively, with 39% and 40% of patients in Malawi and Zambia being within the 18 to 44 years age group respectively.

Observed Health Outcomes and Medications Administered in Malawi and Zambia

The largest diagnosis category recorded in both countries' camps was the musculoskeletal system which a total of 44 (17.0%) in Malawi and 79 (30.5%) in Zambia respectively. The largest treatment classification (medications prescribed) were analgesics with 102 (35.7%) in Malawi and 94 (29.9%) in Zambia, while only a small proportion of patients were referred to local secondary facilities or district hospitals, 51 (28.7%) in Malawi and 59 (19.9%) in Zambia (Tables 2 and 3).

Differences in Health Outcomes in Malawi and Zambia

However, a comparative analysis of data in both countries using the chi square test (Table 4) clearly shows a significant difference in the diagnosis/disease distribution recorded in both countries ($P < .001$), but there was no statistically significant difference between the mean age of patients seen in both countries, using the independent *t*-test ($P = .365$; Table 1).

Strengths and Limitations of This Study

This study is very unique because it is conducted by self-funding volunteers with limited funding and is completely devoid of bias, as there are no competing financial interests. However, the data may not have been fully representative of the local populations.

The main limitations of the study are that as a purely observational study with limited funding, the research methodology could have been better and several other medical camps in different settings could have been explored to improve the statistical power of the analysis.

This may be added in future rural health studies, in addition to exploring volunteer roles further.

Discussion and Global Health Implication

How Might This Report's Findings Impact on Global Rural Healthcare in the Future?

From the results of our study, there were no statistically significant difference in the mean age between the 2 communities (independent *t*-test, $P = .365$), probably because only the younger population who were able to access the medical camps by trekking significant distances were able to come and thus included in the study. There were no observable differences in other health demographics recorded like sex, largest diagnosis category and treatment classification in the 2 rural communities in Malawi and Zambia likely due to similar ethnicity, culture, languages, socio-economic, and health challenges like poverty, unemployment, and poor access to healthcare. Also, unexpectedly a significant majority of our patients presented with non-communicable diseases probably due to increasing global prevalence, and risk factor control measures to reduce the morbidity and mortality in rural areas should be explored by governments as well as Non-governmental organixations.[13,14]

However, this study confirms a statistically significant difference in the disease distribution pattern in both

Table 1. Frequency of Patients by Age, Sex, and Proportion Referred Seen at Temporary Health Centers in Malawi and Zambia.

	Age (%)				Sex (%)		Referred patients	
	<18 years	18-44 years	45-65 years	>65 years	Male	Female	Referred (%)	Treated (%)
Country								
Malawi	52 (29)	71 (39)	36 (20)	23 (12)	73 (40.3)	108 (59.7)	51 (28)	130 (72)
Zambia	81 (26)	126 (40)	61 (19)	47 (15)	98 (32)	209 (68)	51 (28)	248 (80)
Total						488		

Table 2. Frequency of Diseases Reported by Volunteer Medics at Temporary Health Centers in Malawi and Zambia.

	Diagnosis 1		Diagnosis 2		All diagnoses	
	Malawi	Zambia	Malawi	Zambia	Malawi	Zambia
	N (%)					
Hypertension	0 (0)	3 (1.0)	0 (0)	2 (0.7)	0 (0)	5 (1.7)
Cardiovascular system	20 (11.0)	21 (6.8)	1 (0.6)	8 (2.7)	21 (11.6)	29 (9.4)
Communicable disease	9 (5.0)	8 (2.6)	5 (2.8)	1 (0.3)	14 (7.7)	9 (2.9)
Congenital disorder	0 (0)	1 (0.3)	0 (0)	0 (0)	0 (0)	1 (0.3)
Dental	0 (0)	5 (1.6)	0 (0)	1 (0.3)	0 (0)	6 (1.9)
Dermatology	10 (5.5)	6 (2.0)	6 (3.3)	3 (1.0)	16 (8.8)	9 (2.9)
Endocrine system	0 (0)	4 (1.3)	10 (5.5)	1 (0.3)	10 (5.5)	5 (1.6)
ENT	6 (3.3)	8 (2.6)	5 (2.8)	1 (0.3)	11 (6.1)	9 (2.9)
Gastrointestinal system	27 (14.9)	34 (11.1)	9 (5.0)	10 (3.3)	36 (19.9)	44 (14.3)
Genitourinary system	7 (3.9)	18 (5.9)	7 (3.9)	3 (1.0)	14 (7.7)	21 (6.8)
Gynecological	0 (0)	16 (5.2)	1 (0.6)	2 (0.7)	1 (0.6)	18 (5.9)
Musculoskeletal system	35 (19.3)	66 (21.5)	9 (5.0)	13 (4.2)	44 (24.3)	79 (25.7)
Neurological system	6 (3.3)	12 (3.9)	1 (0.6)	2 (0.7)	7 (3.9)	14 (4.6)
Obstetrics	3 (1.7)	32 (10.4)	0 (0)	1 (0.3)	3 (1.7)	33 (10.7)
Ophthalmology	14 (7.7)	25 (8.1)	10 (5.5)	2 (0.7)	24 (13.3)	27 (8.8)
Oral	0 (0)	1 (0.3)	0 (0)	0 (0)	0 (0)	1 (0.3)
Pediatrics	1 (0.6)	0 (0)	0 (0)	0 (0)	1 (0.6)	0 (0)
Psychiatric disorder	5 (2.8)	0 (0)	0 (0)	0 (0)	5 (2.8)	0 (0)
Respiratory system	36 (19.9)	39 (12.7)	6 (3.3)	7 (2.3)	42 (23.2)	46 (15.0)
Surgery	0 (0)	4 (1.3)	2 (1.1)	0 (0)	2 (1.1)	4 (1.3)
Urology	0 (0)	3 (1.0)	0 (0)	0 (0)	0 (0)	3 (1.0)
Viral Infection	2 (1.1)	1 (0.3)	0 (0)	0 (0)	2 (1.1)	1 (0.3)
Tropical disease	0 (0)	0 (0)	6 (3.3)	0 (0)	6 (3.3)	0 (0)

countries (chi-square test, $P < .001$), which suggests that health interventions to produce positive outcomes can be targeted to rural populations in different countries if governments, NGOs, and the private sectors collaborate.

Learning Points/Take Home Messages

What are the New Findings That This Report Adds?

- This study revealed the unique and peculiar similarities and differences in the different communities and was conducted purely by self-funding volunteers without any competing interests or bias.
- Rural healthcare should be prioritized in allocation of healthcare resources in resource-poor countries, and collaboration between governments and the voluntary sector is crucial.
- This study highlights the need for enhancement of governmental efforts in bridging the quality of health gaps between rural and urban communities, as well as opportunities for harnessing the potentials of volunteers in contributing to improving healthcare indices in both countries.

Further larger demographic studies are needed to evaluate partnership opportunities and initiatives between governments, volunteers, and NGOs.[3,6,9,10]

Table 3. Frequency of Prescribed Medications by Volunteer Medics at Temporary Health Centers in Malawi and Zambia.

	Treatment 1		Treatment 2		Treatment 3	
	Malawi	Zambia	Malawi	Zambia	Malawi	Zambia
	N (%)					
Analgesic	29 (16.0)	66 (21.5)	60 (33.1)	27 (8.8)	13 (7.2)	1 (0.3)
Antacid	10 (5.5)	2 (0.7)	1 (0.6)	2 (0.7)	1 (0.6)	0 (0)
Antiasthma	0 (0)	1 (0.3)	0 (0)	0 (0)	0 (0)	0 (0)
Antibiotics	38 (21.0)	52 (16.9)	7 (3.9)	14 (4.6)	0 (0)	3 (1.0)
Anticonvulsant	0 (0)	1 (0.3)	0 (0)	0 (0)	0 (0)	0 (0)
Antifungal	0 (0)	1 (0.3)	0 (0)	1 (0.3)	0 (0)	0 (0)
Anthelminthic	2 (1.1)	3 (1.0)	3 (1.7)	3 (1)	1 (0.6)	0 (0)
Antihistamine	0 (0)	1 (0.3)	0 (0)	5 (1.6)	0 (0)	0 (0)
Antihypertensive	15 (8.3)	16 (5.2)	1 (0.6)	6 (2.0)	0 (0)	2 (0.7)
Antipsychotic	2 (1.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Beta agonist	0 (0)	3 (1.0)	0 (0)	3 (1.0)	0 (0)	0 (0)
Cough expectorant	9 (5.0)	1 (0.3)	4 (2.2)	0 (0)	0 (0)	0 (0)
H2 antagonist	12 (6.6)	0 (0)	5 (2.8)	0 (0)	0 (0)	0 (0)
Iron therapy	0 (0)	1 (0.3)	0 (0)	0 (0)	0 (0)	0 (0)
Laxative	0 (0)	1 (0.3)	1 (0.6)	0 (0)	0 (0)	0 (0)
Multivitamins	0 (0)	6 (2.0)	0 (0)	0 (0)	0 (0)	1 (0.3)
NSAID	16 (8.8)	40 (13.0)	10 (5.5)	15 (4.9)	2 (1.1)	2 (0.7)
Oral rehydration therapy	5 (2.8)	7 (2.3)	1 (0.6)	4 (1.3)	2 (1.1)	0 (0)
Proton pump inhibitor	0 (0)	7 (2.3)	0 (0)	11 (3.6)	1 (0.6)	8 (2.6)
Steroids	0 (0)	1 (0.3)	0 (0)	0 (0)	0 (0)	1 (0.3)
Topical cream	12 (6.6)	5 (1.6)	6 (3.3)	9 (2.9)	1 (0.6)	2 (0.7)
Topical eye drops	13 (7.2)	12 (4.0)	3 (1.7)	0 (0)	0 (0.0)	1 (0.3)

Table 4. Camparison of Frequencies of Diseases Reported by Volunteer Medics at Temporary Health Centers in Malawi and Zambia.

	Malawi	Zambia
	N (%)	
Cardiovascular system	20 (11.0)	24 (7.8)
Infections	11 (6.1)	9 (2.9)
Dermatology	10 (5.5)	6 (2.0)
Gastroenterology + endocrine	27 (14.9)	38 (12.4)
ENT	6 (3.3)	8 (2.6)
OBGYN	10 (5.5)	69 (22.5)
Musculoskeletal + neurological	41 (22.7)	78 (25.4)
Ophthalmology	14 (7.7)	25 (8.1)
Respiratory system	36 (19.9)	39 (12.7)
Others	6 (3.3)	11 (3.6)

Further Future Research Area

The importance of NGOs was identified in a study observing NGO involvement in HIV and TB interventions in rural Malawi, and in a similar one in Zambia.[10,15,16]

The government should maximize the role of volunteers through incentives or motivation as well as providing an enabling environment for NGOs who have a huge role to play in improving quality of rural health care delivery.[15–17] The recommendations from future studies on the role of volunteers/NGOs should be considered for implementation by relevant stakeholders in both countries. These should be tailored to the specific needs in each country.

Conclusion

In this paper, the authors who are self-sponsored volunteers have attempted to analyze and compare data collected during 2 medical camps in rural communities in Malawi and Zambia.

Both socio-culturally similar communities had predominantly non-infectious (non-communicable) diseases in female adult patients, with similar mean age groups showing no statistically significant difference. Since most health users are women (as observed in our study), the influential role of women in the society and how empowering them can directly improve gender inequalities in healthcare, as highlighted by a Malawian study, should be explored.[12]

As observed by Doede et al,[14] global morbidity and mortality of non-communicable diseases has been increasing significantly, especially in Africa, and governmental and non-governmental efforts need to be synergized.

Both populations presented with predominantly musculoskeletal problems and were mostly prescribed analgesics

with only a small proportion of patients referred to other facilities.

However, a statistically significant difference in the disease pattern or distribution shows that population health policies need to be focused on evidence-based local rural needs in order to make meaningful impact in improving health outcomes, especially where resources are limited and significantly rising healthcare costs in Africa is becoming an unwelcome economic and financial burden.[18]

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Author Contributions

Dr Adekunle Olowu: (20% contribution; principal investigator, physician volunteer, data collation, data analysis, and research write-up). Dr Rabson Kachala: (20% contribution; co-investigator, physician volunteer, interpreter, and research write-up). Dr Oluwadamilola Bamigbade: (20% contribution; co-investigator, physician volunteer, and research write-up review). Mrs Omotinuolawa Olowu (Formerly): (20% contribution; co-investigator, research assistant, and data collection). Dr Faith Chibeza: (20% contribution; co-investigator, physician volunteer, and interpreter).

Declaration of Conflicting Interests

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Ethical Approval

Permission was obtained from the ministries of health of both countries and from local community leaders. It was done routinely with the health sector governance leadership and their structures approval through the relevant medical regulatory authorities; and there was minimal risk and the data collected were de-identified. Participants were purely on a voluntary basis and the camps were self-funded, with no conflicts of interest declared by the authors.

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