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A closer look at amputees in Vietnam: a field survey of Vietnamese using prostheses

S. L. MATSEN

Prosthetics Outreach Foundation, Seattle, USA

Abstract

This study aims to improve the quality and effectiveness of follow-up data on prosthetics in developing countries. In order to bridge the gap between members of non-governmental organizations and their international patients, a field survey was conducted via direct interviews in Vietnam. Eighty-three (83) patients in 5 different geographic regions were interviewed using a standardized assessment tool designed by the author. Demographic information, questions of prosthetic history, inquiries into function, lifestyle and occupation, and queries of social and family integration were asked of each patient.

While the overall results prove salutary for those who serve the amputees of developing countries, it is clear that amputation presents a substantial challenge to the Vietnamese patient. On one hand, respondents wore their prostheses over 12 hours each day on average, rated their prostheses as quite comfortable, and were altogether satisfied with their prosthetic treatment. In addition, the provision of care for Vietnamese with amputations has improved markedly over the past few decades. On the other hand, many patients related the barriers they encountered due to their amputation, including their departure from previous careers, inability to perform rigorous physical activities, and difficulties with social interactions. Furthermore, discrepancies in care were noted between demographic groups and amongst different regions.

The questionnaire developed for this study may provide a useful evaluative tool for agencies working throughout the developing world. The use of such a standardized questionnarie could greatly improve the evaluation and comparison of prosthetic programmes and help guide the efforts of such organizations in developing countries.

All correspondence to be addressed to The Prosthetics Outreach Foundation, 726 Broadway, Suite 306, Seattle, WA 98122-4311, USA.

Introduction

As Western agencies look to assist the prosthetic efforts of developing nations, a number of impediments persist. The prolonged international debate on "appropriate technology", sustainability and durability continues as various organisations attempt to serve the underserved. While numerous theories are championed, an undeniable fact prevails: most organisations do not have quality data on the services they provide for their most remote and alienated patients (Cummings, 1996). Hughes (1996) writes that while "all the agencies are well intentioned.....there is an almost complete failure to evaluate the outcome of their efforts. No matter what technology is used, all countries and agencies involved have to answer the same questions: how to best utilise the resources which can be made available and how to measure the outcome and effectiveness of their programmes?"

More specifically, many authors have called for field studies in the actual living environment of the patients, Staats (1996) writes, "What is often overlooked is the evaluation of results for the amputee in the village, far from the workshops where the limbs are manufactured... This is rarely understood by modern or third world prosthetists until they visit amputees in their living and working situations". Cummings

(1996) refers to the work of P. K. Sethi when he notes that the scientific approach in designing prostheses is "subject to failure if it ignores the lifestyles and cultures of the patients being served". This study evaluates patients served by the Prosthetic Outreach Foundation (POF) by interviewing the subjects directly in their living and working environments.

Vietnam was selected as the research site because of the persisting acute condition of Vietnamese amputees. The number of amputees in Vietnam in 1996 was estimated at 200,000 and increasing by 3-4% per year (Day, 1996). Like many developing countries savaged by wars in the twentieth century, Vietnam continues to suffer the human costs of undetonated landmines. However, mines are not solely responsible for losses of limbs. Road traffic accidents claim an increasing number of victims as the country shifts towards motorized transport. In Hanoi, the number of compound fractures of the lower limb increased 400% between 1990 and 1991. Train accidents, tumors and work-related accidents take their tolls as well. Citizens of Vietnam continue to lose their limbs at an alarming rate. Immediately after the Vietnam War, war victims accounted for 75% of amputees; by 1996, war victims comprised only 46% of the total Vietnamese amputee population (Day, 1996). Through personal interviews, this study helps define the prosthetic needs and the working and social environments of Vietnamese amputees.

Methods

In the weeks between June 1 and July 14, 1997, the author conducted personal interviews with 83 Vietnamese amputees in 5 different locations. Each interview followed a standard questionnaire designed by the author and the members of the POF in Seattle, USA (Appendix 1). Follow-up questions and questions of clarification were added as needed. A member of the Orthopaedic Institute of Rehabilitation Sciences and the Prosthetics Outreach Center served as interpreter in all the interviews. At least two photographs were taken of each patient: one focusing on the prosthetic leg of the patient and one of the entire person (Fig. 1).

Fig. 1. Sample photographic record of a Prosthetics Outreach Foundation patient.

Interviewees were identified by a variety of methods. In Hanoi, members of the POF clinic called patients at their homes to ask if an interview could be conducted. The author then travelled to the home or business of the patient. Six (6) interviews were conducted at the Hanoi Disabled Sports Association, where numerous amputee athletes congregate. In addition, a number of impromptu interviews were arranged when a patient visited the clinic for prosthetic care.

Patients in outlying areas were identified in a different manner. Interviews were conducted in conjunction with POF outreach trips during which the team delivered new legs or adjusted and repaired legs delivered previously. Members of the Hanoi POF clinic called the local government office when planning a trip. These district or sub-district offices of the Ministry of Labor, Invalids and Social Affairs then notified patients by letter that the POF team would be visiting the area. The 4 regions visited outside of Hanoi include: the Quang Tri Province south of the former Demilitarized Zone, the Vinh Phu Province in northwest Vietnam, and the towns of Phu Ly and Bac Giang. Approximate distances from interview sites to major prosthetic centers are provided in Table 1. In interpreting the results of this study, one should bear in mind the differing methods of patient selection on the levels of both prosthetic care and interview arrangement. Notably, a random sampling of patients proved impossible to achieve, given the government preference of care for veterans and other non-identifiable factors.

Results

Table 2 presents the demographics and questionnaire responses for the whole study group as well as for each of the 5 interview sites individually. While satisfaction with prosthetic treatment was found to be high at 87% of those surveyed, functional ability could be improved. The acceptance of the amputee by family, friends and the public scored much higher in Hanoi than in other areas. Table 3 exhibits data regarding the number of prosthetic legs received, occupation, level of amputation and cause of amputation. Figure 2 depicts the relationship between the year of amputation and the delay to the fitting of the prosthesis.

Discussion

The results of this study reveal an encouraging picture of the efforts to serve the amputees of a developing country. Most of the 83 Vietnamese amputees have achieved a degree of functional normality in their lives thanks to their prosthesis. A number of different survey result point towards this conclusion (Table 2). On average, the subjects in this study wore their prostheses 12.7 hours per day, found their prostheses quite comfortable, experienced little pain and did not suffer from pressure sores. They could walk up and down stairs, ride a bicycle, walk 2-3km without resting, and carry a load of 20kg. Furthermore, 87% were satisfied with their prosthetic management.

Despite these promising results, it remains clear that many amputees have experienced disruptions in their working lives (Table 2). Although 83% of the amputees describe themselves as "working", only 49% work outside of their homes, whether farming in the fields, working at a skilled trade, or selling commodities. In the estimation of the author,

Table 1 Distance from interview site to prosthetic center (km)

	Interview site				
Prosthetic Center	Hanoi	Quang Tri	Vinh Phu	Phy Ly	Bac Giang
Prosthetic Outreach Foundation, Hanoi		620	60	35	50
27th July Center Hanoi		620	60	35	50
Ba Vi	50		20		90
Thuan Thanh	40		100		40
Ninh Binh	85		120		120
Tam Diep	100		150		140
Hue		65			
Da Nang		150			

Table 2

Category	Whole group	Hanoi	Quang Tri	Vinh Phu	Phu Ly	Bac Giang
Number of patients	83	21	16	25	7	14
Urban	41%	86%	63%	0%	71%	7%
Rural	59%	14%	38%	100%	29%	93%
Height (cm)	161 ± 10	161	158	162	161	163
Weight (kg)	50 ± 9	54	48	49	48	52
Birth date	1950 ± 13	1951	1947	1952	1948	1950
Male	94%	86%	94%	96%	100%	100%
Date of amputation	1974 ± 10	1973	1973	1975	1973	1975
Married	93%	81%	94%	100%	86%	100%
Amputation year - marriage year[1]	-0.5	-2.6	0.4	0.3	-2.3	1.5
Hours prosthesis worn per day	12.7 ± 3.8	11.0	12.9	13.2	13.0	13.8
Comfort scale (0 low, 3 high)[2]	2.4 ± 1.1	2.6	2.7	2.0	2.1	2.5
Pain scale (0 low, 2 high)[3]	0.61	0.67	0.38	0.64	0.43	0.86
Pressure sores	13%	5%	6%	20%	0%	29%
Assistance device for walking (0 low, 2 high)[4]	1.2 ± 0.9	0.8	0.9	1.6	1.4	1.5
Walk up and down stairs step over step	93%	90%	88%	96%	86%	100%
Able to walk while carrying a load	78%	81%	63%	76%	71%	100%
Average load carried (kg)	20 ± 12	21	13	25	4	19
Distance able to walk without resting (km)	2.3 ± 2.9	3.1	1.9	2.1	2.8	1.8
Able to ride bicycle	87%	81%	81%	96%	57%	100%
Able to run	22%	38%	19%	16%	14%	14%
Participate in sports regularly	48%	76%	44%	28%	29%	57%
Of sports, percent morning exercises	55%	36%	57%	57%	100%	43%
Collect Government pension	78%	76%	31%	92%	100%	100%
Working	83%	62%	94%	84%	57%	86%
Employed outside of house	49%	62%	69%	32%	57%	36%
Work is "same as before"[5]	58%	86%	75%	48%	57%	29%
Work is due to amputation	30%	14%	19%	48%	14%	50%
Work rigor scale (0 low, 2 high)[6]	0.80	0.57	0.63	0.92	0.86	1.07
Change in life after amputation (-1 low, +1 high)	-0.6	-0.4	-0.4	-0.6	-0.9	-0.8
Reaction of family and friends (0 low, 2 high)[7]	1.5 ± 0.7	1.9*	1.6	1.6	1.1	0.9
Reaction of public (0 low, 3 high)[8]	1.9 ± 1	2.43	2.13	2.08	0.86	1.21
Years delay before care	4.7	5.8	8.9	3.0	4.5	1.8
Satisfied with prosthetics treatment	87%	95%	N/A[9]	84%	86%	86%
Total number of legs from a center	5.6[10]	4.9	2.9	10.3	7.0	6.1
Satisfied with surgery	73%	74%	86%	80%	43%	64%
Number of surgeries	1.9	1.8	1.7	1.8	2.6	2.1
Satisfied with real leg	75%	89%	56%	74%	71%	79%
Wear shoes usually	34%	55%	63%	16%	43%	0%
Wear sandals usually	66%	45%	38%	84%	57%	100%

* Score for Hanoi significantly ($p<0.005$) better than for the other sites combined.

[1] This value shows the difference between the year of amputation and the year of marriage. No data are included for those never married.

[2] The patient was asked to evaluate the comfort of his prosthesis. In analysis, a scale of 0 to 3 was used with the following delineations: 3 = very comfortable; 2 = comfortable; 1 = OK; 0 = not at all comfortable.

[3] The patient was asked if he experienced pain in his residual limb. The following scale was used: 2 = yes; 1 = sometimes; 0 = no.

Table 3

Number of Legs[11]	Whole group	Hanoi	Quang Tri	Vinh Phu	Phu Ly	Bac Giang
0 to 1	23%	14%	38%	4%	0%	7%
2 to 3	17%	19%	31%	12%	0%	7%
4 to 6	23%	38%	19%	8%	29%	36%
7 to 10	23%	19%	13%	24%	71%	43%
11 to 24	10%	10%	0%	40%	0%	7%
> 20	4%	0%	0%	12%	0%	0%
Occupations	Whole group	Hanoi	Quang Tri	Vinh Phu	Phu Ly	Bac Giang
House farmer[12]	29%	4.8%	19%	52%	0%	50%
Farmer	14%	0%	6%	24%	14%	29%
Retired/unemployed	18%	29%	0%	16%	43%	14%
Business/skilled trade	17%	14%	44%	4%	43%	0%
Seller[13]	8%	19%	6%	4%	0%	7%
Government	5%	10%	13%	0%	0%	0%
Academics	2%	10%	0%	0%	0%	0%
Student	4%	10%	6%	0%	0%	0%
Other	2%	4.8%	6%	0%	0%	0%
Level of amputation	Whole group	Hanoi	Quang Tri	Vinh Phu	Phu Ly	Bac Giang
Short TT	51%	52%	50%	44%	86%	43%
Long TT	23%	14%	31%	24%	14%	29%
Mid TT	16%	0%	19%	24%	0%	29%
Short TF	4%	14%	0%	0%	0%	0%
Mid TF	4%	14%	0%	0%	0%	0%
Bilateral TT	2%	0%	0%	8%	0%	0%
Bilateral TF	1%	5%	0%	0%	0%	0%
Cause of amputation	Whole group	Hanoi	Quang Tri	Vinh Phu	Phu Ly	Bac Giang
Mine	49%	24%	56%	64%	43%	57%
Bullet/projectile	19%	19%	6%	24%	43%	29%
Vehicle accident[14]	17%	33%	25%	4%	0%	7%
Bomb	12%	19%	13%	8%	14%	0%
Infection/tumor	2%	4.8%	0%	0%	0%	7%

[4] This scale includes: 2 = daily; 1 = sometimes; 0 = never.

[5] This value is a subjective evaluation by the author as to whether the patient is participating in the same or similar work he would have without the amputation.

[6] The patient was asked to describe his type of work and the following scale was used in analysis: 2 = heavy; 1 = light; 0 = sedentary.

[7] The patient was asked how his family and friends responded to his amputation. The scale was: 2 = well; 1 = OK; 0 = poorly.

[8] This scale includes: 3 = well; 2 = "I ignore any problems"; 1 = OK; 0 = poorly.

[9] Given that these patients were receiving their POF legs on the day of the interview, this question was not asked in Quang Tri.

[10] Prosthetic Outreach Foundation legs comprised 1.5 prostheses out of this total on average. Other types of legs in use included those from the following centers: Ba Vi, Tam Diep, Da Nang, Thuan Thanh in Ha Bac Province, Handicap Foundation, Hue Hospital, Ninh Binh, Ho Chi Minh City, 27th July Center in Hanoi, and homemade legs. The policy of the Ministry of Labor, Invalids and Social Affairs is to provide 1 leg and 10 prosthetic socks every 3 years.

[11] Number of legs the patient has received from a Prosthetics Center, whether one run by the Vietnamese government or by a Non-Governmental Organisation.

[12] One who gardens, tends livestock and maintains the household of a farming family.

[13] Purveyor of food, cigarettes, alcohol or lottery tickets.

[14] Refers to both traffic and train accidents.

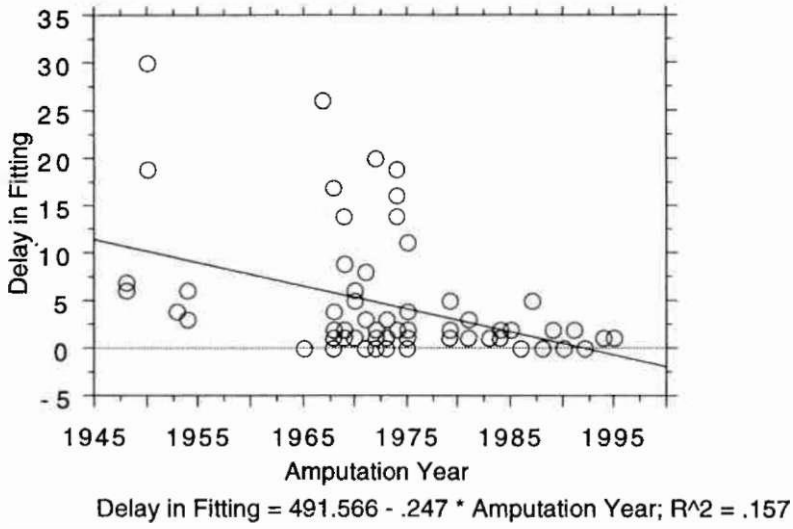

Fig. 2. Relationship between amputation year and delay to prosthesis fitting including a regression analysis for the relationship.

only 58% currently hold the same or similar job they would have without their amputaton. Many patients have moved from the rice field to "house farmer"; others had moved from government official to the life of a seller. The average work rigor scale value of 0.80 indicates that most participate in "light" to "sedentary" work, suggesting a shift from more labor-intensive careers (Table 2). Certainly, a similar survey of the non-amputated population of Northern Vietnam would provide a basis for comparison. Nonetheless, these data indicate reduced functionality of the amputee in the developing world setting. To the majority of patients, amputation presents a formidable barrier to the continuation of their old way of life.

Such an interpretation is borne out in the results pertaining to the amputees' sense of integration within society, which reveal a challenge existence for amputees particularly in those locales outside of Hanoi. The "Change in Quality of Life", "Reaction of Family and Friends", and "Reaction of Public" data expose a particularly pronounced sense of disjointedness in Phu Ly and Bac Giang. Even though patients as a whole were married half a year later than their amputation on average, stories of courting difficulties emerged in interviews. In a society where physical strength translates into prosperity, many amputees conceded that it had been difficult to convice potential spouses of their ability to work. Others said their families considered them a burden initially, and indeed that their families had grown poorer as a result of their disability. The preponderance of "house farmers" suggests that many amputees were looking for a way to contribute after losing their ability to work in the fields (Table 3).

These data also reveal that universal access to care remains a daunting problem. Because international prosthetics agencies in Vietnam must channel their efforts through the centralized, communist government and its district and sub-district offices, patient selection heavily favours war veterans. The patient population interviewed was remarkably homogeneous: patients on average were 47-year old males amputated in 1974 due to a landmine explosion. Rarely treated are those victims who have stepped on mines or suffered traumatic accidents in the course of their daily lives ("social amputees"). The author gained the impression that veterans are served preferentially over other social groups, and receive a substantially higher number of prosthetic legs. For example, 3 veterans in Vinh Phu Province had received 20 or more legs, compared to an average of 5.6 legs for the whole group. In contrast, one 66-year old woman in the same province had used only one leg for 29 years, which she herself repaired. No clear

rationale for this high number of legs provided to certain patients was proffered at the time of the interview, although it is noteable that these 3 patients were all veterans living in relatively close proximity to the Ba Vi Prosthetics Center.

There remains an apparent discrepancy in the number of limbs supplied in differing regions. Quang. Tri Province lies south of the former Demilitarized Zone of the Vietnam War. The number of legs its amputees have received (average 2.9) is about half the number received by the subject population as a whole (average 5.6) (Tables 2 and 3). Caring for the broad population of amputees remains a challenge in Vietnam.

This study suggests that differences in the quality of care and level of integration in urban versus rural areas may exist, although the high standard deviations and relatively small sample size did not yield statistical significance for most of these differences. Patients in Hanoi proved to be the one exception: they were significantly better integrated into their families than those in rual areas (Table 2). Although these patients had received fewer legs than those in Vinh Phu, they certainly had better access to care if their legs needed repair. Furthermore, city life demands less of a person physically, allowing smoother integration back into the patient's pre-amputation lifestyle.

The number of years patients wait on average before care is diminishing with time, but continues to vary dramatically across regions. In Bac Giang, for instance, patients waited on average only 1.8 years, while in Quang Tri patients waited nearly five times as long (average 8.9 years) before their first government-provided leg. This statistic correlates strongly with the rate at which government pensions are allotted to the patients of the province. Those areas in which 100% of those surveyed received pensions also featured the lowest waited period for a leg. This finding complements the perception that the government provides first for those it deems essential to national vitality. The observed order of hierarchy generally privileges North Vietnamese war heroes, followed by revered public officials and North Vietnamese veterans, then "war mothers", those women deemed essential in the fight for independence, proceeded by civilian casualties of the war and "social amputees", those injured traumatically or medically. Given the long wait for a leg provided by the government, many patients had improvised a prosthesis or borrowed one from a friend.

Generally, pensions are awarded for service to the state, either after a lifetime of government work, or as particularly apt in this population, for service in the armed forces. A definitive percentage of veterans vis-à-vis the patient population at large was not obtained, although 82% of the injuries leading to amputation were war-related. The rate at which pensions were awarded ranged from 31% in the province of Quang Tri to 100% in Phu Ly and Bac Giang. As Quang Tri sits south of the former Demilitarized Zone, a number of patients there were veterans of the South Vietnamese Army, and therefore ineligible for pensions. Given its rural aspect and distance from a major center of government, Quang Tri also includes a relatively limited number of former government officials.

The connection between the rate at which patients received government pensions on one hand and worked on the other appear to follow an inverse relationship. The low pension rate (31%) in Quang Tri was associated with a 94% work rate, while the high rates of pension receipt in Phu Ly (100%) and Hanoi (76%) were associated with lower work rates (57% and 62% respectively). A relationship between occupation and the collection of government pension is not obvious when comparing Tables 2 and 3. Instead, it is most helpful to consider occupation in terms of the opportunities and vocational culture of the region.

The conclusion form this study are limited by its relatively small sample size and by the fact that a random sampling proved impossible to achieve.

Conclusion

This study has demonstrated the importance and the challenge of collecting meaningful data on the efficacy of a prosthetics programme in a country such as Vietnam. The geographic dispersion of the served individuals in this largely rural setting requires going into the field to assess the prosthesis wearer in his living and working environment. The results of this investigation indicate that many individuals enjoy restoration of activity with a prosthesis. However, it remains apparent that functional rehabilitation has not yet advanced to the point where most amputees can resume occupations

such as farming. Furthermore, reaching individuals living far from prosthetic fitting and repair centers continues to be an impediment.

Field data collected using standardized assessment tools, such as that used in this study, will help direct future efforts to improve the quality of life for individuals with amputations in developing countries.

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Appendix 1

Prosthetics Outreach Foundation Patient Chart

DEMOGRAPHICS

Date
Patient Name
Location (urban or rural)
Height
Weight
Birth Date
Gender
Occupation
Date of Amputation
Level of Amputation
Right or Left
Cause of Amputation

QUESTIONNAIRE

1. Have you had an artificial limb before the one from POF? If so, where did you obtain it and when?
2. At what date did you receive the prosthesis from POF?
3. Is the prosthesis in need of repair? How and when will it be repaired?
4. Have any components or has the complete prosthesis been replaced? If yes, which?
5. Is the prosthesis comfortable? If not, what hurts?
6. On an average day, how many hours do you wear the prosthesis?
7. Do you have trouble with your residual limb? (e.g. phantom pain, pressure sores...)
8. How has your lifestyle changed since your amputation? (social life, employment...)
9. Has your lifestyle changed since receiving your POF prosthesis? (social life, employment...)
10. Are you currently employed? Job Requirements:
11. Do you collect a government pension?
12. Work:
    (1) retired and stay at home
    (2) part-time
    (3) full-time
    (4) able to work, but unemployed
    (5) unable to work due to reasons other than amputation (explain)
    (6) presently working, but new job due to amputation
    (7) child, at school
    (8) other (specify)
13. Type of work:
    (1) do not work
    (2) sedentary work
    (3) stand mostly
    (4) heavy lifting involved
    (5) great deal of walking involved
    (6) other (specify)

14. How satisfied are you with the appearance of your prosthesis? (1 low - 5 high)
15. Does your prosthesis make squeaking, clicking or other noises? If so, which?
16. Can you go up and down stairs step over step?
17. Can you walk while carrying a load? If so, how much?
18. Approximately how far can you walk without resting?
19. Can you ride a bicycle?
20. Can you run?
21. Do you regularly participate in sports? Has this changed since receiving your POF prosthesis?
22. What kind of footwear do you normally wear?
    (1) sandals
    (2) shoes
    (3) none
23. Do you have enough prosthetic socks to use a clean one daily?
24. Are you married? If yes, when did you get married?
25. How have your family and friends responded to you as an amputee?
26. How do you feel the public responds to you as an amputee?
27. Are you satisfied with the results of your surgery? How many operations have you had on your amputated leg?
28. Are you satisfied with the results of your prosthetic treatment?
29. Are you satisfied with the condition of your non-amputated limb? If not, what is the problem?
30. Do you use any assistance devices to walk such as canes or crutches? If yes, which?

Additional Comments: