



Policy Options for the Effective Management of Acute Pain among Households in Nakuru

Macai J.N, Wanzala P.,Ng'ang'a Z.

Laikipia University

Corresponding Author: John N. Macai, (MPH), Laikipia University P.O Box 2666–20100 Nakuru, Kenya.
Telephone: 0722 312928, Email: macaijohn@gmail.com

SUMMARY

Background: The effective management of acute pain remains a challenge to many households especially in resource-poor countries. In Kenya, the healthcare seeking behaviour associated with management of acute pain has not been clearly documented.

Methods: A pre-tested questionnaire was used to collect data from 404 randomly selected households in Nakuru County. The sampled households were surveyed three times, the first was to establish the prevalence of acute pain and subsequent surveys assessed the effectiveness of treatment methods used by the patients. It was hypothesized that the interplay between perception of pain, human capital, social capital and burden of pain would be associated with effective management of acute pain. A logit model that utilizes Gibbs sampling and data augmentation was used to establish factors that explain the use of effective healthcare services following the onset of acute pain.

Results: The mean age of the respondents was 28.85 years (SD = 10.30), with 53 percent being males. The prevalence of acute pain was estimated to be 51 percent (95% credible interval 46% to 56%). Effective management of acute pain was found to be related with perception of pain with a one additional unit of pain perception being associated with a 0.006 increase in effectiveness. In turn perception of pain was related to human capital, social capital and the burden of pain. Males and membership to voluntary associations were negatively associated with the perception of pain. However, age and pain intensity had positive relationships with perception of pain.

Conclusion: In order to effectively manage acute pain, the primary measure upon which health educationists and policy planners should focus attention on is to enhance the perception of pain. Such a policy option could be effected by a variety of techniques, including reduction in the number of voluntary groups one belongs to, or instead, by increasing the general experience of patients. Pain perception could also be effected by reducing the intensity of pain of the patients.

Key Words: Acute Pain, Perception of Pain, Pain Intensity, Social Capital, Human Capital

[Afr J Health Sci. 2013; 26:183–188]

Introduction



Acute pain is a major health and socioeconomic problem in the world. It is estimated that 22 percent of primary care patients complain of acute pain [1]. In the United States of America, an estimated 25 million people experience acute pain as a result of injury or surgery and between 70 and 90 percent of advanced cancer patients experience this type of pain [2]. Inadequately managed acute pain has major physiological, psychological, economic, and social ramifications for patients, their families and society [3]. The economic impact of acute pain on budgets of developing countries is yet to be estimated, however, it is thought that these budgets suffer considerable losses due to acute pain [4]. This underscores the need for aggressive control of acute pain and especially in resource-poor countries which have weak healthcare delivery systems.

Pain is usually defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage [5]. In research settings, pain is commonly classified as either acute or chronic [2]. Acute pain is a normal response to tissue damage experienced during trauma, surgery, or illness, rarely exceeds three months and resolves during the healing process. Thus, acute pain serves as a warning of tissue damage or danger [6]. Due to this important biological function, an understanding of the epidemiology of acute pain is of paramount importance. Despite this significance, acute pain has not received commensurate attention both in literature and treatment. This apathy is immense in resource-poor countries [2] and hence the need to redress this situation.

The conventional medical view of managing pain is the use of analgesics and anti-inflammatory drugs

which are usually prescribed by clinicians [2, 6]. There are concerns, however, that many patients who require such drugs do not access them due to personal, legal, political, cultural and ethical reasons [7]. Patients suffering from acute pain also seek help from other professionals' such as psychiatrists and counselors. Patients are also known to engage other strategies such as indigenous knowledge based medicine and self treatment. The empirical support for the effectiveness of such pain relief methods is however limited. If not managed effectively, acute pain may result in immune and metabolic problems, as well as leading to chronic pain syndromes [8, 9].

Acute pain remains one of the most pressing challenges for households globally, especially among households in developing countries [10]. Data on the magnitude of acute pain and factors that are associated with its effective management in the developing world is rarely assembled. This lack of data obscures the real impact and consequences of acute pain to individuals, households and economies. Thus assembling data on the extent of acute pain is important since it has the potential to raise awareness about the magnitude of the problem. This study attempts to fill this gap in knowledge using household data from collected in Nakuru County.

Patients and Methods

Research Setting

This research was conducted within Nakuru County in Kenya. The cosmopolitan nature of the County offered a setting to investigate whether there are cultural diverse options for managing acute pain at the household level. The County is divided into 8 administrative divisions, which are in turn subdivided into 28 locations and 65 sub-locations. The divisions provide a natural stratification of households in the



County. Ngata division was randomly selected as the study site. Government data estimates that there are 3,040 households who are spread in the 10 locations of this division with each household having an average of 4.6 members [11]. Cartographic records for each of these locations were updated in the field, at least three months before the actual study.

Research Design

This was a longitudinal study that sought to establish factors that explain healthcare seeking behavior following acute pain among households in Nakuru County, Kenya. Respondents were recruited from randomly selected households and those found to have at least one member suffering from acute pain (exposure) were followed for six months to measure healthcare seeking behaviour (outcome). Data collection was done in three phases each of 3 months interval: baseline survey and three and six months later. The baseline survey was used to identify households with at least one member aged 18 years and above who had some complaints about acute pain. This baseline survey was also used to collect demographic characteristics of household members. Households with at least one member having acute pain were personally interviewed with a structured questionnaire two more times within the following six months to ascertain the pain management options pursued.

Sampling Procedure

The target population of this study included all the 3,040 households that reside in Ngata Division of Nakuru County. A sampling list of the households in the study site was constructed, where each household was given a unique identification number. This list was used to select the study sample. The

minimum sample size for this study was established from formula described by [12]:

$$n = \frac{Z^2 p (1 - p)}{e^2}$$

Z is the Z value for the corresponding confidence level (1.96 for 95 percent confidence level);

e is the margin of error (0.05) and p is the estimated value for the proportion of a sample that have acute pain (taken as 0.5 since this proportion is not known). Inserting these figures in the minimum sample size formula,

$$n = 384 \text{ households}$$

Measurement of Variables

The dependent variable in this study was effective healthcare option used to manage acute pain by the study respondents. This involved assessing whether patients considered themselves to have been managed effectively by the healthcare options they used following the onset of acute pain. Patients who indicated that the healthcare option(s) used were effective were labeled one otherwise zero.

Four sets of independent variables were assessed namely human capital, social capital, characteristics of pain and perceptions on pain. The socio-demographic characteristics of the survey respondents made up components of general human capital. These were assessed using the age, sex, educational attainment and social-economic class of the respondents. Social capital was measured using items selected from World Bank Integrated Questionnaire for the Measurement of Social Capital (SC-IQ) [13]. The items were used to assess the prevalence of groups and networks, and the



utilisation of trust, solidarity and reciprocity among the study participants.

The Short-Form McGill Pain Questionnaire (SF-MPQ-2) [14] which incorporates a series of adjectives to describe the characteristics and intensity of pain was used to assess the nature of pain. This is the most widely used pain measurement scale and its psychometric properties are well established [15].

Perception of pain was assessed in five dimensions which included (i) identity—the label the person uses to describe the illness and the symptoms they view as being part of the disease; (ii) consequences—the expected effects and outcome of the illness; (iii) cause—personal ideas about the cause of the illness; (iv) timeline—how long the patient believes the illness will last; and (v) cure or control—the extent to which the patient believes that they can recover from or control the illness. The respondents were then asked to circle the number that corresponds to their views on each item of the knowledge dimensions on a scale of 1 = least agreement to 10 = total agreement. A pain perception index for each respondent was calculated by summing up the individual item scores. This list of the dimensions of pain was generated through a careful scale development strategy (review of literature, expert interviews, formulation of a pre-version, application and statistical analyses such as factor, item and reliability analyses, scale improvement, and additional application and analyses).

All the measures of interest were then compiled into a structured questionnaire. This questionnaire was pilot tested using 40 households in the study area before the final survey. These households were not form part of the final sample size.

Data was collected using interviews with at least one recruited member of the selected household at their residences. The pre-tested questionnaires were administered by the researcher with the help of three trained research assistants.

Data Analysis

Data was initially cleaned, counter-checked for accuracy and then entered into a computer using Microsoft Excel. The created data file was then converted into WinBUGS (Windows Bayesian Inferences Using Gibbs Sampling) the software that was used for data analysis.

Data was initially summarized using frequencies, percentages, means and standard deviation (SD) and presented using contingency tables. Likert type questions were subjected to factor analysis. The numerical variables in the survey were then subjected to correlation analysis.

The determinants of effective management of acute pain were subjected to a logit model which was estimated from a Bayesian paradigm using a statistical model that exploits Gibbs-sampling and data-augmentation to make inferences. The procedures for conducting this estimation are well described in literature [16] and in this study they were executed in WinBUGs Release 14.

Ethical Consideration

Initial clearance to conduct this study was sought from Jomo Kenyatta University of Agriculture and Technology. Approval to conduct research was sought from the Scientific Steering Committee (SCC) and ethical clearance was obtained from the Kenya Medical Research Institute (KEMRI)/National Ethics Clearance Committee (SSC Protocol Number 1960).



Informed consent was also obtained from the study respondents voluntarily.

Patient data was held in strict confidentiality. Households were only identified during the study using codes to ensure privacy. The rights to privacy as enshrined in Kenyan legislation regarding medical research and the Helsinki Declaration were adhered to. Patients with high levels of pain that could not be managed at home (Present Pain Intensity ≥ 4 using the McGill Pain Questionnaire) were advised to seek attention in appropriate health facilities.

Results

In the baseline survey 404 respondents were sampled, 53 percent of whom were males and 47 percent females. The mean age of the respondents was 28.85 years (SD = 10.30). The youngest respondent was 18 years while the oldest was 84 years. Further, 46 percent of the respondents indicated that they were married with the other 54 percent saying they were not married. Moreover, 44 percent of the respondents had attained at least college level education. Using the expenditure approach, 57 percent of the sampled respondents indicated they were of low socio-economic status, 31 percent were of middle class and 12 percent were in the high expenditure bracket.

Fifty nine percent of the respondents suffering from acute pain stated that they were members of at least one voluntary group. The surveyed acute pain sufferers were members of an average of 1.35 (SD = 1.34) groups. The density of membership was not

normally distributed (Skewness = 1.99, SE = 0.17). The median number of groups per respondent was 1 (25th = 0, 75th = 2 percentiles).

Bayesian estimates of prevalence of acute pain indicate that it is 51 percent (95% credible interval 46% to 56%) in the study area (Table 1). The node statistics table lists the mean and standard deviation of the posterior distribution of the monitored quantity, θ as well as its median and the 95% Credible Interval.

Table 1: Prevalence of acute pain: posterior moments and quantiles

Pain type	μ	σ	Median	95% Credible Interval	
Acute	0.51	0.024	0.51	0.46	0.56
Chronic	0.11	0.016	0.11	0.08	0.14
None	0.38	0.024	0.38	0.33	0.43

A Pain Rating Index (PRI) was calculated by summing the intensity rank values of all the words chosen to describe the different kinds of pain using SF-MPQ-2. The descriptive statistics of the PRI among the surveyed acute pain sufferers and its individual items are shown in Table 2. The mean for PRI was 6.16 (SD = 6.04). On the 0–11 scale, item means ranged from 0.02 (pain caused by light touch) to 1.02 (throbbing).



Table 2: Descriptive statistics of SF-MPQ-2 items and pain severity scores of the respondents

SF-MPQ-2 Item	Mean	SD	Skewness	Kurtosis
Throbbing	1.02	2.19	1.96	2.35
Shooting	0.56	1.70	3.84	15.99
Stabbing	0.25	1.29	6.09	39.27
Sharp	0.94	2.29	2.57	5.89
Cramping	0.46	1.56	3.67	13.55
Gnawing	0.24	1.24	5.29	27.30
Hot-burning	0.38	1.45	3.91	14.48
Aching	0.66	1.86	2.77	6.51
Heavy	0.20	1.14	5.82	33.54
Tender	0.10	0.61	6.68	45.94
Splitting	0.19	1.11	6.21	38.09
Tiring-exhausting	0.14	0.89	6.97	50.28
Sickening	0.23	1.04	5.13	27.47
Fearful	0.05	0.53	11.87	147.86
Punishing-cruel	0.12	0.82	8.14	70.00
Electric shock	0.05	0.41	8.34	69.85
Cold-freezing	0.21	1.09	5.40	29.02
Piercing	0.08	0.57	8.26	73.67
Pain caused by light touch	0.02	0.28	14.21	202.00
Itching	0.09	0.64	7.50	58.42
Tingling or 'pins and needles'	0.09	0.65	7.56	58.25
Numbness	0.06	0.61	10.19	106.45
SF-MPQ-2 22-items (PRI)	6.16	6.04	3.62	18.55
PPI	1.92	1.02	0.46	-0.08



In addition pain intensity was measured using the Present Pain Intensity (PPI) scale. This is a verbal analogue scale (VAS) with values from 0 (no pain) to 5 (excruciating). The mean of PPI on a scale of 0 to 5 was 1.92 (SD = 1.02). The PRI and the PPI were highly correlated (Spearman's rho = 0.20, $p < 0.05$). This may be indicator of the concurrent validity of both these two measures of the intensity of pain.

The descriptive statistics of the respondents' ratings of the seven items used to assess perception of pain are offered in Table 3. The sampled respondents gave the dimension of treatment control the highest

average rating of 6.17 (SD = 3.70) while the timeline dimension was rated lowest at a mean score of 2.11 (SD = 2.01). This table includes as well the correlation coefficients of all the seven dimensions of the respondents' ratings on the pain perception items.

This table also presents the results of the single item that assesses the comprehensibility of pain by the study respondents (Item 8). This item was rated by the respondents at an average of 5.26 (SD = 3.74) and was significantly correlated with all but one of the dimensions of perception of pain namely timeline.

Table 3: Descriptive statistics and correlation coefficients on respondents' perception of pain

	Mean	SD	1	2	3	4	5	6	7	8
1. Consequences	3.17	3.07	1							
2. Timeline	2.11	2.01	0.40**	1						
3. Personal control	5.28	3.62	0.03	-0.16*	1					
4. Treatment control	6.17	3.70	0.27**	-0.01	0.65**	1				
5. Identity	3.25	3.07	0.63**	0.39**	0.06	0.30**	1			
6. Concern	4.88	3.73	0.51**	0.25**	0.35**	0.43**	0.47**	1		
7. Emotions	3.09	3.15	0.61**	0.31**	0.08	0.25**	0.57**	0.47**	1	
8. Comprehensibility	5.26	3.74	0.19**	-0.03	0.51**	0.54**	0.23**	0.47**	0.27**	1

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

A Pain Perception Score (PPS) was calculated by summing up the seven dimensions of pain and dividing by seven. This scale showed good internal consistency ($\alpha = 0.77$) and there was no damage to its internal consistency even if any of the individual

items was removed. There was substantial variation in this 7-item scale, with the average scores ranging from 0 to 8.29, on an 11-point (0-10) scale. The surveyed respondents had an average per-item score of 3.99 (SD = 2.14) on this 7-item scale.



The results show that only 50 (24 percent) of respondents suffering from acute pain sought medical attention from formal medical institutions which included the provincial general hospital, dispensaries and private hospitals and referral hospitals. Further, results show that the remaining 76 percent of the surveyed respondents did not seek formal medical attention outside home. Seventy percent of these respondents indicated that they were using conventional medicine, 10 percent used indigenous knowledge based methods, 9 percent used other alternative methods and the remaining 9 percent took no action.

This study hypothesized that the interplay of human capital, burden of pain and social capital leads to improved perception of pain which in turn results in choice of effective pain management options. A logit model was used to investigate the simultaneous effects of socio-demographic, burden of pain, social capital and perception of pain variables on effectiveness of managing acute pain. Variables were entered using backward stepwise elimination method. The results are reported in Table 4. The model had satisfactory properties for example it predicted 80 percent of the cases correctly. Perception of pain was positively associated with effective management of pain at home, with one additional unit of pain perception being associated with a 0.006 increase in effectiveness. Occupancy however had a negative influence on effectiveness, with each additional year of stay in the location being associated with a reduction of 0.016 on effectiveness in managing acute pain at home.

Table 4: Estimation results of a logit model for factors influencing effective management of pain among the respondents

	μ	σ	2.50%	97.50%
				%
Constant	0.484	0.10	0.278	0.687
		6		
Pain	0.006	0.00	0.002	0.009
Perception		2		
Occupancy	-	0.00	-	-0.008
	0.016	4	0.024	

The regression coefficients obtained by using stepwise regression testing are shown in Table 5. The reported results are all significant at the 5% level. Thus, each of the reported covariates has a significant impact on perception of pain. Focusing on the parameter estimates themselves, the male sex is associated with a 7.50 decline in score of perception of pain. Further, the addition of one unit in the pain intensity is associated with a 2.47 increase in the pain perception score. Group diversity on the other hand is inversely associated with the perception of pain, with the more diversified membership to a group is the less the PPS. The likelihood of getting help from close neighbours is negatively associated with PPS, with a one unit increase in likelihood of obtaining help being associated with a 2.46 decline in perception of pain scores. Age is positively associated with PPS, with a one year increase in life being associated with a 0.26 increase in perception of pain score.



Table 5: Results of Regression Analysis of Factors Affecting the Perception of Pain

	μ	σ	2.50%	97.50%
Constant	46.1 6	6.1 6	34.12	58.26
Sex (Male)	- 7.50	2.1 5	- 11.74	-3.28
Pain Intensity	2.47	1.1 1	0.26	4.65
Diversity (Network)	- 1.85	0.3 7	-2.66	-1.12
Help (Neighbour)	- 2.46	0.9 4	-4.29	-0.61
Age	0.26	0.1 2	0.02	0.50

Discussion

A 51 percent prevalence of acute pain was estimated in the study site. This is quite a high figure in a population based study. This is suggestive that acute pain is a major health problem within the surveyed population.

The surveyed population used a variety of health options to manage acute pain which ranged from self medication, alternative medicine, and indigenous knowledge to visits to a variety of medical institution. The use of both ethnomedicine and biomedicine for the same episode of illness is widely practiced in the developing world [17]. It is therefore likely that there exists within the study site of differently designed and

conceived medical systems in regards to management of acute pain. It can therefore be argued that the study respondents see medical systems as either complimentary or supplementary and not competing.

The reported results show that most of the respondents suffering from acute pain were engaged in self medication. The use of conventional medicine was the most popular, followed a distance second by indigenous knowledge based methods, other alternative methods and simply taking no action. This result support literature that has documented the prevalent misuse of pharmaceuticals by people in Kenya [18]. This is a dangerous trend that that may lead to resistant drugs and drug addiction.

Further results show that a high proportion of the surveyed respondents considered that the health option they used to manage acute pain at home was effective. This was regardless of whether formal or informal methods of managing acute pain were used. Literature that can be used to compare this result is not readily available. However extant literature suggests that people usually perceive their actions in a favourable way [19].

The reported results indicate that social capital in the form of group diversity and obtaining help from neighbors was negatively associated with perception of pain. This result contradicts the literature that argues that social capital helps transmits knowledge [20]. Social capital is discussed in literature as either the resources (such as information, ideas, support) that individuals are able to procure by virtue of their relationships with other people or the nature and extent of one's involvement in various informal networks and formal civic organizations [13]. The negative relationship observed in this study may be



explained by the observation that the available groups and networks are deficient in requisite resources. The effects of social capital to on pain perception deserve a deeper empirical reflection.

Males were found to have poorer perception of pain when compared to women. This finding is not surprising since males are known to tolerate pain and sickness [21]. The idea of not being able to overtly show pain or emotions (such as fear about an illness) hinders men from feeling psychological relief as well as manifesting it in the medical encounter. It has also been suggested that men tend to report lower intensities of pain when compared to women [2]. Males should be encouraged to be more open in order to prevent the adverse outcomes that are associated with acute pain.

Age was found to be positively associated with the perception of pain. This may be explained as advanced age is associated with more episodes of pain, which leads to enhanced understanding of pain. Therefore age fosters the development of appropriate skills and attitude. It is therefore reasonable to expect that age contributes to human capital. Age is usually correlated with experience. Experience also translates into valuable episodic knowledge and is thus considered as a direct source of knowledge. Previous experience with health related activities provides individuals with a variety of resources that can be utilized in managing subsequent healthcare needs [22]. Previous experience can be used to enhance individual skills and reputations that can help to influence the reallocation of resources in subsequent healthcare needs.

A key result in this study was that pain intensity was associated with perception of pain. The burden of pain has been identified in literature as an important

predictor of healthcare seeking behavior. The overall burden of pain consists of the duration and the intensity of pain. Overall, perceptions about severity of illness have been associated with effective healthcare seeking behaviour [23].

Respondents with higher pain perception scores had effectively controlled acute pain. This result agrees with the literature that supports the role of knowledge in overcoming challenges [24]. It also supports the conceptual framework advanced in this study that perception of pain is an immediate determinant of effective management of acute pain. Enhanced knowledge of phenomena leads to better handling of the same.

Respondents who had stayed longer in the study area were found to have a lower perception of acute pain. It is not easy to explain why, but one cannot rule out spillover effects. It appears people who came to the study area earlier share a common culture which prevents them from effectively managing acute pain.

Conclusion

The policy-relevant variable having the greatest impact on managing acute pain effectively is enhanced perception of pain. Such a policy option could be effected by a variety of techniques, including reduction in the number of voluntary groups one belongs to, or instead, by increasing the general experience of patients. Pain perception could also be effected by reducing the intensity of pain of the patients.



References

1. Gureje O., Von Korff M., Simon G. E. and Gater R. (1998). Persistent Pain and Well-being: A World Health Organization Study in Primary Care. *Journal of American Medical Association (JAMA)*, **280(2)**:147–151. Available Internet: <http://jama.ama-assn.org/cgi/content/full/280/2/147> Accessed on July 15, 2009
2. The Pain Institute (2009). Acute Pain Management Manual. The Pain Institute
3. Brennan F., Carr D. B. and Cousins M. (2007). Pain management: a fundamental human right. *Anesth Analg*, **105**: 205–21.
4. World Health Organization (WHO) (1997). *Gender and Health a Technical Paper*. Available Internet: <http://www.who.int/frh-whd/GandH/Ghreport/gendertech.htm>. Accessed June 13th 2009
5. International Association for the Study of Pain (2009). *Classification of Chronic Pain*. 2nd Ed. Seattle: International Association for the Study of Pain (IASP) Press
6. Carr D. and Goudas L. (1999). Acute pain. *Lancet*, **353**: 2051–58
8. Shipton E. A. and Tait B. (2005). Flagging the Pain: Preventing the Burden of Chronic Pain By Identifying and Treating Risk Factors in Acute Pain. *European Journal of Anaesthesiology*, **22**: 405–412.
9. Australian and New Zealand College of Anaesthetists (2005). *Acute Pain Management: Scientific Evidence*. Melbourne. Australian and New Zealand College of Anaesthetists
10. Fisher R.A. (1973) *Statistical Methods and Scientific Inferences* 3rd Edition. Hafner London
11. Government of Kenya (2009). *Nakuru District Development Plan 2008–2012*. Government Printers. Nairobi
12. Bartlett J. E., Kotrlik J. W. and Higgins C. C. (2000). Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning, and Performance Journal*, **19** (1): 43–50.
13. Grootaert C., Narayan D., Nyhan J. V. and Woolcock M. (2004). *Measuring Social Capital: An Integrated Questionnaire (SC-IQ)*. Washington D.C.: The International Bank for Reconstruction and Development/The World Bank.
14. Melzack R. (1987). The Short Form McGill Pain Questionnaire. *Pain* **30**: 191–97
15. Melzack R. and Katz J. (2001). The McGill Pain Questionnaire: Appraisal and Current Status. In: Turk D.C. and Melzack, R. (Eds.) *Handbook of Pain Assessment*. 2nd Ed. New York: Guilford pp 32–52.
16. Albert J. and Chib S. (1993). Bayesian Analysis of Binary and Polychotomous Data. *Journal of the American Statistical Association*, **88**:669–679.
17. Sindiga I, Chacha N and Kamunah (1995). *Traditional Medicine in Africa*. East Africa Educational Publishers. Nairobi.
19. Mackian S. (2003). *A Review of Health Seeking Behaviour: Problems and Prospects*. Health Systems Development Programme. HSD/WP/05/03. University of Manchester
20. Hendryx S., Ahern M. M., Lovrich N. P. and McCurdy A. H. (2002). Access to health care and community social capital. *Health Services Research*



21. Doyal, L. (2000). Gender Equity in Health: Debates and Dilemmas. *Social Science and Medicine*, **51**:931–939.
22. Weller S.C., Ruebush II T. R. and Klein R. E. (1997). Predicting Treatment–Seeking Behaviour in Guatemala: A comparison of the Health Services Research and Decision–Theoretic Approaches. *Medical Anthropology Quarterly*, **11**(2):224–245.
23. Hausmann–Muela S., Muela–Ribera J. and Nyamongo I. (2003). Health–seeking Behaviour and the Health System Response. Disease Control Priorities Project (DCPP) Working Paper No. 14
24. Hausmann–Muela S., Muela–Ribera J. (2003). Recipe Knowledge: A Tool for Understanding Some Apparently Irrational Behaviour. *Anthropology and Medicine*, **10** (1):87–105.