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Patient-Reported Barriers to Accessing Surgical Care in Northern Vanuatu

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Abstract

Background The Lancet Commission on Global Surgery proposed that population access to essential surgical care within 2 h is a core indicator of health system preparedness. Little evidence exists to characterise access to surgical care for island nations, including Vanuatu, a lower middle-income country in the Western Pacific.

Methods A descriptive, facility-based, survey of surgical inpatients was undertaken over a 6-month period at Northern Provincial Hospital (NPH), Espiritu Santo, Vanuatu. This evaluated demographics, access to surgical care using the 'three delays' framework and clinical outcomes.

Results A total of 121 participants were surveyed (60% of all surgical admissions), of which 31% required emergency surgery. Only 20% of emergency surgical cases accessed care within 2 h. There were no emergency cases from Torba or Malekula. The first delay (delay in seeking care) had the biggest impact on timely access. There was a geographic gradient to access, gender preponderance (males), and a delay in seeking surgical care due to a preference for traditional healers.

Conclusion There is urgent need to improve access to surgical care in Vanuatu, particularly for Torba and Malekula catchments. Demographic, geographic, sociocultural, and economic factors impact on timely access to surgical care within the northern regions of Vanuatu and support the notion that addressing access barriers is more complex than ensuring the availability of surgical resources. Future priorities should include efforts to reduce the first delay, address the role of traditional medicine, and review the geographic disparities in access.

Background

The Lancet Commission on Global Surgery concluded that 'surgical services in lower middle-income countries (LMICs) are affordable, save lives, and promote economic growth' [1]. Despite this, an estimated 5 billion people are

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without adequate access to surgery [2]. There is great utility in focusing resources and policy initiatives on strengthening surgical care; surgically avertable deaths constitute an estimated 6–7% of all avertable deaths in LMICs, or approximately 1.5 million lives per year [3].

Improving access to surgical care is a crucial step in the global challenge to reduce the burden of surgical disease. Adequate access to surgery has been defined as being within 2 h of a facility that has the capacity to emergently provide three 'Bellwether procedures' (laparotomy, caesarean section, and treatment of an open fracture) safely and without fear of facing catastrophic health expenditure as a result of requiring care. These three Bellwether procedures have been shown to be proxy indicators of wider surgical capacity for essential interventions at healthcare facilities [1].

Three critical points of delay have been identified for patients requiring access to care: the 'first delay', the delay in deciding to seek care after symptoms arise; the 'second delay', the delay in reaching a facility with essential surgical capacity once the decision to seek care has been made; and the 'third delay', the delay in receiving care after arriving at such a facility [2, 4]. Patients also face both direct and indirect costs as they seek care, with an estimated 81 million people facing catastrophic health expenditure each year due to accessing surgical/anaesthetic care [5].

Although there has been a surge in Global Surgery research in recent years, there has been little focus on the Western Pacific region. Vanuatu is a Western Pacific LMIC with a population of approximately 250,000. An estimated 75% of this population lives rurally, spread across 83 separate islands, with an estimated population density of 19 people/km^2 [6]. The population is young with a median age of 20.5 years, and 39% are under 15 years of age [7].

A recent mixed-methods assessment of provider's perceptions of surgical capacity in Vanuatu suggested that an interplay of geography, culture, and indirect costs hinder the population's access to surgical care [8]. Unfortunately, there is a limited understanding of these barriers from a population perspective owing to a lack of data, although a desire for such information has been clearly articulated by local clinicians [8]. With this in mind, this study aimed to provide an initial characterisation of the demographic, socioeconomic, and associated barriers to accessing surgical care for patients who received surgical care in northern Vanuatu.

Methodology

A descriptive, facility-based, survey methodology was undertaken over a 6-month period (28 March–28 September 2016) at Northern Provincial Hospital (NPH), Espiritu Santo, Vanuatu.

NPH provides secondary care for an estimated 100,000 people within the northern islands of Vanuatu. NPH is staffed with one Ni-Vanuatu general surgeon, one Chinese governmental aid surgeon, and intermittent visiting international specialist surgeons. Anaesthetic services for NPH are predominantly nurse specialist led. Operating theatre staff are on call and available onsite (if not already) within 20 min at all times. Post-operative mortality (POMR) at discharge, recently reported as 0.28% for Vanuatu nationally, suggests surgical safety is in line with other LMIC Pacific island countries and resembles close high-income neighbours New Zealand (0.43%) and Australia (0.19%) [9]. NPH was selected as the site for this study as it is one of the two hospitals in Vanuatu that can undertake all three bellwether procedures and the only hospital to do so that serves the Northern Vanuatu population [8].

A survey was administered by Ni-Vanuatu doctors and offered to NPH inpatients during the study period whose primary clinician is a consultant surgeon or who required a surgical procedure. Exclusion criteria were patients who were too sick to offer consent of participation or provide reliable answers to the survey, as by the discretion of the surgeon; paediatric populations (<16 years of age) with no guardian to provide consent; patients who did not speak a dialect spoken by the investigator (English, Bislama, French, or Spanish); patients under obstetrics and gynaecology (due to logistical constraints); or patients who were not recruited within 72 h of hospital admission.

Data points for the survey included the patient's place of residence, use of traditional medicine, direct/indirect cost of accessing care, mode/s of transport used to travel to hospital, referral pathway to surgical care, and quantification, in hours, of the 'three delays' to care. Upon discharge, the length of hospital admission, surgical interventions undertaken, complications, final diagnosis, and outcome were recorded by the attending doctor.

A local pilot survey was undertaken prior to the study commencing. NPH doctors undertaking data collection completed an initial week-long period of observation to improve consistency in survey administration. To overcome the multiple languages and dialects of the catchment population at NPH, the survey was verbally administered with answers translated and recorded by the doctor in English. The full survey is available as Appendix 1 (Electronic Supplementary Material).

Ethical approval was provided by the University of Auckland Human Participants Ethics Committee and the Vanuatu Ministry of Health. All recruited patients gave informed written consent to participate. Clinical care was not influenced by their choice to participate or not.

Surveys remained anonymous and were securely stored immediately after completion in a locked NPH office. Data were collated using Microsoft Excel, and descriptive analysis was undertaken. Recruitment rate was assessed by cross-referencing completed surveys against the surgical and paediatric ward log books, which record all surgical admissions.

Results

A total of 121 surveys were completed during the 6-month study period. A total of 203 surgical inpatients were admitted during this time based on ward logbooks, to give a 60% response rate.

Demographic determinants

Almost all survey participants were indigenous Ni-Vanuatu, and 47 (39%) were aged below 18 years of age—Table 1. Most participants recorded travelling and/or staying at hospital with multiple family members, with 33 (27%) participants listing 3 or more family travelling/staying with the patient.

There was a 2:1 preponderance of male to female patients. There was no evidence that females had greater temporal and/or financial barriers to accessing surgical care—Supplement 1.

Education beyond pre-primary school correlated with more timely access to care, mostly precipitated by a reduced first delay in seeking care. For participants living on islands other than Santo, where NPH is situated, basic wealth indicators such as access to electricity, water, concrete housing, and earning a wage were associated with more timely access to care; however, these indicators of wealth did not appear to greatly reduce timely access to care for participants already on Santo Island—Supplement 2.

Access determinants

Thirty-one per cent ($n = 38$) of participants received emergency operative care, 41% ($n = 49$) received elective operative care, and 26% ($n = 32$) received non-operative care. Access delays are reported based on these three different types of care. The first delay (delay in seeking care) had a median reported time of 65 h (IQR 164 h) for emergency cases—Supplement 3. A marked variation in the first delay, as suggested by a large interquartile range, was appreciated for both emergency and elective/non-operative participants. Both the second delay (delay in reaching care) and third delay (delay in receiving care) had a median time of approximately 1 h for emergency operative cases (with an IQR of 1.7 and 1.5, respectively). There did not appear to be appreciable differences in the second or third delays between elective and emergency operative cases. Only 20% of emergency operative cases reached surgical care within the Lancet Commission's recommended timeframe of 2 h from the onset of symptoms recognised by a lay person.

Sixty-six participants (54%) reported financial hardship (either needing to borrow/sell items [$n = 26$], facing subjective significant financial loss [$n = 66$], or both) as a direct result of seeking surgical care.

Table 1 Demographic and socioeconomic indicators of the study population

	Respondents (%)
Age (years)	
0–5	15 (12)
6–18	32 (26)
19–65	63 (52)
>65	10 (8)
No response	1 (1)
Ethnicity	
Ni-Vanuatu	117 (97)
Other	4 (3)
Gender	
Male	81 (67)
Female	40 (33)
Education	
None	18 (15)
Pre-primary	6 (5)
Primary	51 (42)
Secondary	38 (31)
Tertiary	8 (7)
Wealth indicators	
Receive a wage	26 (21)
House built with concrete	95 (79)
Access to piped water	
Always	57 (47)
Sometimes	16 (13)
Never	48 (40)
Access to electricity	
Always	56 (46)
Sometimes	11 (9)
Never	54 (45)

Forty-five participants (37%) reported accessing traditional medicine or healers before arriving to hospital with similar rates for both emergency (16 participants; 42%) and elective cases (16 participants; 32%)—Supplement 4. For emergency cases who did access traditional medicine or healers, the first delay was markedly extended with a total first delay time of 132 h (IQR 297) compared with 26.6 h (IQR 95.6) for those who did not. This disparity in the first delay was also evident with the elective and non-operative cases.

Forty-six participants (38%) accessed primary care (including nurse-led health centres [$n = 29$], pharmacies [$n = 1$], private doctors [$n = 9$], village volunteer health workers [$n = 10$], or a combination of these) before seeking or being referred on for hospital treatment.

Geographic determinants

Figure 1 provides a map of the NPH catchment, including the number of recruited participants relative to the estimated catchment population of each province. There were no emergency cases admitted from the northern islands (Torba province) or Malekula Island during the six-month study period despite the fact this represents an estimated 33,000 catchment population between these two areas. Eighty-four participants (69%) were from the local urban area of Lugannville or the greater Santo Island which comprises only 40% (approx. 39,600 people) of the hospital catchment population [10]. Participants who had to traverse the ocean (i.e. accessing care from islands other than Santo) demonstrated a small increase in the second delay compared to those who did not; however, this difference was small relative to the comparatively augmented first delay—Table 2. Delay times for each island can be found in Supplement 5.

Surgical care received

The provision of care was divided between emergency ($n = 38$), elective ($n = 49$), and non-operative cases ($n = 32$), with 72% of participants undergoing operative management. Trauma was the leading cause for emergency presentations (23 male participants and 9 female participants).

Supplement 6 demonstrates the length of stay, and indicates that emergency cases had longer admissions, with most cases staying for between 3 to 7 days.

There were 8 recorded complications, and all of these were in patients undergoing emergency procedures. These included surgical site infection ($n = 4$), metabolic disturbance in the post-operative period ($n = 1$), therapeutic failure ($n = 2$; both were suboptimal alignment of a fracture post an attempt at reduction in theatre), and an unexpected return to theatre ($n = 1$; a case of diabetic foot sepsis requiring further debridement for source control). There was one additional participant where the surgeon documented uncertainty as to whether an adverse outcome was a complication or the progression of underlying disease. There was 1 referral overseas for further (tertiary orthopaedic) care, and 3 referrals to Port Vila Central hospital (two complex orthopaedic cases and one malignant mass; all referred seeking a senior surgical opinion). There was 1 death due to sepsis from an infected pressure sore. Although other participants were likely discharged with palliative intent, the number of these discharges was not recorded. All other participants were discharged home.

Discussion

This study characterised the demography and access barriers for patients seeking surgical care in the northern islands of Vanuatu. Our findings demonstrate a young surgical inpatient population reflective of the young Ni-Vanuatu population, with a 2:1 preponderance of males receiving surgical care (both emergency and elective), as well as a geographic access gradient and a significant first delay in accessing care, particularly for those on the outer islands. Our findings also suggest that a preference for traditional medicine and significant financial barriers may be key components contributing to this significant first delay. These findings will help shape future research priorities and policy development to improve access to surgical care for the Northern region of Vanuatu.

The inpatient gender disparity is not due to recruitment bias, as it persists in the ward logbook for all admitted patients. This study was not designed to identify the basis for this finding. Without robust data on the burden of surgical diseases among the catchment population, it is not possible to determine whether this represents differential burden of disease, access to care, or both. There are however well-documented inequities in the power dynamics, distribution of resources, entitlements, norms, and values that disadvantage women's autonomy to access health services, particularly within LMICs [11]. Within Vanuatu, similar gender disparities have been identified—including limited representation in leadership positions, increased experience of gender-based violence, and reduced economic opportunities [12]. Further study regarding disease burden and access to health services for women in Vanuatu is needed.

Of those patients who can access surgical care, the population represented in this study, the first delay is the largest barrier to timely access. Previous qualitative research in Vanuatu suggests the determinants of the first delay are likely multifactorial involving a complex

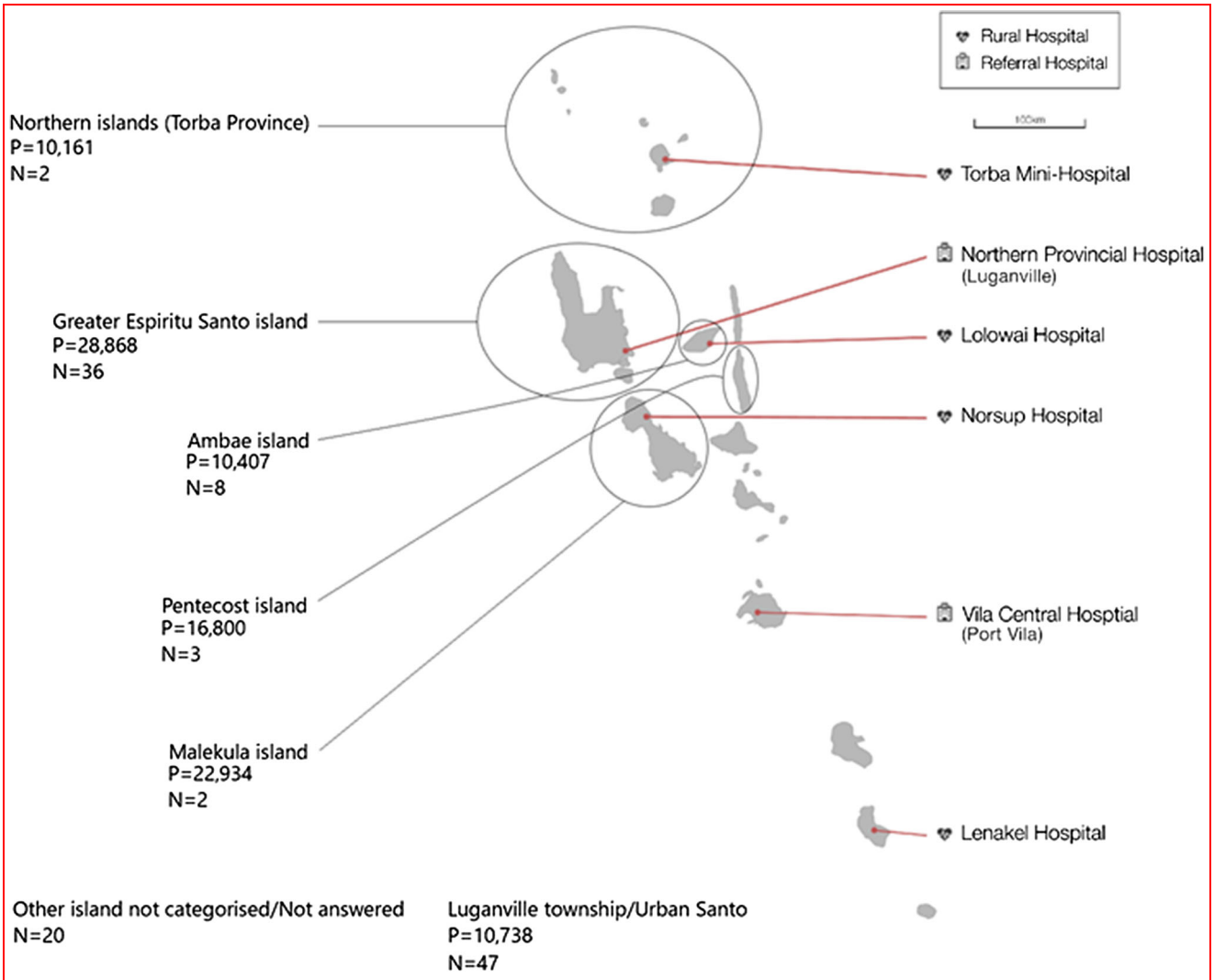

Fig. 1 Map of Vanuatu showing public healthcare facilities, the division of participant catchment areas, and the respective populations (*P*)/number of recruited participants (*N*)

interplay of at least health literacy, traditional medicine, and financial factors [8]. The latter two factors were identified in the present study, where financial hardship and access to traditional medicine were reported by a proportion of the participants. As surgical services are publicly funded within NPH, it is likely that the financial hardship is the result of transportation costs and accumulated indirect costs resulting from accessing surgical care.

There are two aspects of the first delay that warrant further exploration. The first is that of those who required emergency surgery, but first sought traditional medicine or healers; the median first delay was 57 h longer than those who did not utilise traditional medicine. Traditional, or locally described 'kastom', medicine within Vanuatu is widely variable by island but includes the use of ingested/topically applied local plants, customary rituals, massage, or bone setting [13]. Due to the small sample size, it was not possible to fully characterise the group of patients who sought traditional medicine or healers according to other demographics, and it was not possible to quantify the clinical impact of the associated delay. Future research should concentrate on understanding this significant contributor to the first delay in accessing surgical care in Vanuatu, and in other contexts where traditional medicine is routinely used. Qualitative evidence suggests traditional healers may be receptive to collaborating with national health services in Vanuatu [13]. An intervention to educate and empower traditional healers to participate in the continuum of care in their communities could be explored as a next step, aiming to aid in the early diagnosis of common emergency surgical pathologies and to seek their help in ensuring timely access to surgical care.

Table 2 Three delays to accessing surgical care for Santo Island and all other islands for the NPH catchment area

	Emergency	Elective	Non-operative	Not answered
Santo Island				
N	28	32	22	2
Median first delay in hours (IQR)	30 (166)	168 (1451)	11.5 (110)	–
Median second delay in hours (IQR)	0.5 (0.8)	0.5 (0.8)	0.6 (1.3)	–
Third delay in hours (IQR)	0.8 (0.8)	1 (2.1)	1.8 (1.5)	–
Total delay in hours (IQR)	10.6 (114)	6.7 (433)	14.7 (108)	–
All other islands				
N	5	15	7	–
Median first delay in hours (IQR)	168 (240)	252 (3045)	336 (418)	–
Median second delay in hours (IQR)	2 (1.5)	4 (3)	3 (2.1)	–
Third delay in hours (IQR)	2 (2)	1 (1.8)	1.5 (2.9)	–
Total delay in hours (IQR)	175 (242)	129 (2770)	341 (422)	–
Not answered				
N	5	2	3	–

Similar endeavours utilising traditional birth attendants, in lieu of available skilled birth attendants, have demonstrated success in other LMIC communities [14]. There may be scope to learn from these previous experiences in maternal health when attempting to implement such collaborative interventions for rural Vanuatu.

Second was the disparity in the first delay faced by emergency cases between Santo and all other NPH catchment islands. There is a much larger median first delay for the cohort of emergency cases from islands outside of Santo compared to those from only Santo Island (168 h and 30 h, respectively). This is despite the median second delay—or specifically the delay resulting from travel across water—being only modestly longer comparatively between the two groups (0.5 and 2 h, respectively). This suggests that although participants from other islands had reasonable methods to access care, other sociocultural and/or financial factors may significantly delay seeking care. The augmented first delay might be partially explained by a relatively larger socioeconomic opportunity cost facing those who must travel between islands to seek surgical care. Alternatively, this may reflect the unpredictability of inter-island transport as most patients likely must wait for ships to pass through and ferry them ad hoc to NPH. This disparity extends to differences in overall access to emergency care, with a lower proportion of emergency cases being from islands other than Santo, despite these islands having a higher proportion of the NPH catchment population.

There is a clear geographic access gradient across all participants from urban Lugannville (participant per estimated population ratio of 1:228), greater Santo (1:801), and other islands (1:2222). There is also a notable absence of participants from Torba province (the islands north of Santo) and Malekula islands for emergency cases. Torba and Malekula's combined population is approximately 30,000 [10]. Based on this population and a similar burden of disease, the estimate would be an extra 46 cases. That these patients did not access surgical care is a grave concern. The reasons for this will be multifactorial and warrant further study. A population-based methodology to characterise and investigate the underlying reasons why Ni-Vanuatu people in these areas do not, or cannot, access surgical care would be a useful next step in this regard.

This study provided a descriptive analysis of the barriers to accessing surgical care among surgical inpatients. The complex geocultural reality of Northern Vanuatu precludes these findings from being generalised beyond this unique context. Furthermore, the barriers facing those who could not successfully access surgical care were not investigated in this study. The recruitment rate of 60% may indicate that those included are not completely representative of all surgical admissions, and particularly may under-represent emergency presentations. Informal discussion between clinicians and investigators suggested the reasons included the severity of initial presentation, as well as issues around consent or language, and patient self-discharge.

Conclusion

This study describes the demographic, geographic, sociocultural, and economic factors impacting timely access to surgical care within the northern regions of Vanuatu among inpatients who received surgical care. This study lays a foundation from which to further elucidate gender,

sociocultural, and geographical disparities and provides an impetus to characterise the causes behind the first—and largest—delay to accessing surgical care, the decision to seek care. Lastly, this study confirms there is an urgent need to improve access within the catchment population.

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Compliance with ethical standards

Conflict of interest None.

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