Causes of locomotor disability and need for orthopaedic devices in a heavily mined Taliban-controlled province of Afghanistan: issues and challenges for public health managers

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Summary

We conducted a locomotor disability survey on a heavily mined Taliban-controlled province of Afghanistan to document the problem of locomotor disability and to assess the need for orthopaedic rehabilitation devices in a study population of 12065. Global prevalence of locomotor disability was 23/1000 (95% CI: 20–26). War-related injuries were the leading cause of disability, affecting almost exclusively adult males. Leading causes of disability among women and children were medical and poliomyelitis. Devices most needed were lower limb orthoses (8.2 devices/1000 people; 95% CI: 5.9–10.4) and orthopaedic shoes (6.0/1000; 95% CI: 4.1–8.0). The need for lower limb prostheses was less frequent (2.0/1000; 95% CI: 1.1–2.8). Most lower limb amputees (mainly victims of landmine injuries) were fitted with an artificial leg, while rehabilitation needs for other types of disability remained largely unmet. We estimated that it would take at least 3 years to provide enough orthopaedic shoes and 10 years for orthoses, whereas the need for lower limb prostheses could be met in less than 4 months. None of the 27 women with lower limb disability were equipped with an orthopaedic device, although this was the case for 31 of 89 men (35%). The problem of landmines should not divert attention from other causes of disability such as poliomyelitis or from other rehabilitation requirements. Immunization programmes and restoration of the public health infrastructure should be given high priority; rehabilitation services are largely insufficient and should be developed. Extreme gender difference in needs coverage is a matter of concern. Researching culturally sensitive strategies to tackle this problem should be a priority for donors and implementing agencies.

keywords Afghanistan, locomotor disability, gender differences, health planning, land-mines, needs assessment, orthopaedic devices, poliomyelitis, rehabilitation services, women health, war

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Introduction

The problem of landmines left after armed conflicts has raised international concern in recent years. Landmine injuries are a major cause of disabilities, and are better documented than other causes of disability (Andersson et al. 1995). In Afghanistan, years of civil war and an almost complete breakdown of the health care system have resulted in a great number of locomotor-disabled persons, but no locomotor disability survey including the prevalence of poliomyelitis sequelae has been conducted to date although estimates of the frequency and type of disability in the population are mandatory for the provision of appropriate rehabilitation services. Services for amputees differ from those for patients suffering from other types of disability, and are usually provided in separate workshops. Equipment and skills required in the making of prostheses (artificial limbs) are different from those required for the making of orthoses (devices aimed at compensating deficient muscle or nerve, or correcting deformities), orthopaedic shoes or wheelchairs. A child with poliomyelitis sequelae, for example, causes a higher workload to rehabilitation services than an adult.
amputee because the child requires close follow-up, regular fittings and physiotherapy.

The household survey reported here was carried out on behalf of a nongovernmental organization providing rehabilitation services in Kandahar Province, south-west Afghanistan. Our objectives were to document the problem of locomotor disability, and to assess rehabilitation needs. Detailed disability prevalence data have been published elsewhere (Lambert et al. 1997). This paper focuses on orthopaedic devices needs assessment. It provides estimates of the quantity and type of devices needed, and of the proportion of disabled already serviced in the area. These data are used to assess the capacity of existing rehabilitation services to meet the needs of the population.

Materials and methods

Setting

Kandahar Province is among the most heavily mined provinces of the country (Mine Clearance Planning Agency 1993). It has been relatively peaceful since it came under the control of an Islamic political movement, the Taliban, in 1994. The Taliban emphasize traditional ways of life as opposed to modern concepts of development. Lack of reliable population data and a detailed map of the area, together with heavy logistic and cultural constraints, were among the challenging conditions faced by the survey.

Study base

The study base included all residents in the most populated districts of the Kandahar province (Kandahar City, Dand, Arghandab, and Panjwai). The survey team visited all the mosques in Kandahar City, as every head of household was registered in a particular mosque, and all the villages in the rural districts. The number of households (people living within the same compound) was estimated by interviewing the mullahs of the mosques, or the village leaders. A total of 42839 households in 500 mosques or villages comprised the sampling frame. The population of the area surveyed was estimated at 428390 (10 persons per household).

Study population

We performed a two-stage random cluster sampling. Assuming an anticipated prevalence of 5 cases of poliomyelitis sequelae in 1000 children < 15 years of age (Bernier 1984), a sample of 6116 under-15s was needed in order to be 95% confident of estimating the true value with a precision of 2.5 per 1000, and a design effect estimated as 2 (Lwanga & Lemeshow 1991). Assuming that 50% of the population was in the younger age group, the required sample size increased to around 12000 people. Mosques and villages were the primary sampling units (PSU); 38 were selected with replacement, with a probability of selection proportional to their size. In each selected PSU, 35 households were chosen at random or all were taken if the PSU was smaller than 35 households. All members of these households were included in the survey.

Case definitions

A disabled person was defined as someone unable to walk normally without help and/or unable to move hands or arms properly for a reason other than age. Causes of disability were defined according to broad categories, but poliomyelitis was defined using the clinical case definition recommended by WHO for lameness surveys (Bernier 1984). Needs for orthopaedic devices were defined by a health professional (as opposed to the needs perceived by the patients). Needs were met when the patient was equipped with the device(s) needed. Needs were unmet if this was not the case.

Data collection

Due to the particular characteristics of this Islamic regime, special efforts were required to achieve credibility and acceptability of the survey, especially regarding women. For instance, it was considered offensive for a man to ask for the number of women in the household, disabled women could not be examined by a man, and no Afghan woman could be part of the survey team. The survey team consisted of eight Afghan male interviewers and four Afghan male supervisors recruited within the districts surveyed, and three foreign women (two physicians, one physiotherapist). Training emphasized communication skills. Supervisors were specifically trained to identify the cause of disability and rehabilitation needs. Interview and examination methods were pretested in three clusters not included in the sample. Local leaders in the 38 sampled PSUs were visited prior to the survey and informed about its objectives and practical organization. None refused to participate.

Data were collected from 13–30 June 1996. Every sampled household was visited by a pair of interviewers who asked for the age and sex of the household members and for the presence of a disabled person if any. Disabled men were later examined by a supervisor, disabled women by a foreign woman. Causes of disabilities and rehabilitation needs were identified. A rigorous on-the-spot examination was done by the two physicians and the physiotherapist. Apart from the survey, activity data were collected from the existing rehabilitation services.
Data management and analysis

EpiInfo6 software was used for data entry and data analysis. Confidence intervals were calculated using the Taylor Linearized Deviation approach to account for the cluster sampling methodology (Kalsbeek & Frerichs 1994).

As an indicator of the coping capacity of the rehabilitation services, we estimated the time required to cover the unmet needs in the population. We assumed that no new needs would arise, that the workshops would operate at optimal capacity, and that only the disabled living in the area surveyed would be serviced. Lower and upper estimates of the time required to cover the unmet needs in the population were computed as the product of the 95% confidence limits of the unmet needs prevalence and the size of the target population, divided by the maximal monthly production of orthopaedic devices.

Results

Of 1212 households surveyed in 38 clusters, 9 refused to provide data (response rate: 99%). The total population surveyed was 12065 (2848 men, 2916 women; 3364 boys and 2937 girls). The number of disabled persons found during the house-to-house survey was 275 (23 per 1000, 95% CI: 20–26).

One disabled person was found in every four households. The proportion of disabled among adult males was 50 per 1000 (95% CI: 43–57), whereas among adult females, boys and girls this proportion was 14 (11–18), 15 (11–19), and 14 (10–18) per 1000, respectively. War-related injuries (fighting, torture, landmine accidents) were the leading causes of disability (6.2 per 1000) in the study population, but globally less people had been disabled by landmine accidents (2.3 per 1000) than by poliomyelitis (3.2 per 1000). Other disabilities were post-traumatic (5.9 per 1000), related to a medical problem (5.0 per 1000) or congenital (1.7 per 1000).

Causes of locomotor disability were obviously related to sex and age. War-related causes affected almost exclusively adult males, whereas medical causes (infectious diseases, stroke, diabetes, etc.) prevailed among adult females. In the younger age group, the leading cause of disability was poliomyelitis (4.8 per 1000 children). These prevalence data were first reported and discussed elsewhere (Lambert et al. 1997).

Among the 275 disabled, 204 (74%) persons suffered from a disability which required orthopaedic devices. Of the 362 devices required, lower limb orthoses and orthopaedic shoes were most needed (Table 1). The majority of the disabled were not yet equipped (Table 1 and Fig. 1). Twenty-five of the 28 poliomyelitis cases (89%) in need of orthose(s) did not have any. On the other hand, most amputees requiring a lower limb prosthesis were already fitted with one. Women and children were very much less likely than men to be equipped with the device(s) they needed (Table 2).

The estimated minimum required time for the available rehabilitation services to cover the unmet needs ranged from 0 months for lower limb prostheses to 10 years for orthoses (Table 3).

Discussion

Based on this survey we estimated the locomotor disability prevalence as 23 per 1000. Not surprisingly this figure appears to be high compared to data from other developing countries. A household survey of locomotor disability among people >= 7 years of age in Malaysia computed a prevalence of 39 per 1000 (Osman & Rampal 1989). In a village in Botswana, the prevalence of difficulty with mobility was 9 per 1000 (Lundgren-Lindquist & Nordholm 1993). A household survey in Thailand showed a prevalence of locomotor

Table 1 Total and unmet needs for orthopaedic devices in Kandahar Province

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Number of devices needed per 1000 (95%CI)</th>
<th>Number of devices not provided to the patient</th>
<th>Unmet needs per 1000 (95%CI)</th>
<th>Proportion of unmet needs relative to total needs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostheses:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper limb</td>
<td>6</td>
<td>0.5 (0.1–0.9)</td>
<td>6</td>
<td>0.5 (0.0–1.1)</td>
</tr>
<tr>
<td>Lower limb</td>
<td>24</td>
<td>2.0 (0.9–3.1)</td>
<td>4</td>
<td>0.3 (0.0–0.8)</td>
</tr>
<tr>
<td>Orthoses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper limb</td>
<td>39</td>
<td>3.2 (1.8–4.7)</td>
<td>38</td>
<td>3.2 (1.7–4.6)</td>
</tr>
<tr>
<td>Lower limb</td>
<td>99</td>
<td>8.2 (5.9–10.4)</td>
<td>87</td>
<td>7.2 (5.0–9.3)</td>
</tr>
<tr>
<td>Total</td>
<td>138</td>
<td>11.4 (8.7–14.1)</td>
<td>125</td>
<td>10.3 (7.8–12.9)</td>
</tr>
<tr>
<td>Orthopaedic shoes</td>
<td>73</td>
<td>6.0 (4.1–8.0)</td>
<td>67</td>
<td>5.6 (3.6–7.5)</td>
</tr>
<tr>
<td>Wheelchairs</td>
<td>24</td>
<td>2.0 (1.1–2.8)</td>
<td>22</td>
<td>1.8 (1.0–2.7)</td>
</tr>
</tbody>
</table>

Total number of devices needed = 362 for 204 disabled.
disability of 3 per 1000 (Swaddiwudhipong et al. 1994). In Bangladesh, the prevalence of movement disability was 13 per 1000 (Hosain 1995). Comparisons, however, are not easy. We are not aware of any disability survey conducted in a war-torn country like Afghanistan, and few of the relevant published studies were conducted with reproducible case definitions. Moreover, a survival bias might hamper comparisons. Conditions of life are extremely harsh in Afghanistan: life expectancy and mortality rates are among the worst in the world, much worse than in any of the countries quoted above (UNDP 1995).

In a country stricken by war for 17 years, war-related injuries are expected to be a major cause of disability. However, we found that adult males were mostly affected by war-related disabilities, while the leading causes of disability among women and children reflect the less visible and more sinister ongoing effects of war, i.e. the breakdown of health services and routine vaccination. Similarly, in this heavily mined area one would have expected the greatest rehabilitation need to be artificial limbs. Our survey revealed that this was not the case: prostheses were less frequently needed than other types of devices. In fact, a wider range of disabilities requires orthoses or orthopaedic shoes (poliomyelitis, hemiplegia, club foot). These observations suggest that the international concern about landmines in recent years has led to some underestimates of the frequency and consequences of those types of disabilities. We also fear that the current campaign to eradicate poliomyelitis has misled some donors into thinking that poliomyelitis-related disability is now a minor problem. However, given low immunization coverage in the area (Lambert et al. 1997), poliomyelitis eradication seems very far away in Afghanistan; and immunization cannot reduce the large number of existing cases in the area.

Another unexpected finding was that the need for prostheses was adequately covered, while other needs remained largely unattended. One explanation is the fact that the orthotic workshop in Kandahar City was completely

### Table 2 Number and proportion of disabled equipped with orthopaedic devices, per age and sex

<table>
<thead>
<tr>
<th>Device(s) needed</th>
<th>Under 15 years of age</th>
<th>Adults</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
</tr>
<tr>
<td>Prosthetic workshop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower limb prostheses</td>
<td>0/1 (0%)</td>
<td>1/1 (100%)</td>
<td>18/20 (90%)</td>
</tr>
<tr>
<td>Orthotic workshop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthopaedic shoes, wheelchairs, and lower limb orthoses</td>
<td>2/42 (5%)</td>
<td>1/37 (3%)</td>
<td>13/69 (19%)</td>
</tr>
</tbody>
</table>
overburdened while the prosthetic workshop was not. The prosthetic workshop could in theory cover the needs in prostheses within a few months. By contrast, several years would be required before the orthotic workshop could meet existing needs for other orthopaedic devices in the area. Rehabilitation services for the amputees thus seem to have been given priority. It is worth adding that a few patients needed upper limb prostheses, but none had one. Upper limb prostheses providing hand mobility present technical difficulties and are not currently available through rehabilitation services under field conditions like those in Kandahar City.

Health-seeking behaviour might also explain why needs in prostheses were better covered. The perceived benefits of a prosthesis for a leg amputation are higher than the perceived benefits of other orthopaedic devices and adult males (the group mostly affected by leg amputation) as the socially dominant group are more likely to seek help than children or women. This factor contributes to the extreme gender difference in the proportion of needs covered (overall, 1 in 4 men was equipped with the device he needed, against 1 in 33 women). Women were less likely to be given help than men. Services provided to women have to meet very strict criteria to be culturally acceptable, such as separate rooms for women and female health staff. Even then, specific services for women could not always run smoothly, as women were not supposed to exercise any type of professional activities. The extreme gender difference in needs coverage is a matter of concern; researching culturally sensitive strategies to tackle this problem should be a priority for donors and implementing agencies.

We believe that the main findings of our survey stand up to evidence despite some methodological limitations. Although our sampling frame offered the current least unreliable estimate of the study base, some population clusters at high risk of disability were not surveyed. They included nomads who were away from the province at the time of the survey, soldiers and their families living in army barracks in Kandahar City to whom access was forbidden (1% of the study base), and some distant villages which were not identified in due time. Bearing this in mind, the prevalence of disability and rehabilitation needs reported here might be an underestimate. Secondly, under challenging field conditions some measurement errors were likely to occur. However, given the efforts made regarding accurate information of the target communities, the composition of the survey team, the systematic examination of any difficult case by qualified health professionals, and close supervision of data collection, we succeeded in obtaining a very high response rate and observations which could be considered reliable beyond any reasonable doubt. Yet, we cannot completely rule out a possible overestimation of the needs other than prostheses. Indeed, while the need for an artificial leg is relatively easy to assess, benefits from orthopaedic devices other than prostheses should be carefully evaluated in relation with the individual lifestyle and environment; such evaluations were not feasible on the spot. Finally, none of the assumptions we made when computing the minimum time required to cover existing needs is really true. In particular, production in the prosthetic workshop had been far from optimal in the months before the survey, and roughly half of the patients serviced came from districts not included in the survey, or even from different provinces. As a consequence, figures of the time to cover unmet needs are likely to be underestimates.

Despite these limitations our survey demonstrates the feasibility of needs assessment meeting basic scientific standards under challenging field conditions. Data were provided quickly and with a precision sufficient for immediate operational use. Several unexpected findings confirm the importance of proper needs assessment as a tool for the planning and evaluation of health services.
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