Challenges in the Management of Hydrocephalic Children in Northern Mozambique

Sérgio Salvador[1,3-5], João Carlos Henriques[1,2], Missael Munguambe[1], Rui M. C. Vaz[3-5], Henrique P. Barros[6,7]

- BACKGROUND: **Hydrocephalus in sub-Saharan Africa, including Mozambique, is still a significant health care problem.**
- METHODS: **Retrospective data from a previous study were used to determine patient provenance, referral patterns, and lost to follow-up rates.**
- RESULTS: **Many children with hydrocephalus in this region are not taken to health care facilities for treatment. Reasons include poverty, difficult access, lack of transportation, and erroneous cultural interpretations. Resource limitations in terms of poorly equipped health care facilities and a lack of trained health professionals also contribute.**
- CONCLUSIONS: **Efforts to improve prevention, early diagnosis, treatment, and follow-up are of utmost importance in Mozambique.**

INTRODUCTION

Hydrocephalus is a medical condition resulting from a change in the dynamics of cerebrospinal fluid flow, with or without underlying pathology (20). If untreated, it can lead to significant impairment and even death (5). However, timely treatment can reduce morbidity and mortality as well as reduce the socioeconomic impact on families and communities (1, 28, 30). Hydrocephalus is one of the most common developmental disorders, it is more common than Down syndrome and congenital deafness (8), and it is the most frequently treated neurosurgical condition in pediatric practice (10, 12, 34).

Hydrocephalus is reported to be more common in developing countries; however, the prevalence (10, 34) and incidence of hydrocephalus in sub-Saharan Africa are unknown (35). In this region, it is estimated that <10% of cases are treated using ventriculoperitoneal shunt (VPS) systems, meaning that most children who have this medical condition do not have access to needed treatment (23).

The population of Mozambique was approximately 24 million people in 2014 (17); using data from developed countries to estimate incidence (35), we estimate there are 480 cases of congenital hydrocephalus and up to 4800 cases of neonatal hydrocephalus each year in Mozambique. Mozambique is divided into 10 provinces and 1 capital city with provincial status. The provinces are subdivided into 129 districts. The districts are further divided in 405 administrative posts and then into localities, the lowest geographical level of the central state administration (**Figure 1**).

There is at least 1 health center in each district, but not all health centers have a physician. A patient with hydrocephalus from a locality would present to a health center (in the district capital) and would need referrals to a provincial hospital (tertiary level) and after that to 1 of the 3 quaternary central hospitals (in Maputo, Beira, and Nampula) to receive neurosurgical care. In parts of northern Mozambique, some patients are more than 1000 km from a health facility with a neurosurgeon (**Figure 2**). Mozambique has only 2 active national neurosurgeons in the public sector (Maputo and Nampula), and there are 14 foreign neurosurgeons working in the country (4 Cuban, 2 Russian, and 8 Korean).

In northern Mozambique, prenatal care is performed by health personnel (physicians, nurses, midwives, or auxiliary or traditional birth attendants) and reaches 90%–96% of pregnant women. However, assisted deliveries and postdelivery/neonatal care by skilled health personnel remain low throughout the country (54%), ranging from 35.6% in Cabo Delgado province to 60.3% in

Key words
- Hydrocephalus
- Infant
- Management
- Mozambique

Abbreviations and Acronyms
VPS: Ventriculoperitoneal shunt

From the [1]Department of Neurology and Neurosurgery of Faculty of Health Sciences, University of Lúrio, Nampula, Mozambique; [2]Department of Neurosurgery, Central Hospital of Nampula, Nampula, Mozambique; [3]Department of Neurosurgery, Centro Hospitalar São João, Oporto, Portugal; [4]Department of Clinical Neurosciences and Mental Health, Faculty of Medicine, University of Porto, Oporto, Portugal; [5]Neurosciences Unit of CUF Porto Hospital, Oporto, Portugal; [6]Institute of Public Health of University of Porto, Oporto, Portugal; and [7]Department of Clinical Epidemiology, Predictive Medicine and Public Health of Faculty of Medicine, University of Porto, Oporto, Portugal

To whom correspondence should be addressed: Sérgio Salvador, M.D. [E-mail: sfsalvador.neurocirurgia@gmail.com]

Citation: World Neurosurg. (2015) 84, 3:671-676.
http://dx.doi.org/10.1016/j.wneu.2015.03.064

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

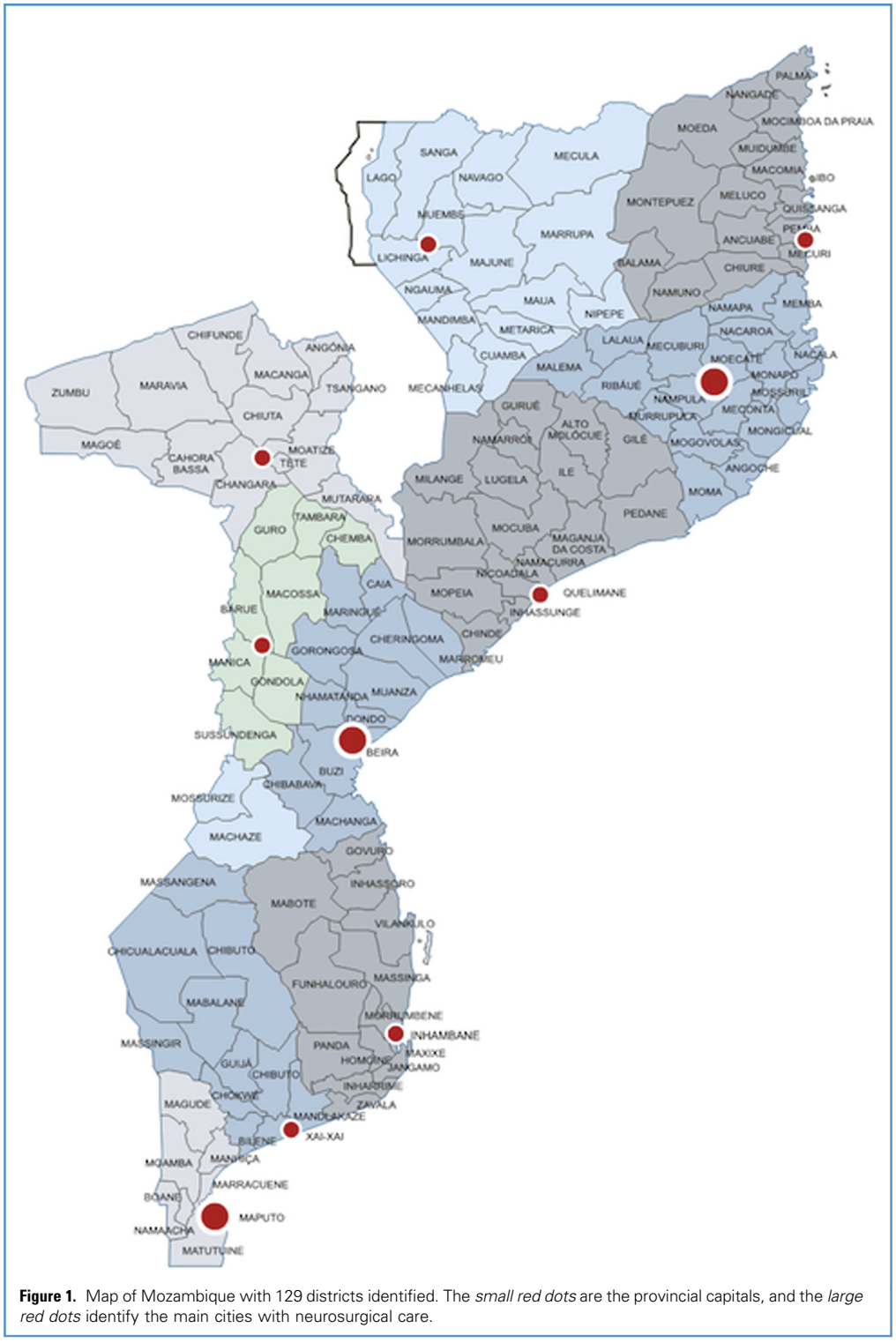

Figure 1. Map of Mozambique with 129 districts identified. The *small red dots* are the provincial capitals, and the *large red dots* identify the main cities with neurosurgical care.

Niassa province (55.3% in Nampula province). Overall low levels of education in pregnant women contribute to these low coverage rates (17, 18).

The Nampula Central Hospital is the quaternary reference hospital for the country's northern region, covering more than one third of the country's population (17, 35). There is only 1 Mozambican