ACUTE PAIN MANAGEMENT: PREVALENCE AND STRATEGIES FOR IMPROVEMENT IN NAKURU SUB-COUNTY, KENYA

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Acute Pain Management: Prevalence and Strategies for Improvement in Nakuru Sub-County, Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other Universitty.

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DEDICATION

To my late father Diomende Macai and my late mother Saraphina Macai

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ABBREVIATIONS AND ACRONYMS

ANOVA	*Analysis of Variance*
ASA	Acetylsalicylic acid
DIFF	Difference
FPC	Finite Population Correction
GLMs	Generalized Linear Models
IASP	International Association for the Study of Pain
IK	Indigenous Knowledge
ITROMID	Institute of Tropical Medicine and Infectious Diseases
KEMRI	Kenya Medical Research Institute
MCMC	Markov-Chain Monte Carlo Method
MOH	Ministry of Health
MPQ	McGill Pain Questionnaire
NERC	National Ethical Research Committee
DIFF	Difference
OD	Odds Ratio
OTC	Over-the-counter
PHC	Primary Health Care
POMP	Percentage of Maximum Possible
PPI	Present Pain Intensity
PPS	Perception of Pain Score
PRI	Pain Rating Index
RR	Relative Risk
SCC	Scientific Steering committee

SC-IQ	World Bank Integrated Questionnaire for the Measurement of Social Capital
SF-MPQ-2	Short-Form McGill Pain Questionnaire-2
TENS	ɪscutaneous Electrical Nerve Stimulation
USA	United States of America
WHO	World Health Organization
WinBUGS	Windows Bayesian Inferences Using Gibbs Sampling

DEFINITION OF KEY TERMS

Acute Pain:	Pain of recent onset and probable limited duration (usually ≤ 6 months), typically has an identifiable temporal and causal relationship to injury or disease and causes anxiety
Healthcare behavior :	Is defined as any action undertaken by individuals who perceive themselves to have a health problem or to be ill for the purpose of finding an appropriate remedy (Olenja, 2003).
Minimum efficient resources:	Least possible personal strengths that are required to manage acute pain

ABSTRACT

The effective management of acute pain remains a challenge to many households especially in resource-poor countries. In Kenya, healthcare seeking behavior associated with the management of acute pain at the household level has not been clearly documented. The aim of this study was to establish the prevalence of acute pain and derive strategies for improving its management. A longitudinal study design was utilized. At baseline, data on socio-demographic characteristics, perception of pain and the nature of acute pain were collected. Acute pain was assessed using the universally validated Short-Form McGill Pain Questionnaire. A pre-tested questionnaire was used to collect data from 404 randomly selected households in Nakuru County. The mean age of the respondents at the start of the study was 28.85 years (SD = 10.30), with 53% being males. The prevalence of acute pain at the inception of the study was estimated to be 51% (CI = 46-56). Respondents were resurveyed three and six months later to assess the effectiveness of the treatment options they had adopted to manage acute pain. At three months, 77% of all respondents with acute pain were successfully resurveyed. Six months later, 61% of all respondents with acute pain were contacted. Self-medication was the most prevalent treatment option used as it was practiced by 76% of the respondents during the entire study period. From self-reports, most of the respondents (77%) considered that the treatment option they used as effective. Statistical models that utilize Gibbs sampling and data augmentation were used to establish the factors that explain the use of effective healthcare services following the onset of acute pain. Respondents with superior perception of pain relative to their less endowed peers tended to report effective management of acute pain ($t_{196} = 3.12$, $\rho < 0.05$). Insightfully, sex, age, pain intensity, group diversity and obtaining help from neighbors were found to be statistically significant correlates of perception of pain. Male sex was associated with a

7.50 (CI = 11.74-3.28) decline in perception of pain. Further, the addition of one unit in the duration of pain was associated with a 2.45 (CI = 0.26-4.65) increase in the pain perception. Group diversity on the other hand was inversely associated with the perception of pain (β = 1.85, CI = 2.66-1.12). The likelihood of getting help from close neighbours was negatively associated with pain perception (β = 0.26, CI = 4.29-0.61). Further, results show that the studied sample required to enhance their perception of pain generally by 20.52% (CI = 12.99 - 39.47) in order to be in a position to manage acute pain effectively. The results therefore suggest that the parsimonious formulation adopted in this study, with effective management of acute pain postulated to depend on perception of pain which in turn depends on human capital, social capital and burden of pain is a good approximation of the actual decision-process affecting health care seeking behavior. Need therefore exists to avail iinformation on treatment options, goals, and likely benefits and probability of success. This can be effected by a variety of techniques, including empowering groups and networks, or instead, by broadening the experience of individuals. Pain perception can also be effected by reducing the intensity of pain. Advocacy activities, educational and promotional programs that focus on effective management of acute pain are recommended.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The understanding of pain as a major healthcare problem has been legendary. A common assumption in many societies has been the divine origins of pain. In this view pain is regarded as an unavoidable part of life where humans can only control it partially due to its presumed supernatural etiology (Witte & Stein, 2010). A purely medical theory of pain based on natural phenomena independent of divine powers where pain control is possible has also been propagated. In the last few decades this physiological concept of pain has been revised and expanded through the acceptance of the psychosocial and ethno-cultural dimensions of pain. The International Association for the Study of Pain (IASP) offers a widely accepted definition of pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Merskey & Bogduk,1994; IASP, 2012). Despite being fairly lean, the definition points to the complexity of pain processing, contradicts the oversimplified definition of pain as a purely nociceptive event and draws attention to various psychological influences of pain (Traue *et al*., 2010).

Pain, especially if unmanaged, should be seen as a multidimensional problem that can detrimentally affect the afflicted individual's physical and psychological aspects of life, activities of daily living and work. In other words it negatively impacts on the quality of life. Consequently, the relief of pain is a fundamental human right (Brennan, Carr & Cousin, 2007). The management of pain should therefore be part of the strategies that are utilized to improve the welfare of people.

Pain is ordinarily categorized as either acute or chronic. Acute pain is widely described as pain of recent onset and probable limited duration and usually has an identifiable temporal and causal relationship to injury or disease (Macintyre *et al*., 2010). On the other hand, chronic pain usually persists beyond the time of healing of an injury and frequently there may not be any clearly identifiable cause (Ready & Edwards, 1992). Chronic pain tends to receive more attention in literature and treatment when compared to acute pain (Todd & Miner, 2010). Acute pain has further been described as a normal response to tissue damage that is experienced during trauma, surgery, or illness, rarely exceeds three months and resolves during the healing process (Carr &Goudas, 1999). Broadly then, acute pain serves as a warning of tissue damage or danger. Despite this important biological function, acute pain has not received commensurate attention both in treatment and literature. Pointedly, an understanding of the epidemiology of acute pain is of paramount importance.

The management of acute pain has moved away from symptom management to the creation of a discipline of acute pain medicine. This discipline is rapidly changing. Valid and pragmatic assessment of acute pain is essential for effective pain management (Schug, Palmer, Scott, Halliwell, & Trinca, 2016). An important prerequisite in the design of effective strategies for managing pain is the assembling of adequate data on the epidemiology of pain.

Understanding human behaviour is prerequisite for improving health practices. A review of literature by Hausmann-Muela, Ribera and Nyamongo (2003) that is yet to be updated suggests that previous studies demonstrate that human behavioural factors are critical in the utilization of quality healthcare services. In this direction, an individual's traits or predisposing factors namely age, sex, marital status, socio-economic status, formal education, experience, general attide towards health services, and knowledge about the

illness have been linked to the choice of effective treatment therapies (Taffa & Chepngeno, 2005; Weller, Ruebush & Klein, 1997; Kosimbei, 2005). A variety of models and genres are used to isolate these individual characteristics (Hausmann-Muela, Ribera & Nyamongo, 2003). Very frequently, investigators adapt such models to the peculiarities of their research field or study area, or fuse various models, with the main aim to increase the repertoire of possible key factors rather than to achieve theoretical advancements. Results obtained using these models permit the evaluation of the relative weight of different factors in health behaviour such as choice between different treatment options.

In general, health-seeking behaviour models tend to overestimate the capacity for an individual to choose and follow behaviour which is considered adequate (McKian, 2003; Hausmann-Muela, Ribera & Nyamongo, 2003). The assumption that individuals are rational decision makers, that is, they prefer behaviours which are associated with the highest expected benefits is a major weakness of such models. In order to circumvent this concern, the present study borrows from behavioural economics and proposes a conceptual framework where individuals choose less than perfect options in light of the characteristics of disease (or condition), and their repertoire of social and human capital to manage acute pain. This conceptual framework will be used in analyzing the health-seeking behaviour of households in Nakuru County, Kenya, that have at least one of its members suffering from acute pain. Identifying the factors suggested in the framework along with their relative importance is crucial for strategy prioritization, given that different factors might be associated with particular strategic measures.

1.2 Conceptual Framework

The management of pain has attracted considerable literal attention (Todd & Miner, 2010). However, this attention has focused primarily on the management of chronic pain. Acute pain has not yet received adequate attention in literature. This implies that theoretical frameworks for analysing the management of acute pain are not readily available.

In order to examine the factors that are associated with effective management of acute pain at home this study proposes to utilise a conceptual framework that is derived from behavioral economics (Figure 1.1). Behavioral economics is a combination of both psychology and economics that investigates what happens when decision makers display limitations and are, as a result, not necessarily able to select their best options. In other words, behavioral economics uses rational choice models that take into account the cognitive limitations of both knowledge and learning ability (Camerer, Loewenstein & Rabin, 2004).

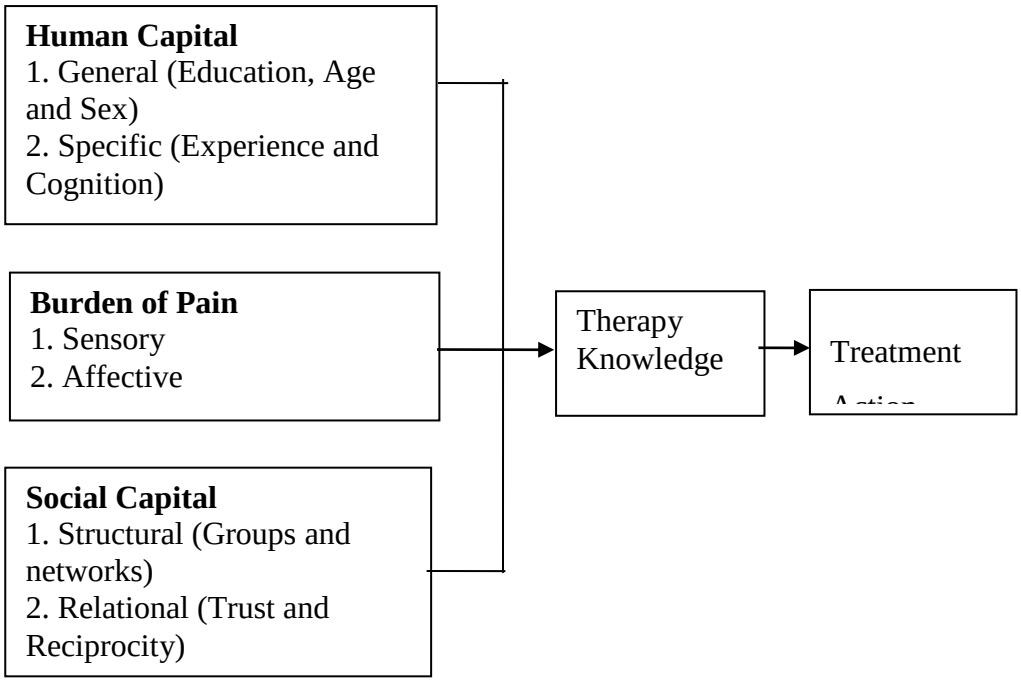

Figure 1.1: Factors that may influence effective management of acute pain. Source Researcher

Furthermore, behavioral economics suggests that less than perfect alternatives may nonetheless appeal to individuals and thereby may influence their decision making. Indeed, bounded rationality, a central theme in behavioral economics, is concerned with the ways in which the actual (as opposed to strictly rational) decision-making process influences the decisions that are eventually reached. Because of its nature, epidemiology lends itself well to a behavioral economics approach. Following this approach, this study proposed to combine socio-demographic variables with subjective perceptual variables to investigate which factors are more strongly linked to the utilization of health-care services after experiencing acute pain. Further, in line with behavioural economics, this

study argued that individuals may choose less than perfect alternatives in the management of acute pain at home.

The search for the factors that predispose individuals to choose different alternatives have attracted the attention of researchers for a long time. Marks *et al*. (2005) indicated that three sets of factors namely superior human capital, effective social capital and the nature of the disease or health condition influence healthcare seeking behaviour. Usually these three set of factors are examined in epidemiological literature independently (Hausmann-Muela, Ribera & Nyamongo, 2003; Mackian, 2003). However, in practice each set of factors is necessary, but not, in itself sufficient to influence effective health seeking behaviour. Thus, multiple factors are required, often in a specific temporal sequence.

A model of healthcare seeking behaviour that was utilized in this study proposed that superior human capital, perceptions about pain and effective social capital influence awareness and knowledge on available therapy choices for managing pain, which precedes the treatment action that is taken. In epidemiology, there is evidence that patients' knowledge about effective therapies determine the choice decision which in turn determines the treatment action taken (Hausmann-Muela, Ribera & Nyamongo, 2003). This model underscores that health seeking behaviour is dynamic and may involve the uptake of a treatment option (or non-uptake), rejection and re-taking decisions over time. At any given point in time, the decision to use a treatment option, reject or defer decision is thus postulated to be influenced by the belief derived from available knowledge.

Patients suffering from acute pain also pose additional challenges as they tend to change pain management therapy as their suffering progresses. The pathways involved in

health-care seeking behavior in the course of acute pain sequelae and the factors involved are not clearly understood. This limits the design of appropriate acute pain management strategies.

1.3 Statement of the Problem

Managing acute pain remains a major health and socio-economic problem in the world. Literature notes that pain treatment is low priority in healthcare systems, particularly in developing countries (Vijayan, 2011; Kopf & Patel, 2010; Size, Soyannwo & Justins, 2007). Consequently, there have been recommendations and increasing attempts towards adopting home-based care for patients suffering from acute pain in resource-poor countries (WHO, 2002a). It is not clear whether households in general have requisite knowledge and skills to offer home-based care for patients with acute pain. A search for effective and appropriate pain management strategies and guidelines for use in households is therefore appropriate.

A prerequisite for the development of effective pain management interventions for the use by households is sound empirical information on issues where action is required. However, data on the magnitude of acute pain, existing healthcare seeking behavior and associated factors following the onset of acute pain is not readily available. This problem is more pronounced in low-income countries such as Kenya where epidemiological data on acute pain is scarce. Consequently, this study aimed at establishing the burden of acute pain and strategies of improvement using a sample of households in Nakuru Sub-County, Kenya. The study considered that the selected population offered an appropriate setting for studying the epidemiology of acute pain since it is relatively homogenous, an attribute that allows circumventing cost and logistical challenges that are inherent in large scale studies.

1.4 Research Questions

1. What is the prevalence of acute pain among households in Nakuru Sub- County, Kenya?
2. Which healthcare options are used by households in Nakuru Sub- County to manage acute pain?
3. What factors influence the choice of effective healthcare options following the onset of acute pain among households in Nakuru-Sub County, Kenya?
4. What is the minimum efficient resource base that is required for effective management of acute pain at home?

1.5 Research Objectives

1.5.1 General Objective

To establish the prevalence of acute pain and strategies of improvement among households in Nakuru Sub-County, Kenya.

1.5.2 Specific Objectives

1. To determine the prevalence of acute pain among households in Nakuru-Sub County, Kenya.
2. To establish the healthcare options used in managing acute pain by households in Nakuru Sub- County, Kenya.
3. To establish factors that influence the choice of effective healthcare options following the onset of acute pain among households in Nakuru County, Kenya.
4. To determine the minimum efficient resources required for effective management of acute pain at home.

1.6 Hypothesis

Hypothesis 1: The burden of pain, human capital and social capital jointly influence the perception of pain.

Hypothesis 2: The perception of pain influences the effective management of acute pain at the household level.

1.7 Justification and Significance of the Study

The study addresses a community health concern that is largely given low priority in the formal healthcare system in the Kenya. If the study findings are well exploited a reduction in visits to health facilities and improvement on family health and the economy at large will be observed.

This study validated the WHO (2002a) recommendation that home-based care be offered to patients with acute pain in resource poor countries. The study is therefore of use to the government and other healthcare service providers who will gain informed alternatives to choose from if they desire to promote home-based care as an option for the management of acute pain. The study is also of use to households which stand to benefit from a greater understanding of their healthcare seeking behavior and the factors involved.

Data on acute pain in Kenya is not routinely assembled, and this compromises the development of evidence based health policy on acute pain management at home. This study aimed at establishing baseline data that can be used to evaluate the effects of home based care following the onset of acute pain, and thus validating WHO (2002a)

recommendations. This study also aimed at producing reliable data that can be used to develop appropriate interventions for managing acute pain at the household level.

Most of the published reports on the epidemiology of acute pain are from the developed countries and are cross-sectional in nature and thus do not offer strong cause-effect relationships. This study extended the current knowledge on acute pain in two ways. First it offers data on the extent of acute pain in a developing world setting. Second, the study extends the boundaries of epidemiology by adopting concepts in behavioral economics to examine healthcare seeking behaviour following the onset of acute pain. In this direction, this study examined whether individuals choose less than perfect alternatives to manage acute pain at the household level.

This study helps in furthering the understanding and documenting respondents' perceptions on acute pain and its management. Results of this study can be used as baseline data in a framework meant for monitoring and evaluation of actions taken by individuals to manage acute pain at the household level. The study further provides feedback on personal strengths and weaknesses of the study respondents as far as management of acute pain is concerned. This study has the potential to guide the respondents' future learning, foster a habit of self-reflection and self-remediation and promote access to further learning as far as the management of acute pain at the household level is concerned.

1.8 Limitations of the Study

This study may have suffered from the problem of panel attrition. At the six month time interval 39% of all respondents with acute pain were not contacted. This loss of study participants in the course of time even though expected may have bias the results of the study. To surmount this problem, this study focused on a carefully defined study area

and population. The respondents were also sufficiently motivated to continue participating in the study through showing them the possible personal benefits they will reap from the study. The respondents were specifically informed that their responses will help them in their understanding of acute pain and its subsequent management.

A comparison of the drop-outs and those who complete all the data collection rounds on important socio-demographic characteristics was also conducted in order to rule out any possible differences in the two groups. No statistically significant differences in socio-demographic characteristics were observed among the drop-outs and respondents who completed the three data collection rounds were noted.

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition of Acute Pain

Pain is generally defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (Merskey & Bogduk, 1994; IASP, 2012). Pain is further considered as a multidimensional problem that can detrimentally affect the afflicted individual's physical and psychological aspects of life, activities of daily living and work. In other words it negatively impacts on the quality of life.

Pain is commonly classified as either acute or chronic. Acute pain is widely described as pain of recent onset and probable limited duration and usually has an identifiable temporal and causal relationship to injury or disease (Macintyre *et al*., 2010). On the other hand, chronic pain usually persists beyond the time of healing of an injury and frequently there may not be any clearly identifiable cause (Ready & Edwards, 1992). Table 2.1 summarizes the main differences between acute and chronic pain.

Table 2.1: Characteristics of Acute and Chronic Pain

Acute Pain	Chronic Pain
A symptom of injury or illness	Is the actual problem/medical condition
Serves a biologic purpose	Has no biologic function
Causes anxiety	Causes depression
Associated with identifiable pathology	May or may not be associated with identifiable pathology
Is present for < 6 months	Is present for > 6 months
Example: Postoperative pain	Example: Musculoskeletal pain

Source: Adapted from Macintyre *et al*. (2010) and Ready and Edwards (1992)

There are concerns that the classification of pain as either acute or chronic may not be informative from a treatment point of view (Woolf, 2004). It is also increasingly recognised that acute and chronic pain may represent a continuum rather than distinct entities (Shipton & Tait, 2005). That is, if not managed effectively, acute pain may result in immune and metabolic problems, as well as lead to chronic pain syndromes. Elsewhere, it has been noted that the importance of original triggers of pain (such as somatic processes and significant stress levels) tend to diminish as the disorder progresses and psychological chronification mechanisms gain prominence (Traue *et al*., 2010). Despite these reservations, the classification of pain as acute or chronic is a common feature in research settings (Macintyre *et al*., 2010). Thus, to allow comparisons of the results of the current study with the existing body of knowledge on pain management, the distinction was retained.

Inadequately managed acute pain has major physiological, psychological, economic, and social ramifications for patients, their families and society. It is estimated that 22 percent of primary care patients complain of acute pain (Gureje *et al*., 1998). In the United States of America (USA), 80% of the estimated 99 million patients who undergo surgery annually report acute pain (Apfelbaum *et al*., 2003) and over 70% of the annual emergency department visits are due to such pain (Todd & Miner, 2010). In Australia, it is estimated that 20 percent of its people experience acute pain (Macintyre *et al*., 2010). In the USA, lost productive time (measured in terms of absenteeism as well as reduced productivity while at work) due to common pain is estimated to cost $61 billion a year (Stewart *et al.,* 2003). In Australia it is estimated that pain leads to lost workdays and reduced-effectiveness workdays amounting to 36.5 million total lost workdays which cost the economy $5.1 billion annually. The economic impact of acute pain on budgets of resource-poor countries is yet to be estimated, however, it is thought that these budgets suffer considerable losses due to acute pain (Kopf & Patel, 2010).

Further, acute pain remains one of the most pressing challenges for households in resource-poor countries (Soyannwo, 2010). Regrettably, data on the magnitude of acute pain is rarely assembled in such countries. 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.

2.2 Health Care Options

Medical systems refer to patterned interrelated body of values and deliberate practices, governed by a single paradigm of the meaning, identification, prevention and treatment of sickness (Sindiga, 1995). They are conceived and designed in a particular way and reflect part of the cultural and social patterning of the society in which it is part of. Broadly there exist two medical systems namely Indigenous Knowledge (IK) based medicine and western medicine. Patients with acute pain seek health care options based on these two broad medical systems.

IK based medicine or ethno-medicine refers to the aggregate of a group's beliefs, strategies, behavior and interaction with environment that pertains to sickness, its management and health status. It concentrates on adaptation of knowledge and is less formal both it its social organization and research methods. In IK based medicine, the treatment process goes beyond addressing symptomatology of sickness to discovering its deep-seated causes. In IK based medicine the causes of ill-health are considered to be either natural or human induced. Both organic and psychological attributes of sickness are said to occur concurrently.

Western medicine or biomedicine largely views disease as physical or mechanical disorders (organic malfunctioning). It views the causes of disease as ranging from diet,

enzymes, genes, organs, pathogens, climate to social problems. It further separates the physical and psychological components of ill-health. This somehow means that patients and doctors use different value systems and frames of reference which may lead to patient disillusionment with the treatment process. This explains partly why people in developing countries seek alternative therapies (Sindiga, 1995). Since patients utilize different medical systems, separately or jointly, it is necessary to study the existing systems in order to see how they can be brought to work together for the enhancement of health.

It has been observed that there exists in a single society of differently designed and conceived medical systems. The use of both ethno-medicine and biomedicine for the same episode of illness is widely practiced in the developing world. It is said that patients use both to maximize chances of regaining health. Moreover, people in the developing world see medical systems as either complimentary or supplementary and not competing. Since the late 1970s there has been a shift from emphasis on curative health policy to promotive and preventive services. In this direction, WHO has advocated for Primary Health Care (PHC) (Alma Ata International conference on PHC, 1978). This policy shift was reaffirmed in 1987 by the 40th World Health Assembly. This policy advocates for the use of local human and material support. Some writers have interpreted this to include IK based medicine (Sindiga, 1995). WHO (2002b) also urges strongly for the recognition of IK in healthcare delivery systems. Illness and disease sometimes have multiple causes in which case symptoms become confusing which leads to pragmatic therapy-seeking by patients in both IK based medicine and western medicine. A detailed understanding of both systems, including their contribution to healthcare at all levels is required.

2.3 Management of Acute Pain

There are two broad methods of managing acute pain. The conventional medical view of managing pain is the use of analgesics and anti-inflammatory drugs (Carr & Goudas, 1999). Pain and discomfort in everyday life are often treated with over-the-counter (OTC) analgesic medications. For example it is estimated that up to 70% of the population in Western countries use analgesics regularly, primarily for headaches, other specific pains and febrile illness (Abbott & Fraser, 1998). OTC analgesics are also widely used to treat dysphoric mood states and sleep disturbances. It is not however clear whether the patterns of use of OTC analgesics are consistent with good pain management practices. These drugs are remarkably safe, but serious side effects can occur. High levels of OTC analgesic medication use have for example been associated with psychiatric illness, particularly depressive symptoms, and the use of alcohol, nicotine and caffeine. A further disturbing example is that phenacetin, which was taken off the market in the 1970s, had intoxicating effects. Additionally, more than 4 g per day of acetylsalicylic acid (ASA) or acetaminophen over long periods is generally considered as abuse (Abbott & Fraser, 1998). The possibility that such OTC analgesics drugs have subtle properties needs therefore to be systematically investigated. Further, a better understanding of patterns of OTC analgesics use is needed to determine the extent of problem use, and whether health could be improved by educating people about the appropriate use of these drugs. There are further concerns, however, that many patients who require such drugs do not access them due to personal, legal, political, cultural and ethical reasons (Scholten *et al*., 2007). Consequently, there are concerted efforts from individuals and health-based organizations to address the barriers to access of necessary drugs for the management of acute pain.

Acute pain can secondly be managed using indigenous knowledge (IK) based therapies (Gagnier, 2010; Tasso & Behar-Horenstein, 2004). Such therapies include among others, the use of herbs, acupuncture, massage and transcutaneous electrical nerve stimulation (TENS). These complimentary therapies may work through either direct analgesic effects (such as in the case of acupuncture), by anti-inflammatory action (for example with herbs) or even by distraction (as with music therapy). Consequently, they affect the perception of pain, assist in relaxation, improve sleep, reduce symptoms such as nausea, neuropathy, vomiting and anxiety or depressed mood as well as relieving pain. Complimentary therapies are further credited for being low-cost, minimally or non-invasive, comforting and for offering patients a widened variety of treatment options (Cassileth & Gubili, 2010). Further, they are holistic as they address the body, mind and spirit and thus enhance patients' quality of life. The empirical support for such IK based pain relief methods is growing rapidly but is currently limited and far between. Additional empirical evidence should therefore be gathered in order to offer support (or not) for the use of IK therapies in the management of acute pain. The extent of use of IK in the management of acute pain among households, especially in low resource-settings should also be documented, a task that this study attempted to accomplish.

Pain is the most common problem that makes patients in low resource countries like Kenya to often undertake self-treatment at home (Soyannwo, 2010). Self-treatment takes many forms from buying drugs over the counter, preparing herbal concoctions, meditation, and bed-rest to doing nothing. Self-treatment can also be sought from significant others such as family members, friends, other patients, neighbors and medicine vendors. Recommendations from such significant others may be effective for simple and uncomplicated pain but patients may be forced to seek for alternative therapies in cases of severe and persistent pain. A major concern currently is that data validating the effectiveness of self-treatment on the onset of acute pain at home is not

readily available. It is also not clear whether households have the capacities to offer quality home-based pain management care. Furthermore, the factors that influence the choice of self-treatment at home on the onset of acute pain are largely unknown. It is therefore necessary to provide data to validate home-based pain management. This study attempted to fill this gap in knowledge.

Patients suffering from acute pain also seek help from formal healthcare providers who include both medical and psychosocial specialists such as clinicians, psychiatrists and counselors. It is estimated that pain complaints constitute between 10 and 20 percent of primary care consultations globally (Gureje *et al*., 1998). In the United States of American (USA), pain is the primary complaint in about 50 percent of patients who seek medical treatment (Turk & Dworkin, 2003). Pain is further thought to be the most common problem that makes patients to visit formal health care providers in most resource-poor countries. Unfortunately, pain management specialists and dedicated pain clinics are few or non-existent in such countries. Frequently too, the available networks of health facilities operate without doctors or essential analgesics. This situation is quite pronounced in rural areas where most of the people in resource-poor countries live. In such gloomy environments, patients expect pain as an inevitable part of health interventions and thus tend to rate any available help as satisfactory (Soyannwo, 2010). All efforts must therefore be made to promote effective pain management in such settings, a goal that can be duly informed by provision of quality data on the utilization of formal healthcare services following the onset of acute pain.

2.4 The Nature of Health-care Seeking Behaviour

Health-care seeking behaviour has been defined as any action undertaken by individuals who perceive themselves to have a health problem or to be ill for the purpose of finding

an appropriate remedy (Olenja, 2003). There are two widely recognised approaches to the definition of the term health-care seeking behaviour. The first approach has been described as the end-point utilisation of the health-care system. McKian (2003) observes that there is a general tendency for studies to focus specifically on the act of seeking healthcare as defined officially in a particular context (mainly visiting trained allopathic doctors). Studies on pain management are not an exception. However, patients have been reported to choose alternative healthcare providers such as traditional healers, village homeopaths or untrained allopathic doctors above formally trained practitioners or government health facilities for some kinds of illness (Government of Kenya [GoK], 2003). The end-point utilisation approach is criticised for its failure to appreciate that patients may consult different practitioners rather than seek care through one avenue or provider.

An alternative way to operationally define health-care seeking behaviour is to adopt the processes or pathway approach (Hausmann-Muela, Ribera & Nyamongo, 2003). This approach emphasises successive therapy choices and describes health-care seeking behaviour as a sequence of remedial actions that are taken to rectify perceived ill-health. Nyamongo (2002), for example, has elaborated a descriptive model which includes treatment sequences and switching from one therapy modality to another. The strength of pathway approach is its ability to depict health-care seeking behavior as a dynamic process. It is therefore possible to organize predictor variables sequentially according to different steps in the health-care seeking process such as recognition of symptoms, decision making, medical encounter, evaluation of outcomes and re-interpretation of illness which determine the course of the therapy path. Consequently, this approach offers an opportunity to identify key junctions where there may be a delay in seeking competent care and is therefore of potential practical and policy relevance.

2.5 Determinants of Health-care Seeking Behaviour

Human capital comprises cognitive characteristics of individuals, achieved attributes and accumulated habits and experience that may have a positive or negative effect in productivity (Becker, 1993). In this study productivity is viewed in the context of epidemiology as effective healthcare seeking behaviour. Since human capital can be seen as an input, this study proposes to explore human capital-based determinants of effective healthcare seeking behaviour following the onset of acute pain among households in Nakuru Sub- County.

Human capital comprise aspects ranging from an individuals achieved attributes, education attainment, experience, family background characteristics, attitudes and motivations, sex, ethnic origin, specific know-how, competencies and capabilities to age. Individuals develop their human capital over time, which can then determine the extent to which resources necessary for the choice of effective healthcare seeking behaviors can be accessed and leveraged. The traits of an individual have been linked to effective healthcare seeking behaviour (Weller, Ruebush & Klein, 1997; Hausmann-Muela, Ribera & Nyamongo, 2003). However, such studies have only identified a few of these factors singly, implying that the interactive effects of multiple human capital-based determinants of healthcare seeking behaviour are not known. Further, such studies fail to anchor the identified individual traits on robust theoretical frameworks and therefore specification of how and why the different factors affect therapeutic selection is limited. This implies that the studies fail to help in the development of an accumulated and related body of literature. Probably, of immediate concern to this study is that previous epidemiological studies on healthcare seeking behaviour have not paid sufficient attention to the management of acute pain.

Knowledge is usually assessed in literature on healthcare seeking in order to see how far community knowledge corresponds to biomedical concepts. Typically knowledge is assessed using questions about causes and symptoms of the illness under study. However, the extent into which knowledge actually determines practice remains an unresolved question in health-seeking behaviour studies (Hausmann-Muela, Ribera & Nyamongo, 2003). The uncertainties of illness and non-reasoned behavior usually complicate the relationship between knowledge and effective healthcare seeking behavior. In most occasions, the symptoms of illness are diffuse and ambiguous and the courses of illness or treatment outcomes are unexpected. Facing uncertainty, people follow a trial and error search for relief and meaning. Under these circumstances, even good biomedical knowledge may not affect behaviour. At the other extreme, a very clear symptomatology may automatically activate certain actions, without reasoning about the nature of illness and its appropriate treatment. Further, enquiry about the role of other types of knowledge tends to be highly neglected in studies on healthcare seeking behaviour.

Literature distinguishes between declarative knowledge and procedural knowledge (Berge & van Hezewijk, 1993). Declarative knowledge refers to an understanding of the principles behind phenomena such as the causes or characteristics of pain. On the other hand, procedural knowledge refers to knowing the procedures for how to do things and arises from experience with similar situations. It is difficult to formalize, articulate, and transfer between contexts and is therefore rare and inimitable. When such knowledge is also valuable and organized, it can provide individuals with sustainable advantages. Procedural knowledge can be equated with the concept of recipe knowledge. This knowledge is like a recipe book containing formulae for solving routine problems. The recipe knowledge for treating an illness is a scheme for therapeutic action, implying a culturally learned and well-established repertoire of

actions which provides guidance about what to do and when to do it. Recipe knowledge has practical value and is largely unrelated with etiological concepts and beliefs (Hausmann-Muela & Ribera, 2003). The effect of procedural knowledge and non-reasoned behaviour in general on health-seeking behaviour is neglected in behavioral studies.

Procedural knowledge is considered to be valuable since it is highly immobile and has general applicability. It permits individuals to predict more accurately the nature and potential of changes in the environment and the appropriateness of strategic and tactical actions. Without such knowledge, individuals are less capable of taking advantage of emerging opportunities. Consequently individuals with higher levels of procedural knowledge will be expected to have superior performance. In health, we should expect that individuals with superior knowledge will utilize effective pain treatment options.

One of the most influential theoretical concepts in the analysis of human capital is the distinction between general and specific knowledge (Becker, 1993). In this perspective, human capital consists of a hierarchy of skills and knowledge with varying degrees of transferability across situations. These skills and knowledge can either be specific to a situation, suggesting that they are difficult to transfer across situations or generic, meaning that they are transferable across situations. This hierarchy can be adapted to reflect the context of effective healthcare seeking behaviour following the onset of acute pain management. General human capital is generic to all types of health related activities and includes aspects such as education, age and gender. In contrast, specific human capital is more or less exclusively applicable to the management of acute pain and includes aspects such as experience with pain, attitudes towards pain and capabilities of managing pain.

Education is an important means through which knowledge can be gained. Education is related to knowledge, skills, problem-solving, discipline, motivation and self-confidence. These attributes enable highly educated individuals to cope better with problems and have skills to search for the resources they require. Indeed there is evidence that higher educational attainment is associated with effective healthcare seeking behaviour (Weller, Ruebush & Klein, 1997). However, education on its own is unlikely to provide individuals with a competitive advantage since it is not rare or inimitable. Knowledge gained through education is articulable, meaning that it can be codified and thus can be written and easily transferred. It follows then that individuals can enhance their ability to choose effective healthcare seeking behaviour if they combine skills and attributes gained through education with other resources.

Traditionally, women have been associated with lower levels of education and limited exposure with the paid employment. Consequently women have fewer opportunities to gain relevant knowledge and have greater difficulty in assembling resources. It may therefore be expected that women may not be in a position to cope better with problems or have the necessary resources to access effective healthcare (WHO, 1997). However, feminist literature suggests that women have developed effective mechanisms for coping up with their presumed limitations (Beasley, 1999). Following this observation, women are expected to have health related coping mechanisms that are equal to if not superior to those of men. Literature shows that men not only have often higher labour risks than women, but also that certain risk behaviors are socially valued, denoting virility (Doyal, 2000). On the other hand, 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. Men also tend to seek medical attention late so as not show their weaknesses, or do not comply with health advice that implies a change in habits if they are considered feminine. The studies on gender, implicitly or explicitly, depart from

the idea that health behaviour not only depends on a person's knowledge, will and capacity, but also on the position which they occupy in society. Literature indicates that women tend to utilize highly effective healthcare seeking behaviours (Taffa & Chepngeno, 2005; Doyal, 2000). It has also been suggested that women tend to report higher intensities of pain when compared to men (WHO, 1997). Following these observations we expect that women will tend to report greater utilization of effective healthcare seeking behaviour than men.

Age is usually correlated with experience. Therefore age fosters the development of appropriate skills and attitude. Extant literature suggests that younger guardians and mothers of children are predisposed towards accessing effective healthcare options (Kosimbei, 2005). It is therefore reasonable to expect that age contributes to human capital until the diminishing effects associated with old age set in.

Experience is an important aspect of human capital. Previous experience 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 (Weller, Ruebush & Klein, 1997). Previous experience with available healthcare options can be used to enhance individual skills and reputations that can help to influence the reallocation of resources in subsequent healthcare needs. Therefore greater levels of experience should lead to the utilization of effective healthcare seeking behavior.

Cognition is a crucial aspect of human capital. Leventhal *et al.* (1984) propose that situational stimuli (such as symptoms) generate both cognitive and emotional representations of the illness or health threat. These representations are processed in parallel through three stages. The individual first forms the representation of the illness

or health threat, next, they adopt behaviours to cope with this, and, lastly, they appraise the efficacy of these behaviours. The results of such an appraisal process may be fed back into the formation of the illness/threat representation and the adoption of coping responses. Early research identified five dimensions within the cognitive representation of illness (Petrie *et al.*, 1997). These dimensions are summarised in Table 2.1 below. The emotional representation incorporates negative reactions such as fear, anger, and distress. Ongoing research over the past 30 years has demonstrated the importance of illness representations to patient behaviour (Broadbent *et al.,* 2006). Therefore cognitive and emotional representations of acute pain are likely to play a crucial role in determining healthcare seeking behaviour.

Table 2.2: Dimensions of cognitive representation of pain

Dimension	Description
Identity	The label the person uses to describe acute pain and the symptoms they view as being part of the ailment
Consequences	The expected effects and outcome of the acute pain
Cause	Personal ideas about the cause of the acute pain
Timeline	How long the patient believes acute pain will last
Cure/control	The extent to which the patient believes that they can recover from or control the acute pain.

Source: Adapted from Broadbent *et al.,* (2006)

Direct and indirect treatment costs are among the most commonly mentioned obstacles to adequate health-seeking behaviour by the poor (Worrall *et al.*, 2003). Even where direct costs are affordable or medical services are free, indirect costs (for transport,

special food) can limit access to treatment or lead patients to interrupt therapies (Hausmann-Muela, Ribera & Nyamongo, 2003). Weller, Ruebush and Klein (1997) identifies availability of health services, financial resources that can be used to purchase treatment, health insurance and social network support as important enabling factors for healthcare seeking. The poor tend to lack such enabling factors. Treatment costs also signify a higher burden for the poorer households compared to the more affluent. The relative proportion of income that is used by the poor to cope up with illness is higher when compared to other socio-economic classes. Consequently poor households are expected to use less effective treatment options in cases of ill-health.

The burden of pain has been identified in literature as an important predictor of healthcare seeking behaviour. The overall burden of pain consists of the duration and the intensity of pain. A fundamental feature of current theory and research on pain is the distinction between the sensory and affective components of pain which are considered integral components of an individual's response to pain that should be assessed separately (Jensen & Karoly, 2001). These components of pain are usually assessed using the McGill Pain Questionnaire (MPQ) sensory and affective subscales, which have been shown to distinguish the sensory qualities of pain from its affective qualities in acute postoperative pain and birth-labor pain (Melzack & Katz, 2001). Overall, perceptions about severity of illness have been associated with effective healthcare seeking behaviour (Hausmann-Muela, Ribera & Nyamongo, 2003).

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 (Grootaert *et al*., 2004). Social capital is a multidimensional concept which is most frequently defined in terms of the groups,

networks, norms, and trust that people have available to them for productive purposes. A range of social problems-crime, health, poverty, unemployment-have been linked empirically to a community's endowment of social capital (or lack thereof).

The theoretical distinction between structural and relation social capital (Adler & Kwon, 2002) is important for analysis. Structural social capital refers to the types of groups and networks that individuals can call upon, and the nature and extent of their contributions to other members of those groups and networks. In contrast relational social capital refers to an individuals' subjective perceptions of the trustworthiness of other people and key institutions that shape their lives, as well as the norms of cooperation and reciprocity that surround attempts to work together to solve problems. The concept of relational social capital reflects the belief that levels of interpersonal trust, engagement in civic affairs, and reciprocity norms among citizens in a community determine the extent of cooperative and mutually beneficial behaviors occurring within the community. Relational social capital improves the likelihood and impact of community accountability mechanisms, and accountability mechanisms help protect and improve access to healthcare care (Hendrix *et al*., 2002).

The structure of a given network (who interacts with whom, how frequently, and on what terms) has a major bearing on the flow of resources through that network. Those who occupy key strategic positions in the network, especially those whose ties span important groups, can be said to have more social capital than their peers, precisely because their network position gives them heightened access to more and better resources (Burt, 2000). Social capital offers important information about the nature of and management of illness and may therefore influence healthcare seeking behavior positively (McKian, 2003). Consequently, we expect that individuals with higher levels of social capital will utilize more effective healthcare services on the onset of acute pain.

CHAPTER THREE

RESEARCH METHODS

3.1 Study Site

This study was conducted in Nakuru Sub-County in Kenya (Appendix 1). Nakuru, is the fourth largest town in Kenya with a population of approximately 471,514 people, with nearly an equal male to female ratio and 74% of whom are below 30 years old (GoK, 2009). The main economic activities in the County are commercial farming (48 percent of the household income in the district is derived from agriculture) and urban based business activities. Provision of quality healthcare is a major developmental challenge in this county. Poverty which is estimated to be at 45 percent, contributes to the poor health status of the population. Consequently, the County's health indicators are not encouraging. The Sub-county is faced with continued high infant, child and maternal mortality levels, high birth rate and increasing re-emergence of diseases. The onset of HIV/AIDS has had a profound negative effect on the health of the County's population (6.7% HIV prevalence rate). Other problems in the health sector include limited access to health services, the high cost of drugs, inadequate funding and high cost of health care.

Despite a life expectancy at birth (55.6 years) which is higher than the national average (51.0 years), the county still faces many health challenges. Several difficulties have been the result of its tremendous growth associated with its status as a major administrative and commercial centre. An annual rate of population growth of approximately 7% over the past three decades–compared to a national rate of 2.6% and an urbanization rate of 47% compared to the national urbanization rate of 37% has led to a dramatic increase in demand for basic services and infrastructure (GoK, 2009), an enormous challenge for

public authorities. Growth in the refugee population (especially the Sudanese) is another challenge due to the poor health and immunization status of newcomers. The establishment of a hospice within the Rift Valley Provincial General Hospital is an indicator that pain is a major public health concern in the district. Further, the Cosmopolitan nature of the County offers a setting to investigate whether there are cultural diverse options for managing acute pain at the household level.

3.2 Research Design

This was a longitudinal study that sought to establish the prevalence of acute pain and strategies for improvement among households in Nakuru County, Kenya. Longitudinal studies are useful for offering potentially stronger causal investigations, permit plausible generalizability and allow examination of natural course of disease, survival or insightfully recovery patterns. They are further advantageous in that they have less potential for recall bias. Longitudinal studies however suffer from challenges of loss to follow up and differential nonresponses. Weighing their advantages relative to disadvantages, longitudinal studies are indispensable in epidemiologic studies.

This was a longitudinal study where the investigator identified the study population at the beginning of the study and accompanied the subjects through time of the study. Effective management of acute pain was examined at baseline, three and six months post exposures.

Data collection was done in three phases each of 3 months interval: baseline survey and three and six months later. This study begun with the onset of acute pain and followed the subjects for six months to measure outcomes of healthcare seeking behaviour. The study population (subjects with acute pain) was identified at the beginning of the study and prevalence rate of acute pain in the study area determined. The baseline survey was

used to identify households with at least one member aged 18 years and above who had of acute pain. The baseline survey was also used to collect demographic characteristics of household members. Outcomes were measured in the study subjects until reaching the six months endpoint in accordance with the common definition of acute pain. Households with at least one member having acute pain were interviewed two more times within the following six months to ascertain the pain management options pursued and their effectiveness.

This design adopted in the study permitted the observation of healthcare seeking behavior of household members on the onset of acute pain over time. Choice of this study design allowed for the analysis of not only the overall trends but the effectiveness of healthcare seeking behavior following the onset of acute pain. This study design also helped to show the precise patterns of persistence or change in healthcare seeking behavior over time. Longitudinal studies have the inherent advantage of providing information describing processes over time.

3.3 Target Population

Nakuru Sub-county County is divided into 8 administrative divisions, which are in turn subdivided into 28 locations and 65 sub-locations. Table 3.1 presents the total area of these administrative divisions together with the number of households in each. The divisions provide a natural stratification of households in the County.

Table 3.1: Distribution of households in Nakuru-County (Nakuru District),

Division	Area (Km^2)	Number of Locations	Number of Sub locations	Number of Households
Nakuru Municipality	18.6	3	10	56,269
Lanet	38.1	2	6	10,119
Baruti	36.8	2	6	2,048
Rongai	261.4	5	10	3,415
Kampi ya Moto	305.3	4	8	14,374
Ngata	197.9	5	10	3,040
Mbogoini	203.2	3	6	6,758
Solai	253.8	4	9	6,281
	1484.1	28	65	102,304

Source: GoK, 2009

Ngata Division is cosmopolitan as the other divisions in Nakuru Sub-county. It is estimated that there are 3,040 households who are spread in the 10 locations of this division. These households were the target population of this study. Each household has an average of 4.6 members (GoK, 2009). Cartographic records for each of these locations were updated in the field, at least three months before the study.

3.3.1 Inclusion Criteria

Only household members ≥ 18 years old and residing permanently in the study site were recruited.

3.3.2 Exclusion Criteria

Households that did not have at least one member complaining of acute pain were excluded from the study. Respondents who had not attained the age of 18 years were also excluded. In addition respondents who had no intention of residing in the study area within the six months corresponding to the data collection period of this study were also excluded. Further, respondents who complained of chronic pain were not included in the study. Respondents who were unlikely to cooperate or would not be available in all scheduled visits were also excluded from this study. Respondents who had participated in any other device or drug clinical trial within the previous month before the onset of this study were also dropped. Any respondent with physical or mental incapacity, which made it impossible to offer informed consent and/or patients with legal incompetence were also excluded. Respondents with a history of drug or alcohol abuse and those with an underlying terminal condition were also not be recruited. Patients with severe pain that could not be managed at home (Present Pain Intensity ≥ 4 using the McGill Pain Questionnaire) were not recruited but were advised to seek appropriate medical attention.

3.4 Sampling Procedures

The study sample was selected from households in Ngata Division based on mapping work done earlier. Village maps were used to assign households and guide the research assistants during the baseline survey.

The estimated minimum sample size for independent longitudinal studies was calculated using an alpha value of 0.05 at 95% confidence interval, a power of 80%, 3-time intervals, a correlational coefficient of 0.7 and an attrition rate of 5% to be a minimum of 396 households using formula provided by Hedeker, Gibbons and Waternaux (1999).

The basic assumptions in the calculation of the minimum sample size were derived from a pilot study and related literature. The formulae for calculating the minimum sample size is illustrated as:

$$N = \frac{[z_{\alpha} (2\bar{p}\bar{q})^{1/2} + z_{\beta} (p_1q_1 + p_2q_2)^{1/2}]^2 (1 + (n-1)\rho)}{n (p_1 - p_2)^2}$$

Where

p_1 = response proportion in group 1 ($q_1 = 1 - p_1$), taken as 0.77

p_2 = response proportion in group 2 ($q_2 = 1 - p_2$), taken as 0.61

$\bar{p} = (p_1 + p_2)/2$

$\bar{q} = 1 - \bar{p}$

ρ is the common correlation across the n observations, taken as 0.7

n = 3 time points

This formula gives the minimum number of case subjects required (N) to detect a true relative risk with a two-sided type I error probability α (alpha), power (β), that is the type II error and considering three time periods. An alpha level of 5% is the usual choice for α (taken as 1.96). The usual value for power (probability of detecting a real effect) is 80% which was taken as 0.842 (Kothari, 2009). Given, β = 1- power, N is the continuity corrected sample size, that is the number of control subjects per experimental subject, p_1

is the probability of event in controls, p_2 is the probability of event in experimental subjects, and $Z\alpha$ is the standard normal deviate for the probability p.

Using the Kish Grid Method, one individual was selected at random from each of the sampled households (Kish, 1965). A total of 420 households were visited and a total sample of 404 participants agreed to be interviewed. The demographics and reasons for the refusal were recorded in notebooks by the research assistants.

3.5 Measurement and Definition of Variables

The dependent variable in this study was effective healthcare option used to manage acute pain at home. This involved assessing whether a patient considered himself or herself to have been effectively cured by the chosen healthcare options following the onset of acute pain. Patients who indicated that the healthcare options used was effective were labeled one otherwise zero. Three sets of independent variables were assessed namely human capital, perceptions on pain and social capital. General human capital was assessed by the age, sex, educational attainment and social-economic class of the respondents. Age was taken as the number of years since birth, sex took two values, 1 for males and 0 for females while education was assessed as the highest level of formal schooling attained. The socio-economic class of the respondents was assessed from an expenditure point of view as is suggested by GoK (2003). Respondents were requested to indicate the average amount of money they spend in a month and this were later categorized into low income (below Kshs. 7431), middle income (between Kshs 7431 and 11312) and high income (greater than Kshs. 11312).

The Short-Form McGill Pain Questionnaire (SF-MPQ-2) (Melzack, 1987) 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 (Melzack and Katz, 2001). In addition pain intensity was measured using the Present Pain Intensity Scale (PPI). This is a descriptive pain intensity scale with values ranging from 0 (no pain) to 5 (excruciating).

Social capital was measured using items selected from World Bank Integrated Questionnaire for the Measurement of Social Capital (SC-IQ) (Grootaert, 1999). The selected items were used to assess the prevalence of groups and networks, and the utilisation of trust, solidarity and reciprocity among the study participants. The selected items of this survey instrument reflect structural social capital (group membership) and relational social capital (subjective perceptions of trust and the main ways in which social capital operates). The application of this survey instrument in the contexts of developing countries is well discussed in literature and its psychometric properties have been demonstrated (Grootaert *et al.*, 2004).

Knowledge was measured using a scale that was developed by the researcher. A list of all possible dimensions of knowledge 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). Five dimensions of cognitive representation of pain that were assessed 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 knowledge index for each respondent was calculated by summing up the individual item scores.

3.6 Data Collection Tools and Procedures

A structured questionnaire was used to collect data (Appendix 2A-D). This research tool was made up of both close-ended and likert-type questions. Data was collected using interviews with household members at their residences. The questionnaires were administered by the researcher with the help of three trained research assistants.

The research assistants initially made a courtesy call to the selected households. If no member was present during the visit two more visits were arranged at different times of the day. Once adult members in the selected household were identified, the research assistants introduced themselves and the purpose of the study. The general socio-demographic questionnaire was then administered. The research assistants then enquired if any member of the household was suffering from pain. If the response was positive, the McGill Pain Questionnaire was administered.

Data was collected in three phases, each at three months interval. In the first phase, baseline data on the sample was collected. This data included socio-demographic characteristics and any episode of acute pain. In the second phase, data on healthcare seeking behaviour of respondents with acute pain was collected three months after the baseline. In the third phase, (six months after the baseline) similar data on healthcare seeking behaviour was solicited. The data collection process took six months to complete.

3.6.1 Validity of Data Collection Instruments

The validity of the research tool was tested in two steps. First, variables were extracted from previous literature and evaluated for relevance. Second, experts in epidemiology and pain management helped in the validation of variables for this study. The extracted variables were given to two groups of experts as suggested by Mugenda & Mugenda (2003). One group was asked to assess what concepts the research instrument was trying to measure while the other was asked to determine whether the selected items accurately represented the concepts under study.

A pretest was then conducted with 40 households before the final survey. These households were not part of the final sample size. The major purpose of the pilot study was to check the face and content validity of the questionnaire. It also helped to estimate the completion time for administering the research tool. Responses from this exercise were only used to improve the quality and administration of the research tools for this study.

The pre-tested questions were then compiled into a structured questionnaire. The questionnaire was then double translated, first into Kiswahili and then back into English to cater for the members of the sample that were not conversant with English.

3.6.2 Reliability of Data Collection Instruments

The reliability of the questionnaire was assessed using the internal consistency technique (Mugenda & Mugenda, 2003). In this approach, a score obtained in one item was correlated with scores obtained in other items in the instrument. Cronbach's Coefficient Alpha were then calculated to determine how well items correlate with each other.

Following Kothari (2008), alpha levels of above 0.70 were considered as acceptable in this study.

3.7 Data Management and Analysis

Data was initially cleaned, counter-checked for accuracy and then entered into a computer using Microsoft Excel. Data was entered twice, with the second time having a data entry programme checking that exactly the same data is entered as in the first time. The created data file was then converted into WinBUGS, (Windows Bayesian Inferences Using Gibbs Sampling) the software that was used for data analysis.

The survey data was initially summarized using frequencies, percentages, means and standard deviation (SD). The data was then presented using graphs, charts and contingency tables. Likert type questions were subjected to factor analysis. In the factor analysis, the principal component analysis procedure using varimax rotation was used. Scale items were then tested for reliability using Cronchba's alpha.

The magnitude of acute pain was established using frequencies, percentages and graphs. It was further presented along sex, age and social economic class. Healthcare seeking behavior options were presented using percentages and a pie chart. These options were also presented along sex, age, social economic class and characteristics of pain.

Conventionally, prevalence is defined as the number of affected persons present in a population at a specific time divided by number of persons in the population at that time. It is however difficult to identify the characteristics of any given population in this sense. Population characteristics can help predict the possible end results of health problems and your risk for certain diseases. They can also show how diseases can develop and change over time and from one place to another. Population characteristics

include sex, age, race and ethnicity, and socioeconomic factors, such as how much money and what kind of job you have.

Consequently, the estimation of the prevalence of acute pain in the study area was done from a Bayesian paradigm using a statistical model that exploits Gibbs-sampling and data-augmentation to make inference about a single binomial proportion. This involved first setting up a simple binomial model with x successes in n trials as the data, and a beta (1, 1) prior density. Then a bernoulli model with success parameter, θ was estimated as the likelihood distribution. The versatile package WinBUGS (the MS Windows operating system version of BUGS: Bayesian Analysis Using Gibbs Sampling) was used to implement this binomial model.

Contrast for the success rate of different healthcare options were also made from the Bayesian paradigm. The difference (DIFF), the odds ratio (OR) and the relative risk (RR) were obtained from a simple binomial model with x successes in n trials as the data, and a beta (0.5, 0.5) prior density. A Bernoulli model with the parameters of interest was selected as the likelihood function. This model was executed using WinBUGS.

The analysis of factors that influence healthcare seeking behavior involved several steps. First, the numerical variables in the survey were subjected to correlation analysis. This exercise helped to identify the factors that are associated with healthcare seeking behaviour. It also helped to establish whether multicollinearity posed problems in estimation of the econometric model.

A generalized linear regression model was then used to establish the key factors that are associated with perception of pain. This statistical analysis involved the estimation of a beta regression model using the maximum likelihood method. This model was

considered appropriate due to the bounded nature of the presumed pain perception index [0-1]. The model was also deemed as appealing due to its ability to utilize outputs as probabilistic estimates since they are in a range and the possible interpretation of the coefficients in terms of the 'logodds' ratio.

Beta regression models are among the most widely used members of the broad family of Generalized Linear Models (GLMs) in the case of bounded dependent variables. Typically, GLMs depend on a probability model that describes an event's probability as the distribution function of any given independent variable. GLMs can be expressed in the form:

$$E(y) = g(x'\beta) \quad (1)$$

Where y is a response variable, x is the vector of explanatory variables, β is the vector of model parameters and g is the link function. The model is bounded when the dependent variable takes any values between 0 and 1 and the inclusion of a logistic cumulative distribution function (CDF) as a link function obtains a logit model.

The model may succinctly be expressed as:

$$Y = X\beta + \varepsilon \quad (2)$$

With Y being a m X 1 vector of the response variable. Further, on the right hand side of equation (2), X is an m x K matrix of covariates, β is a k X 1 vector of regression coefficients and ε is a m X 1 vector of random errors. The errors were assumed to take standard logistic distributions. The dependent variable was an index of pain perception scale. The respondents' socio-demographic, burden of pain and social capital were the independent variables.

This pain perception score was not presented in its raw form but was converted to a percentage of maximum possible (POMP) score. This involved taking the raw score of each individual and subtracting the minimum score and then dividing the result by the possible scoring range.

> POMP = (x_i – the minimum score) / (the maximum score minus the minimum score)

In this formula, x_i is the raw score for each study subject. Effectively, the formula converts the raw scores into 0-1 interval. Higher scores indicate a higher intensity of pain perception. If multiplied by 100, the converted scores effectively become percentages. This scoring method effectively standardizes the scores (Fischer & Milfont, 2010).

Bivariate statistical analytical tools (t-tests) were then used to establish whether the perception of pain was associated with effective management of acute pain.

The third step involved estimating an econometric model which was used to establish the factors involved in the choice of effective healthcare services on the onset of acute pain using a Logit model. The estimation of this model was done from a Bayesian approach. In this approach, statistical inferences about quantities of interest are described as modifications of the uncertainty about their values in the light of evidence, and Bayes' theorem precisely specifies how these modifications should be made (Albert and Chib, 1993). The equations depicting the healthcare seeking decision across the study respondents can be arranged in matrix form as:

$$z = x\,\alpha + u$$

Where

$z = (z_1, z_2, \ldots, z_n)'$ is a vector of latent effects of independent variables of interest;
$x = (x_1', x_2', \ldots, x'_N)'$ is an N x k matrix of the respondents specific covariates;
$\alpha = (\alpha_1, \alpha_2, \ldots, \alpha_k)'$ is a vector depicting the impacts of the covariates on the latent effects; and vector $u = (u_1, u_2, \ldots, u_N)'$ contains the random errors.

Assuming independence across the respondents, each element of u has a normal distribution with mean zero and variance (due to identification) constrained to equal to one. With these details at hand, estimation difficulties (arising from the need to evaluate integrals appearing in the likelihood function) are easily overcome by following the developments in Albert and Chib (1993). Specifically, by noting that although the joint distribution of the unknown quantities *z* and α are intractable, the full conditional distributions comprising the posterior have well known forms. Moreover, these well-known forms are easy to sample from and hence, a Gibbs-sampling data-augmentation algorism can be constructed for the purpose of simulating draws from the joint posterior. This algorithm was used to compute means, standard errors and to plot histograms of any characteristic of interest in the posterior.

While the impact of the selected covariates on the latent variable (that is effective management of acute pain) are important themselves, special interest resides in computing a measure of additional resources required by each of the households with problems managing acute pain. Specifically, these measures are estimates of the additional levels of the regressors that make each household with trouble managing acute pain in the sample become active in effective healthcare seeking behaviour. This question is answered directly as a by-product of data augmentation, showcasing the power of Bayes estimation methods in policy formation. In this study, means and

implied standard errors were used to infer confidence intervals (95 percent). The procedures were executed in WinBUGs Release 14.

The minimum resources needed to enhance effective management of acute pain at the household level was estimated as a by-product of the Gibbs sampling with the logit model. In reporting, the results corresponding to the non-participating households were rearranged so that the first observation in the set corresponds to the household that is 'nearest' to effectively managing acute home and the last observation is the one that is 'farthest' from effective pain management; where 'near' and 'far' are defined with reference to the units of measurement of the covariate in question. Means, medians and line graphs were then used to present the results.

3.8 Ethical Considerations

Approval and clearance to conduct research was sought from the Scientific Steering Committee (SCC) and Ethical consent was obtained from the National Ethical Clearance Committee and a letter of authorization referenced KEMRI/RES/7/3/1 obtained (Appendix 3). Further informed concept was sort from all the study respondents.

Data collected from the households was handled with outmost confidence. Households were only identified during the study using codes to ensure privacy. 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.

The rights to privacy as enshrined in our legislation regarding medical research and the Helsinki Declaration (World Medical Association, 2008) were adhered to. The study participants were recruited and written informed consent obtained from those persons

willing to voluntarily participate in the study. The participants were made aware of the nature of the study and its anticipated benefits. They were further assured that the study did not pose any potential risks and were reminded about their rights including the right to withdraw from the study at any point. The questions asked to the study participants did not invade on their privacy and did not pose any pain or harm. The questions did not have a right or wrong answer.

The assistance of the local leaders such as the area Assistant Chief, Chief and the Divisional officer were sort to sensitize the concerned communities on the conduct and anticipated benefits of this research. Religious leaders, youth groups, women groups and school heads were also approached in an effort to sensitize the community of this study. The results of the research findings were communicated to the research participants through an elaborate dissemination plan.

CHAPTER FOUR

RESULTS

4.1 The Characteristics' of the Study Sample

4.1.1 Introduction

This section describes the study sample. This is done in four sub-sections. The first subsection describes the response rate in the three data collection rounds. The second presents data on the demographic characteristics of study the respondents. The next section examines the nature of social capital among the respondents while the fourth section presents data on the respondents' extent of perception of pain. This will help offer the requisite background to data analysis in order to help examine the key objectives of this study.

4.1.2 The Response Rate

A total of 404 households were surveyed in the baseline survey. The collected data showed that 206 of individuals within the surveyed households suffered from acute pain at the inception of the study. Three months later, 158 (77%) of all respondents with acute pain were successfully resurveyed. Six months later, 125 (61%) of all respondents with acute pain were contacted (Figure 4.1).

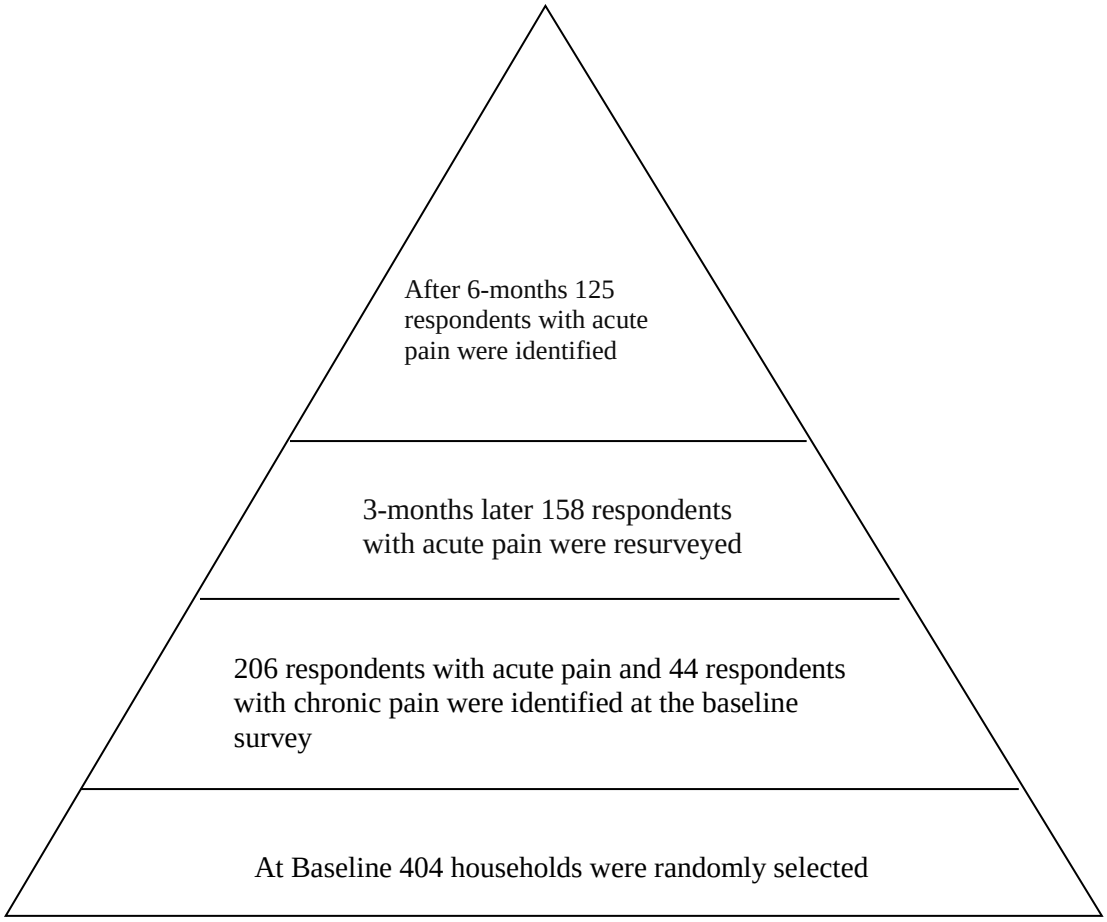

Figure 4.1: The Process of Respondent Contact

A comparison of the drop-outs and those who completed all the data collection rounds on important socio-demographic characteristics was also conducted. No statistically significant differences in socio-demographic characteristics were observed among the drop-outs and respondents who completed the three data collection rounds were noted.

4.1.3 Demographic Characteristics of the Respondents

The collected data show that at the baseline survey, 53% of the respondents were males while the remaining 47% were females. The mean age of the respondents was 28.85 years (SD = 10.30). The youngest respondent was aged 18 years while the oldest was 84

years. There were no statistically significant differences in the mean age of males (mean = 29.54, SD = 10.83) and females (mean = 28.08, SD = 9.65 [$t_{401} = 1.42$, $\rho > 0.05$]) (Table 4.1).

Table 4.1 Distribution of respondents by age and sex

Age in years	Sex of Respondents		
	Female	Male	Total
	Frequency (%)	Frequency (%)	Frequency (%)
18-19	18 (9)	7 (3)	25 (6)
20-29	116 (61)	130 (61)	246 (61)
30-39	34 (18)	50 (23)	84 (21)
40-49	15 (8)	12 (6)	27 (7)
50-59	3 (2)	7 (3)	10 (2)
60 and above	4 (2)	8 (4)	12 (3)
Total	190 (47)	214 (53)	404 (100)

Most of the respondents had attained college level education (44 percent). The sex distribution of the respondents along the highest level of education attained is shown in Table 4.2. No statistically significant differences in education attainment along sex were observed ($\chi^2 = 4.99$, $\rho > 0.05$).

Table 4.2 Distribution of highest level of education attained among respondents by sex

Level of education	Sex of Respondent		Total
	Male	Female	
	Frequency (%)	Frequency (%)	Frequency (%)
Primary	21 (5)	14 (4)	35 (9)
Secondary	69 (17)	64 (16)	133 (33)
College	87 (22)	89 (22)	176 (44)
University	33 (8)	22 (5)	55 (13)
None	4 (1)	1 (0.2)	5 (1)
Total	214 (53)	190 (47)	404 (100)

Majority of the respondents (57%) had attained post-secondary level of education. There were no statistically significant differences in the mean age of respondents with post-secondary education (mean = 29.16, SD = 9. 37) from those with secondary education and below (mean = 28.43, SD = 11.45, [$t_{401} = 0.70$, $\rho > 0.05$]) (Table 4.3). Most of the respondents in their second decade of life had attained post-secondary education (61 percent).

Table 4.3 Distribution of the highest level of education attained by age group among the study respondents

Age	Educational Attainment		Total
	Secondary and Below	Post-Secondary	
	Frequency (%)	Frequency (%)	Frequency (%)
19 and below	22 (6)	3 (1)	25 (6)
20-29	97 (24)	149 (37)	246 (61)
30-39	34 (8)	50 (12)	84 (21)
40-49	9 (2)	18 (5)	27 (7)
50-59	2 (1)	8 (2)	10 (2)
60 and above	9 (2)	3 (1)	12 (3)
	173 (43)	231 (57)	404 (100)

Only 46% of the respondents indicated that they were married with the other 54 percent saying they were not married (Figure 4.2). Twenty two (22) percent of the sampled males were married while 23% of the females were married. There were no statistically significant differences in marital status among the sexes ($\chi^2 = 1.92$, $\rho > 0.05$). Twenty seven (27%) percent of the respondents who indicated that they were married and 31% of those that indicated they were not married had attained post-secondary education, proportions that were not significantly different ($\chi^2 = 0.22$, $\rho > 0.05$).

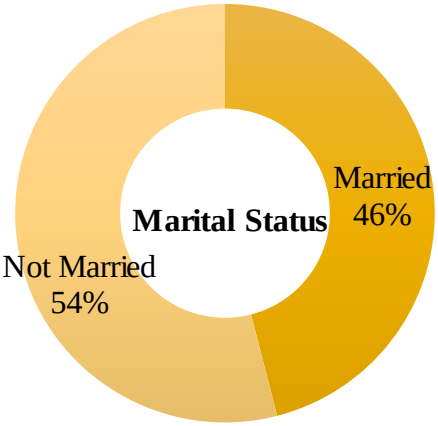

Figure 4.2: Distribution of Marital Status among the Respondents

From the expenditure approach, 61% of the sampled respondents indicated they were of low socio-economic status, 32 percent% were of middle class and 7% were in the high expenditure bracket. There were no statistically significant sex differences along socio-economic status among the sampled respondents (Table 4.4).

Table 4.4: Distribution of Socio-Economic Status by Sex among the sampled respondents

Social Economic Status	**Sex of Respondents**		
	Female	Male	Total
	Frequency (%)	Frequency (%)	Frequency (%)
Low	120 (63)	127 (59)	247(61)
Medium	59 (31)	70 (33)	129 (32)
High	11 (6)	17 (8)	28(7)
Total	190	214	404 (100)

One way Analysis of Variance (ANOVA) with Scheffé post hoc tests showed significant differences in socioeconomic status by age of the sampled respondents [$F(398, 2) = 28.45$, $\rho < 0.05$]. Respondents who indicated that they were of low socio-economic status had the lowest mean age of 25.61 years (SD = 7.82) which was significantly different from that of respondents with middle level (mean = 32.55, SD = 11.98) [$\rho < 0.05$] and high level social-economic status (mean = 33.55, SD = 9.75) [$\rho < 0.05$]. There were no differences in the mean ages of respondents who indicated that they were of middle level and high socio-economic status ($\rho > 0.05$).

Most of the respondents who indicated that they were of low socio-economic status were more likely to have secondary education and below (62%) while those who indicated they spend more every month were likely to have post-secondary education (92%) (Table 4.5). This difference was statistically significant ($\chi^2 = 81.34$, $\rho < 0.05$).

Table 4.5 Distribution of socio-economic status by educational attainment

Educational attainment	Socio-economic Status			Total
	Low	Medium	High	
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Secondary and Below	141 (62)	27 (21)	4 (8)	172 (43)
Post-Secondary	88 (38)	99 (79)	45 (92)	232 (57)
Total	228 (100)	126 (100)	49 (100)	404 (100)

Most of the sampled respondents who indicated that they were of low socio-economic status were not married (70%) while a majority of those with high socio-economic status were married (78%) (Figure 4.3). The differences between socio economic status and marital status were statistically significant ($\chi^2 = 54.92$, $\rho < 0.05$).

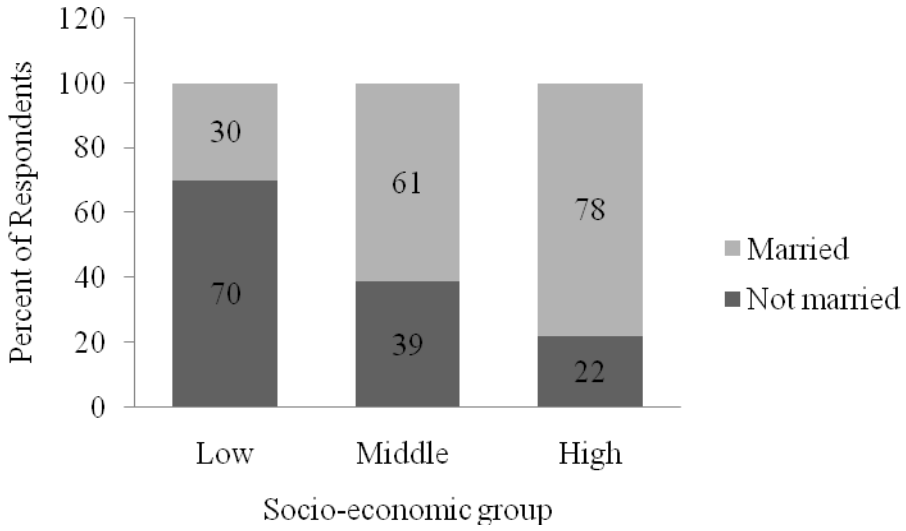

Figure 4.3: Distribution of socio-economic status by marital status of the study respondents

4.1.4 The Respondents Stock of Social Capital

4.1.3.1 Structural Social Capital

Membership into groups is one important measure of structural social capital. The density of membership was measured by the average number of memberships of each household in existing organizations. Fifty nine percent of the respondents suffering from

acute pain stated that they were members of a 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 (25^{th} = 0, 75^{th} = 2 percentiles).

The internal diversity of organizations was assessed by five criteria: religion, sex, age, ethnicity/linguistic group, occupation and education (Table 4.6). A diversity score was then calculated by summing up these five aspects for the most important group of the respondents. The average diversity score was 8.81 (SD = 0.98).

Table 4.6 Characteristics of Groups

Aspect	Yes Frequency (%)	No Frequency (%)
Group members of same religion	60 (50)	60 (50)
Group members of same sex	17 (14)	103 (86)
Group members of same linguistic/ethnic/tribe/race/caste	21 (17)	99 (83)
Group members have same occupation	26 (22)	94 (78)
Group members have same educational level	19 (16)	101 (84)

The size of networks, that is, the circle of "close friends" that one feels at ease with, can talk to about private matters, or call upon for help was also determined. The size of the network was captured by the number of such close friends. The mean number of close friends for acute pain sufferers was 2.35 (SD = 2.25). This variable was not normally

distributed (Skewness = 1.85, SE = 0.17). The median number of close friends was 2 (25^{th} = 1, 75^{th} = 4 percentiles).

A useful classification refers to the scope of the group: whether groups operate only in the community, are affiliated with other groups (inside or outside the community), or are part of a federated structure. Sixty one percent of the survey respondents who are members of at least a group indicated that their groups occasionally interacted with other groups. Only 14% of the respondents indicated that their most important group does not interact with others (Figure 4.4).

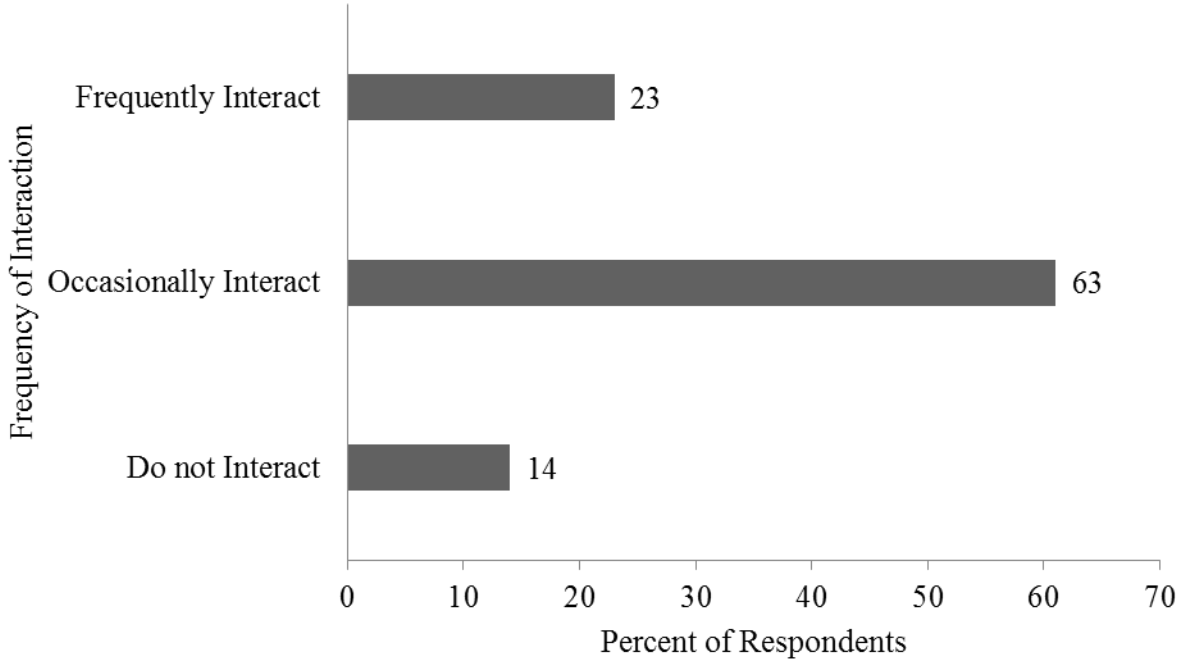

Figure 4.4: Distribution of respondents according to group interaction with other groups

Mutual support was assessed by asking the respondents whether they could turn to a network to borrow money in a hypothetical emergency situation. Fifty one percent of the

respondents indicated that there are people beyond their immediate household and relatives who would definitely give them some money in case of an emergency (Figure 4.5). Only 9% of the respondents indicated that they were definite they would not turn to anyone for help.

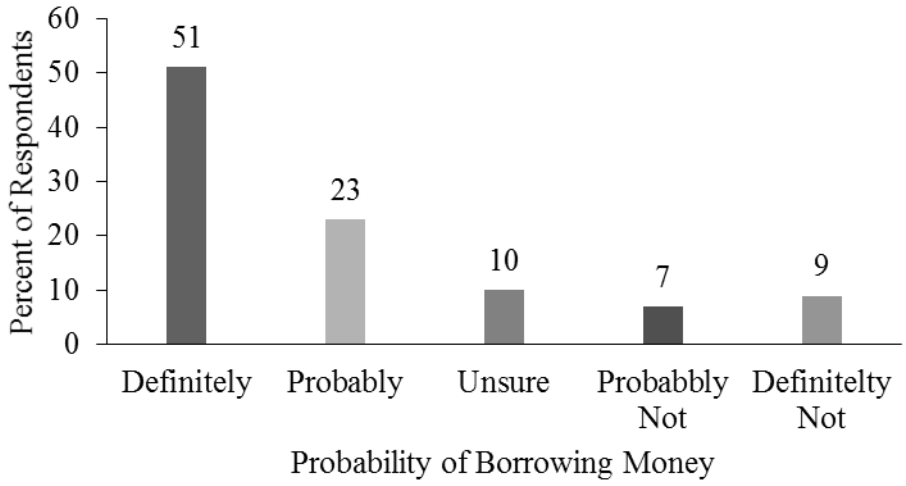

Figure 4.5: Distribution of respondents who could turn to a network to borrow money

4.1.3.2 Relational Social Capital

Trust is an important theme of relational (cognitive) social capital. The descriptive statistics and Pearson's correlation coefficients of the different items on trust are shown in Table 4.7. By rounding off the average score to the nearest whole number, some patterns emerge. The respondents suffering from acute pain believed that one should be careful with generalized trust, that is, the extent to which one trusts people overall. Further, the respondents were of the opinion that people in their neighbourhood do not generally trust each other in specific transactions such as lending and borrowing. The respondents were also not sure whether in their neighborhood one has to be alert or

someone is likely to take advantage of you. The respondents were however on the average in agreement with the statement that most people in this neighborhood are willing to help if you need it. The surveyed respondents trust both local and central government officials only to a small extent.

Table 4.7 Descriptive statistics and correlation coefficients of the different aspects of trust

	Mean	SD	1	2	3	4	5	6
1. Most people can be trusted	1.83	0.38	1					
2. Lending and borrowing	1.88	0.95	0.22**	1				
3. Be alert in neighbourshood	3.05	1.27	-0.12	-0.02	1			
4. Neighbours willing to help	2.47	1.17	0.09	0.23**	0.04	1		
5. Trust in local government officials	3.73	1.39	0.11	-0.05	-0.13	0.18*	1	
6. Trust in central government officials	3.63	1.44	0.05	-0.01	-0.06	0.27**	0.65**	1

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

Due to the complexity of the concept of trust, factor analysis using principal component analysis and varimax rotation was conducted. Only factors with Eigenvalues greater than

one were extracted. From the series of questions on trust, three factors emerged which identified three different dimensions of trust: trust in specific transactions with members of one's immediate environment, trust in government agencies and generalized trust (Table 4.8). These three factors explained 69.02 percent of the variance.

Table 4.8 Factor Analysis Results of different dimensions of trust

	Components		
	Transactions	Agencies	General
Lending and borrowing	**0.74**	-0.23	0.26
Neighbours willing to help	**0.68**	0.39	-0.003
Be alert in neighbourhood	**0.58**	-0.07	0.30
Trust in central government officials	0.19	**0.88**	-.010
Trust in local government officials	-0.36	**0.72**	0.20
Most people can be trusted	0.01	0.03	**0.93**
Eigenvalue	1.51	1.49	1.08
Variance explained (%)	25.17	24.89	17.96
Cronbach's alpha (α)	0.41	0.57	

Generalized trust was assessed by a question on the extent to which one trusts people overall. Only, 17% of the respondents indicated that they believed that most people can be trusted. The remaining 83% were of the view that they are too careful in dealing with people.

Trust was also viewed in the context of specific transactions, such as lending and borrowing. Forty five percent of the respondents indicated that people in their neighbourhood in general do trust each other in matters of lending and borrowing (Table

4.9). Another 28% of the respondents noted that people in their neighbourhood in general do not trust each other in matters of lending and borrowing while 20% were unsure.

Table 4.9 Distribution of responses on trust in lending and borrowing among the respondents

	Frequency	Percent
Missing	3	1
Do trust	92	45
Do not trust	57	28
Don't know/not sure	41	20
No answer	13	6
Total	206	100.0

The respondents were also asked two Likert questions on their perception of trust in the neighbourhood (Table 4.10). Ten percent of the respondents strongly agreed that in their neighbourhood one has to be alert or someone is likely to take advantage of you. Those who strongly disagreed with this statement made up 13 percent of the respondents. The average score of this item was 3.05 (SD = 1.27), implying that the respondents were unsure of the likelihood of someone taking advantage of them if one is not alert.

Most of the respondents were in agreement that most people in the neighbourhood were willing to help if one was in need (18%). However, 9 percent strongly disagreed with this statement.

Table 4.10 Perception of trust in the Neighbourhood

Statement	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Missing
In our neighborhood:						
1. One has to be alert or someone is likely to take advantage of you	20 (9)	72 (35)	14 (7)	70 (34)	26 (13)	4 (2)
Frequency (%)						
2. Most people are willing to help if you need it	38 (18)	88 (43)	39 (19)	18 (9)	19 (9)	4 (2)
Frequency (%)						

Trust in service providers such as government agencies is another relevant indicator of cognitive social capital. The surveyed respondents were asked to state the extent of trust they have with both local government and central government officials. Only 11% of the respondents trusted local government officials to a very great extent while 38 percent trusted them to a very small extent (Table 4.11). Central government officials were trusted to a great extent by 12% of the respondents while 40% trusted them to a very small extent.

Table 4.11 Extent of trust with different categories of government officials

	Local government officials	Central government officials
	Frequency (%)	**Frequency (%)**
No response	7 (3)	7 (3)
To a very great extent	22 (11)	25 (12)
To a great extent	18 (9)	16 (8)
Neither great nor small extent	22 (11)	42 (20)
To a small extent	59 (27)	34 (17)
To a very small extent	78 (38)	82 (40)
Total	206 (100)	206 (100)

Collective action is the third basic type of proxy indicator for measuring social capital. Two questions were used to assess the overall extent of willingness to cooperate and participate in collective action (Table 4.12). Fifty five percent of the respondents indicated that they would contribute their time in a community project that does not benefit them directly but has benefits to many others in the neighbourhood. Further, 40 percent of the respondents indicated that they would contribute their money in a community project.

Table 4.12: The extent of willingness to cooperate and participate in collective action among the survey respondents

Collective action	Contribute time	Contribute money
Yes		
Frequency (%)	114 (55)	83 (40)
No		
Frequency (%)	85 (41)	116 (56)

4.1.5 The Respondents' Perception of Pain

A Pain Perception Score (PPS) was calculated by summing up the seven dimensions of pain and dividing by seven. The descriptive statistics of the respondents' perception of pain are shown in Table 4.13. The results of the single item that assesses the comprehensibility of pain by the study respondents (Item 7) are also shown. The pain perception 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).

Table 4.13 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. Comprehensibility	5.26	3.74	0.19**	-0.03	0.51**	0.54**	0.23**	0.47**	1	
8. Emotions	3.09	3.15	0.61**	0.31**	0.08	0.25**	0.57**	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).

The sampled respondents gave the dimension of treatment control the highest average rating of 6.17 on a scale of 0-10. The timeline dimension was rated lowest at a mean score of 2.11. Four of the seven dimensions were skewed. These are consequences (Median = 3, 25^{th} = 0, 75^{th} = 5 percentiles), timeline (Median = 1, 25^{th} = 0, 75^{th} = 3

percentiles), identity (Median = 3, 25^{th} = 0, 75^{th} = 6 percentiles) and emotions (Median = 3, 25^{th} = 3, 75^{th} = 5 percentiles). The dimension of timeline was neither correlated with personal control dimension (Pearson's r = -0.01, $\rho > 0.05$) nor the treatment control dimension (Pearson's r = -0.03, $\rho > 0.05$). The personal control dimension was also not significantly associated with the dimensions of consequences (Pearson's r = 0.03, $\rho > 0.05$), identity (Pearson's r = 0.06, $\rho > 0.05$) and emotions (Pearson's r = 0.08, $\rho > 0.05$).

The single item that measured the comprehensibility of pain by the study respondents was positively and statistically correlated with all but one dimension of pain. A negative and insignificant association between comprehensibility of pain and the time dimension was observed (Pearson's r = - 0.03, $\rho > 0.05$).

4.2 The Burden of Pain among the Sampled Households

The first objective of this study was to determine the prevalence of acute pain among households in Nakuru sub- County, Kenya. This was accomplished by initially determining the prevalence of pain in the study area from a Bayesian paradigm and subsequently establishing the intensity of the pain.

4.2.1 The Prevalence of Acute Pain among Sampled Households

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 4.14). The WinBUGS output displayed indicates that the posterior distribution of θ, the prevalence of acute pain in the study area, is approximately normal with $\mu = 0.51$ and $\sigma = 0.024$. These numbers are computationally accurate to about $\pm$ 0.0002 (MC error).

Table 4.14 Prevalence of acute pain: posterior moments and quantiles

Pain type	M	σ	MC error	Median	95% Credible Interval	
Acute	0.51	0.024	0.0002	0.51	0.46	0.56
Chronic	0.11	0.016	0.00009	0.11	0.08	0.14
None	0.38	0.024	0.0002	0.38	0.33	0.43

Only the first-ranked cause of pain was analyzed in the causal question of the pain perception scale. Nine different causes of pain were ranked first by the study respondents with acute pain (Table 4.15).

Table 4.15 Rankings of causes of acute pain among the study respondents

Cause of Acute Pain	**Frequency**	**%**
Diseases	62	30
Stress	61	30
Trauma	22	11
Work based	17	8
Biological processes based (such as birth)	8	4
Dental	7	3
External causes	3	1
Allergies	3	1
Food based	2	1
Missing responses	21	10
Total	206	100

Diseases were ranked-first by 30 percent of the respondents and dental problems were ranked first ranked by only one percent of the study sample. Ten percent of the respondents could not identify any definite cause of their pain.

The distribution of duration of pain among acute pain sufferers is shown in Table 4.16. Seventy percent of the respondents reported that they had experienced pain for a duration of less than a month.

Table 4.16: Distribution of the duration of acute pain among the study sample

Duration	Frequency	Percentage
Less than a month	145	70
Upto 3 months	34	17
Upto 6 months	27	13
Total	206	100

Most of the respondents suffering from acute pain (63%) indicated that pain was not causing any anxiety to them. There were no statistically significant differences in the presence of anxiety due to pain with socio-demographic characteristics such as age ($t_{204} = 1.27$, $\rho > 0.05$), sex ($\chi^2 = 0.004$, $\rho > 0.05$), marital status ($\chi^2 = 1.57$, $\rho > 0.05$), highest level of educational attainment ($\chi^2 = 2.10$, $\rho > 0.05$) or socio-economic group ($\chi^2 = 3.27$, $\rho > 0.05$).

Respondents with acute pain and those without did not statistically differ in any social demographic variable (Table 4.17). There were neither statistically significant age differences ($t = 1.79$, $\rho > 0.05$) nor sex differences between respondents with acute pain and those without ($\chi^2 = 0.02$, $\rho > 0.05$). Further respondents with acute pain were not statistically different from those without in their socio-economic status ($\chi^2 = 1.53$, $\rho > 0.05$), marital status ($\chi^2 = 0.004$, $\rho > 0.05$) or highest level of educational attainment ($\chi^2 = 3.63$, $\rho > 0.05$).

Table 4.17 Comparison of socio-demographic characteristics of respondents with and without acute pain

		Presence of Acute Pain		Test statistic
Characteristics		Yes (n = 206)	No (n = 198)	
Age in years	Mean (SD)	27.05 (9.11)	28.87 (11.24)	$t = 1.79$, $\rho > 0.05$
Sex	Male	109 (27)	106 (23)	$\chi^2 = 0.02$, $\rho > 0.05$
Frequency (%)	Female	97 (24)	92 (26)	
Socio-economic Status	Low	119 (29)	110 (27)	$\chi^2 = 1.53$, $\rho > 0.05$
	Middle	65 (16)	62 (15)	
Frequency (%)	High	22 (6)	26 (6)	
Marital Status	Yes	94 (23)	91(23)	$\chi^2 = 0.004$, $\rho > 0.05$
Frequency (%)	No	112 (28)	107 (27)	
Education	Primary	24 (6)	17 (4)	$\chi^2 = 3.65$, $\rho > 0.05$
Frequency (%)	Secondary	72 (18)	62 (15)	
	College	88 (22)	87 (22)	
	University	22 (5)	32 (5)	

4.2.2 The Intensity of Acute Pain among the Sampled Respondents

The descriptive statistics of Pain Rating Index (PRI) among the surveyed acute pain sufferers and its individual items are shown in Table 4.18. The respondents with acute pain had an average PRI score of 6.16 (SD = 6.04).

Table 4.18 Descriptive statistics of SF-MPQ-2 items and severity scores

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

Item means of the individual descriptors of the SF-MPQ-2 range from 0.02 (pain caused by light touch) to 1.02 (throbbing). Data on all the individual items of SF-MPQ-2 was positively skewed. The internal consistency reliability (the Cronbach alpha) of the SF-MPQ-2 items was 0.11. Standardizing the SF-MPQ-2 items improved the Cronbach alpha to 0.37. Removal of any of the SF-MPQ-2 did not alter the reliability of the tool in any meaningful way.

The mean of PPI on a scale of 0 to 5 was 1.92 (SD = 1.02). The PRI and the PPI were positively correlated (Spearman's rho = 0.20, $\rho < 0.05$). This suggested reasonable construct validity of both data collection tools.

4.3 The Treatment Options Adopted by Respondents with Acute Pain

The second objective of this study was to establish the healthcare options used in managing acute pain by households in Nakuru County, Kenya. This was expounded firstly through documenting the recovery rates and frequencies of primary healthcare options utilized by the study respondents at the onset of the study and at 3 and 6 months post the onset of acute pain. Secondly, results of an examination on whether there were socio-demographic differences in the choice of different healthcare options are reported. Finally, the relative effectiveness of different sources of healthcare options used by the respondents was also evaluated.

At three months post the baseline survey, 22% of the 158 contacted respondents with acute pain stated that they were yet to gain relief from acute pain (Figure 4.6). No statistically significant differences were noted on reported recovery along sex, age, education attainment and social economic status at the three months data collection round.

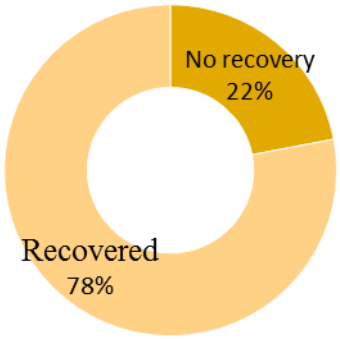

Figure 4.6: Self-reported Recovery Rates after Suffering from Acute Pain among the Respondents at 3 months

Six months after the start of the study 19% of the respondents who reported having suffered from acute pain indicated they were yet to recover (Figure 4.7). No statistically significant differences in sex, age, educational attainment and social economic status were identified six months after the study begun.

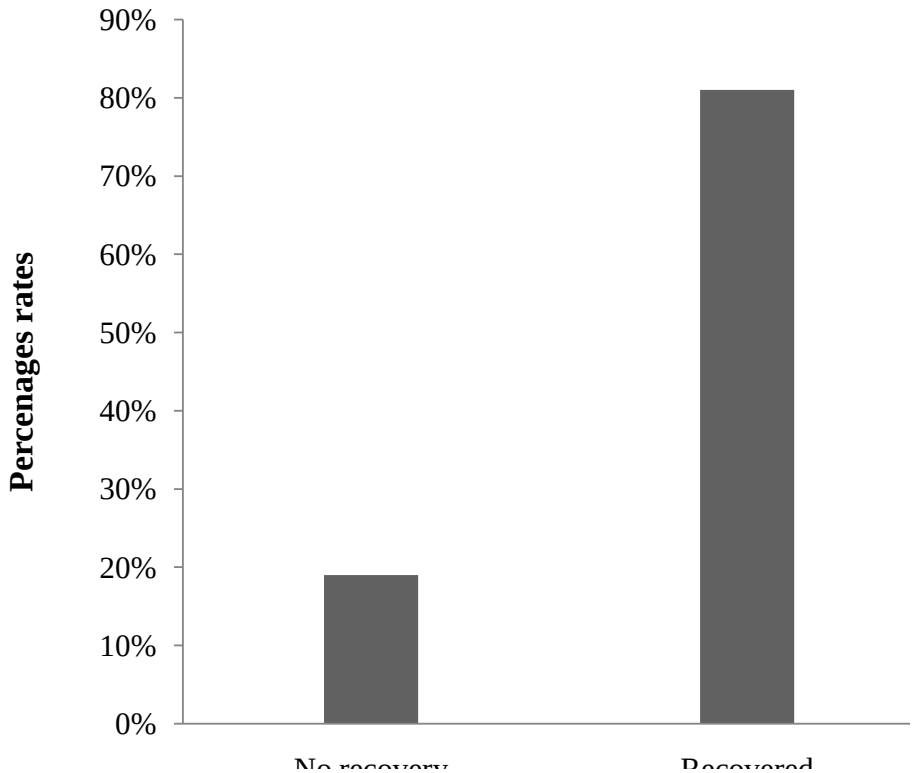

Figure 4.7: Self-reported Recovery Patterns after Suffering from Acute Pain among the Respondents at 6 months

Overall, the study results showed that most of the respondents suffering from acute pain (76 percent) did not seek formal medical attention outside home in the entire six months study period. Seventy percent of these respondents indicated that they were using conventional medicine, 10% used indigenous knowledge based methods, 8% used other alternative methods and the remaining 9 percent took no action (Figure 4.8).

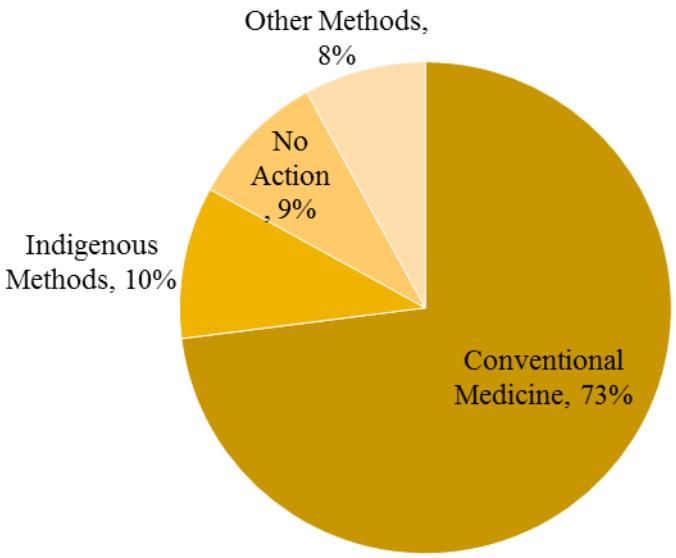

Figure 4.8: Methods used to manage acute pain at home among the respondents

Conventional medicine included the use of analgesics and anti-inflammatory drugs such as paracetamol, hedex (APC), brufen and *mara moja (APC)*. The use of celestamine and piriton was (Methylated Ointment-Methyl Salicylate) also mentioned. Antacids such as actal and Eno were also used to manage acute pain. Eye drops were used in case of pain in the eye. Deepheat (Methylated Ointment-Methyl Salicylate) and Rob were also used in case of muscle-ache.

The use of indigenous knowledge based methods to manage acute pain largely involved the use of medicinal herbs. Other varied methods to manage acute pain included massage, the use of hot water, exercise, resting and meditation.

Only 24% of respondents suffering from acute pain sought medical attention from formal medical institutions (Figure 4.9). The most popular source of formal medical institution for these respondents was the provincial general hospital with 36%, followed by dispensaries and private hospitals with 22% each, private clinics (16%) and referral hospitals at 4% in that order.

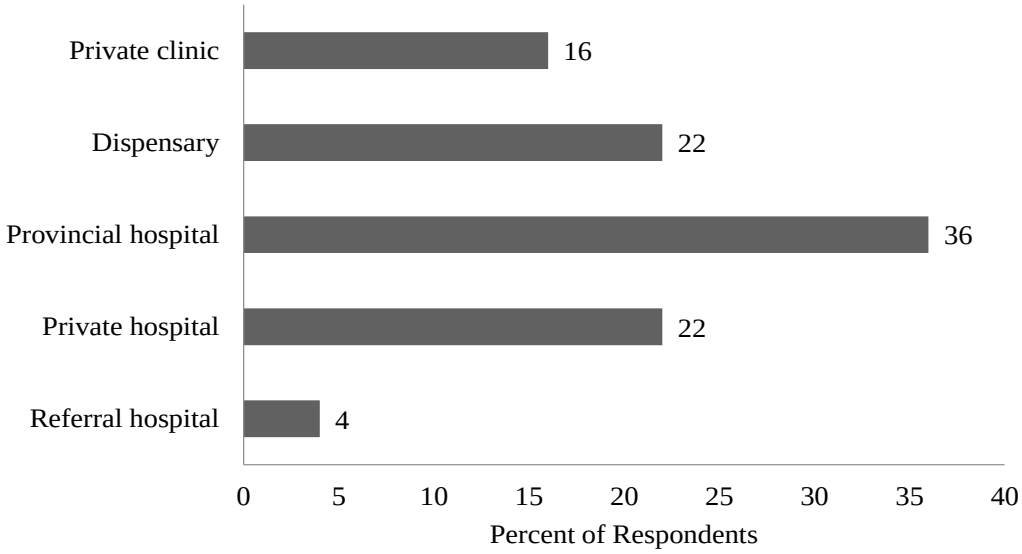

Figure 4.9: Sources of formal medical attention among the respondents with acute pain

The study further endeavored to establish whether socio-demographic characteristics of the respondents were associated with the decision on whether to seek formal medical attention or not following the onset of acute pain. There were no statistically significant differences in the decision to seek formal medical attention or not on the onset of acute pain with socio-demographic characteristics such as age ($t_{198} = 1.52$, $\rho > 0.05$), sex ($\chi^2 = 0.67$, $\rho > 0.05$), marital status ($\chi^2 = 1.92$, $\rho > 0.05$) or socio-economic group ($\chi^2 = 1.86$, ρ

> 0.05). Significant differences were only notable with the highest level of educational attainment and the likelihood of seeking formal medical attention or otherwise after suffering from acute pain ($\chi^2 = 10.61$, $\rho < 0.05$). Respondents with college, secondary and university education in that order were unlikely to seek formal medical attention outside home following the onset of acute pain (Table 4.19).

Table 4.19: Distribution of highest level of educational attainment by likelihood of seeking medical attention outside home

Level of education	Seek formal medical advice/attention outside home		
	Yes	No	Total Frequency (%)
	Frequency (%)	Frequency (%)	
Primary	12 (50)	12 (50)	24 (100)
Secondary	17 (24)	55 (76)	72 (100)
College	17 (19)	71 (81)	88 (100)
University	8 (36)	14 (64)	22 (100)
Total	54 (26)	152 (74)	206 (100)

A total of 158 (77%) of the respondents suffering from acute pain indicated that the healthcare option they took to manage pain was effective with the remaining 48 (23 percent) saying it was not effective. Acute pain remained uncontrolled in 14 of the 50 respondents who sought formal medical attention and 34 of the 156 respondents who opted for alternative sources of healthcare. The results of the contrasts for the success rates of the two healthcare options are indicated in Table 4.20.

Table 4.20: Comparisons of the failure rates of formal medical and alternative care for acute pain

Failure Rate Comparisons	μ	σ	95 % Confidence Interval	
DIFF (Formal – Alternative)	0.07	0.07	- 0.07	0.20
InOR (In(OR))	0.34	0.37	- 0.40	1.05
OR (Formal/Alternative)	1.50	0.56	0.67	2.85
RR (Formal/Alternative)	1.33	0.36	0.73	2.13
p (P(Formal > Alternative | Data))	0.82			

The 95% credible intervals for the odds ratio and relative risk include 1 (meaning equal rates), and the 95% credible intervals for the difference and log odds ratio include 0 (also meaning equal rates). The posterior probability that medical attention has the higher failure rate is about 82 percent.

4.3.1 The Correlates of Perception of Pain

Sex, pain intensity, group diversity, obtaining help from neighbours and age were significantly associated with the PPS (Table 4.21). The correlates are all significant at the 5% level. Male sex is associated with a 7.50 decline in PPS. Further, the addition of one unit in the duration of pain is associated with a 2.45 increase in the PPS. Group diversity on the other hand is inversely associated with the PPS, 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 likehood of obtaining help being associated with a 0.26 decline in PPS.

Table 4.21: Regression Analysis of Factors Affecting the Perception of Pain

	Mean	SD	2.50%	97.50%
Constant	46.16	6.16	34.12	58.26
Sex (Male)	-7.50	2.15	-11.74	-3.28
Pain Intensity	2.47	1.11	0.26	4.65
Diversity (Network)	-1.85	0.37	-2.66	-1.12
Help (Neighbour)	-2.46	0.94	-4.29	-0.61
Age	0.26	0.12	0.02	0.50

4.3.2 The Intensity of Acute Pain among the Sampled Respondents

The descriptive statistics of Pain Rating Index (PRI) among the surveyed acute pain sufferers and its individual items are shown in Table 4.22. The respondents with acute pain had an average PRI score of 6.16 (SD = 6.04).

Table 4.22: Descriptive statistics of SF-MPQ-2 items and severity scores

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
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PPI	1.92	1.02	0.46	-0.08

Item means of the individual descriptors of the SF-MPQ-2 range from 0.02 (pain caused by light touch) to 1.02 (throbbing). Data on all the individual items of SF-MPQ-2 was positively skewed. The internal consistency reliability (the Cronbach alpha) of the SF-MPQ-2 items was 0.11. Standardizing the SF-MPQ-2 items improved the Cronbach

alpha to 0.37. Removal of any of the SF-MPQ-2 did not alter the reliability of the tool in any meaningful way.

The mean of PPI on a scale of 0 to 5 was 1.92 (SD = 1.02). The PRI and the PPI were positively correlated (Spearman's rho = 0.20, $\rho < 0.05$).

4.4 The Treatment Options Adopted by Respondents with Acute Pain

The second objective of this study was to establish the healthcare options used in managing acute pain by households in Nakuru sub County, Kenya. This was expounded firstly through documenting the frequencies of the primary healthcare options utilized by the study respondents after suffering from acute pain over time, 3 and 6 months post inset of acute pain. Secondly, results of an examination on whether there were socio-demographic differences in the choice of different healthcare options are reported. Finally, the relative effectiveness of different sources of healthcare options used by the respondents was also evaluated.

The results show that most of the respondents suffering from acute pain (76 percent) did not seek formal medical attention outside home in the entire six months study period. Seventy percent of these respondents indicated that they were using conventional medicine, 10% used indigenous knowledge based methods, 8% used other alternative methods and the remaining 9 percent took no action (Figure 4.6).

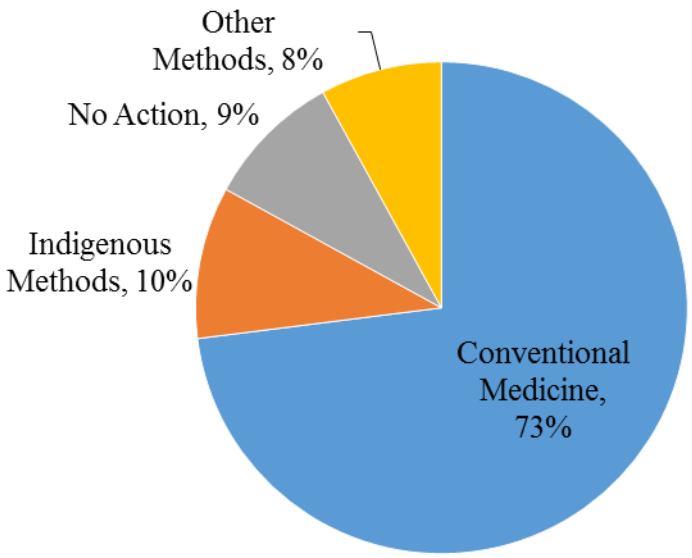

Figure 4.6: Methods used to manage acute pain at home among the respondents

Conventional medicine included the use of analgesics and anti-inflammatory drugs such as paracetamol, hedex (APC), brufen and *mara moja (APC)*. The use of celestamine and piriton was also mentioned. Antacids such as actal and Eno were also used to manage acute pain. Eye drops were used in case of pain in the eye. Deepheat (Methylated Ointiment-Methyl salicylate) and Rob (Methylated Ointment-Methyl salicylate) were also used in case of muscle-ache.

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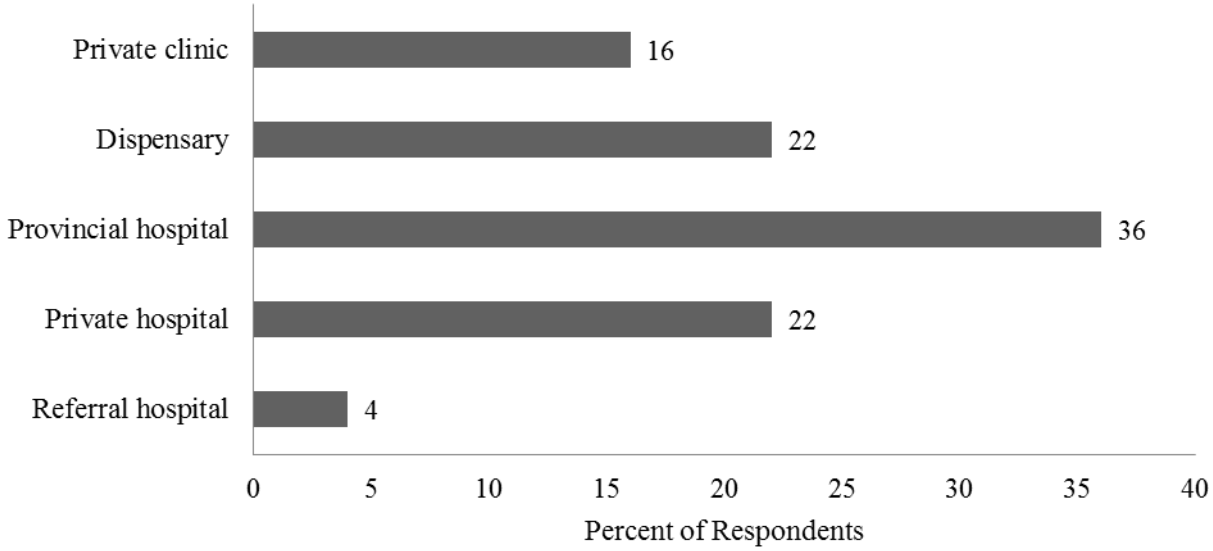

Figure 4.7: Sources of formal medical attention among the respondents with acute pain

The study further endeavored to establish whether socio-demographic characteristics of the respondents were associated with the decision on whether to seek formal medical attention or not following the onset of acute pain. There were no statistically significant differences in the decision to seek formal medical attention or not on the onset of acute pain with socio-demographic characteristics such as age ($t_{198} = 1.52$, $\rho > 0.05$), sex ($\chi^2 = 0.67$, $\rho > 0.05$), marital status ($\chi^2 = 1.92$, $\rho > 0.05$) or socio-economic group ($\chi^2 = 1.86$, $\rho > 0.05$). Significant differences were only notable with the highest level of educational attainment and the likelihood of seeking formal medical attention or otherwise after suffering from acute pain ($\chi^2 = 10.61$, $\rho < 0.05$). Respondents with college, secondary

and university education in that order were unlikely to seek formal medical attention outside home following the onset of acute pain (Table 4.23).

Table 4.23: Distribution of highest level of educational attainment by likelihood of seeking medical attention outside home

Level of education	Seek formal medical advice/attention outside home		
	Yes	No	Total Frequency (%)
	Frequency (%)	Frequency (%)	
Primary	12 (50)	12 (50)	24 (100)
Secondary	17 (24)	55 (76)	72 (100)
College	17 (19)	71 (81)	88 (100)
University	8 (36)	14 (64)	22 (100)
Total	54 (26)	152 (74)	206 (100)

A total of 158 (77%) of the respondents suffering from acute pain indicated that the healthcare option they took to manage pain was effective with the remaining 48 (23 percent) saying it was not effective. Acute pain remained uncontrolled in 14 of the 50 respondents who sought formal medical attention and 34 of the 156 respondents who opted for alternative sources of healthcare. The results of the contrasts for the success rates of the two healthcare options are indicated in Table 4.24.

Table 4.24: Comparisons of the failure rates of formal medical and alternative care for acute pain

Failure Rate Comparisons	μ	σ	MC error	95 % Confidence Interval	
DIFF (Formal – Alternative)	0.07	0.07	3.786E-4	- 0.07	0.20
InOR (In (OR))	0.34	0.37	0.001966	- 0.40	1.05
OR (Formal/Alternative)	1.50	0.56	0.003129	0.67	2.85
RR (Formal/Alternative)	1.33	0.36	0.001966	0.73	2.13
p (P(Formal > Alternative | Data))	0.82				

The 95% credible intervals for the odds ratio and relative risk include 1 (meaning equal rates), and the 95% credible intervals for the difference and log odds ratio include 0 (also meaning equal rates). The posterior probability that medical attention has the higher failure rate is about 82 percent.

4.4.1 The Correlates of Perception of Pain

Sex, pain intensity, group diversity, obtaining help from neighbours and age were significantly associated with the PPS (Table 4.25). The correlates are all significant at the 5% level. Male sex is associated with a 7.50 decline in PPS. Further, the addition of one unit in the duration of pain is associated with a 2.45 increase in the PPS. Group diversity on the other hand is inversely associated with the PPS, 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 likehood of obtaining help being associated with a 0.26 decline in PPS.

Table 4.25: Regression Analysis of Factors Affecting the Perception of Pain

	Mean	SD	2.50%	97.50%
Constant	46.16	6.16	34.12	58.26
Sex (Male)	-7.50	2.15	-11.74	-3.28
Pain Intensity	2.47	1.11	0.26	4.65
Diversity (Network)	-1.85	0.37	-2.66	-1.12
Help (Neighbour)	-2.46	0.94	-4.29	-0.61
Age	0.26	0.12	0.02	0.50

4.5 Factors Associated With Choice of Effective Healthcare Options for Managing

4.5.1 Acute Pain at the Household level

The third objective of this study was to establish factors that influence the choice of effective healthcare options following the onset of acute pain among households in Nakuru County. This was accomplishing by first elucidating the correlates of perception of pain using a regression analysis and then identifying the predictors of effective management of acute pain at the household level.

4.5.2 The Correlates of Effective Management of Acute Pain at the Household Level

The results of the relationship between the perception of pain and effectiveness of managing acute pain are illustrated in Table 4.26. Respondents with controlled acute pain had a higher average PPS when compared to those with uncontrolled pain, a difference that was statistically significant ($t_{196} = 3.12$, $\rho < 0.05$).

Table 4.26: The relationship between perception of pain and effectiveness of acute pain management

Aspect of perception of pain		Effectiveness of chosen healthcare option (Mean ± SD)	
		Effective	Not effective
Overall Perception	Pain Perception Score	4.24 ± 1.98	3.14 ± 2.44
Cognitive representation	Consequences	3.21 ± 3.04	2.58 ± 3.14
	Identity	3.28 ± 3.04	2.75 ± 3.18
	Timeline	1.89 ± 2.27	2.54 ± 3.43
	Personal control	5.88 ± 3.57	2.65 ± 2.86
	Treatment control	6.57 ± 3.58	4.06 ± 3.83
Emotional representation	Emotions	3.05 ± 3.03	2.81 ± 3.53
	Concern	5.05 ± 3.75	3.69 ± 3.66
Comprehensibility		5.63 ± 3.64	3.38 ± 3.39

The mean ratings of respondents with controlled acute pain on the dimensions of personal control and treatment control differed significantly from those with uncontrolled pain. Respondents with controlled acute pain had a higher mean score on the personal control dimension than their counterparts with uncontrolled pain (t_{204} = 5.75, $\rho < 0.05$). The mean score on the dimension of treatment control of respondents with controlled acute pain were significantly higher than those of respondents suffering from uncontrolled acute pain (t_{204} = 4.18, $\rho < 0.05$). Respondents who indicated that their pain had been controlled did not statistically differ significantly from their

counterparts with uncontrolled pain in the dimensions of consequences (Mann-Whitney U = 3321, z = -1.34, $\rho > 0.05$), identity (Mann-Whitney U = 3373, z = -1.20, $\rho > 0.05$) and timeline (Mann-Whitney U = 3762, z = -0.09, $\rho > 0.05$).

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 (Table 4.27). 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 the effectiveness of managing acute pain, with each additional year of stay in the location being associated with a reduction of 0.016 on the effectiveness in managing acute pain at home.

Table 4.27: Estimation results of a logit model for factors influencing effective management of pain at home

	Mean	SD	2.50%	97.50%
Constant	0.484	0.106	0.278	0.687
Perception	0.006	0.002	0.002	0.009
Occupancy	-0.016	0.004	-0.024	-0.008

4.6 The Minimum Efficient Resources Required for Effective Management of Acute Pain

The fourth and final objective of this study was to determine the minimum efficient resources required for effective management of acute pain at home. This objective was examined from two perspectives. First, the minimum efficient resources needed to

effectively manage acute pain at home were identified and second, such resources required to enhance the perception of pain were derived.

4.6.1 Resource Requirements Needed to Effectively Manage Acute Pain at the Household Level

Turning to the distance measures, Table 4.28 reports point estimates of the 'distance' statistics together with their 95% confident limits. Further, comments are not made about the occupancy requirements due to the difficulty of implementing policy interventions in the short run.

Table 4.28: Distance estimates to effective management of acute pain at home

	Mean	SD	2.50%	Median	97.50%
Perception Need	-20.52	6.83	-39.47	-18.47	-12.99
Occupancy Needed	48.35	17.77	25.25	45.49	96.94

Figure 4.10 reports estimates of pain perception distance from effective acute pain management. Across the entire set of censored observations the mean requirement is an addition of 20.52; the maximum requirement (the household farthest from the market) is 0.049; and the minimum requirement is 29.24, which is the patient with the greatest 'excess' estimates of pain perception requirements. With the Gibbs-sample means as reference points, were within the effective acute pain management boundary.

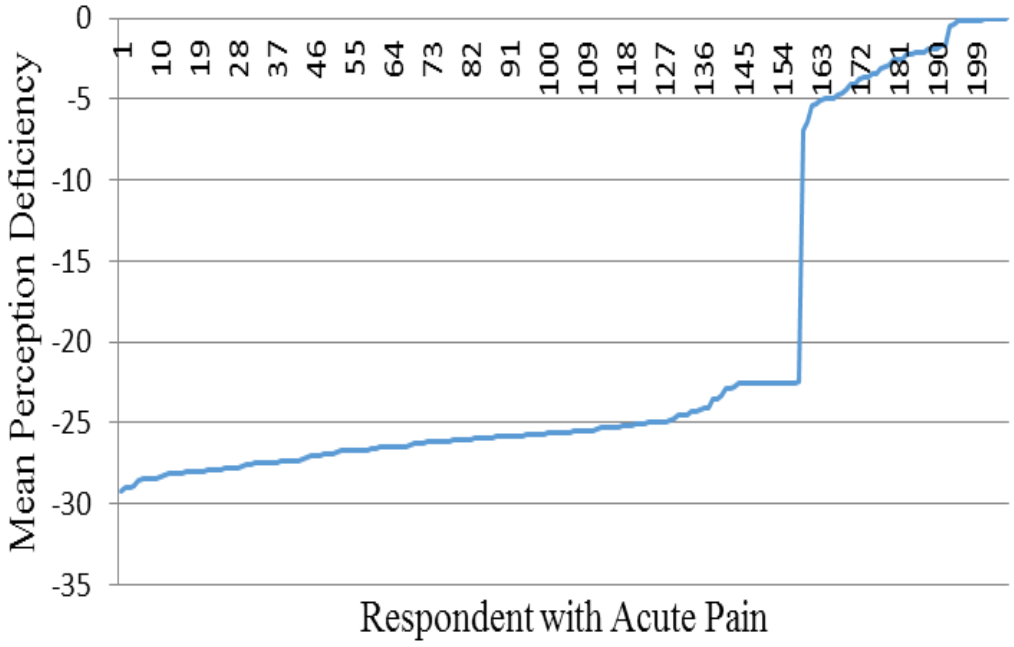

Figure 4.10: Estimates of the Pain perception distance to effective acute pain management

4.6.2 Resource Requirements Needed to Enhance Perception of Pain at the Household Level

The estimates of the responses for the pain intensity and capital-forming variables (group diversity and age) are, perhaps, more important for this study because these variables are potentially more likely to be directly affected by policy. The focus on the three quantities is, dictated by the fact that they may be readily changed in the short term. Turning to the distance measures, table 4.29 reports point estimates of the 'distance' statistics together with their 95% confident limits.

Table 4.29: Distance estimates to perception of acute pain

	Mean	2.5%	97.5%
Pain Intensity	-3.45	-69.34	-8.53
Diversity	10.72	4.74	21.6
Age Resource	-294.7	-696.3	-87.41

Figure 4.11 reports estimates of pain intensity requirements. With the Gibbs-sample means as reference points, there are 150 respondents that have high pain intensity (are resource-sufficient!) within the market boundary; each of the remaining patients has a deficiency of pain intensity. Across the entire set of censored observations the mean requirement is an addition of 3.45 units of pain intensity; the maximum requirement (the household farthest from the market) is 2.5; and the minimum requirement is -11, which is the patient with the greatest 'excess

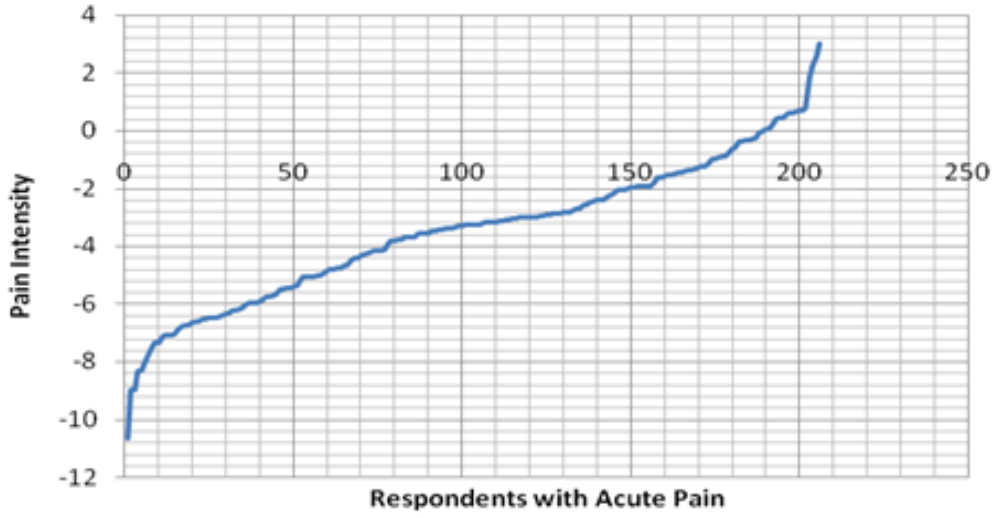

Figure 4.11: Pain intensity distance to pain perception estimates

Turning to network density requirements (Figure 4.12), the focus of attentions again is on the Gibbs-sample means. The mean requirement across the non-pain perceptive patients is 10.72 units. The maximum requirement is 32 diversified networks and the minimum requirement is -1.5 diversified networks-six of the households have an excess diversified networks.

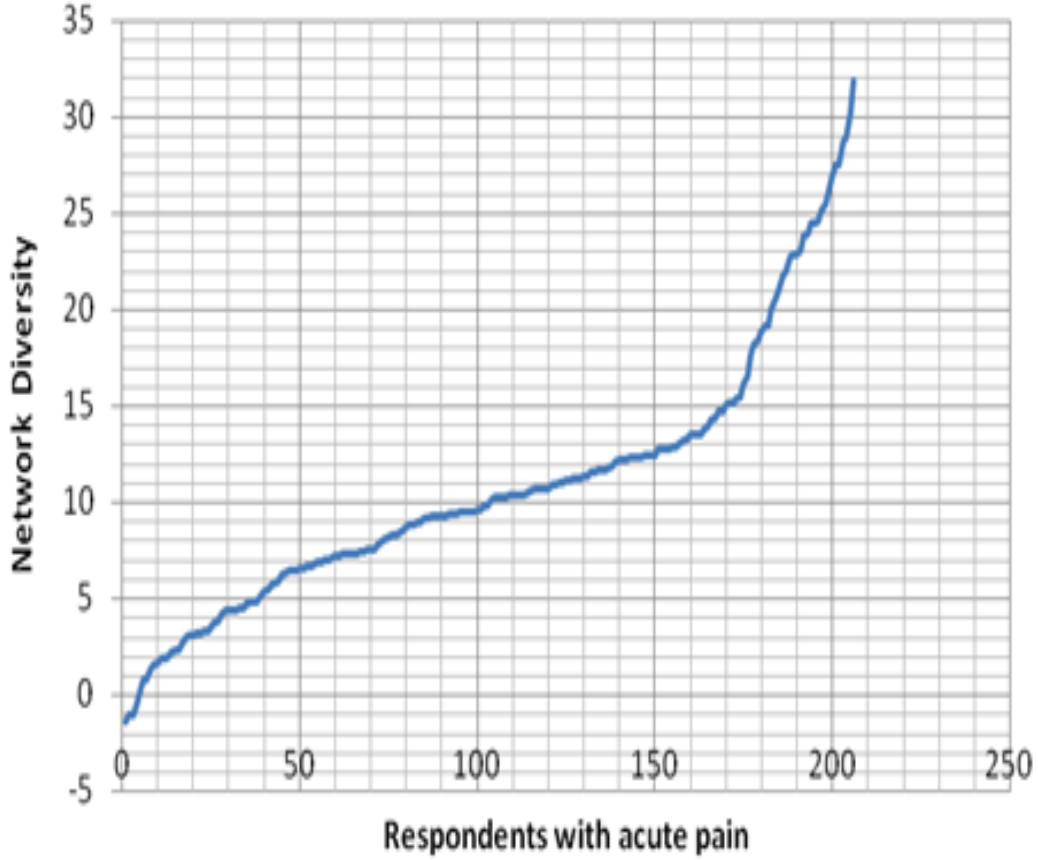

Figure 4.12: Network diversity distance to pain perception estimates

Results for the age of the respondents are reported in Figure 4.13. From this figure we can deduce that the patient closest to the pain perception has an excess of -75 units, and the patient farthest from the market requires -275 units. The mean requirement for age as a resource is -294.7 units. The graph shows that all the patients had an excess of age as a resource.

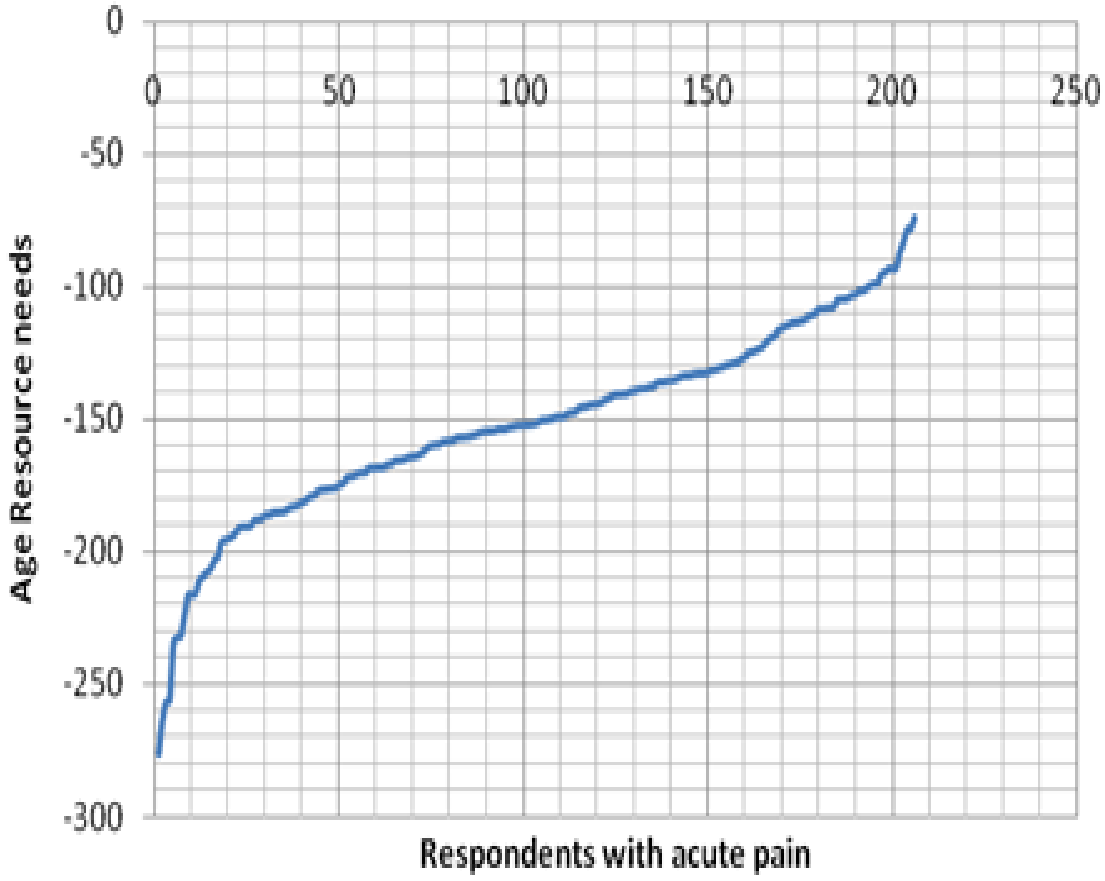

Figure 4.13: Age distance to pain perception estimates

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1. Discussion

5.1.1 The Prevalence of Acute Pain in Nakuru County, Kenya

A prevalence rate of 51 percent of acute pain was estimated in this study. This figure is considerably greater than estimates reported from the developed countries such as the USA which show that 22 percent of primary care patients complain of acute pain (Gureje *et al*., 1998) and 20 percent of the people in Australia experience acute pain (Macintyre *et al*., 2010). The high prevalence rate reported in this study may indicate the presence of high incidences of tissue damage among the study respondents maybe through trauma and illness. The burden of disease in developing countries is heavier relative to the developed world due to high incidences of road traffic crashes, disasters, violence and torture. This is further compounded by weak healthcare systems. The reported prevalence underscores the burden of acute pain to individuals, households and the economy at large. The effective management of acute pain is considered a daunting challenge to many households especially in resource-poor countries ((Vijayan, 2011; Kopf & Patel, 2010; Size, Soyannwo & Justins, 2007; Soyannwo, 2010). This is suggestive that acute pain is a major health problem within the surveyed population that deserves attention. The presence of acute pain in the studied population poses serious challenges in the provision of healthcare and therefore it deserves increased attention.

The respondents had a mean of 6.16 pain intensity when measured using the SF-MPQ-2. This can be considered as moderate pain. Literature on the intensity of acute pain among populations is not readily available. The moderate level of intensity of acute pain

reported in the current study is a source of concern especially in resource poor countries like Kenya which has weak healthcare systems.

5.1.2 Healthcare Options Used in Managing Acute Pain by Households in Nakuru County, Kenya

The surveyed population had a variety of health options that they used to manage acute pain at home. These ranged from self-medication, alternative medicine, and indigenous knowledge to visits to health care providers. The use of both ethnomedicine and biomedicine for the same episode of illness is widely practiced in the developing world (Sindiga, 1995). The surveyed respondents presumably used both such medical systems to maximize their chances of regaining health. Acute pain has multiple causes in which case symptoms become confusing which leads to pragmatic therapy-seeking by patients in both ethnomedicine and biomedicine. Moreover, people in the developing world 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 by indigenous knowledge based methods, other alternative methods and simply taking no action in that order. A similar pattern has been reported among low resource countries (Soyannwo, 2010). Such self-medication may be effective for simple, uncomplicated pain but may be counterproductive for more severe pain. This may ultimately lead to medical complications, and compromise the economic and/or the social security of the concern patient. Self-medication may also result in drug resistance or addiction, an issue that has been blamed on the prevalent misuse of pharmaceuticals by people in Kenya (Global Antibiotic Resistance Partnership-Kenya Working Group, 2011).

Only 24 percent of the surveyed respondents used formal medical care. This utilization rate is much lower than the estimated 84.5 visits to health professionals per 100 sick people (Ministry of Health, 2003). This may reflect that the surveyed respondents do not consider acute pain to be a problem worthy of medical attention. The utilization of formal medical services after suffering from acute pain should be encouraged to minimize the incidence of complications.

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. Extant literature suggests that people usually perceive their actions in a favourable way (McKian, 2003) and this may be a plausible reason for the high proportion of respondents who reported that their acute pain had been effectively managed.

5.1.3 Factors that are Associated with the Choice of Effective Healthcare Options Following the Onset of Acute Pain among Households in Nakuru County, Kenya

PPS was found to be positively associated with effectively controlled acute pain. This result agrees with the literature that supports the role of knowledge in overcoming health challenges (Hausmann-Muela & Ribera, 2003). The result also supports the conceptual framework advanced in this study that perception of pain is an immediate determinant of effective management of acute pain. This can be explained by the observation that enhanced knowledge of phenomena often leads to better handling of the same. Following Levinthal *et al* (1984), situational stimuli (such as symptoms of acute pain), generate both cognitive and emotional representation of illness or health threat. The surveyed respondents therefore formed the representation of acute pain, they then adopted appropriate coping behaviours and finally, they appraised the efficacy of these

behaviours. The importance of illness representation to patient behavior is well documented in literature (Broadbent *et al*., 2006). Therefore, perception of pain is an important factor that explains the choice of effective health care options for managing of acute pain.

Another important finding 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 (Jensen & Karoly, 2001). 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 (Hausmann-Muela, Ribera & Nyamongo, 2003). This finding is consistent with the conceptual framework advanced in this study.

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.

The reported results indicate that social capital in the form of group diversity and obtaining help from neighbors was negatively associated with perception on pain. This result contradicts the literature that argues that social capital helps transmit knowledge (Hendrix *et al*., 2002). Social capital is described 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 (Grootaert *et al*., 2004). Social capital is usually available to people for productive purposes. Individuals therefore call upon diversified groups and networks to enhance their perception of illness. Further

peoples' subjective perceptions of the trustworthiness of other people as well as the norms of cooperation and reciprocity can help in attempts to work together to solve problems. The structure of a given network (who interacts with whom, how frequently, and on what terms) has a major bearing on the flow of resources through a network. Individuals whose ties span important groups, can be said to have more social capital than their peers, precisely because their networks gives them heightened access to more and better resources (Burt 2000). Social capital offers important information about the nature of and management of illness and may therefore influence healthcare seeking behavior positively (McKian, 2003). 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 on pain perception deserve a deeper empirical reflection.

Males were found to have poorer perception of pain when compared to females. This finding is not surprising since males are known to tolerate pain and sickness (Doyal, 2000). 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. Men also tend to seek medical attention late so as not show their weaknesses, or do not comply with health advice that implies a change in habits if they are considered feminine (Taffa & Chepngeno, 2005; Doyal, 2000). Males also tend to report lower intensities of pain when compared to females (WHO, 1997).

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 mainly from the wear and tear of tissues, 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 (Weller, Ruebush & Klein, 1997). Previous experience can be used to enhance individual skills and reputations that can help to influence the reallocation of resources in subsequent healthcare needs.

5.1.4 The Minimum Efficient Resources Required for Effective Management of Acute Pain at Home

In order to effectively manage pain, the representative non-participant must increase perception of pain by 183.9 units of pain perception. Such an increase could be effected by a variety of techniques, including reduction in membership to diversity of groups of 10.72 units, or instead, by experience of 294.7 units, a feasible but nonetheless substantial increase in productive human capital. Of the remaining covariates for which the distance estimates are significant, pain perception could also be affected by reducing the intensity of pain by 3.45 units per patient.

The variable having the greatest impact on managing acute pain at home is enhanced perception of pain. This is through better comprehension of pain. An increase in the understanding of pain leads to confidence in managing it. Literature underscores the importance of illness representations to patient behaviour (Broadbent *et al.,* 2006). A clear understanding of the causes and symptoms of pain may automatically activate certain mitigating actions. Such knowledge can provide individuals with sustainable advantages. Enhanced knowledge permits individuals to predict more accurately the nature and potential of changes in the environment and the appropriateness of strategic and tactical actions. Without such knowledge, individuals are less capable of taking

advantage of emerging opportunities. Consequently individuals with higher levels of knowledge are expected to have superior performance. In health, we should expect that individuals with superior knowledge will utilize effective pain treatment options. Pain perception is a repertoire of knowledge that contains 'formulae' for solving routine problems. The knowledge for effectively managing pain is a scheme for therapeutic action, implying a culturally learned and well-established repertoire of actions which provides guidance about what to do and when to do it. Thus, enhancing pain perception has the potential to mitigate against acute pain.

The perception of pain was from a policy perspective mainly associated with social networks, experience and pain intensity. A change in any of these three correlates may therefore alter perception of pain. A modest change in pain intensity is therefore expected to have the most effect on perception of pain, followed by a change in social networks and a change in experience (proxied by chronological age) in that order. A unit increase in perception of pain required at least 3.5 units increase in the intensity of pain intensity. From a practical and ethical point of view this is not acceptable. However, the underlying explanation is that individuals who experience higher intensities of pain tend to have superior perception of pain, an observation that can be explained by experience. Going through much pain triggers their understanding of pain. This observation reinforces the need of not subjecting individuals to different levels of pain but to offering them relevant information of acute pain and its management.

The study respondents are supports to minimize group diversity in order to attain an acceptable perception of pain. This result is contrary to literature which suggests that social networks enhance health knowledge (MacKian, 2003). The differences can be explained by the observation that the groups are weak as far as health knowledge is concern. At the worst the voluntary groups may be offering less than correct health

education. Since it is questionable whether group members hold relevant and adequate information on the nature of acute pain, targeting them with accurate information may be a prerequisite.

To enhance the perception of pain of the study respondents are required to invest in experience. Previous experience with health related activities provides individuals with a variety of resources that can be utilized in managing subsequent healthcare needs (Weller, Ruebush & Klein, 1997). Previous experience with available healthcare options can be used to enhance individual skills and reputations that can help to influence the reallocation of resources in subsequent healthcare needs. In low resource countries, older individuals usually go through various health challenges in life and may thus accept pain as an inevitable part of life (Sayannwo, 2010). In addition they may have learned valuable coping mechanism which they draw from whenever need arises. The estimated resource requirement is a feasible but nonetheless substantial increase in productive human capital.

5.2 Conclusions

There was a relatively high prevalence of acute pain with moderate pain intensity in the study area. Self-m edication was the most prevalent health option used to manage acute pain at the household level. The majority of the surveyed respondents considered that the health option (s) they used to manage acute pain at the household level to be effective.

The effective management of acute pain is associated with the perception of pain which in turn depends on human capital (age and sex), social capital (networks and trust) and burden of pain (pain intensity).

In order to effectively manage acute pain at the household level, the primary measure upon which health educationists and policy planners should focus attention on is to enhance the perception of pain. Patients and their carers who learn about assessment of pain as well as risks and side effects of treatment, and who are made aware that they should communicate both effectiveness (or otherwise) and the onset of any side effects, will have some control over the delivery and success of their pain relief, regardless of the technique used. There should also be information on treatment options, goals, and likely benefits and probability of success. Such an increase could be effected by a variety of techniques, including strengthening groups and networks, or instead, by enhancing personal experience. Offering individuals with targeted information on the nature and management of acute pain is a viable policy option.

5.3 Recommendations

1. Acute pain as a major health concern in the study area that deserves immediate attention. Targeted advocacy and media activities aimed at highlighting the magnitude of the problem in the study area are paramount.

2. Formal protocols and guidelines covering acute pain management should be put in place and legistrative guidelines on the sale and dispense of analgesics put in force. This guidelines should also be communicated to the citizenry so that society appreciates and owns the process.
3. Individuals should be empowered to effectively manage moderate and below moderate pain at the household level. In this direction home-care programs should be designed and implemented immediately. Additionally, individuals should be discouraged from self-treatment at the onset of acute pain especially for above moderate pain.

4. Enhancing the perception of pain is a policy option that should be considered as an effective intervention for acute pain management at the household level. Educational and promotional programs should be designed to enhance individuals' perception of acute pain. Targeting males should especially be considered as a viable policy option.
5. A variety of techniques can be used to enhance individuals' perception of pain. The one that requires the least resource investment (from the point of the individual) are educational and promotional programs that focus on the nature and management of acute pain at the household level. Empowering groups and networks with relevant knowledge on acute pain, promoting trust among neighbors or broadening the experience of individuals appear feasible options but from the provided data, they may require substantial resources to accomplish when compared to the former.

5.4 Suggestions for Further Research

Several issues that were left unanswered in this study offer opportunities for future research:

1) This study focused on household level characteristic as possible determinants of the choice of effective healthcare options after the onset of acute pain. A number of the selected factors were found either to be statistically insignificant or had an unexpected relationship with the effective management of acute pain. For instance, social capital was expected to be positively associated with effective choice of healthcare options but this study found an inverse relationship. Future studies should examine this relationship with more methodological rigour for instance through

improved measurement of variables or detailed examination of the quality of social capital.

2) This study focused on a relatively small geographical area. Large scale studies are required both in geographical scope and number of respondents. Studies that focus on special populations such as the sick, teenagers, children and those discharged from hospital could shed extra understanding on the prevalence and management of acute pain at the household level. Such studies have the potential to highlight whether different population sub-groups perceive and manage acute pain differently. This has important implications on interventions. If different sub-populations manage acute pain differently, then different remedial actions are required for each group.
3) The cost-effectiveness of the policy options suggested in this study need to be determined. Further, optimal methods that can be used to implement the suggested interventions need to be determined.
4) Studies on the social and economic burden of acute pain are needed at all levels from the individual up to the national level. Such information is vital for educational, promotional and advocacy purposes as far as acute pain is concerned.

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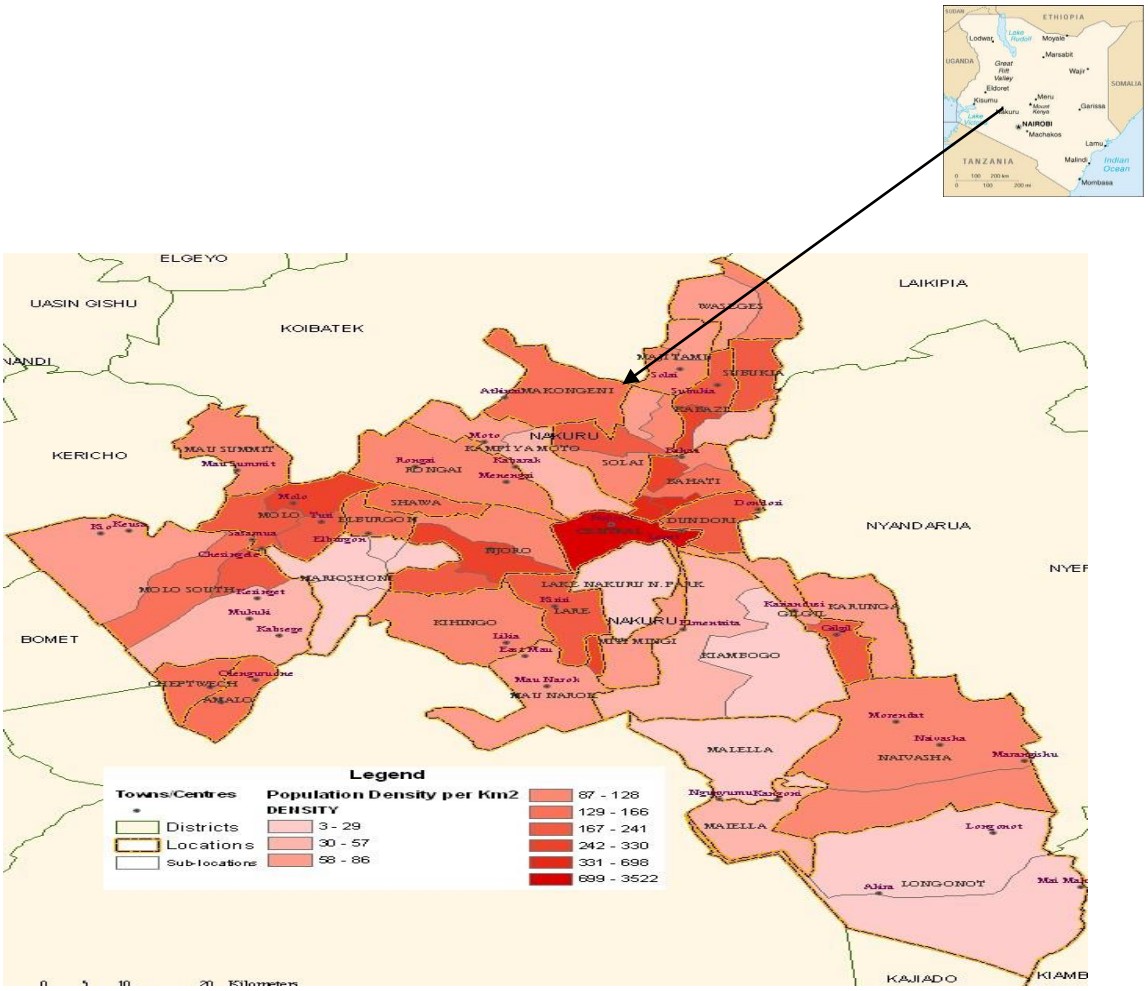
APPENDICES

Appendix 1: Map of Nakuru County 2013, Kenya



Appendix 2: Questionnaires

Appendix 2 A. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

1. Indicate gender of the respondent □ Male □ Female 2. Year of birth_____

3. Are you married? □ Yes □ No

4. Indicate the highest level of education attained

□ Primary □ Secondary □ College □ University

5. Please provide an estimate of your total monthly expenditure.

□ Below kshs.7431 □ kshs. 7431- 11312 □ Greater than kshs.11312

6. Have you been suffering from some form of pain in the previous four weeks?

□ Yes □ No

If yes,

i) What was the cause of the pain? _____

ii) How long have you had the pain? _____

iii) Is the pain causing anxiety? □ Yes □ No

7. Have you sought advice or treatment for the illness outside the home? □ Yes □ No

8. If yes, from where did you seek this care? _____

9. If no on question 7 above, how have you been managing this pain at home?

_____

_____

_____

10. The option I took to manage the pain was effective

□ Yes □ No

Appendix 2 B: WORLD BANK INTEGRATED QUESTIONNAIRE FOR THE MEASUREMENT OF SOCIAL CAPITAL (SC-IQ)

Groups and Networks

1. How long have you lived in this area? _____

2. I would like to start by asking you about the groups or organizations, networks, associations to which you or any member of your household belong. These could be formally organized groups or just groups of people who get together *regularly* to do an activity or talk about things. Of how many such groups are you or any one in your household a member?

_____

3. Of all these groups to which you or members of your household belong, which one is the most important to your household?

_____ [Name of group]

4. Thinking about the members of this group, are most of them of the same….

	1 Yes 2 No
A. Religion	
B. Gender	
C. Ethnic or linguistic background/ race/caste/tribe	

5. Do members mostly have the same…

	1 Yes 2 No
A. Occupation	
B. Educational background or level	

6. Does this group work with or interact with groups ***outside*** the village/neighborhood?

1. No 2. Yes, occasionally 3. Yes, frequently

7. About how many ***close friends*** do you have these days? These are people you feel at ease with, can talk to about private matters, or call on for help.

_____

8. If you suddenly needed to borrow a small amount of money [RURAL: enough to pay for expenses for your household for one week; URBAN: equal to about one week's wages], are there people beyond your immediate household and close relatives to whom you could turn and who would be willing and able to provide this money?

1. Definitely 2. Probably 3.Unsure 4. Probably not 5. Definitely not

Trust and Solidarity

9. Generally speaking, do you believe that most people can be trusted or can't you be too careful in dealing with people?

[ ] most people can be trusted [ ] You can't be too careful

10. Do you think that in this neighbourhood people generally trust each other in matters of lending and borrowing?

[ ] Do Trust [ ] Do not trust [ ] Don't Know/ Not sure [ ] No Answer

11. Please tell me whether in general you agree or disagree with the following statements:

		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
a	In this neighborhood one has to be alert or someone is likely to take advantage of you					
b	Most people in this neighborhood are willing to help if you need it					

12. How much do you trust….

	1 To a very great extent 2 To a great extent 3 Neither great nor small extent

	4 To a small extent 5 To a very small extent
A. Local government officials	
B. Central government officials	

13. If a community project does not directly benefit you but has benefits for many others in the village/neighborhood, would you contribute time or money to the project?

A. Time _____ B. Money_____

1 Will not contribute time 1 Will not contribute money

2 Will contribute time 2 Will contribute money

Appendix 2 C. SHORT-FORM MCGILL PAIN QUESTIONNAIRE-2 (SF-MPQ-2)

i) Please indicate the intensity of pain that you have

0. No pain 1. Mild 2. Discomforting 3.Distressing 4. Horrible 5. Excruciating

ii) Which part (s) of your body has pain? _____

iii) This questionnaire provides you with a list of words that describe some of the different qualities of pain and related symptoms. Please put an X through the numbers that best describe the intensity of each of the pain and related symptoms you felt during the past week. Use 0 if the word does not describe your pain or related symptoms.

1. Throbbing pain *none*		0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
2. Shooting pain *none*		0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
3. Stabbing pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
4. Sharp pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
5. Cramping pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst*

													possible
6. Gnawing pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
7. Hot-burning pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
8. Aching pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
9. Heavy pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
10. Tender	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
11. Splitting pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
12. Tiring pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
13. Sickening	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*

14. Fearful	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
15. Punishing-cruel	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
16. Electric shock	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
17. Cold-freezing	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
18. Piercing	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
19. Pain caused by light touch	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
20. Itching	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*
21. Tingling or ‘pins and needles’	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst possible*

22. Numbness	*none*	0	1	2	3	4	5	6	7	8	9	10	*Worst Possible*

Appendix 2 D. KNOWLEDGE SCALE

1. In the last twelve months, how many episodes of acute pain have you had?

_____

2. For the following questions, please circle the number that best corresponds to your views:

How much does your pain affect your life?	*No Effect*	0	1	2	3	4	5	6	7	8	9	10	*Severely Affects my Life*
How long do you think the pain will continue?	*A very Short time*	0	1	2	3	4	5	6	7	8	9	10	*Forever*
How much control do you feel you have over the pain?	*Absolutely no Control*	0	1	2	3	4	5	6	7	8	9	10	*Extreme Amount of Control*
How much do you think your treatment for pain can help?	*Not at all*	0	1	2	3	4	5	6	7	8	9	10	*Extremely Helpful*
How much do you experience the burden of acute pain?	*Not at all*	0	1	2	3	4	5	6	7	8	9	10	*Severe Burden*
How concerned are	*Not at all*	0	1	2	3	4	5	6	7	8	9	10	*Extremely*

you about your pain?	*Concerned*												*Concerned*
How well do you feel you understand your pain?	*Do not understand at all*	0	1	2	3	4	5	6	7	8	9	10	*Understand very Clearly*
How much does pain affect you emotionally?(make you angry, scared, upset or depressed)	*Not at all affected emotionally*	0	1	2	3	4	5	6	7	8	9	10	*Extremely Affected Emotionally*

3. Please list in rank –order the three most important factors that you believe cause acute pain.

1. _____

2. _____

3._____

Appendix 3: Informed Consent Form

My name is John N. Macai. I am a Doctor of Philosophy student at INTROMID, KEMRI, Jomo Kenyatta University of Agriculture and Technology. I am conducting a research for my thesis and would very much appreciate if you consent to participate in the study.

Project title: *Acute Pain Management: Prevalence and Strategies for Improvement in Nakuru County Kenya*

Patient's name----------Age --------- Sex -------Study Number----------

Purpose of the study: To establish the incidence of acute pain, associated healthcare seeking behaviour and the factors involved among households in Nakuru District.

Procedure to be followed: You will be given a questionnaire to fill. Questions posed are on the intensity of pain and the type of treatment you are using. You will be asked similar questions in periods of one month, three months and six months in order to examine whether you are seeking other types of help. Your responses will be combined with those of other patients and analyzed in a computer in order to identify patterns.

Risks involved: The questions asked are not invasive, do not invade on your privacy and do not pose any pain or harm to you. The questions do not have a right or wrong answer. Most of them require you to state your opinions on the listed statements.

Benefits: Results obtained from this study that is deemed useful will be communicated to you.

Confidentiality of the records: Personal information gathered from you will be encoded

for purposes of confidentiality and your name will not be identified from these records. Only the code numbers will be used in reports and publications.

Basis for participation: It is important for you to know that you have the choice to decline from participating in this study. Should you have any question or clarification required, you can ask the principal investigator, John N .Macai of Tel. no. 0722-312928. You may also contact the Secretary, KEMRI/NERC Tel.No. 2722541.

Consent: I have read the above information and was given an opportunity to ask questions, which were answered. I consent to take part in the study. I fully understand there are no risks associated with the questions posed by the study.

Signature---------- Date ----------

I, the undersigned, have fully explained the relevant details of this study to the patient.

Signature----------Date----------
(Investigator)

Signature----------Date---------- (Witness)

Mambo ya Ziada 2: Maswali

Mambo ya Ziada 2A: Idadi Ya Watu Wanaoshiriki Kijamii

1. Onyesha jinsia □ Mwanaume □ Mwanamke

2. Mwaka wa Kuzaliwa _____

3. Wewe uko kwa ndoa? □Ndio □Hapana

4. Onyesha ngazi ya juu ya elimu □ Shule ya Msingi □ Chuo cha Sekondari □ Chuo □ Chuo Kikuu

5. Tafadhali onyesha makadirio ya matumizi yako kwa jumla ya kila mwezi. □ Chini ya Shilingi. 7,431 □ Shilingi. 7,431-11,312 □ Kubwa kuliko shilingi. 11,312

6. Umekuwa na maumivu yoyote katika wiki nne zilizopita? □Ndio □Hapana

Kama ndiyo,

i) Je, nini sababu ya maumivu? _____

ii) Umekuwa na maumivu kwa muda gani? _____

iii) Je, maumivu haya husababisha wasiwasi? □Ndio □Hapana

7. Je, umetafuta ushauri au matibabu kwa ajili ya ugonjwa nje? □Ndio □Hapana

8. Kama ndiyo, ulitafuta huduma hii kutoka wapi? _____

9. Kama hapana katika swali la 7 hapo juu, umekuwa ukishughulikia maumivu haya nyumbani kwa njia gani?

_____

_____

_____

10. Ile njia nilitumia kushughulikia maumivu ilikuwa ya ufanisi □Ndio □Hapana

Mambo ya Ziada 2B: Maswali Kwa Ajili Ya Kipimo Cha Mtaji Wa Kijamii (SC-IQ) Kulingana Na Benki Ya Dunia

Vikundi na Mitandao

1. Umeishi eneo hili kwa muda gani? _____

2. Ningependa kuanza kwa kukuuliza juu ya makundi, mashirika, mitandao au vyama ambavyo wewe au mwanachama yeyote katika kaya yako yumo. Haya yanaweza kuwa makundi rasmi au makundi tu ya watu ambao hukusanyika pamoja mara kwa mara kwa kufanya shughuli au majadiliano kuhusu mambo.
Wewe na wanajamii wako mumo katika makundi mangapi kama haya? _____

3. Kati ya makundi haya ambayo wewe au wanajamii wako wamo ni ipi iliyo na umuhimu kwenyu? _____ [Jina la kikundi]

4. Ukitafakari kuhusu wanachama wa kundi hili, wengi wao ni wa ....

	1. Ndiyo

	2. Hapana
A. Dini	
B. Jinsia	
C. Kikabila au lugha / mbio / tabaka / kabila	

5. Je, wanachama wengi huwa sawa kwa...

	1. Ndiyo 2. Hapana
A. Kazi	
B. Elimu au ngazi	

6. Je, kundi hili huingiliana na makundi ya ***nje*** ya kijiji / kitongoji?

1. Hapana 2. Ndiyo, mara kwa mara 3. Ndiyo, mara nyingi

7. Siku hizi una marafiki wangapi wa karibu? Hawa ni watu ambao unaweza kuongea nao kwa urahisi kuhusu maswala ya kibinafsi, au kuwaomba msaada.

_____

8. Iwepo kwa ghafla unahitaji kukopa kiasi kidogo cha fedha [VIJIJINI: kutosha kulipia gharama kwa matumizi ya jamii yako kwa wiki moja; MJINI: sawa na mshahara ya wiki moja], kuna watu zaidi na jamaa wa karibu ambao wangeweza na wako tayari kutoa pesa hizi?

1. Dhahiri 2. Pengine 3. Uhakika 4. Pengine sana 5. Hapana *Uaminifu na Mshikamano*

9. Kwa ujumla, je, unaamini kuwa watu wengi wanaweza kuaminiwa au huwezi kuwa makini sana katika kushughulika na watu?

[ ] Watu wengi wanaweza kuaminiwa [ ] Huwezi kuwa makini sana

10. Je, unafikiri kwamba katika mtaa huu watu wanaaminiana katika mambo ya mikopo na kukopa?

[ ] Naamini [ ] Siamini [ ] Sijui / Uhakika [ ] Sina Jibu

11. Tafadhali nieleze iwepo kwa ujumla wakubaliana au kutokubaliana na maelezo yafuatayo:

		Nakubali kabisa	Nakubali	Sina uhakika	Sikubali	kabisa sikubaliani
a	Katika eneo hili, lazima uwe macho au kuna uwezekano wa watu kukunyanyasa					
b	**Watu wengi katika mtaa huu wako tayari kusaidia kama unahitaji**					

12. Una Imani kiasi gani ....

	1 Kwa kiasi kikubwa sana 2. Kwa kiasi kikubwa

	3 Wala kiasi kikubwa wala kiasi kidogo 4 Kwa kiasi kidogo 5 Kwa kiasi kidogo sana
A.Viongozi wa serikali za mitaa	
B. Viongozi wa serikal kuu za mitaa	

13. Kama mradi wa jamii hauna faida moja kwa moja kwako lakini una faida kwa wengine wengi katika kijiji / kitongoji, unaweza kuchangia wakati au fedha kwa mradi huo?

A Wakati _____ B. Fedha_____

1. Sitachangia muda 1. Sitachangia fedha

2. Nitachangia muda 2. Nitachangia fedha

Mambo ya Ziada 2C: Fomu Fupi Ya Maswali Ya Mcgill Kuhusu Maumifu -2 (SF-MPQ-2)

i) Tafadhali onyesha kiwango cha maumivu unayo

0. Hakuna maumivu 1. Kali 2. Zizofaa 3.Kusikitisha 4. Kutisha 5. Makali

ii) Ni sehemu gani ya mwili wako ina maumivu? _____

iii) Fomu hii ya maswali ina orodha ya maneno yanayoelezea baadhi ya sifa tofauti za maumivu na dalili zinazohusiana. Tafadhali weka alama ya X kwa nambari inayoelezea kiwango cha maumivu na dalili kuhusiana na jinsi ulivyojisikia wiki iliyopita.Tumia alama ya 0 kama huna neno la kuelezea maumivu yako au dalili ulizohisi

1. Maumivu makali kupita kiasi	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
2. Uchungu mkali	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
3. Uchungu mkali sana	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
4. Uchungu mkali	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
5. Uchungu kama wa tumbo hivi	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
6. Uchumgu wa kuguguna	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
7. Uchungu wa kuchoma	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
8. Kuumwa	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
9. Uchungu mwingi	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
10. Isiyo kali sana	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
11. Ya kugawanyisha	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
12.Ya kuchokesha	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana

13. Ya kufanya uhisi mgonjwa	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
14. Ya kuogopesha	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
15. Isiyo ya huruma	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
16. Uchungu kama wa stima	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
17. Baridi	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
18. Kudunga	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
19. Maumivu yanayosababishwa na kuguzwa kidogo	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
20. Kuwasha	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
21. Kuwakwa	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana
22. Kufa ganzi	hakuna	0	1	2	3	4	5	6	7	8	9	10	Mbaya sana

Mambo ya Ziada 2D. Upimaji Wa Maarifa

1. Je,Miezi kumi na miwili iliyopita umekuwa na maumivu makali na kwa mara ngapi?

_____

2. Kwa maswali yafuatayo, tafadhali tilia alama ya mduara (0) kwa nambari inayofafanua zaidi maoni yako:

Maumivu yako huathiri maisha yako namna gani?	Hakuna athari	0	1	2	3	4	5	6	7	8	9	10	Huathiri maisha yangu sana
Unafikiri maumivu yataendelea kwa muda gani?	Muda mfupi sana	0	1	2	3	4	5	6	7	8	9	10	Milele
Unahisi una udhibiti upi kwa maumivu hayo?	Hakuna Udhibiti wowote	0	1	2	3	4	5	6	7	8	9	10	Udhibiti uliokithiri
Unafikiri matibabu kwa maumivu yako husaidia?	Hapana	0	1	2	3	4	5	6	7	8	9	10	Husaidia sana
Kiasi gani uzoefu mzigo wa maumivu ya papo hapo?	Hapana	0	1	2	3	4	5	6	7	8	9	10	Jukumu kali

Una wasiwasi kiasi gani kuhusu maumivu yako?	Sina Wasiwasi	0	1	2	3	4	5	6	7	8	9	10	Wasiwasi mwingi
Unadhani unaelewa maumivu yako kikamilifu?	Hayaeleweki kabisa	0	1	2	3	4	5	6	7	8	9	10	Yanaeleweka vizuri sana
Maumivu yanakuathiri kihisia kwa kiasi kipi? (kukufanya uwe mwenye hasira, hofu, au kuwa na huzuni)	Hakuna athari ya kihisia	0	1	2	3	4	5	6	7	8	9	10	Kuna athari kubwa ya kihisia

3. Tafadhali orodhesha katika cheo tatu muhimu sababu unazoaminii husababisha maumivu makali.

1. _____
2. _____
3. _____

Mambo ya ziada 3: Fomu Ya Ridhaa

Jina langu ni John N. Macai. Mimi ni Daktari wa Falsafa katika INTROMID, KEMRI, Chuo Kikuu cha Jomo Kenyatta cha Kilimo na Teknolojia. Nafanya utafiti kulingana na utaratibu wa masomo muhtasari na ningependa ushiriki katika utafiti huu.

Mradi: Usimamizi wa maumivu makali: kiwango cha maambukizi na mikakati ya kuboresha katika Kaunti ya Nakuru

Jina la mgonjwa ---------- Umri --------- Jinsia--------- Nambari ya utafiti ----------

Madhumuni ya utafiti: Kutambua matukio ya maumivu makali, utafutaji wa huduma ya afya na vitu vinavyohusishwa na kaya katika wilaya ya Nakuru.

Utaratibu wa kufuatwa: Utapatiwa fomu ya maswali ya kujaza. Maswali yatakayo ulizwa ni kuhusiana na kiwango cha maumivu na matibabu unayotumia. Utaulizwa maswali yaya haya kwa kipindi cha mwezi moja, miezi tatu, na miezi sitaili kuchunguza kama unatafuta njia zingine za usaidizi. Majibu yako yatajumuishwa na ya wagonjwa wengine kisha kuchambuliwa kwenye ili kutambua ruwaza.

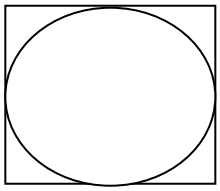
Hatari kwa wanaohusika: Maswali yanoyoulizwa si ya uvamizi,hayaingilii siri zako na si ya kukudhuru. Vilevile maswali haya hayana majibu ambayo ni sawa au si sawa. Maswali mengi yanahitaji utoe maoni yako kwa utakayoulizwa.

Faida: Matokeo yatakayo patikana kutoka utafiti huu yatawasilishwa kwenu .

Usiri wa rekodi: Taarifa binafsi zilizokusanywa hazitawekwa wazi kwa madhumuni ya usiri na majina hayatatambuliwa kutoka kwa rekodi hizo ila tu idadi ya kanuni zitatumika katika ripoti na machapisho.

Msingi wa ushiriki: Ni muhimu kuelewa kuwa si lazima kushiriki katika utafiti huu. Ukiwa na swali lolote au ufafanuzi wowote, unaweza kuuliza mpelelezi mkuu, John N. Macai kupitia nambari ya simu 0722-312928. Pia unaweza kuwasiliana na Katibu Mkuu, KEMRI / NERC Tel. No, 2722541.

Ridhaa: Nimesoma taarifa hii na nikapewa fursa ya kuuliza maswali, ambayo yalijibiwa. Nimekubali kushiriki katika utafiti huu. Naelewa kikamilifu kuwa hakuna hatari yoyote inayohusika na maswali katika utafiti huu. Tafadhali andika jina lako chini, kuonyesha kuwa umesoma na kuelewa asili ya utafiti huu, majukumu yako kama mshiriki wa utafiti, yanayohusiana na ushiriki wako na kwamba maswali ambayo yana wasiwasi wowote kuhusu huu utafiti yamejibiwa.



X _____

Sahihi ya utafiti wa Mshiriki

X _____

Kidole ya Mshiriki wa utafiti na tarehe

X

Sahihi ya Mwenye kupata Kibali cha utafiti

Appendix 4: Letter of approval from SSC

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840 - 00200 NAIROBI, Kenya
Tel: (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org info@kemri.org Website:www.kemri.org

ESACIPAC/SSC/ 9098 **4th March, 2011**

John N. Macai

Thro'
Director, CPHR
NAIROBI

Forwarded 10/3/11

REF: SSC No.1960 (Revised) – Acute pain among households in Nakuru: Burden and strategies for improvement.

I am pleased to inform you that the above-mentioned proposal, in which you are the PI, was discussed by the KEMRI Scientific Steering Committee (SSC), during its **176th meeting** held on **1st March, 2011** and has since been approved for implementation by the SSC.

The SSC however, advises that work on this project can only start when ERC approval is received.

Sammy Njenga, PhD
SECRETARY, SSC

In Search of Better Health

Appendix 5: Ethical committee Clearance letter

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840 - 00200 NAIROBI, Kenya
Tel: (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org info@kemri.org Website:www.kemri.org

KEMRI/RES/7/3/1 **June 20, 2011**

TO: **MR. JOHN N. MACAI (PRINCIPAL INVESTIGATOR)**

THROUGH : **DR. YERI KOMBE,**
THE DIRECTOR, CPHR
NAIROBI.

Forwarded
24/6/2011

Dear Sir,

RE: **SSC PROTOCOL No. 1960 – 2ND REVISION (*RE-SUBMISSION*): ACUTE PAIN AMONG HOUSEHOLDS IN NAKURU: BURDEN AND STRATEGIES FOR IMPROVEMENT (*VERSION DATED 15 JUNE*)**

Reference is made to your letter dated June 15, 2011.

We acknowledge receipt of:

a. The Revised Study Protocol;
b. The Revised Informed Consent Documents - English and Kiswahili versions;
c. The Study Questionnaire - English and Kiswahili versions.

The Committee is satisfied that the issues raised at the initial and subsequent reviews have been adequately addressed.

The study is granted approval for implementation effective this **20th day of June 2011**. Please note that authorization to conduct this study will automatically expire on **18th June 2012**. If you plan to continue with data collection or analysis beyond this date, please submit an application for continuing approval to the ERC Secretariat by **7th May 2012**.

Any unanticipated problems resulting from the implementation of this protocol should be brought to the attention of the ERC. You are also required to submit any proposed changes to this protocol to the ERC to initiation and advise the ERC when the study is completed or discontinued.

Sincerely,
Christine Wasunna,
FOR: SECRETARY,
KEMRI/NATIONAL ETHICS REVIEW COMMITTEE