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Alternative measures of spatial distribution and availability of health facilities for the delivery of emergency obstetric services in island communities

Koyejo Oyerinde^{1,*} and Wame Baravilala²

¹Mailman School of Public Health, Columbia University, New York, USA

²UNFPA Pacific Sub-Regional Office, Suva, Fiji

Abstract

International guidelines and recommendations for availability and spatial distribution of emergency obstetric care services do not adequately address the challenges of providing emergency health services in island communities. The isolation and small population sizes that are typical of islands and remote populations limit the applicability of international guidelines in such communities.

Universal access to emergency obstetric care services, when pregnant women encounter complications, is one of the three key strategies for reducing maternal and newborn mortality; the other two being family planning and skilled care during labor. The performance of selected lifesaving clinical interventions (signal functions) over a three-month period is commonly used to assess and assign performance categories to health facilities but island communities might not have a large enough population to generate demand for all the signal functions over a three-month period. Similarly, availability and spatial distribution recommendations are typically based on the size of catchment populations, but the populations of island communities tend to be sparsely distributed.

With illustrations from six South Pacific Island states, we argue that the recommendation for availability of health facilities, that there should be at least five emergency obstetric care facilities (including at least one comprehensive facility) for every 500,000 population, and the recommendation for equitable distribution of health facilities, that all subnational areas meet the availability recommendation, can be substituted with a focus on access to blood transfusion and obstetric surgical care within two hours for all pregnant residents of islands. Island communities could replace the performance of signal functions over a 3-month period with a demonstrated capacity to perform signal functions if the need arises.

Keywords

Emergency obstetric and newborn care; maternal mortality; island communities; referral; South Pacific

*Corresponding author: kao2127@columbia.edu.

Introduction

Maternal and newborn health services have gained increased attention from national governments and international agencies in recent years. Some of the attention is due to the imminence of 2015 when countries have to report back to the United Nations (UN) General Assembly on their performance on all the Millennium Development Goals (MDGs) (1). The fifth and fourth MDGs are the most pertinent to maternal and newborn health; however, the sixth on HIV and all the other MDGs have direct or indirect effects on the attainment of MDGs 4 and 5.

Health policy makers in national governments, UN agencies, international NGOs and others all need measures to establish that progress is being made towards achieving MDG targets and other operational benchmarks. This quest for measurement is seen in the many guidelines issued by the World Health Organization (WHO) and other UN health agencies. International guidelines provide national and sub-national governments with policies that can be adapted to local operational environments. An important weakness of global level policy-making is the inherent and justifiable need to address the needs and priorities of most countries. While such policies can be operationalized with minor adaptations in most countries, island countries may require substantial modifications before the policies are applicable. In some situations, policies developed at the global level are entirely inapplicable in small island countries.

Unique health services challenges in island communities

Island communities tend to be atypical because they are bound by a geographical barrier that isolates them from the rest of the country or from other countries. Island communities must, by nature, be self-reliant for most of their health needs. For the purposes of this paper, the term “island communities” includes all isolated communities – communities that are islands unto themselves. For instance, remote villages in the Sahara desert or the Himalayas are practically remote island communities; they share most of the same health programming difficulties experienced by islands. In addition to their remoteness, most island communities have relatively small populations resulting in relatively high per capita cost of healthcare. On the other hand, because many island countries are classified as least developed or middle income countries, they tend to receive significant levels of development assistance.

As 2015, the year of reckoning for the MDGs, approaches countries are focusing on their maternal mortality ratio (MMR) trends over the period of 2000 to 2015. However, in sparsely populated island nations MMR is an unstable measure of mortality. In 2006 a single maternal death in Tuvalu meant an MMR of 377/100,000 live births (2).

Access to public utilities such as potable water, electricity and communications tend to be unreliable and expensive in island communities. Optimal provision of maternity services depends heavily on access to potable water for personal hygiene and infection prevention. Electricity is also essential for providing light for procedures after sunset, and to power several machines required for obstetric surgery and blood transfusion.

Reducing maternal and newborn morbidity and mortality

Maternal health experts generally agree that universal access to the following three interventions are a prerequisite to significant maternal mortality reduction: 1) family planning to reduce the number of women at risk of maternal mortality and to reduce the number of women demanding pregnancy termination services; 2) skilled attendant at childbirth to promptly recognize and manage women with complications; and 3) emergency obstetric care services for women who develop life-threatening obstetric complications. The delivery of emergency obstetric services is particularly critical in island communities because the isolation of inhabitants is likely to impede timely access to services for mothers and their newborns when complications inevitably occur.

The 2009 Monitoring of Emergency Obstetric Care handbook (4) updates the list of life saving services or signal functions (5) to which all women in labor must have access in the event of childbirth complications (refer to Table 1). The handbook lists seven signal functions for basic services and two additional signal functions – provision of blood transfusion and obstetric surgery - for comprehensive emergency obstetric and newborn care (EmONC) services.

The handbook recommended some population-based indicators; the most relevant for island communities are indicators of availability and equitable spatial distribution of health facilities. The recommendation for availability states that for every 500,000 members of the population, there should be at least five emergency obstetric care facilities, including at least one comprehensive facility. The recommendation for equitable distribution of health facilities asserts that all subnational areas should meet the availability recommendation (4).

How should Tuvalu (refer to Table 2), which had a mid-year population of 11,300 in 2012, apply UN recommendations for availability and equitable spatial distribution of health facilities? In this paper we examine how island communities could operationalize the recommendations using the experiences of Island nations in the South Pacific. We reviewed data from seven country reports produced by the United Nations Population Fund (UNFPA) Pacific Sub Regional Office (PSRO), Suva Fiji (refer to Table 3). All the reports were drawn from cross-sectional, facility-based surveys of reproductive health services and emergency obstetric services done between November 2005 and June 2008 in the Federated States of Micronesia, Kiribati, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu (2).

Approaches to providing EmONC services in island communities

In this section we argue that timely access to critical care should be the guiding principle for the delivery of emergency obstetric and newborn services in island communities. We start by suggesting an alternative measure to define whether a health facility is categorized as a basic or comprehensive EmONC facility.

○ Focus on demonstrated capacity to perform signal functions

The effect of the small population of island communities is that the number of deliveries per year and the proportion of them that are complicated (refer to Table 3) could be too low for

health facilities to perform all signal functions within a 3 or 12-month period as suggested in the handbook (4).

Island communities could consider using a demonstrated capacity to perform signal functions to determine health facility performance. To maintain the skills of health workers it would be important to enter into agreement with busy maternities in other parts of the country or in other countries to allow island health workers to rotate through them.

○ Access to blood and cesarean section within two hours

Hemorrhage, eclampsia, sepsis, obstructed labor and complications of abortion are the most important causes of maternal mortality across the globe (6, 7). The main interventions to provide clinical care to women who suffer from these complications are captured in the list of signal functions in the handbook (4).

Postpartum hemorrhage (PPH) is the leading contributor to maternal mortality in the developing world and it is the direct cause for which rapid access to care is most critical. In a 1987 report, experts found that the modal time from onset of complication to death is about two hours for postpartum hemorrhage (8). Others have found that approximately 88% of deaths due to PPH occur within 4 hours of delivery (9). We therefore recommend a 2-hour travel time-to-care benchmark to avert the death of most women suffering from PPH.

The other time sensitive intervention is the provision of emergency cesarean section services. When the need for emergency cesarean section arises, the procedure must be delivered promptly to save the life of the mother and/or the unborn child. Rather than focus on the number of facilities per population, island communities could focus on providing healthcare – especially blood transfusion and cesarean section services - within a 2-hour time frame for their entire population.

The mix of comprehensive and basic emergency EmONC facilities should also be based on the principle of timely access to critical services. While the handbook suggests a ratio of about one comprehensive to four basic care service facilities (4), the population in island communities may not need so many healthcare facilities. If there is only one facility in an island community, it must be a comprehensive EmOC facility or otherwise have a means of rapid transportation so that women with complications can arrive at a facility of definitive care within 2 hours.

Other policy and programming options

The establishment of maternity waiting homes (MWHs) - places for expectant mothers to stay close to maternities when long travel distances to health facilities are anticipated or, as with many island communities, when adverse weather conditions would make regular transportation or medevac impossible - should be considered in island communities. MWHs have been shown to reduce the incidence of adverse maternal and newborn outcomes (10). Expectant mothers could be received in MWHs sometime in their third trimester as they await the onset of labor. Local considerations for ease of transportation and seasonal usability of roads should inform policies on the timing of admission into MWHs.

Postpartum women could be re-admitted into MWHs to permit observation of the newborn and to care for delayed complications of childbirth such as secondary PPH. In addition to the above suggestions, there must be a plan in place for women whose labor starts before admission in a MWH.

Remote support for healthcare providers in distant areas should be available for those who remain in isolated areas at the onset of labor. Care providers in island communities should have access to remote support throughout the course of labor and the immediate period after delivery. The growing ubiquity of mobile telephony and internet services in developing countries will increasingly make remote support more feasible.

In the event that complications develop during labor or delivery in island communities, 2-hour medevac services –ambulances, speedboats, aircrafts or other means of rapid transportation — must be readily accessible. As much as possible, the location of the transport service should allow for a one-leg trip to the facility of definitive care rather than an empty vehicle travelling from the facility to pick up the patient and then returning on a second leg back to the facility. Whatever the case, a 2-hour travel time should be the benchmark.

Finally, the planning for utilities for health facilities in island communities should incorporate redundancies in the form of backups for the supply of potable water, electricity and communications services until regular services are restored.

Conclusions

Time is of the essence during delivery of emergency obstetric care services. The travel time to health facilities during emergencies must be factored into the distribution of maternity services in all communities but especially on islands and in isolated communities. The actual performance of critical services, as a measure of capacity, could be substituted by an assessment of the capacity to perform procedures even if they have not been performed within a time period.

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Table 1

Emergency Obstetric Care Signal Functions

Basic services	Comprehensive services
(1) Administration of parenteral antibiotics	(1–7) Basic services
(2) Administration of parenteral uterotonics (e.g. oxytocin)	(8) Performance of obstetric surgery (e.g. cesarean section)
(3) Administration of parenteral anticonvulsants (e.g. magnesium sulphate) for preeclampsia/eclampsia	(9) Perform blood transfusion
(4) Removal of placenta manually	
(5) Removal of retained products (e.g. manual vacuum aspiration or dilatation & curettage)	
(6) Performance of assisted vaginal delivery (forceps or vacuum extraction)	
(7) Performance of neonatal resuscitation (with bag & mask)	

Source: WHO, UNFPA, UNICEF, & AMDD. (2009). Monitoring emergency obstetric care, A Handbook. Geneva: WHO.

Table 2

Demographic data on selected island nations of the South Pacific

Indicators	Federated States of Micronesia	Kiribati	Samoa	Solomon Islands	Tonga	Tuvalu	Vanuatu
Population Mid-Year 2012	107,000	105,000	187,000	552,000	103,000	11,300	258,000
Birth per 1000 population	24	30	29	32	27	23	31
Growth Rate	0.4	1.9	1.2	2.4	0.3	0.5	2.6
Skilled birth attendance	88%	-	81%	70%	99%	-	74%
Contraceptive prevalence (modern methods)	70%	13%	27%	27%	23%	22%	37%
TFR	3.5	3.8	4.5	4.2	3.8	3.1	4.0

Source: Data Finder, Population Reference Bureau <http://www.prb.org/DataFinder> accessed December 19, 2012.

Table 3

Findings from selected island nations of the South Pacific

Island Nations	Population Mid-Year 2012	Birth per 1000 population	Expected births per year	Expected direct obstetric complications per year
Federated States of Micronesia	107,000	24	2,568	385
Kiribati	105,000	30	3,150	473
Samoa	187,000	29	5,423	813
Solomon Islands	552,000	32	17,664	2,650
Tonga	103,000	27	2,781	417
Tuvalu	11,300	23	260	39
Vanuatu	258,000	31	7,998	1,200
Comments[†]				
Federated States of Micronesia Kosrae State Hospital did not attain full CEmOC status because neither a manual removal of the placenta nor an assisted delivery had taken place there in the previous six months. The population-based cesarean section rate (pCSR) was 12%				
Kiribati No facilities on Gilbert Islands provided basic EmONC services. The main referral hospital in Kiribati provided only basic EmONC. No facility performed at the comprehensive EmONC level. Only one facility on Gilbert Islands provided hematological screening, blood transfusion services and anesthetic services on a 24-hour basis. The population-based cesarean section rate (pCSR) was 4%				
Samoa The Tupua Tamasese Meaole (TTM) National Hospital provided comprehensive EmONC services. While Maliefoa Tanumafili II Hospital on Savaii provided blood transfusion and caesarean sections, it did not provide - anticonvulsants, manual removal of placenta and removal of retained products in 6 months due to the low case load in Savaii. No doubt the staff there could have carried out the procedures if the need arose. The good road infrastructure on both main islands was considered an asset because most people could access the National Hospital in Apia in less than 2-hours. pCSR was 7%				
Solomon Islands Four hospitals delivered comprehensive EmONC services, one basic EmONC facility and one other facility that would have performed at the comprehensive level if it provided assisted vaginal delivery. Many health facilities report that referral times to the next higher level facility depends on the weather, on how long it takes to organize transportation and this in turn depends on whether boats, ships or airplanes are ready pCSR was 4%				
Tonga Vaiola Hospital performed at the comprehensive EmONC level and the Prince Ngu Hospital performed as a basic EmONC service. pCSR was 10%				
Tuvalu Princess Margaret Hospital, Funafuti delivered comprehensive EmONC services pCSR was 8%				
Vanuatu Two facilities performed at the comprehensive EmONC level and one at the basic level.				

Island Nations	Population Mid-Year 2012	Birth per 1000 population	Expected births per year	Expected direct obstetric complications per year
pCSR was 3%				

[†] Comments are based on UNFPA. (2009). *Family Planning and Emergency Obstetric Care Facility Assessment in Seven Pacific Countries: Federated States of Micronesia, Kiribati, Samoa, Solomon Islands, Tonga, Tuvalu & Vanuatu*. Suva, Fiji: United Nations Population Fund Pacific Sub Regional Office.