

# Demographics and diagnoses at rural health camps in Nepal: cross-sectional study

Michael Pambos<sup>a,b,\*</sup>, Jessica Ng<sup>b</sup>, Jonathan Loukes<sup>b</sup>,  
James Matheson<sup>b</sup>, Bibek Aryal<sup>b</sup>, Suman Adhikari<sup>b</sup>, Sarah Kerry<sup>a</sup>,  
Fiona Reid<sup>a</sup> and Pippa Oakeshott<sup>a</sup>

<sup>a</sup>Population Health Sciences and Education and <sup>b</sup>Health Partnership Nepal, St George's, University of London, London, UK.  
\*Correspondence to Michael Pambos, Foundation Year 2 Doctor in General Practice, Department of Population Health Sciences and Education, 6th Floor Hunter Wing, St George's, University of London, Cranmer Terrace, London SW17 0RE, UK; E-mail: mpambos@doctors.org.uk

**Background.** The charity 'Health Partnership Nepal' is committed to both improving global health care and providing medical training links between Nepal and the UK. This paper analyses data gathered at rural health camps.

**Aim.** To describe the demographics, diagnoses and treatments offered to people attending three rural health camps in Nepal during 2009.

**Design.** Cross-sectional study.

**Setting.** Three free health care camps established within the Nuwakot district of Nepal during April–May 2009. Camps were staffed by doctors including GPs, nurses and medical students from London and Kathmandu.

**Methods.** Attendees had treatment sheets completed which recorded their demographics, diagnoses and dispensed medications.

**Results.** The mean age of the 1903 consecutive patients attending was 42.8 years (range one month to 98 years) of whom 68.6% were female and 13.7% were children. The majority, 82.3%, were agricultural workers. For adults ( $n = 1574$ ), the most frequent complaints were stomach pain 20.1%, musculoskeletal pain 19.3% and visual acuity problems 6.1%. Stomach pain was significantly more common in women than men [21.2% (236/1064) versus 14.5% (65/449)  $P < 0.01$ ]. For children ( $n = 249$ ), the most common diagnoses were helminthiasis 10.4%, conjunctivitis 7.6% and upper respiratory tract infection 7.2%. Overall, ophthalmological, gastroenterological and rheumatological diagnoses were significantly more common in Nepalese than UK general practice patients. Of 1109 recorded prescriptions, the most common were multivitamins 23%, oral analgesics 15% and oral antibiotics 14%.

**Conclusions.** There is a considerable unmet disease burden within rural districts of Nepal particularly for stomach pain, musculoskeletal pain and visual acuity problems. When planning similar rurally based health camps, we recommend recruiting GPs and ophthalmologists.

**Keywords.** Charities, education, health promotion, rural health, world health.

## Introduction

Nepal is a country of ~29 million people where 82% of the population is rurally based<sup>1</sup> but 80% of the country's doctors are practicing in large cities.<sup>2</sup> On average, there are 2.1 physicians per 10 000 of the population.<sup>3</sup> With a growing population rate of 2.3% per annum and limited economic income (gross national income per capita \$1120),<sup>4</sup> Nepal is one of the least developed countries in the world. Combined life expectancy at birth is 67.5 years and the country is ranked 138/169 on the Human Development Index Scale.<sup>5</sup>

Under the 2009 government initiative 'New Nepal, Healthy Nepal' citizens are able to register free of charge at district hospitals and primary health care centres for emergency inpatient and outpatient treatments. The government funds between 22 and 32 essential medications without charge.<sup>6</sup> Provision of health care spans downwards from District Hospitals—staffed by two to five doctors, Primary Health Centres—staffed by one doctor plus other support staff, Health Posts—staffed by a health care assistant and support staff and Sub Health Posts—staffed by village health workers and community medical assistants.<sup>7</sup> Rurally isolated villages

usually have limited health care access with the most basic of medical advice provided at a Sub Health Post.<sup>8,9</sup> Access to a trained doctor can mean an 8-hour walk with patients often having to pay for services and medications that are not funded by the government.<sup>6</sup> Poverty, challenging terrain, limited infrastructure and civil unrest limits access to health care and exaggerates health inequalities further.

A number of different charities and projects have been established to provide health care to the most isolated and poorest members of society.<sup>10–12</sup> During a 6-week period in April–May 2009, the UK-based charity, Health Partnership Nepal, set up and ran three rural health camps. The aims were to provide a shared educational experience for doctors, nurses and medical students from both the UK and Nepal and also to deliver free health care to those who were rurally isolated or could not afford specific medical care. We describe the demographics of the patients, diseases encountered, treatments issued and which medical specialities were most called upon during the health camps.

## Methods

Health camps were setup in three villages within the Nuwakot district of Nepal during 2009: Bageswori Chokade, Chaturale and Deurali. Based on a needs assessment performed by UK and Nepalese medical staff in 2008, villages were chosen due to their rural location and potentially unmet health care needs. Each village was ~8 hours drive from the capital Kathmandu, across often difficult mountainous terrain (Fig. 1).

Local village community centres housed the camps which were staffed by doctors and nurses from the UK and Nepal, including a GP, cardiologist, endocrinologist, general physician and general surgeon as well as medical students from St George's University of London and Nepal Medical College and Teaching

Hospital, Kathmandu. Each health camp was run over the course of 5 days. A preliminary day was needed to setup camp, 3 days to actively see and treat patients and a final day to pack up. Local advertising campaigns in the form of posters, leaflets and word of mouth were used to generate awareness about the camps before their arrival. All equipment, staff and medical supplies were funded by the charity Health Partnership Nepal. We used international aid packs containing an assortment of antibiotics and drugs tailored to the area.<sup>13</sup> Each camp comprised a minimum of three doctors, six medical students and two local village organizers. The camps ran from 8 a.m. to 7 p.m. and provided free medical care and medication to all patients who turned up.

Patients who attended the health camps, after giving informed consent, had basic demographic information recorded onto a patient *pro forma* and then queued to see a doctor. If time and resource constraints allowed, before each assessment routine observations such as blood pressure, pulse, temperature, height, weight and random blood sugar levels were performed. Blood pressure was measured after at least 5 minutes of rest using a standard mercury sphygmomanometer. Pulse was taken manually as were measurements of height and weight. Random blood sugar levels were obtained via finger prick testing using finger lancets and a OneTouch Ultra2 Blood Glucose Meter produced by Lifescan©.

Patients were then taken to a consultation room where they were assessed by a doctor. The reason for encounter, complaint or diagnosis was entered on the *pro forma*. Translators were present for UK doctors to aid them in their assessments. If medication was prescribed, patients could collect it free of charge from the medical camp's pharmacy room. Each consultation would last between 5 and 15 minutes and on average, over 200 people were seen each day. If any patient needed further assessment at a local hospital or surgical camp, then transport arrangements were provided and where possible a small monetary donation provided by Health Partnership Nepal to help subsidize any further investigations and treatments.

### Statistical analysis

Patients' *pro forma* sheets were stored securely and data were entered and analysed using Microsoft Access, Excel and Stata. Patients were divided into children aged  $\leq 16$  years and adults, with each diagnosis categorized into relevant medical and surgical specialities (Table 1). To enable comparison with UK primary care, we also classified diagnoses via International Classification of Diseases: 9th Edition (ICD9) criteria and compared frequencies of diagnoses with published UK consultation data<sup>14</sup> using chi-square test (Table 2).



FIGURE 1 Map of Nepal indicating Nuwakot district highlighted

TABLE 1 Diseases in 1903 consecutive Nepalese patients subcategorized into medical and surgical specialities

Speciality in order of frequency	Top two diagnoses by speciality	Total	Adult age >16 years	Child age ≤16 years	Unspecified age
Ophthalmology, <i>n</i> = 477 diagnoses, 19.6% of total	Visual acuity problems	108	96	8	4
	Eye symptoms—not otherwise specified	99	83	14	2
Gastroenterology, <i>n</i> = 461 diagnoses, 18.9% of total	Stomach pain	343	316	13	14
	Helminthiasis	65	37	26	2
Rheumatology, <i>n</i> = 345 diagnoses, 14.2% of total	Musculoskeletal pain	202	185	10	7
	Osteoarthritis	119	116	0	3
Respiratory, <i>n</i> = 242 diagnoses, 9.9% of total	Chronic obstructive pulmonary disease	77	72	0	5
	URTI	42	23	18	1
Gynaecology, <i>n</i> = 195 diagnoses, 8.0% of total	Vaginal infection	63	62	0	1
	Vaginal prolapse	39	39	0	0
Dermatology, <i>n</i> = 131 diagnoses, 5.4% of total	Dermatological symptoms—not otherwise specified	43	31	9	3
	Eczema	11	7	4	0
Neurology, <i>n</i> = 121 diagnoses, 5.0% of total	Headache	87	75	11	1
	Sensory neuropathy	12	11	0	1
Surgical, <i>n</i> = 120 diagnoses, 4.9% of total	Lump for excision	25	22	0	3
	Right-sided hydrocoele	18	14	2	2
ENT, <i>n</i> = 87 diagnoses, 3.6% of total	Sinusitis	20	18	1	1
	Otitis media	17	8	8	1
Urology, <i>n</i> = 72 diagnoses, 3.0% of total	Urinary tract infection	67	61	4	2
	Renal calculus	2	2	0	0
Cardiology, <i>n</i> = 57 diagnoses, 2.3% of total	Hypertension	30	30	0	0
	Cardiac symptoms—not otherwise specified	13	11	2	0
Psychiatry, <i>n</i> = 11 diagnoses, 0.5% of total	Anxiety	6	6	0	0
	Depression	5	4	0	1
Endocrinology, <i>n</i> = 7 diagnoses, 0.3% of total	Diabetes	5	5	0	0
	Gynaecomastia	2	0	2	0
Non-specific, <i>n</i> = 107 diagnoses, 4.4% of total, ( <i>n</i> = 12 dental problems)	Non-specific pain	39	35	1	3
	Abdominal pain	37	31	5	1

Listed in the table are the top two diagnoses for each speciality and also the total disease burden by speciality in order of frequency encountered. No recorded pathology *n* = 114.

## Results

### Demographics

One thousand nine hundred and three patients were seen over the three health camps: 882 at Bageswori Chokade, 578 at Chaturale and 443 at Deurali. A total of 1823 patients (95.8%) had their ages recorded. The average age of patients attending health camps was 42.8 years (range 1 month to 98 years old) and 13.7% (*n* = 249) of attendees were children (aged ≤16 years). Of 1668 patients (87.7%) where gender was recorded, 68.6% (*n* = 1144) were female.

### Occupation

Of 1432 patients (75.2% of total) who gave their occupation, 82.3% were agricultural workers (*n* = 1178), 13.4% were students (*n* = 192 which encompassed primary, secondary and university education) and 2.2% were teachers (*n* = 31) with the remaining patients working as tailors, police, health care workers, domestic workers and business people (each group <1%).

### Diagnoses

One thousand nine hundred and three patients were reviewed which generated 2433 recorded diagnoses (Table 1). For adults (*n* = 1574), the most common

complaints were stomach pain 20.1% (*n* = 316), musculoskeletal pain (including back pain) 11.8% (*n* = 185), osteoarthritis 7.4% (*n* = 116) and visual acuity problems 6.1% (*n* = 96). In 249 children, the most common diagnoses were helminthiasis 10.4% (*n* = 26), conjunctivitis 7.6% (*n* = 19) and URTI 7.2% (*n* = 18).

Overall, combining both adults and children (*n* = 1903), the most common complaint was stomach pain 18% (*n* = 343). This was more common in adult females than adult males: 21.2% (236/1064) versus 14.5% (65/449) (*P* < 0.01).

Patients often presented with more than one diagnosis: 82 (4.3%) had three or more separate diagnoses, 491 (25.8%) had two separate diagnoses and 1206 (63.4%) had only one diagnosis. There were also 102 (5.4%) patients who had no identifiable pathology and 22 (1.2%) who had no recorded diagnosis on their forms.

### Disease burden by speciality

The most frequent diagnoses were ophthalmological 19.6% (*n* = 477/2433), gastroenterological 18.9% (*n* = 461) and rheumatological 14.2% (*n* = 325) (Table 1). The least frequent diagnoses were psychiatric 0.5% (*n* = 11) and endocrinological 0.3% (*n* = 7).

TABLE 2 Comparison of frequency of disease presentations, classified by ICD9, in patients attending Nepalese Health Camps and UK primary care

ICD9 chapter	Percentage and number of diagnoses encountered at Nepalese Health Camps, total $n = 2433$ diagnoses	4th Morbidity Survey in General Practice data, percentage and number of diagnoses encountered at UK GP settings, total $n = 34\ 785^a$
I. Infections and parasitic diseases	5.1% ( $n = 124$ )	5.8% ( $n = 2006$ )
II. Neoplasms	0.0% ( $n = 1$ )	1.4% ( $n = 492$ )
III. Endocrine, nutritional and metabolic diseases and immunity disorders	0.4% ( $n = 10$ )	2.0% ( $n = 710$ )
IV. Diseases of the blood and blood-forming organs	0.0% ( $n = 0$ )	0.4% ( $n = 151$ )
V. Mental disorders	0.6% ( $n = 14$ )	5.1% ( $n = 1761$ )
VI. Diseases of the nervous system and sense organs <sup>b</sup>	28.3% ( $n = 688$ )	8.2% ( $n = 2848$ )
VII. Diseases of the circulatory system	2.6% ( $n = 63$ )	6.9% ( $n = 2397$ )
VIII. Diseases of the respiratory system	10.4% ( $n = 254$ )	17.8% ( $n = 6200$ )
IX. Diseases of the digestive system <sup>b</sup>	17.5% ( $n = 426$ )	4.3% ( $n = 1493$ )
X. Diseases of the genitourinary system	12.6% ( $n = 306$ )	5.9% ( $n = 2050$ )
XI. Complications of pregnancy, childbirth and puerperium	0.0% ( $n = 0$ )	0.5% ( $n = 183$ )
XII. Diseases of the skin and subcutaneous tissue	4.4% ( $n = 106$ )	6.6% ( $n = 2289$ )
XIII. Diseases of the musculoskeletal system and connective tissue <sup>b</sup>	14.3% ( $n = 347$ )	8.8% ( $n = 3070$ )
XIV. Congenital anomalies	0.0% ( $n = 0$ )	0.2% ( $n = 69$ )
XV. Certain conditions originating in the perinatal period	0.0% ( $n = 0$ )	0.0% ( $n = 16$ )
XVI. Symptoms, signs and ill-defined conditions	3.0% ( $n = 73$ )	6.7% ( $n = 2340$ )
XVII. Injury and poisoning	0.5% ( $n = 11$ )	5.6% ( $n = 1946$ )
XVIII. Supplementary classification of factors influencing health status and contact with Health Services	0.4% ( $n = 10$ )	13.7% ( $n = 4764$ )

<sup>a</sup>4th Morbidity Survey in General Practice data: rates per 10 000 person-years at risk.

<sup>b</sup>Difference between rates in Nepal and UK statistically significant (chi-square analysis  $P < 0.01$ ).

### Disease burden as classified by ICD9

Compared with UK GP patients, those seen in Nepal were more likely to be diagnosed with 'diseases of the nervous system and sense organs' (including eye problems), 'diseases of the digestive system' and 'diseases of the musculoskeletal system and connective tissue' ( $P < 0.01$ ) (Table 2).

### Medications

Although almost all patients were given medication as treatment, only 529 (27.8%) patient records were available for analysis. Of 1109 items, the most commonly prescribed were multivitamins 23% ( $n = 250$ ), oral analgesics 15% ( $n = 163$ ) (paracetamol, diclofenac and ibuprofen), oral antibiotics 14% ( $n = 157$ ) (amoxicillin, metronidazole, ciprofloxacin and doxycycline), proton pump inhibitors/H2 antagonists 8% ( $n = 91$ ), antacids 6% ( $n = 68$ ) and eye drops 6% ( $n = 65$ ) (gentamicin, ciprofloxacin and sterile eye drops). Table 3 shows the 'top 10' prescriptions.

### Blood pressure, body mass index and blood sugar measurements

Blood pressures were recorded in 423 adults (22.2% of total). The mean blood pressure was 127/82 mmHg. In 395 adults (20.7% total) who had their body mass

TABLE 3 Top 10 prescriptions issued during the health camps

Medication	Number Issued	Percentage of total prescriptions ( $n = 1109$ )
Multivitamins	250	23
Paracetamol	95	9
Amoxicillin	70	6
Omeprazole	69	6
Oral antacid	68	6
Ibuprofen	62	6
Albendazole tablets	58	5
Metronidazole	51	5
Diclofenac gel	50	5
Sterile eye drops	36	3

index (BMI) calculated, 66 (16.7%) were underweight (BMI  $< 18.5$  kg/m<sup>2</sup>) with 14 patients (3.5%) classed as severe thinness (BMI  $< 16$  kg/m<sup>2</sup>). Only 55 patients (13.9%) were overweight (BMI  $> 25.00$  kg/m<sup>2</sup>) with 9 (2.3%) classed as obese (BMI  $\geq 30.00$  kg/m<sup>2</sup>).

Random blood sugar measurements were performed on 149 patients (7.8% total). The mean value for recordings was 5.95 mmol/l (range 1.4–25.6 mmol/l). Two patients (1.3%) were discovered to have a new diagnosis of diabetes (defined as a random blood sugar reading  $> 11.1$  mmol/l). These patients



were referred on to the Endocrinology Department at the local hospital.

## Discussion

### *Summary of main findings*

The study has shown there to be a considerable unmet disease burden within the rural districts of Nepal. For adults, the main complaints were stomach pain, musculoskeletal pain and visual acuity problems. For children, they were helminthiasis, conjunctivitis and URTI. Overall, the most common complaint encountered was stomach pain (18% of all patients). The most common diagnoses classified by medical speciality were ophthalmological, gastroenterological and rheumatological. The most common prescriptions issued were multivitamins, paracetamol, oral antibiotics and proton pump inhibitors/H<sub>2</sub> antagonists.

### *Strengths and limitations of the study*

To our knowledge, this is the first paper to describe the diseases encountered at Nepalese rural health camps and equally one of only a few that has analysed a charitable initiative to help improve global health care.<sup>10–12</sup> This may provide useful data for future projects. The medical camps were not restrictive in the patients that were seen, unlike other more specialist Gynaecology or Ophthalmology camps,<sup>15–17</sup> and may provide a better understanding of the overall disease burden for the area. By quantifying diseases within these rural settings, it appears that stomach pain is a common problem affecting a large proportion of the community (18%).

Another strength of the study is that it may inform future projects. One difficulty when establishing a rural health camp is there is little guidance or research as to what sort of medications and types of doctors are required. By outlining disease burden, medications issued and subcategorizing them into medical specialities, this paper may help to rationalize resources and recruitment for future projects. Since populations in India and Nepal may have similar health care needs due to similarities in food habits, race and religions,<sup>18</sup> our findings may also be applicable in parts of India.

Weaknesses of the study include that not every patient had basic observations such as height, weight, blood pressure and blood sugar measurements performed and prescription data were incomplete. This was due to time and resource constraints encountered in collecting data in remote and overworked health camps. A major weakness is that clinicians were limited to purely clinical diagnoses as there was no access to investigations such as blood testing, X-rays, microbiology or stool culture analysis in such rural locations. In addition, cultural and language barriers may have led to misunderstandings and misdiagnoses. The low rate of psychiatric problems may have been due

to a number of reasons, firstly due to cultural and language barriers and secondly due to a lack of trust by Nepalese patients in foreign doctors in reporting such sensitive problems. Although the doctors in the project were all extremely experienced, patients were treated presumptively. In addition, since most patients had an expectation of receiving a treatment regardless of clinical signs, multivitamins were often given when there was no clear diagnosis. Unfortunately, this may create an unhelpful dependence upon manufactured medications and supplements. Finally, the findings may not be applicable to urban areas, different seasons or to other resource poor areas, such as sub-Saharan Africa or South America.

### *Comparison with existing literature*

Although there are descriptions of specialist cataract,<sup>16,17</sup> diabetic,<sup>18,19</sup> ENT<sup>20</sup> and gynaecological camps<sup>21</sup> within Nepal, there is a paucity of data for general health camps. The differences in the frequency of diagnoses compared with published UK 4th Morbidity Survey in General Practice data (Table 2)<sup>14</sup> may be partly due to the high number of cases of stomach pain, musculoskeletal pain and visual acuity problems in this isolated Nepalese population. The high rate of stomach pain, particularly in women, could be related to diet, environment and racial variations or to the extensive use of abdominal bindings (Nepalese patuka) within the rural female community in Nepal. Increased abdominal pressure from bindings might trigger gastric reflux symptoms. Abdominal binding has also been linked to high rates of uterine prolapse within Nepal.<sup>15</sup> Similarly, the relatively high frequency of musculoskeletal pain might be partly due to the heavy manual labour of Nepalese agricultural workers. In addition, ophthalmological problems may present less commonly in UK general practice than in Nepalese health camps as many UK patients with visual acuity problems will first see an optician rather than a GP.

### *Implications for future research or clinical practice*

One clear benefit from running the camps has been the incredible mutual learning opportunities for both UK and Nepalese doctors and medical students. For UK doctors and students, the camps afford an opportunity to encounter disease presentations that only rural developing world medicine can provide. Equally, for Nepalese doctors and students, the opportunity to help their local community as well as share ideas and teaching opportunities with UK staff is equally beneficial.

Despite treating over 1900 patients, it is difficult to know whether health camp initiatives help to achieve long-term health improvements to an area. An analogy for 3-day health camps can be like placing a small plaster across an open wound. It treats the problem short term but undoubtedly, longer term solutions

may be needed. Although we cannot deliver sustainable ongoing care alone, the charity Health Partnership Nepal has since established yearly health camps in Nepal and funding has recently been acquired to provide a Nepalese rural health care worker all year round for the local community ([www.hpnepal.org](http://www.hpnepal.org)).

Overall, the study has indicated a significant disease burden within rural areas of Nepal and variations in presenting problems between the UK and Nepal. Although more rigorous research is required, we recommend recruiting GPs and ophthalmologists for similar rurally based health camps.

Clearly, there are still vast challenges to overcome in reducing inequalities in health on a global scale.<sup>22–24</sup> Charitable initiatives such as the one outlined in this paper may make a small contribution, but the main benefit may be in providing a valuable educational experience for both UK and Nepalese medical staff and students.

## How this fits in

There are few published data on diagnoses and health needs of people attending rural health camps in developing countries such as Nepal.

The most common complaints were stomach pain, musculoskeletal pain and visual acuity problems in adults and helminthiasis, conjunctivitis and upper respiratory tract infection (URTI) in children.

Camps were an excellent learning opportunity for both UK and Nepalese health professionals and students. For future camps, we recommend recruiting GPs and ophthalmologists.

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For further information about the charity and to help with future projects, please visit [www.hpnepal.org](http://www.hpnepal.org).

## Declaration

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Conflict of interest: none.

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