



A Household Survey to Evaluate Access to Surgical Care in Vanuatu

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Abstract

Introduction Surgical care is an integral part of any healthcare system, yet there is a paucity of data on the burden of surgical disease, surgical capacity and access to surgical services in the Pacific region. This study aimed to evaluate access to surgical care through a pilot household survey in the Vanuatu island of Efate and five of its surrounding islands.

Methods The 2009 Vanuatu census' GPS coordinates were used to randomly select 150 rural and 150 urban households from Efate and its surrounding islands. A total of 143 urban households and 142 rural households were available for inclusion in this study. A household questionnaire was developed to evaluate access to surgical care and included information regarding household demographics, socio-economic indicators and perceived and realised barriers to accessing care. The questionnaire was administered by local health workers, and data were collected electronically.

Results Questionnaires were completed by 285 households. Two hundred and forty-one out of 254 (94.8%) households reported being able to access Port Vila Hospital, if required. The most commonly cited potential barriers to accessing surgical care were financial constraints (42.4%) and transport (26.4%).

Conclusion Our results provide important insights into the geographic, sociocultural and economic barriers to seeking, reaching and receiving surgical care in this region of Vanuatu. Identifying specific areas and communities with poor access to care, alongside the determinants of access, will help in designing both clinical and policy interventions to improve access to surgical care.

Introduction

Vanuatu is an archipelago of 83 separate islands in the southwest of the Western Pacific region. It is ranked 141st among 189 countries on the United Nations Development Program (UNDP) Human Development Index [1] and has a population of about 270,000 with 75% living in rural areas [2]. The country has a severe health workforce crisis with a physician density of 0.2 physicians per 1000 population [3, 4]. Surgical care requiring general anaesthesia is delivered at two hospitals: Villa Central Hospital (VCH) in Efate and Northern District Hospital in Espirito Santo, meaning a large proportion of the population must travel by

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boat to reach the nearest government-provided health facility.

A recent facility-based study conducted in Vanuatu identified that the key challenges facing surgical services were management and human resource issues and a shortage of surgical infrastructure. Barriers to access included geographic isolation, poverty, the use of traditional medicine and poor health literacy [5].

This study set about to better understand the potential and realised access to surgical care in Vanuatu by employing a household survey. It aimed to further explore the impact of geographic, socio-economic and cultural factors on barriers to seeking, reaching and receiving surgical care from a healthcare user perspective.

Methods

Study design

The study was undertaken in Efate and its outer islands of Lelepa, Moso, Pele, Emau and Nguna (Fig. 1). Vila Central Hospital (VCH) is the sole provider of surgical care to Efate and its surrounding islands.

GPS location information on households was drawn from the Vanuatu Census 2009 [6]. Households were divided into urban and rural strata before being randomly selected for inclusion using a random number generator. The sample size was based on a confidence interval of 90%

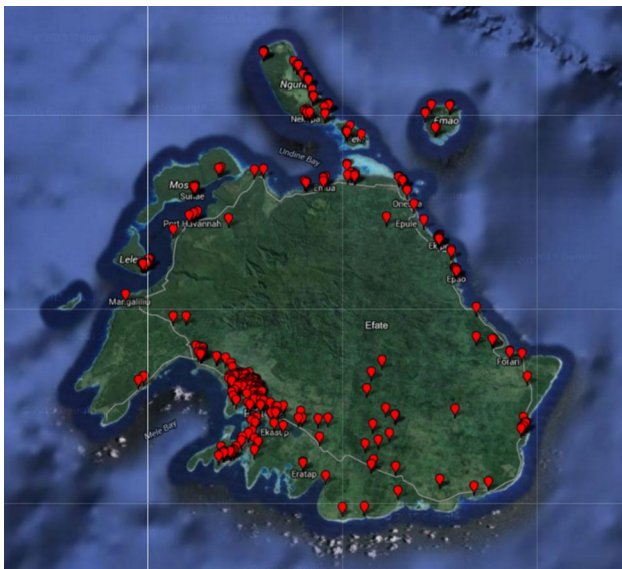


Fig. 1 Map of households on Efate and surrounding islands. Red markers on the map of Efate indicate sampled households. Created on GPS Visualizer using Google Maps as a base layer (version 1.0, Adam Schneider, Portland, USA)

and an estimated response rate of 75%, rounded up to 150 households per strata.

Development of the questionnaire

A questionnaire was developed following a systematic review and discussions with experts using a modified Delphi approach. The ‘Three Delays Framework’ was used to structure the questionnaire and analyse responses [7]. The questionnaire was divided into three sections: demographic information, potential and realised access. Potential access involved questions regarding a households’ ability to access surgical care. Realised access involved questions directed at those who had sought surgical care in the last 5 years. The questionnaire had 40 constructs in total: eight demographic, 17 on potential and 15 on realised access. The questionnaire was translated into Bislama by local healthcare workers, with cross-checks performed by one of our senior authors (BL).

Implementing the survey

The survey was conducted over June and July of 2016. Eight junior doctors and two intern nurses fluent in both English and Bislama were employed over 23 days to complete data collection.

Selected households were found with electronic tablets using GPS coordinates. If no one was available or if they did not agree to partake, an adjacent house was randomly selected. This process continued until a household consented to partake or until all adjacent households were exhausted, at which point the GPS coordinate was counted as a non-response. A standardised enrolment script was read, describing the purpose of the study and the requirements of the participants.

Responses were recorded using tablets and a mobile data collection package (KoBoToolbox version 1.0, Harvard Humanitarian Initiative, Cambridge, USA). They were anonymised and uploaded securely to the KoBoToolbox cloud. At the end of the data-collection period, the data were extracted to a digital spreadsheet. Prior to analysis, responses were translated into English by the interviewers.

Analysis

Summary statistics were analysed using Stata 11 with *t*-test and Chi-squared tests. Logistic and linear regression was used to test the significance of variables. Where rural and urban data were combined to provide an overall proportion or average, calculations were weighted based on rural and urban population density. Overall averages and proportions were only calculated when there was no significant difference between urban and rural households.

Ethics

Approval was obtained from the University of Auckland Ethics Committee and from the Vanuatu Ministry of Health. A Bislama patient information and consent form was signed by all participants prior to inclusion in this study.

Results

A total of 143 urban and 142 rural households (95%) were interviewed (Table 1).

Delays in seeking care

Potential access

The most frequently reported barriers to seeking care were financial constraints ($n = 28$, 30.1%), transport-related barriers ($n = 13$, 23.0%) and a preference for traditional medicine ($n = 20$, 21.5%). Overall, rural households were

more likely to report barriers to seeking care (urban $n = 25$, 17.5% vs. rural $n = 46$ 32.4%; $p < 0.01$ univariate).

A lack of trust in VCH to provide quality surgical care was more likely to be reported by urban households: 40 urban households (28.0%) compared to 24 rural households (16.9%; $p = 0.03$ univariate). Among all respondents that reported a lack of trust in VCH, the three most commonly reported reasons were poor-quality staff ($n = 47$, 74.5%), delays in treatment ($n = 26$, 40.2%) and under-resourced facilities (urban $n = 15$, 37.5% vs. rural $n = 3$, 12.5%; $p = 0.03$ univariate).

Fear of surgery was reported by 76 urban households (53.5%) and 76 rural households (53.2%) as a barrier to accessing surgical care when needed. The three most common reasons overall for fearing surgery were complications or death from the operation ($n = 77$, 50.2%), a fear of being cut ($n = 39$, 21.2%) and a lack of trust in the providers ($n = 21$, 16.3%).

The lack of availability of a support person to accompany sick household members to the hospital was reported to be a barrier to seeking care by 7 rural households (4.9%) and 4 urban households (2.8%; $p = 0.29$ univariate).

Table 1 Demographic information

Demographic variables	Urban ($n = 143$)	Rural ($n = 142$)	Significance (p value)
<i>Reasons for household exclusion</i>			
Transport difficulty	0	3	
Household GPS mismatch	1	3	
Lack of available participants	0	7	
Refusal to participate after starting the survey	1	0	
<i>Household size, mean</i>	5.57	5.31	0.37
<i>Proportion female, mean</i>	0.499	0.479	0.37
<i>Age, mean</i>	29.33	28.58	0.77
<i>Education level (%)</i>			
None	1 (0.7)	0 (0)	0.71
Pre-primary	0 (0)	2 (1.4)	<0.01
Primary	21 (14.0)	56 (39.4)	<0.01
Secondary	72 (50.4)	73 (51.4)	0.86
Tertiary	50 (35.0)	11 (7.8)	<0.01
<i>Language spoken (%)</i>			
Bislama	139 (97.2)	142 (100)	0.42
English	117 (81.8)	105 (73.9)	0.11
French	54 (37.1)	35 (24.7)	0.02
<i>Occupation (%)</i>			
Work for salary	102 (72.0)	52 (36.6)	< 0.01
Work to plant and sell food	7 (4.9)	73 (51.4)	< 0.01
Does not work	29 (20.3)	14 (11.3)	0.04
Work without pay	4 (2.8)	1 (0.7)	0.18

Realised access

Fifty-five urban households (38.2%) and 46 rural households (32.4%) had sought care at VCH. Households reported seeking care for a wide variety of surgical conditions, the most common of which were trauma ($n = 20$, 19.8%), acute abdomen ($n = 14$, 13.9%) and obstetric and gynaecological conditions ($n = 13$, 12.9%). On average, the delay between recognition of symptoms and the decision to seek care was 65 days in urban households (0–1825 days) and 37 days in rural households (0–1440 days).

Twenty-six households (26.7%) had seen a traditional healer either prior to seeking care from VCH or as their only source of care. Further delays in seeking care included 59 households (56.9%) that had a responsibility they had to forgo to seek care and 9 households (11.7%) that reported lost income due to seeking care.

Delays in reaching care

Potential access

All households reported the need to use some form of motorised transport to get to VCH. The projected median overall time taken to wait for transport and to travel to VCH was 90 min for rural households (IQR 60–150 min) compared to 20 min for urban households (IQR 13–40 min). One hundred and thirty-eight urban households (96.5%) projected taking less than or equal to two hours to get to VCH compared with 86 rural households (60.6%; $p < 0.01$ univariate).

The cost of transport was projected to be greater for rural households with a median cost of 500 VT (IQR 500–6000 VT) (\$4.30–\$52 USD), compared to urban households with a median cost of 150VT (IQR 150–500) (\$1.30–\$4.30 USD). Rural households were also less likely to be able to afford the projected cost of transport with 35 rural households (24.6%) reporting that they would not be able to afford to pay for transport to VCH at the time of the interview compared with just 3 urban households (2.1%; $p < 0.01$ univariate).

Realised access

Of those households that had sought care from VCH ($n = 96$), median overall time taken to wait for transport and to travel to VCH was 60 min for rural households (IQR 30–145 min) compared to 13.5 min for urban households (IQR 13.5–35 min). Forty-nine urban households (98.0%) reported taking less than or equal to two hours to get to VCH compared to 31 rural households (67.4%; $p < 0.01$ univariate).

Similarly, the cost of transport was greater for rural households with a median cost of 1750 VT (IQR 150–4500 VT) (\$15, \$4.30–\$39 USD), compared to urban households with a median cost of 150VT (IQR 0–350) (\$4.30, \$0–\$3.00 USD). Rural households were also less likely to be able to afford transport with 9 rural households (19.6%) reporting that they could not afford to pay for transport to VCH at the time of accessing care compared to just two urban households (4.0%; $p = 0.01$ univariate).

Delays in receiving care

Realised access

For those who sought care ($n = 9$), the median overall wait time after arriving at the hospital before being seen by a doctor was 60 min (IQR 0–90 min) and the median overall cost for care was 300VT (IQR 200VT–500VT) (\$2.60, \$1.70–\$4.30 USD). Eighty-five households (91.4%) reported they were able to afford the cost of care and there was no significant difference between urban and rural ($p = 0.30$ univariate).

Overall access

Potential access

Most households, 241 out of 254 (94.8%), believed they could access surgical care if needed, including 96 households that had previously accessed some form of hospital level care at VCH, despite recognising several different barriers in doing so. Only five urban (3.5%) and eight rural (5.6%) households reported they believed the barriers faced would prevent them from accessing surgical care if needed ($p = 0.54$ univariate). The 17 perceived barriers and 12 enabling factors to accessing care are presented in Table 2.

Realised access

When examining barriers to access, among those households that sought surgical care in the last five years ($n = 101$) 38 households (38.1%) reported they had faced no barriers to reaching care (Table 3).

Choice of surgical care provider

When unwell, households preferentially sought care from either VCH (213, 74%), a local clinic (59, 20.7%), private doctor (8, 2.8%), traditional healer (3, 1.1%) or internationally (2, 0.7%).

Households were more likely to choose to go to VCH if they trusted the hospital, if transport was available or if they could afford transport. Households that lacked trust in

Table 2 Potential barriers and enablers to access of surgical care

Barrier	Urban (%)	Rural (%)	Significance (<i>p</i> value)
Financial constraints	61 (42.7)	82 (57.8)	0.01
Transport	38 (27.3)	58 (47.2)	<0.01
Fear	18 (12.7)	10 (7.0)	0.11
Bad weather	2 (1.4)	19 (13.4)	<0.01
Nothing	31 (21.8)	17 (12.0)	0.03
Poor-quality service	14 (9.9)	10 (7.0)	0.40
Distance	3 (2.1)	12 (8.5)	0.02
Communication problems	5 (3.5)	7 (4.9)	0.56
Do not know	2 (1.4)	5 (3.5)	0.25
Family	17 (12.0)	5 (3.5)	0.01
Religion	1 (0.7)	4 (2.8)	0.18
Lack of accommodation	0 (0)	2 (1.4)	<0.01
Personal health condition	3 (2.1)	2 (1.4)	0.65
Lack of support	6 (4.2)	2 (1.4)	0.15
Traditional medicine	7 (4.9)	2 (1.4)	0.09
Other responsibilities	9 (6.3)	1 (0.7)	0.01
Lack of trust in surgical care provider	4 (2.8)	0 (0)	0.42
Enabler	Urban (%)	Rural (%)	Significance (<i>p</i> value)
Good weather	0 (0)	3 (2.1)	<0.01
Free/cheap services	2 (1.4)	0 (0)	0.59
Religion	2 (1.4)	6 (4.2)	0.15
Borrowing money	3 (2.1)	11 (7.8)	0.03
I do not know	3 (2.1)	2 (1.4)	0.66
Nothing	4 (2.8)	4 (2.8)	0.99
Good-quality services	5 (3.5)	17 (12.0)	0.01
Individual characteristics	11 (7.7)	3 (2.1)	0.03
Distance	14 (9.8)	4 (2.8)	0.02
Inappropriate response	16 (11.2)	8 (5.6)	0.09
Ambulance service	30 (21.0)	14 (9.9)	0.01
Communication	35 (24.5)	29 (20.4)	0.41
Family/friends	37 (25.9)	33 (23.2)	0.61
Having money	40 (28.0)	41 (28.9)	0.87
Transport	50 (35.0)	57 (40.1)	0.37

VCH were more likely to seek care from a traditional healer (Table 4).

Discussion

Delays in seeking and reaching care, particularly cost and transport, were the most reported barriers to accessing surgical care consistent with other literature [8, 9]. Cost disproportionately affected those living rurally, likely due to the higher transport costs and lower incomes of rural subsistence farmers. Over a quarter of rural households

reported that they would not be able to afford transport costs to reach VCH if they needed to.

Difficulties with transport also disproportionately affected those living rurally with increased wait and travel times. Furthermore, transport options were unavailable in certain rural areas during times of bad weather adding to the difficulties of expensive and poorly available transport.

Fear of surgery was reported by over half of households yet, when asked if there was anything that made it hard to get surgery, fear was only reported by approximately 10%. Although a significant proportion of households may be afraid to receive surgical care, fear alone may not stop most households from seeking it. This compares with Van

Table 3 Realised barriers to access of surgical care

Barrier	Urban (%)	Rural (%)	Significance (<i>p</i> value)
Nothing	21 (38.2)	17 (37.0)	0.90
Poor-quality service	11 (20.0)	10 (21.7)	0.83
Fear	4 (7.3)	6 (13.0)	0.34
Personal health condition	6 (10.9)	6 (13.0)	0.74
Transport	3 (5.5)	4 (8.7)	0.53
Inappropriate response	5 (9.1)	4 (8.7)	0.95
Financial constraints	6 (10.9)	4 (8.7)	0.71
Traditional medicine	1 (1.8)	2 (4.4)	0.46
Bad weather	0 (0)	1 (2.2)	<0.01
Communication problems	0 (0)	1 (2.2)	<0.01
Other responsibilities	1 (1.8)	1 (2.2)	0.90
Do not know	1 (1.8)	0 (0)	0.72
Family	1 (1.8)	0 (0)	0.72
Lack of support	1 (1.8)	0 (0)	0.72
Past bad experience	1 (1.8)	0 (0)	0.72

Table 4 Multivariate analysis of factors influencing choice of provider

	Odds	Significance (<i>p</i> value)
<i>Factors influencing VCH as first choice of provider (accounting for area, household composition and occupation)</i>		
Trust	2.45	0.01
Fear	0.89	0.66
Support	1.59	0.95
Travel time	2.49	0.35
Cost of transport	2.49	<0.01
Ability to pay for transport	4.53	<0.01
<i>Factors influencing traditional healer as first choice of provider (accounting for area, household composition and occupation)</i>		
Trust	0.04	0.04
Fear	0.30	0.38
Support	0.07	0.07
Travel time	1	0.28
Cost of transport	1	0.61
Ability to pay for transport	0.05	0.06

Loenhout et al. who found that 16% of people surveyed in Nepal did not receive surgical care due to fear or a lack of trust [10]. Similarly, the systematic review by Grimes et al. found between 9.2% and 33% of people reported fear as a barrier to surgical care [8].

Fear of surgery was primarily driven by the risk of complications and death during the operation [11]. Compared to other medical specialties, fear is a unique barrier for accessing surgical care, and often also has sociocultural aspects regarding being cut, disfigured or having body parts removed [8]. This highlights the importance of conducting

studies looking at barriers to accessing surgical care, as general healthcare access studies may neglect these types of unique surgical barriers [12].

There is limited understanding of the prevalence of traditional medicine in the Western Pacific Region although it is reported to be used by 53% and 54% of the population in Singapore and Vietnam, respectively [13]. In our study, the choice of a traditional healer as the preferential care provider when very unwell was only reported by three households (1.1%). Despite this, over 20% of households reported that the use of traditional medicine

was a potential barrier to seeking care and over a quarter who sought care from VCH had first sought care from a traditional medicine healer. Traditional medicine usage is likely to be higher in a nationwide survey of Vanuatu due to lower health literacy, less influence from Western culture and medicine, and the increased use of alternatives in more rural areas.

Our study is limited by a reliance on households to subjectively report barriers to surgical care, potentially leading to self-reporting biases and errors in households perceiving scenarios that may be difficult to imagine. The proximity of this study population to VCH makes nationwide extrapolation of the data unreliable with nationwide results likely to show greater barriers and much poorer access.

This study does, however, identify two broad targets for intervention: the delays in seeking and reaching care. In particular, the focus should be on improving costs and access to transportation, improving trust and reducing fear of surgery.

Educational and support outreach programmes may be part of the solution to improving household care seeking behaviours. Such interventions have been undertaken elsewhere, such as in Nigeria, where information presented in a positive light resulted in improved uptake of surgical services [14]. More locally, knowledge can be gained from malaria elimination efforts already undertaken in Vanuatu. They found that providing education in isolation is not enough to improve health seeking behaviours, especially in low-socio-economic communities [15–17]. To achieve the most effective behaviour changes in Vanuatu, community participation and key stakeholder ownership must be integrated into interventions. This reduces the power gaps between the population and the health systems, improving individual care seeking behaviours [18].

Delays in reaching care could be reduced by improving transport options and associated transport costs. One approach is to bring the surgical theatre to the patient through mobile surgical clinics, something shown to improve access while maintaining equity and fiscal viability [19, 20]. By using a decentralised selection process, these mobile surgical clinics could help overcome care seeking barriers and target poor and underserved populations [21]. Transport subsidies and the offer of free transport have successfully improved access to antenatal care and cataract surgery in other LMICs [22, 23] and have the potential to improve access to surgical care in Vanuatu as well.

Conclusion

This study begins to elucidate the barriers of access to surgical care in Vanuatu. Despite the high rates of perceived access, pre-hospital barriers such as high costs and poor transport availability may lead to delays in surgical treatment. This knowledge can assist policy makers in developing targeted interventions that aim to improve access to surgical care. A Vanuatu-wide survey would further help understand this nation's challenges of surgical access.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest. Necessary travel costs, administration, and salary costs for investigators were met by the University of Auckland Department of Surgery and the Vanuatu Ministry of Health.

Informed consent Informed consent was obtained from all individual participants included in the study.

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