

Humanism in Medical Practice: What, Why and How?

Implementation of Hospital Management Information Systems on Service Delivery in Moi Teaching and Referral Hospital, Kenya

A Rare Case of Masked Septal Abscess in a Patient with Lower Respiratory Tract Infection on Prolonged Antibiotic Therapy

The Practice of the Informed Consent Process on Survey Studies Involving Healthcare Providers as Participants at Moi Teaching and Referral Hospital

Socio-Economic Determinants that Influence the Effectiveness of Community-Based Tuberculosis Care in Meru County, Kenya



## Introduction

The World Journal of Medical Education and Research (WJMER) (ISSN 2052-1715) is an online publication of Doctors Academy Group of Educational the Establishments. Published on a guarterly basis, the aim of the journal is to promote academia and research amongst members of the multi-disciplinary healthcare team including doctors, dentists, scientists, and students of these specialties from around the world. The principal objective of this journal is to encourage the aforementioned, from developing countries in particular, to publish their work. The journal intends to promote the healthy transfer of knowledge, opinions and expertise between those who have the benefit of cutting edge technology and those who need to innovate within their resource constraints. It is our hope that this will help to develop medical knowledge and to provide optimal clinical care in different settings. We envisage an incessant stream of information flowing along the channels that WIMER will create and that a surfeit of ideas will be gleaned from this process. We look forward to sharing these experiences with our readers in our editions. We are honoured to welcome you to WJMER.

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Volume 20, Issue 1, 2019, World Journal of Medical Education a	and Research	(WJMER). An Official Publication of the Education and Research Division of
Doctors Academy Group of Educational Establishments.		
Electronic version		Doctors Academy UK, 189 Whitchurch Road,
published at	:	Cardiff, CF14 3JR, South Glamorgan, United Kingdom
Print version printed		Abbey Bookbinding and Print Co.,
and published at	:	Unit 3, Gabalfa Workshops, Clos
		Menter, Cardiff CF14 3AY
ISBN	:	978-93-80573-68-7.
Designing and Setting	:	Doctors Academy, DA House, Judges Paradise, Kaimanam,
		Trivandrum, 695018, Kerala, India
Cover page design and graphics	:	Sreekanth S.S
Type Setting	:	Lakshmi Sreekanth
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# WELCOME

It is our great pleasure to bring you the twentieth edition of the World Journal of Medical Education and Research (WJMER). This edition assembles a variety of intellectually-stimulating articles in an attempt to offer the reader an insight into the innovative research that is being conducted throughout the world.

The opening article by Hulail considers how humanistic characteristics can improve the delivery and impact of healthcare. He argues that a focus on humanism within the medical school curriculum could prompt healthcare professionals to treat patients in an empathetic manner from the initial stages of their career which would, in turn, enhance healthcare.

Believing that the benefits of Hospital Management Information Systems (HMIS) have not been adequately discussed, Cheruiyot et al. investigate how the implementation of such systems aids the delivery and provision of healthcare at Moi Teaching and Referral Hospital, Kenya.

In the following article, Mogre and Vora consider the rare case of a masked septal abscess in a patient with a lower respiratory tract infection who was simultaneously on prolonged antibiotic therapy. They highlight the importance of recognising a masked infection that is associated with the continued use of systemic antibiotics and, as such, recommend that a patient with a nasal injury is re-assessed after 48 to 72 hours.

Acknowledging the importance of informed consent, Chesir et al. evaluate if participants of survey studies are truly aware of and comprehend the process. They conclude that those who participate in survey studies at Moi Teaching and Referral Hospital, Kenya have a limited understanding of what is required of them.

The final article by Mberia and Kei investigates the factors that influence the implementation of care for tuberculosis in rural Kenya. The study found that the support that the individual receives from family and friends, as well as his or her income, determine the effectiveness of the care provided.

We sincerely hope that you find each article in this edition informative, interesting, and enjoyable to read.

Ms Karen Au-Yeung Editor Ms Rebecca Williams Associate Editor Professor Stuart Enoch Editor-in-Chief

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# Humanism in Medical Practice: What, Why and How?

Hulail M

#### Institution

#### Abstract

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WJMER, Vol 20: Issue 1, 2019

Humanism is the basis of medicine. Humanistic medical care improves health outcomes and aids patients to adhere to medical advice and treatment options. Clinicians who are more empathetic towards their patients benefit from higher job satisfaction and less malpractice litigation. A lower level of empathy has been associated with a higher rate of practical mistakes. During the past four decades, new technological devices have been extensively incorporated into medical practice. Physicians focus on the disease and ignore the psychological status, and ethical and social cultures of the patient, abolishing medical humanistic spirit. The teaching of medical humanities becomes a necessity to help medical students to encompass more humanistic and empathic attitudes in their future careers. It can be taught through lectures, role modeling, and training in interpersonal skills, literature and arts study. Multiple tools can be used to assess of humanistic attitudes and behaviours, including observations during patient examination or history taking, simulations, and quizzes. Medical organisations must value their members through showing a concern for their well-being, growth, and development. Experts with good humanistic knowledge and experience in interpersonal skills can qualitatively evaluate humanism among medical students.

#### Key Words

Humanism; Medical Education; Medical Practice; Healthcare; Medical Organisations

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#### Introduction

The word 'humanism' is derived from the Latin concept humanities, which refers to friendly behaviours and a good attitude towards others without distinction. It is characterised by personal principles and beliefs towards an individual's duties and responsibilities when dealing with others, especially those in need. Humanistic characteristics include honesty, empathy, compassion, altruism, and care of patients with respect to their dignity and beliefs (Pellegrino, 1979; Branch, 2000, Libby and Youmna, 2014).

Humanism represents the basis of medicine throughout history, beginning from the time of the Hippocrates and the development of the Hippocratic Oath. Medicine has been regarded as a moral profession and carried out in accordance with a set of morals and ethics (Miles, 2002).

The first conference concerned with humanism, which was held at Chicago University in 1933,

recommended considering humanistic science as the basis of morality and decision-making in medical practice (Grafton and Anthony, 2004).

The Arnold P. Gold Foundation reported that humanism is characterised by a respectful and compassionate relationship between the healthcare providers and patients. It reflects the respect of the healthcare professionals to values, and the cultural and ethnic backgrounds of others (Cohen, 2012; Lee *et al.*, 2016). When dealing with colleagues, humanistic behaviours include personal connections, respect, self-awareness, and response to emotional expressions (Weissmann *et al.*, 2006).

Sir William Osler (1837-1901), who is considered by many authors as the father of modern medicine, advised his students with the words, Listen to the patient. He is telling you the diagnosis, (Silverman *et al*, 2007). Sir Osler also stated that, it is much more important to know what sort of person has a

disease, than to know what sort of disease a person has, (Hojat *et al.*, 2011; Sylvia *et al.*, 2013).

# What Are the Benefits of Humanistic Medical Practice?

Humanistic beliefs are the spirit of professional activity. No physician can be a true profession without having a humanistic attitude (Lee and Ahn, 2007). A good physician must possess not only accurate medical knowledge and skills but also moral judgment and actions, a kind attitude, and a trusting relationship with patients and their families. Physicians must consider that the patient has a body and soul, emotions, feelings, expectations, and fears (Donatella *et al.*, 2010).

Clinicians who are more empathetic towards their patients benefit from higher job satisfaction and less malpractice litigation. A lower level of empathy has been associated with a higher rate of practical mistakes (Livinson, 1994).

Pellegrino (2006) stated that medical practice is a relationship in which two individuals interact. However, one is in a weaker position than the other. The weight of the responsibility rests on the person with the higher degree of power and authority, the one who has made a promise to help the other. Consequently, responsibility lies upon the physician who make the promise to the patient.

Humanistic medical care encourages patients to adhere to medical advice and treatment options, resulting in improved healthcare outcomes (Steinhausen, 2014).

Sir William Osler argued that the physician-patient relationship could be flourish through a physician's good background in humanistic science. While promoting humanities among medical practitioners was a battle that was lost, Osler suggested that the education of medical students should combine both medical knowledge and the humanities (Marek, 2014).

#### Why Do Calls Emerge to Re-Humanise Medical Practice?

One century ago, physicians were among the most educated individuals in their communities, both in the clinical sciences and in the science of humanities (Gourevitch, 1999). However, the past four decades have showed great advances in medical knowledge, and new technological devices have been extensively incorporated into medical practice (Taylor *et al.*, 2015). Physicians have focused on the disease, use of technology, laboratory investigations, treatment, and physical recovery. They tend to ignore psychological status, and the ethical and social culture of the patient. These events abolished medical humanistic spirit (Evans, 2002; Macnaughton, 2011).

Such dehumanised medicine appears to have no past, no cultural language, and no philosophy (Gourevitch; 1999).

The physician-patient relationship was broken (Bertman, 2017). The skills of the physician to interact with patients face-to-face become greatly lost (Egnew, 2009).

There is little doubt that computers increasingly help physicians to find knowledge quickly and easily. However, these tools represented major challenges in the contemporary world due to the time pressures that may prevent physicians from listening to their patients and showing concern for to their problems (Frankel, 2016). Any interpersonal relationship, suck as medicine or education in which the human is in-between the patient and doctor, or the student and teacher, requires time to grow and flourish. However, in the practice of medicine, as anywhere else, the time has become greatly lacking (Ventres and Frankel, 2015; Ventres, 2015).

As clinicians become time-exhausted and overburdened, they become multi-taskers. They may do more than one duty at the same time. The quality of everything they do becomes simultaneously worse and diluted due to the number of tasks they attempt to perform (Eyal *et al.*, 2009; Cheshire, 2015).

Hunt *et al.* (2009) and Serwint (2012) noted that burnout, fatigue, emotional exhaustion, depersonalisation and decreased feelings of personal accomplishment can develop among physicians due to long working hours. Burnout dramatically affects the physician-patient relationship, with a consequent loss of empathy and distancing from patients who feel a sense of abandonment and dissatisfaction with the healthcare providers.

# How Can Humanism in Medical Practice Be Achieved?

Since 1970, there has been a trend towards incorporating medical humanities modality in the undergraduate curriculum both in the United States and in Europe (Goodlad, 2000; Evans and Macnaughton, 2004), as well as in many parts of the world (Bleakley and Marshall, 2013; Bleakley, 2015).

In 1919, Sir Osler described the relations between basic science knowledge and the humanities with his famous equate: 'The humanities are the hormones which do for society at large what the thyroid gland does for the individual' (Osler, 1920). Lewenson and Londrigan (2008) reported that modern society cannot flourish without healthcare professionals exhibiting a strong background in medical humanities as they interact with the individual from birth to death, in health and in illness. So they must be reflective, flexible, and comfortable with the care of their patients and communities.

Medical students begin their journey in medical school with great empathy and a desire to help others. Yet, medical schools teach them solid basic sciences and escape the challenges concerned with human issues (Spiro, 1992). Empathy among medical students declines as they proceed in medical school (Feinstein, 1994). Current medical students lack the essential humanistic behaviours, such as empathy and communication skills (Jung et al., 2016). Incorporating medical humanities in the medical school curriculum helps students in their future careers to do what they are already doing but in a more humanistic and empathic manner (Fox, 1985). It can foster critical thinking, an understanding of personal values, empathy, cultural competence, leadership, and teamwork activities. Thus, it prepares medical students to respond appropriately to complicated clinical problems (Evans, 2002; Bolton, 2003). It encourages medical students to adopt good behaviours in their future practice (John and Jeffrey, 2008). Teaching humanistic values becomes a priority in medical education (Glass, 1996).

Medical humanities modality is concerned with the understanding of the socio-economic, ethnic and religious background of patients and their families (Tucker *et al.*, 2003).

In 1993, the General Medical Council (GMC) in the United Kingdom reported the importance of medical humanities and released its report, termed 'Tomorrow's Doctors' (Downie, 2016). This report proposed a curriculum formed from interdisciplinary subjects, including philosophy, anthropology, religion, law, history, cultural studies, arts and communication skills (Shapiro et al., 2009; Erwin, 2014). The GMC advised integration of this curriculum in undergraduate medical education to promote skills, and ethical and legal issues relevant to clinical practice and the rights of the patient in all aspects (Tseng et al., 2016). The curriculum in medical humanities should be longitudinal and expanded throughout all years of undergraduate study, as well as in continuing medical education (Gracey et al., 2005; Rabow et al., 2010).

Humanism and medical humanities can be taught to medical students through lectures, role modeling, training in interpersonal skills, literature and arts study, and listening to video recordings of students, encounters with patients (Branch *et al.*, 2001; Libby and Youmna, 2014). Small group teaching, standardised patient exercises, clinical rounds, conversations, and service-learning experiences can also be used as learning methods for humanism (Block, 1996; Elam *et al.*, 2003).

A 'role model' is a term that refers to a person or physician who is followed by students or learners to imitate his/her clinical experience, humanistic behaviour, and teaching skills. It is a longstanding educational method which has been recommended for promoting humanism among medical students (Mirhaghi et al., 2015). Positive role models have high degrees of skills and knowledge. They emphasise the psychological and social aspects of medical care. They respect their patients and listen to them with attention; they respond to their feelings and emotions. During teaching, they establish a reflective atmosphere with their students and win their trust as they are appropriately interested in and concerned for their students and patients. They can associate the human and moral dimensions of healthcare in the learning process of basic and clinical medical knowledge (Branch et al., 2001; Molinuevo et al., 2011).

# Assessments of Humanism in Medical Education

Multiple assessment tools can be used to assess humanistic attitudes and behaviours among medical students. These methods include observations during patient examination, history taking or objective structured clinical examinations (OSCEs), simulations, and quizzes (Libby and Youmna, 2014). Qualitative assessment methods are preferred to determine the perception of students in regard to humanistic values and attitudes. These methods highlight the fact that professional practice and humanistic values integrate disease and illness, thoughts and feelings. Medical educators must not forget that humanism is an interdisciplinary subject intermingled with the basic biomedical sciences.

#### The Role of Organisations and the Society in Maintaining Humanism in Medical Practice

Medical institutions depend mainly on technological principles. They are designed to deal with medical and surgical procedures, infection control, nursing, and security. Physicians become humanistically inclined. The medical schools must support the teaching of humanistic values (Inui, 2003). Standards and educational principles of medical institutions must also reflect humanistic values. They must pay attention to and maintain patient satisfaction with the outcome of healthcare services (Levenstein *et al.*, 1986). An organisation must value its members by showing concern for their well-being, growth,

and development (Cooke and Rousseau, 1988; 17. Evans and N

Wilkins and Ouchi, 1983). Medical organisations could employ experts with good humanistic knowledge, skills, and experience in interpersonal skills to qualitatively evaluate professionalism and humanism among medical students.

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Medical Technology DAUIN 20190152



### Implementation of Hospital Management Information Systems on Service Delivery in Moi Teaching and Referral Hospital, Kenya

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WJMER, Vol 20: Issue 1, 2019

#### Abstract

Hospital Management Information Systems (HMIS) has the potential to improve the quality of services delivered, as well as the efficiency and effectiveness of healthcare providers through the integration of various hospital functional units. However, the benefits of this implementation in service delivery have not been adequately addressed. This study sought to appraise the impact of the implementation of HMIS, on service delivery in Moi Teaching and Referral Hospital, (MTRH). The objectives of the study were: to examine the level of implementation of HMIS in MTRH; to establish the strategies motivating implementation and utilisation of HMIS, to assess the benefits that have been realized in utilizing Hospital Management Information Systems, and to assess the effect of HMIS on service delivery in MTRH. Cross sectional descriptive research design was utilised in the study; the sample size formula proposed by Cooper and Schildler formula was used to obtain 240 respondents from a target population of 587 users of HMIS. A structured closed-ended questionnaire and interviews were administered. Quantitative data was obtained, coded using SPSS v.21. Data was analysed using descriptive statistics, *i.e.* mean and standard deviations and inferential statistics i.e. Pearson Correlation Analysis and Multiple Regression Analysis. Of the 240 questionnaires distributed, 192 were filled and returned, with most respondents familiar with HMIS. The respondents moderately agreed that the implementation of HMIS was done well and as per expectations. The Hospital Records module had the highest implementation level, while Consulting Doctor module scored the lowest. On the level of utilisation of HMIS, the result indicate that the mean values were above average on a five point Likert scale. The Further Records module had the highest implementation level, with the majority agreeing that the module had been adequately utilised. Conversely, the Consulting Doctor module posted the lowest utilisation level. On the strategies motivating the utilisation of HMIS results indicate that the strategy of allaying perceptions and fears among staff on the use of HMIS is the one mostly deployed by the hospital in order to improve the level of Utilisation of HMIS. Results indicated that the anticipated benefits of HMIS were all above average. The results of the regression analysis suggested that HMIS implementation ( $\beta$ =.215, p<0.05), HMIS Utilisation ( $\beta$ = ...697, p<0.05), motivation strategy ( $\beta$ = .193, p<0.05), and HMIS benefits ( $\beta$ = .045, p<0.05) had a positive significant effect on service delivery. Therefore, the null hypothesis is rejected. The value of the F-statistic is (F=172.917, p<0.05) is robust. The coefficient of determination value of R2= .787 means that 78.7% of the variation in service delivery at the hospital can be explained by HMIS. The study recommends that a policy be drafted to entrench HMIS implementation and utilisation in the country.

#### Key Words

Hospital Management Information Systems; Service Delivery; Implementation

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#### Introduction

Developing countries face different challenges in their health sector. This has been immensely captured by the annual World Health Organisation (WHO) reports. In the reports, developing countries such as Kenya faced similar healthcare challenges in the year 2001 and 2014. However, investment in the health sector has rather remained stagnant with the 2011 statistics showing Total expenditure on health per capita at 77 United States Dollar (USD) and Total expenditure on health as a percentage of Gross Domestic Product (GDP) declining to 4.5 %. WHO reports further show that key health impact indicators suggest stagnation or

decline in the health status, such as maternal mortality and under five mortality has stagnated. According to Communication Authority of Kenya Report (CAK), (2014) there have been many liberalisation efforts which have resulted in a vibrant communications market in the country, such that in the period 2001 to 2014 internet and mobile computing utilizsation went up from approximately three hundred thousand users to more than nine million users currently.

With access to internet, integrated systems, mobile computing and cyberspace have been utilised to solve a number of challenges in other sectors in the country such as finance, communication, education, aviation, agriculture, mining, transport and manufacturing, which has resulted to betterment of the aforementioned sectors, while the healthcare sector is still facing the same challenges faced before widespread adoption of computers such management of funds, retrieval and accessing medical data, management of medical supplies, connectivity of various hospital units and availability of data for prompt decision making. In the global context, a number of hospitals have slowly adopted the utilisation of HMIS (WHO, 2014).

In Kenya, Moi Teaching and Referral Hospital (MTRH) among other hospitals, has implemented HMIS, with the intention of having dynamic health information solution that synchronises workflow across MTRH entire enterprise. It was envisioned that the system enhances patient care through integrating clinical, financial, therapeutic and diagnostic information.

Whereas a number of researchers have celebrated HMIS as the panacea of the varied challenges facing hospitals globally, and the ultimate solution to effective, timely and efficient service delivery, others have dismissed HMIS as unnecessary, capital intensive, and a fad that has no real ascribed benefits to the health sector (Gregory, 2008). This study will therefore assess the implementation of HMIS on service delivery in MTRH.

#### Statement of the Problem

MTRH faced diverse challenges in utilisation of manual-based systems such as delay in decision making, forgeries of financial records, loss of pharmaceuticals, dressings and sutures, delay in patient service delivery, among other challenges, (Kenya National Audit Office Report, 2011). In 2012, the hospital implemented an HMIS system (Funsoft) which was touted as the panacea of the challenges. However, diverse challenges continue to exist in the hospital, hence the need to understand the level of HMIS utilisation. MTRH's 2012-2017 strategic plan envisions that, by 2016, most of the operations should be automated. However, whereas the hospital has put in immense resources, total automation has not been achieved, while the hospital has not realised tremendous benefits in service delivery commensurate with the resources used. Therefore, a problem exists which requires understanding.

The hospital has deployed a number of HMIS modules in different operational areas including electronics medical records, in-patient and outpatient modules, pharmacy, laboratory and radiology management modules, nursing modules, accounts/finance management and supply chain management modules. Hypothetically, the areas in which the system has been implemented should be efficient with patients' medical records being retrieved as and when needed without duplication of data, past medical and referral data being available at the click of a mouse, there should be comprehensive follow-up of both inpatient and outpatient. In the pharmacy ideally, there should be no loss of drugs, while drugs should be traced to the patient and complete drug reports available, while in the laboratory and radiology, specimens should be traced to the patient while results should be transmitted to the doctor requesting the tests as soon as they are available, payment of creditors and billing of patients should be prompt and accurate, while nursing should triage patients and doctors clerk in patients electronically. It is therefore important to examine if the aforementioned objectives has been completely achieved with the adoption, implementation of HMIS in the hospital.

#### Hypothesis

The study tested the following hypothesis:

H<sub>o</sub>: HMIS has no significant effect on service delivery in MTRH.

#### Literature Review

The adoption, implementation and benefits of HMIS in several sources of literature have been captured in most literature based on the more generic term Health Information System, as defined by Hanafizadeh and Saghaei, (2009). According to the authors, Health Information System is a more wide term which incorporates any system that captures, stores, manages or transmits data and information that relates to all activities in organizations involved in the health sector or the health of individuals. This is supported by WHO Health Metrics Network (2005), which presents that HMIS, can be viewed from the wider context as part of Health Information System which is an integrated endeavour to collect, process, report, send and use health information and knowledge for individual and public health outcomes, programme action, research and to influence policy and decisionmaking.

According to Kenya National Audit office report (2011) to MTRH management, the utilisation of manual-based methodologies in the management of hospital operations, and service delivery has been riddled with a myriad of challenges including high operational and human resource costs, ineffective and compromised service delivery and delayed decision making, furthermore this has negatively affected the level of inter-facility patient referral, medical history follow up, and data retrieval. Continued usage of manual systems is detrimental, therefore, to the wellbeing of the hospital.

In recognition that healthcare institutions, in an attempt to solve the challenges, have had reactive responses which entail automation of the various activities, these have however, created more challenges, with some institutions recording total failure on implementing hospital management information systems, others have partially implemented, while other hospitals still face the same problems before HMIS installation as argued by Bernstein, Mccreless, and Côté (2007). Hospitals' managements have been at a crossroads on whether to continue investing the limited available resources on implementing HMIS whose outcome is unpredictable, or to continue using manual based methodologies in their operations, resulting to compromising on service delivery.

Whereas there have been a number of steps and strategies adopted to overcome the aforementioned challenges, the hospital has not realised tremendous benefits commensurate with the resources, which have been utilised in the implementation of HMIS. Furthermore, whereas implementation of the system was publicised as an integrated system to automate all functions of the hospital within a short time, four years later, a number of functionalities are still manual based. There is also the problem of the expected beneficiaries of the system, the users, whose system implementation was expected to foster their work, being behind sabotaging the implementation of the system.

The benefits of implementation of HMIS are a contentious topic with various studies, researches and presentations having diverse understandings of what actually constitute HMIS. In a number of studies, HMIS is viewed from the general perspective that it is an important component of Electronic Health; in that all the modules of HMIS is what actually constitutes E-health. E-Health has recently become the new "buzzword." E-Health is defined in many different ways and there is no consensus on its definition.

Eysenbach (2001) defines E-Health as "an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state- of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve healthcare locally, regionally, and worldwide by using information and communication technology."

The benefits of HMIS as an ingredient of E-health is viewed through understanding "E" in E-Health apart from standing for electronic health also stands for other paramount factors including Efficiency. HMIS offers efficiency in healthcare delivery timely clinical interventions and costs reduction whereby utilizing HMIS in telemedicine reduces the need for travel and the need for referral to a secondary or tertiary health institution. Also, according to the European Commission, (2006) there is "hard evidence that proves E-Health is already providing real benefits to people as well as real savings in public expenditure" Another way E-Health increases healthcare efficiency is that it "can reduce the time required to perform health tasks and processes" as presented by Heeks, (2004), who opines that appointments and 24-hour emergency consultations can be offered from any geographical area. Through quicker data handling, decisions can be made faster and this could potentially save lives.

Empowerment; E-Health empowers consumers and patients by allowing them to have access to their medical records online. This empowerment enables the patient to be more involved in the decision making process, since both physicians and consumers can access health information online. They can access the information fast and for free. In fact, "about half of adults in the United States have looked for health information on the net, making this the third most popular online activity" (Ferguson & Frydman, 2004).

The benefits of HMIS is further expounded by Dobbs, (2004) who presents that HMIS fosters cost reduction in terms of administrative and clinical transactions planning while encouraging, better service to the patients, through improving operational control and streamlining operations. This is further highlighted through indirect benefits such as corporate image of the hospital and increased competitive advantage, and direct benefits reduced waiting time, reduced wastage, minimal inventory levels, reliable and timely information, greater organizational flexibility, reduced paperwork

and simplification of patient record management as presented by Leung, (2001).

Furthermore, Ferguson and Frydman, (2004) are in agreement that HMIS implementation fosters better revenue management, since it is impractical to utilise age-old manual systems, considering the magnitude of revenue transactions. HMIS offers fast and accurate transactional and management reports that provide real-time required financial and performance status of the hospital.

On the contrary, however, Rockwell and Alton (2003), maintain that, whilst there are various benefits of HMIS, the potential benefits of HMIS have rather been exaggerated in paper, with actual benefits not actually realised on HMIS implementations globally. The author is of the opinion that there are various challenges that impair successful implementation of such systems to enable health institutions claim to have achieved all the envisioned benefits at the beginning of the implementation. As such the intensive capital requirements, the need to totally alter the policies and the structure of the hospital, the frequent need to train and retrain the staff of the new system, incidences of system failures, intrusion and viruses as well as system inconsistencies have so much negative impacts to the extent that by the time the acclaimed benefits are documented so much shall have gone to the implementation such that the net effect is zero.

#### Methodology

#### **Research Design**

This study adopted descriptive cross-section study design with a quantitative approach. This is a research design that made it easy to obtain information of the current phenomena on HMIS for easy analysis, presentation and interpretation through obtaining information from a representative selection of the population (Keith, 2005).

The dependent variable of the study was Improved Hospital Service.

Delivery in terms of efficiency and effectiveness, in MTRH, which was measured through Outpatient Time spent per visit, Service availability per 100 cases, Inpatient Average Length of stay, Percentage of drug availability in drug formulary and Patient satisfaction Percentage. The independent variables were the strategies motivating utilisation of HMIS and the benefits that have been realised in utilising HMIS, and the level at which MTRH has been utilising HMIS.

The target population comprised of 587 respondents from management and the 12 Departments in the Hospital which directly interact with the HMIS, These include; Accident & Emergency, Health Records, Public Relations, Information Communication Technology, Finance, Surgery, Medicine, Pediatrics, Laboratory, Pharmacy, Radiology, and Supply Chain Management.

Stratified sampling technique was used whereby the target population was divided into strata according to functional departments, thereafter sample size was determined by applying Cooper and Schindler (2011) formula. Simple random method was used to select respondents for the study from respective strata.

The research used questionnaires, which were selfadministered physically to the respondents, as well as check-list where HMIS modules were checked on implementation and utilisation status. The questionnaires were used for the purpose of collecting primary quantitative data. Additionally, the questionnaires were used for the following reasons: their potential to reach out to a large number of respondents within a short time their ability to give the respondents adequate time to respond to the items they offer a sense of security (confidentiality) to the respondent; and they are objective since no bias results from the personal characteristics, as explained by Earl (2010). A pilot test was carried out at the formerly Rift Valley Provincial General Hospital, Nakuru. Cronbach's alpha reliability test was used to determine the internal.

#### Results

#### Preliminary Results

Although the study intended to collect data from 240 respondents, data was successfully collected from 192 respondents. This represents a response rate of 80% and falls within the confines of a large sample size ( $n \ge 30$ ). This provides a smaller margin of error and good precision (Anderson, Sweeney and Williams, 2003). The demographic profile of the surveyed respondents which includes designation, education, organisational role, familiarity with HMIS, experience in the health sector, and experience working with HMIS. The results are presented in this section.

The respondents were asked to state their designation in the organisation. The study found that majority of the consistency of the question items that measured the variables of interest for this study.

The collected data was encoded and entered into computerised data analysis software, SPSS v23. Each dimension had various items measured on a 5point Likert scale. Data analysis entailed inspecting, cleaning, transforming, and modeling the collected data with the aim of highlighting useful information, suggesting conclusions, and supporting decisionmaking. Regressions and Analysis of Variance (ANOVA) test will be used to determine the relationship between the independent variables and dependent variables.

Respondents, 52.6 %(103) were staff of low cadre. Table 1 summarises their responses.

The study sought to determine the highest qualification of the respondents. The results are summarised in Table 2. Results indicated that 34.7% had Diplomas and other lower, 41.3% held bachelor's degrees, 21.4% had masters degrees,

while only 0.5% had PhD.

The respondents indicated the roles they play in the organisation as per the organogram of the hospital. The results are as depicted in Table 3. It was found that majority of the respondents (55.1%) were employees with no responsibility positions in the hospital. While 31.6 are at supervisory level, management role had 31.6% of the respondents, and only 0.5% were at executive level.

The level of familiarity with hospital management information system by the respondents was determined. The results are summarised in Table 4. The results indicated that 22.4% were very familiar with the HMIS, 37.8% were familiar, 21.4% had modest familiarity, 10.2% were unfamiliar, while 10.2% were very unfamiliar with the information system. It was, therefore, concluded that majority of the respondents were familiar with the system.

	Frequency	Percent	Valid Percent	Cum Percent
Director/Deputy Director	1	.5	.5	2.6
Senior Manager	5	2.6	2.6	5.1
HOD	21	10.7	10.7	15.8
Head of Section	44	22.4	22.4	38.3
Administrators	18	9.2	9.2	47.4
Staff	103	52.6	52.6	100.0
Total	192	100.0	100.0	

Table1: Designation of Respondent

	Frequency	Percent	Valid Percent	Cum Percent
PhD	1	.5	.5	2.6
Masters	42	21.4	21.4	24.0
Bachelors	81	41.3	41.3	65.3
Diploma/Others	68	34.7	34.7	100.0
Total	192	100.0	100.0	

Table 2: Education Level of Respondents

Fred	quency	Percent	Valid Percent	Cumulative Percent
Executive	1	.5	.5	2.6
Managerial Role	21	10.7	10.7	13.3
Supervisory Role	62	31.6	31.6	44.9
Employee	108	55.1	55.1	100.0
Total	192	100.0	100.0	

Table 3: Role in the Organisation

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An Official Publication of the Education and Research Division of Doctors Academy

Free	quency	Percent	Valid Percent	Cumulative %
Very Familiar	44	22.4	22.9	22.9
Familiar	74	37.8	38.5	61.5
Average	42	21.4	21.9	83.3
Unfamiliar	20	10.2	10.4	93.8
Very Unfamiliar	12	6.1	6.3	100.0
Total	192	98.0	100.0	

Table 4: Familiarity with HMIS

	Mean	SD	Skewness		Kurtosis	
			Statistic	SE	Statistic	SE
Implementation	3.8460	.95960	.415	.146	.616	.291
Utilisation	3.6033	1.02612	.282	.146	199	.291
Strategies Motivating Utilisation	3.5464	1.22850	.731	.146	.963	.291
Benefits of HMIS	3.5072	1.05684	.380	.146	079	.291
Service Delivery	3.1259	1.45470	.827	.146	.133	.291

Table 5: Service Delivery

Variable	Constructs	No. of Items	Alpha
HMIS	Implementation	9	.764
	Utilisation	9	.778
	Strategies Motivating Utilisation	12	.665
	Benefits of HMIS	6	.790
Service Delivery		12	.923

Table 6: Cronbach's Alpha Reliability Coefficient

#### Service Delivery

The dependent variable in this study was service delivery. It was, therefore, imperative to measure the level of this variable at the hospital. Table 5 indicates service delivery at the hospital. From the items used to measure level of service delivery in the hospital, the means were in the range 3.16 to 4.00 Oon a 5-point likert scale. This indicated that the level of service delivery was above the average mark of 2.5 on a 5-point likert scale. The item on fewer complaints and increased revenue collection as a measure of service delivery posted the highest mean of 4.00 and 4.50 respectively.

#### Validity and Reliability Tests

As recommended by Malhotra (2007), the questionnaire pre-tests were done by personal interviews in order to observe the respondents' reactions and attitudes. All aspects of the

questionnaire were pre-tested including question content, wording, sequence, form and layout, question difficulty and instructions. The feedback obtained was used to revise the questionnaire before administering it to the study respondents.

Cronbach's alpha reliability test was used to determine the internal consistency of the question items that measured the variables of interest for this study. Sekeran (2000) benchmark of Cronbach's coefficient value of greater than 0.7 indicates the tool was reliable to measure the variable. Table 6 presents the results of the reliability test.

From tabulated results in Table 6, alpha coefficient for all the variables were in the range .665 –.790. Hence are above the benchmark of 0.7 suggested by Sekeran (2000) and thus the scales were reliable for measuring the variables.

#### Test of Regression Assumptions

The data was tested to determine whether the assumptions of ordinary least square (OLS) are met. This was used as a precursor for regression analysis Both kurtosis and skewaness were used to determine the normality of the data distribution for the variable under study. The skewness statistic and kurtosis statistic obtained for the variables of interest in this study were in the range .282-.827 for skewness and -.199-.963 for kurtosis. According to Hair *et al.*, (2010) the requisite range for normally distributed data is between -1.00 and +1.00. All the values of skewness and kurtosis fell in the range -1.00 and +1.00 and it was concluded that the distribution of data for the variables was normal. The results are summarized in Table 6.

Further, Kolmogrov-Smirnov test was used to check the normality of the distribution for the variables.

Kolmogrov-Smirnov test compares scores in the sample to a normally distributed set of scores with the same mean and standard deviation and if the test is non-significant (p>0.5) then the distribution

of the sample is not significantly different from normal distribution. The results of the

K-S test were as indicated in Table 7. The K-S test statistic for the variables integrated approach, online service, interactive participation, automation of records, transformational leadership, transactional leadership, and service delivery were not significant (p>0.05) and it was concluded that the variables are normally distributed. The fact that data on the key variables did not deviate significantly from normal distribution can be translated to mean that it is safe to use statistical tests such as correlation and regression that assume normality of these variables.

#### **Multi-Collinearity Diagnostics**

Multi-collinearity was assessed using Variance Inflation Factors (VIF). A threshold of Variance inflation factor of 10 is suggested Kleinbaum et al., (1988). The variance inflation factor values for integrated approach, online service, interactive participation, automation of records, transformational leadership, transactional leadership, and service delivery are in the range of 1.132-3.318 and are less than the set threshold

		Implementation	Utilisation	Strategies	Benefits	Service Delivery
N		192	192	192	192	192
Normal	Mean	3.8460	3.6033	3.5464	3.5072	3.1259
Parameters <sup>,</sup>	SD	.95960	1.02612	1.22850	1.05684	1.45470
	Absolute	.158	.142	.087	.102	.124
Most	Positive	.156	.141	.087	.102	.124
Extreme	Negative	158	142	036	098	081
KS- Z		2.630	2.361	1.453	1.702	2.065
Asymp. Sig. (2-tail	ed)	.670	.0790	.069	.089	.098

 Table 7: One-Sample Kolmogorov-Smirnov Test Results

Variables	Tolerance	VIF
Implementation	.385	2.597
Utilisation	.301	3.318
Strategies Motivating Utilisation	.883	1.132
Benefits of HMIS	.605	1.652
Service Delivery	.574	1.74

Source: survey data (2016)

Table 8: Collinearity Statistic for Variables

	1	2	3	4	5
1. Service Delivery	1				
2. HMIS Implementation Level	.754**	1			
3. HMIS Utilisation Level	.834**	.775**	1		
4. HMIS Motivation Strategy	.437**	.354**	.219**	1	
5. HMIS Benefits	.602**	.372**	.568**	315**	1

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

Table 9: Correlation Coefficients

Mod	el Summary	

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.887 <sup>a</sup>	.787	.783	.09942

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	6.837	4	1.709		
1	Residual	1.848	187	.010	172.917	.000 <sup>b</sup>
	Total	8.685	191			

#### Coefficients

Model		Unstan Coefi	dardised ficients	Standardised Coefficients	t	Sig.
		В	Std. Error	Beta		
	(Constant)	434	.196		-2.221	.028
	Implementation	.215	.060	.205	3.572	.000
1	Utilisation Level	.697	.080	.543	8.710	.000
	Motivation Strategy	.193	.037	.197	5.189	.000
	HMIS Benefits	.045	.013	.156	3.603	.000

Table 10: Regression Results

which indicate that multi-collinearity was not an issue. The results are presented in Table 9 .

#### **Correlation Analysis**

Pearson correlation analysis was conducted to examine the relationship between the variables (Wong and Hiew, 2005; Jahangir and Begum, 2008). According to Field (2005), correlation coefficient should not go beyond 0.8 to avoid multicollinearity. Since the highest correlation coefficient is .783, which is less than 0.8, there is no multicollinearity problem in this research. The results are presented in Table 10.

All the associated pairs of variables were significant at level 0.01. Hence hypothesised relationships developed were found to be statistically significant at level p < 0.01. Service delivery and implantation of HMIS had a positive significant relationship (r=.754 p < 0.01). Service delivery correlated with

# ANOVA

HMIS Utilisation significantly and positively (r=.834, p<.01). There was a positive significant relationship between service delivery and strategies motivating Utilisation of HMIS (r=.437, p<.01). Service delivery correlated benefits of HMIS significantly and positively (r=.602, p<.01).

#### **Regression Results**

The study sought to investigate the effect of HMIS on service delivery. The hypothesis (H01) stated that HMIS has no significant effect on service delivery. The results are presented in Table 10.

The results of the regression analysis suggested that HMIS implementation ( $\beta$ = .215, p<0.05), HMIS Utilisation ( $\beta$ = ..697, p<0.05), motivation strategy ( $\beta$ = .193, p<0.05), and benefits ( $\beta$ = .045, p<0.05) had a positive significant effect on service delivery. Hence the hypothesis is not supported. The value of the F-statistic showed that the model was robust enough to be used to explain the relationship between the variables (F=172.917, p<0.05). The coefficient of determination value of R2= .787 means that 78.7% of the variation in service delivery at the hospital can be explained by HMIS implementation, HMIS Utilisation, motivation strategy, and benefits combined.

The regression equation constructed from the regression results took the form:

 $Y = 0.028 + .215X_1 + .697X_2 + .193X_3 + .045X_3 + \varepsilon$ 

Where:

Y = Hospital Service Delivery X1 = HMIS a longitudinal rather than a Implementation extent X2 = Level of HMIS Utilisation X2 = Motivating Strategies X4 = HMIS Benefits

#### Conclusions

The study found a positive and significant effect of HMIS on service delivery. It can, therefore, be concluded that implementation of HMIS, Utilisation of HMIS, strategies motivating use of HMIS, and benefits of HMIS are key to improving service delivery in MTRH.

#### **Recommendation for Further Research**

This study was carried out to investigate the effect of HMIS on service delivery in MTRH. The following areas of concern can be considered for further research:

1. The moderating effect of leadership style on the relationship between HMIS on service delivery needs to be researched on.

2. The tool used in this study was self-rated.

There is need for further research to be done using a tool that allows the subordinates to rate the ICT department on implantation and Utilisation of HMIS

3. This study can be extended to others contexts and industries, such as: banking, hospitality, security and education.

4. Future studies could use the same basic hypotheses, but implement the study in terms of a longitudinal rather than a cross-sectional design. The longitudinal study would need to correct changes in data relative to the time element.

5. Only a single data collection was employed, and future research through interviews and observations could be undertaken to triangulate.

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### A Rare Case of Masked Septal Abscess in a Patient with Lower Respiratory Tract Infection on Prolonged Antibiotic Therapy

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#### Abstract

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WJMER, Vol 20: Issue 1, 2019

**Background**: In today's time, nasal septal abscess are rare. It is a condition most commonly seen after trauma or surgery due to the accumulation of pus under the mucoperiosteum. With the injudicious use of antibiotics, masked infections are a real threat.

**Case Presentation**: We present this rare case of masked nasal septal abscess in a middle -aged male with restrictive lung pathology and nasal trauma when treated with prolonged systemic antibiotics for the lung pathology.

**Conclusion**: Our report highlights the importance of recognising masked infection due to prolonged use of systemic antibiotics. We recommend reassessment of a patient with nasal injury 48 to 72 hours for detection of delayed development of septal abscess.

### Key Words

Septal Abscess; Masked Infections

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#### Introduction:

Nasal septal abscess is a highly serious but uncommon condition affecting the nose. With the advent of modern antibiotics this condition has become rare. Nasal septal abscess usually occur after trauma or nasal surgery. Septal abscess develops when pus gets collected under the mucoperichondrial plane resulting in hypoxia of the underlying quadrangular cartilage leading to cosmetic nasal deformities such as septal perforation and saddle nose deformity. The nasal septal abscess can also lead to cavernous sinus thrombosis, cellulitis, leading to intracranial extension of infection<sup>1</sup>.

Use of higher antibiotics alters the clinical course of disease with suppression of the presenting signs and symptoms creating a false sense of security in the minds of clinicians<sup>2</sup>. This phenomenon is termed as masked infection. Is not a rare phenomena and has been reported in other otolaryngological inflammation. Our search of literature did not show any evidence where a large nasal septal abscess has been masked by protracted use of antibiotics.

#### Case Report:

A 59-year-old male, tailor by occupation, had a history of syncope followed by injury to the nose during a social event in February 2018. The patient

was brought by relatives with nose bleed and injury to external nose, along with shortness of breath and fever. Complete ENT examination revealed an undisplaced fracture of nasal bones with a few blood clots within the nasal cavity; rest of anterior rhinoscopy was unremarkable. A Computed Tomography of Brain and paranasal sinus was performed confirming the fracture of nasal bone rest of the structures were normal (Figure 1). Plan was to manage the fracture conservatively. The patient also showed tachypnoea with signs of respiratory distress with the use of accessory muscles of respiration. On auscultation, air entry was reduced on right side, with bronchial breathing and crepitations with dull note on percussion. Chest X-ray revealed mid- and lower zone consolidation on right side (Figure 2). ABG revealed partially compensated respiratory alkalosis. The patient was admitted under medical services with a provisional diagnosis of right lobar pneumonia and started on intravenous Beta lactams. Despite a protracted course of systemic antibiotics patient complained of difficulty in breathing and distress especially at night or on lying down and was eventually discharged on oral macrolides and bronchodilators. Pulmonary function tests revealed a restrictive curves and hence focus of management was centered on lower respiratory tract. Portable saturation monitoring showed hypoxic events especially in night or

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Figure 1: Axial view of CT PNS showing undisplaced comminuted fracture of nasal bone



Figure 2: Chest X-ray PA view showing right sided mid- and lower zone consolidation



Figure 3: Large septal abscess

sleeping. As patient had no clinical improvement he was referred to the ENT department in April 2018 to rule out other causes of respiratory distress. The patient was asymptomatic but, on observation, was seen performing mouth breathing. On examination, a large septal abscess blocking both nasal passages was revealed (Figure 3). The patient had no systemic signs of infection, blood investigations showed neutrophilia, and rest of the haematological parameters were within normal limits (Hb 12.9, WBC 9100, Platelet 450x10<sup>3</sup> with neutrophils 73%). The abscess was drained as an emergency

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procedure and nose packed for 72 hours postoperatively. On pack removal, the patient showed immediate improvement of symptoms, with marked relief from dyspnoea. Pus culture showed growth of *S. Aureus* sensitive to cephalosporins,  $\beta$  lactams and respiratory fluoroquinolones but resistant to piperacillin and tazobactam. After a short course of antibiotics, patient was mostly symptom-free and on MDI for restrictive lung disease. Patient has developed loss of septal support with saddle nose deformity and loss of tip support, which will be addressed at a later date.

#### Discussion:

There is limited availability of good quality evidencebased literature regarding the presentation and management of nasal septal abscess. Cloquet in 1810 gives the first report of nasal septal abscess. He gave the first description of draining the nasal septal abscess and reported the development of septal perforation secondary to this condition<sup>3</sup>. Trauma is the most common condition leading to the development of nasal septal abscess but nasal surgery, autoimmune diseases and other condition have been reported to lead to the development of such abscesses. Septal cartilage like rest of the cartilages is avascular and derives its nutrition from the investing layer of mucoperichondrium. Separation of this vital layer either due to a haematoma or an abscess leads to ischemia and cartilage necrosis. Ultimately the framework of the nose loses its integrity and there is collapse of the dorsum leading to saddle nose deformity as well as tip collapse. This was seen in our case also and a plan set up to address the cosmetic deformity.

*S. aureus* was isolated in our case and remains the most common pathogen isolated from nasal septal abscesses, methicillin-resistant *S. aureus* should be suspected in nosocomial settings<sup>4</sup>. The other organisms found in the culture of nasal septal abscess are *S. epidermidis*, *S. pneumoniae*, beta-hemolytic group A Streptococcus, *H. influenzae*, and anaerobic bacteria. There are isolated reports of fungal etiology especially in immunosuppressed hosts<sup>5</sup>.

The signs and symptoms expected in suspicion of the nasal septal abscess are swelling, pain, redness and tender nose. Injudicious antimicrobial therapy is an under reported medical issue with a huge impact on the community. Such ill practices increase the risk of resistance in microorganisms and put the patient at unwarranted risk of allergic reactions and toxic effects. It creates an economic burden on the patient and his or her family<sup>6</sup>. Yet, what is often missed is the masking of signs and symptoms, thus delaying the correct diagnosis and late initiation of appropriate therapy. The reports of masked bacterial infection came soon after the antibiotic era started and have increased ever since<sup>7</sup>. Our case exemplifies the masking of symptoms of fever, pain, and clinical signs such as congestion and erythema and tenderness on palpation over the tip of nose when the patient was on systemic antibiotics.

CT scan is a useful tool in assessment of craniofacial trauma. In case of septal abscess apart from evaluation of trauma, CT helps to screen other possible causes such as rhinosinusitis and dental infections. It also acts as a tool to rule out possible complications. Yet in our case, the very early timing of CT scan before the onset of development of haematoma raises a red flag. This reiterates the point that a single point assessment of nasal trauma is often misleading and patient must be observed over few hours for the evolution of complications especially a haematoma. Prompt detection and drainage of nasal haematoma avoids the formation of abscess and subsequent sequelae. We want to stress the importance of follow up of cases with nasal trauma and a keen watch for septal bulge at least 48 to 72 hours post initial evaluation in emergency department.

Nasal obstruction has a negative effect on respiration during sleep, and nasal packing may cause nocturnal dip in oxygen saturation. This has been attributed to the naso-pulmonary reflex<sup>8</sup>. Our case also highlights the nasopulmonary reflex where nasal obstruction due to abscess was associated with hypoxia in our patient, with inadequate pulmonary reserve. This intermittent hypoxia in our patient was initially interpreted as a sign of restrictive lung disease and led to clinical confusion. We recommend ensuring nasal patency in all cases of intermittent hypoxia occurring after a history of nasal trauma or surgery.

#### Conclusion:

This rare case highlights the importance of masked infection and diligence in examination of nasal trauma. It shows that keeping close follow-up for 48 to 72 hours is vital to detect complications at an early stage. Nasal abscesses should be drained immediately to prevent infective, as well as cosmetic, sequelae. Long term nasal obstruction can lead to nocturnal hypoxia and should be kept in mind in elderly patients and in patients with reduced pulmonary reserve.

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## The Practice of the Informed Consent Process on Survey Studies Involving Healthcare Providers as Participants at Moi Teaching and Referral Hospital

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WJMER, Vol 20: Issue 1, 2019

#### Abstract

**Background**: The informed consent process is an ethical pillar whose implementation enhances the ethical principle of respect for individuals. It was formulated after discovery of inhumane historical events in research with human subjects. It has seven steps, namely; i) determination of authority to consent; ii) provision of standard information; iii) confirmation of understanding; iv)giving opportunity for questions; v) confirmation of consent; vi) documentation of consent; and vii) implementation of post-consent follow-up. In routine survey studies, healthcare providers have been found to have limited knowledge on the informed consent process. Yet they are expected to be the most conversant. This study assessed the understanding of the steps in and the practice of the informed consent process on survey studies involving healthcare providers as research participants.

**Methods**: The study employed a descriptive cross-sectional research design, generating qualitative data from healthcare providers who included medical specialists, medical officers, clinical officers, nurses and IREC members as key informants. Quota and purposive sampling was carried out for the healthcare providers and key informants respectively. Data was collected until a saturation point was reached, having interviewed four key informants and presented 54 open-ended researcher administered questionnaires to the health workers. Thematic analysis using SPSS program that involved frequencies, non-parametric correlation techniques of Multiple Correspondence Analysis (MCA), and nonlinear canonical correlation analysis (OVERALS) was performed.

**Results**: Most respondents were aged 31 to 40 years (n=31, 53%). None (0%) was above 60 years, with more females (n=40, 69%) relative to males (n=18, 31%). Approximately three quarters were married (n=46, 79%), and a few were single (n=8, 14%) or widows/ widowed (n=4, 7%). Their understanding of the consent process was limited; of the 54 (100%), none understood all the seven steps, especially on the first (determining authority) and last step (follow-up).

**Conclusion and Recommendation**: In survey studies, consent takes place without adherence to the required steps. Hence it is not valid. There is a limited understanding of the process among healthcare providers, of whom the majority are middle-aged. IREC should make researchers responsible in due consent procedures.

#### Key Words

Informed Consent; Healthcare Providers

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#### Introduction

Informed consent process is an ethical pillar in research with human subjects. Its implementation enhances the principle of respect for individuals. This promotes autonomy and self-determination of potential participants, improving research, regularizing relationships between investigators and subjects, and protecting privacy rights<sup>1</sup>. The process is about what participation means, particularly on potential harms and anticipated benefits of a study<sup>2</sup>. Most consenting processes end up with legal agreements between concerned parties and are verbal, written, or both. It may be expressed, e.g. via a signed consent form, commonly done in

research and hospitals in relation to specific procedures. It can be implied, e.g. when a patient goes voluntarily to a doctor's office for check-up or treatment<sup>3</sup>.

Its formulation came as a result of inhumane nature of historical events in research with human subjects. For instance, in Germany, Nazi physicians conducted involuntary experiments in which subjects were forced into participation. One of the international guidelines that was developed as a result of this injustice is the Nuremberg code of 1949 which states that there should be voluntary participation in research. Another code of ethics used by many regulating research agencies is the Belmont report of 1978/1979. It highlights three main guidelines: respect for persons (participants be treated autonomously and those with limited autonomy given protections and considerations); beneficence (the need for the benefits of the study to outweigh any potential harm). The researcher's responsibility is to balance risks and benefits in a favourable manner. This means, low income populations cannot be used in research and then the findings transferred to benefit a different population.

Various issues have been found to undermine the informed consent processes in the developing countries. They include:

i) Limited exposure through formal education to research concepts and procedures and lack of local terms for key elements of research.

ii) Lack of in-depth understanding of research or research ethics among those responsible for examining research activities.

iii) Difficulties for potential participants or their guardians in listening to or understanding large volumes of research related information<sup>4</sup>.

Active debate continues among clinicians, researchers and ethicists about exactly what forms of consent are necessary in various situations, for example social scientists consider adding the collection of bio-specimens to their surveys would make informed consent a much more complex process than is the case for surveys that involve collecting only self-reported psychological, social or economic data<sup>5</sup>.

However, the Institutional Research and Ethics Committees (IREC) of Moi Teaching and Referral Hospital (MTRH) and Moi University, have the mandate to safeguard the dignity, rights, safety and wellbeing of research participants by ensuring that research is conducted according to the highest ethical and international scientific standards.. One key function of ethical review is to ensure that consent for participation is properly obtained and documented<sup>6</sup>. IREC reviews the scientific design and conduct of the study. For example, how participants are recruited, cared for, how their confidentiality is protected and consideration of the community's culture<sup>7</sup>. Apart from IREC playing an oversight role to ensure that the conduct of research is ethically sound, other research stakeholders including researchers, research institutions and regulatory bodies also have an ethical responsibility<sup>6</sup>.

Healthcare and research are interrelated; one cannot function without the other. For example, due to lack of research on women, their health was compromised for a long time until 1986 when the National Institute of Health (NIH) policy in the

United States of America (USA) encouraged the inclusion of women in clinical trials. Human rights activists also played part in these developments<sup>1</sup>. Healthcare providers therefore participate in different research that includes experiments and observations. In survey studies they become researchers, participants or research assistants hence they are expected to be involved with the informed consent process in one way or the other. In healthcare institutions, they commonly participate in employee surveys aimed at measuring and monitoring the extent that personnel are aligned with the management's business goals and objectives. Most of which are non experimental, descriptive methods used to gather information on peoples' opinions, feelings and thoughts by use of questionnaires and interviews. Hence, is a means to an end where the healthcare for the general public is improved<sup>6</sup>. Competent persons can only give informed consent. This is a process that has its place in relationships "between consenting adults", and it is only possible when they are knowledgeable or, as John Stuart Mill puts it, "in the maturity of our faculties,"8.

#### Practice of Informed Consent Process

Healthcare Providers are perceived to understand the importance of research and are expected to be conversant with the process. Yet their knowledge may not be greater than other research participants. On the grounds that they are informed on consent matters, it is possible that they may be predisposed to more research participation than other groups of workers<sup>9</sup>.

Healthcare workers are potential participants in different studies including employee surveys that are aimed at measuring and monitoring the extent that personnel are aligned with the management's business goals and objectives. Surveys are nonexperimental, descriptive methods used to gather information on peoples' opinions, feelings and thoughts. They are easily conducted and can be used on some specific group of people using questionnaires and interviews. They can be specific and limited, or have more global widespread goals, promoting utilitarian theory that states, The 'right' thing to do is that which maximises the 'good' for many (Berglund, 2007).

According to Cornell University (2007), it is the investigator's responsibility to document that the process has taken place by use of an informed consent form as a standard for the documentation process. This is in line with what deontologists suggest, that "what is important is the obligation vested on individuals<sup>10</sup>. Institutional Review Boards (IRB) have standards operating procedures (SOP) on the informed consent process which require

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that: The forms should be written in a language understood by participants avoiding technical terms and complex sentences even for the educated group of participants so as to aid their comprehension process. Explanation of the purpose of the study, what happens to the participants during the study period, description of risks, side effects or any discomforts in the study procedures while giving information in case there are no anticipated risks i.e. "we do not anticipate any risks in this study except those encountered in daily life". Benefits including those that indirectly benefit society or for scientific knowledge have to be stated well i.e. "information from this study will benefit other people now or in the future". Other statements include provision of information on the voluntary nature of the study. That they are free to refuse participating from the beginning of the study, discontinue at any level, skip some questions and that no penalty will be imposed on them. They should be informed that they are free to ask questions, be assured of how their participation will be made confidential, what will happen to the data after the study is over and how audio or visual recording devices used will be kept at the study completion. A separate signature line on the consent form should be provided if the participant is to be taped/audio or photographed. An indication that the participant shall receive a copy of the signed and dated consent form with the name(s) of investigator(s) and contact information. Information on the possibility of the participant contacting IRB with any concerns or complaints has to be provided e.g. IRB email address or telephone numbers. A "statement of consent", the name and signature of the participant together with the name and signature of the person obtaining the consent have to be given. At the end of the consent form, a statement on the duration of time that the consent form has to be written (Cornell University, 2007).

Research is key to healthcare practice and the health of human population. However in developing countries, research regulations are either in their initial stages or not in existence<sup>11</sup>. Therefore, the implementation of the consent process ought to be well guided to ensure that the right ethical practice is in place. The role of informed consent in human subjects research is central to ethical regulation and conduct, guided by existing guidelines<sup>12</sup>. When this is done, human subjects are protected from harm and risks that are associated with research activities, self-determination (autonomy) of researched individuals is promoted, and justice prevails. The rights and dignity of research subjects is safeguarded and guaranteed.

Informed consent has been defined as an autonomous authorisation by individuals of a medical intervention or of involvement in research.

For it to be validly obtained, it must have disclosure of information, understanding, voluntariness and competence built into the consent process. In oral or written consent, determining whether it is truly informed, a researcher should ascertain if at all participants actually understood the information and their believe that they gave consent voluntarily for the study<sup>11</sup>. A lot depends on what information is conveyed and how it is done. Researchers should understand information needs of the group they want to study so that they can use the same knowledge in delivering information in a way that enable potential participants understand what participation will involve<sup>13</sup>.

Competence (capacity for decision making) comprise of four functional abilities. These are: the ability to understand relevant information, the ability to appreciate the nature or situation of events and its related consequences, the ability to reason through the given information and to weigh options in a logical manner as well as communicate the choice<sup>11</sup>.

Healthcare workers participate in different types of survey studies, including employee surveys by human resource departments. For example, due to serious human resource crisis in the health sector in developing countries, especially in Africa, on low motivation of health workers, a study was conducted in Benin and Kenya. It assessed the role of non-financial incentives for motivation revealing that mixture of non-financial and financial incentives help maximize health worker motivation. Many studies have also shown that most participants do not understand the research process they are involved, some are even unaware of participating in research. In Nigeria, participants in an oral health research did not adequately understand the studies they were invited to join or their rights as research subjects. This limitation called for training of researchers on research ethics and inclusion of bioethics in the curriculum of dental schools<sup>11</sup>. With training on the consent process, the interests of the research subjects would prevail over that of third parties as recommended by the Declaration of Helsinki<sup>14</sup>.

Healthcare and research are interrelated, one cannot function without the other. For example, due to lack of research on women, their health was compromised for a long time until 1986 when the National Institute of Health (NIH) policy encouraged inclusion of women in clinical trials<sup>1</sup>. The growing need for human subjects participation in research so as to promote their health also arose with human rights activists taking lead. With the inclusion of healthcare providers in different researches as participants, they are expected to be

taken through informed consent process whose functions are: To promote autonomy and selfdetermination, improving research, regularizing relationships between investigators and subjects and protecting privacy trials<sup>1</sup>. For these purposes to be accomplished, knowledge and practice of the consent process should be exercised, reinforced and emphasised among all researchers and the researched persons.

Healthcare workers have been found to lack adequate knowledge on the informed consent process i.e. on how to asses capacity and treat people who either refuse treatment or those that lack ability to comprehend any given information. Findings from a study to investigate what and how much information dental patients perceived after oral health workers informed them about treatment, benefits, risks and management alternatives in order to make decisions and give informed consent on their treatment showed that there they had limited knowledge on the consent. Therefore, if they are not able to take patients through correct consent process, how are they managing to undergo the same process as participants in survey studies?

There are barriers associated with understanding consent process. The barriers lead to ineffective communication between researchers and participants. These include language barriers, religious influences and false expectations.

#### Methods

A descriptive cross-sectional qualitative research design was used in this study to determine the understanding of the steps and practice of informed consent process on healthcare providers in survey studies at MTRH. The study looked at variables at a specific point in time from the potential participants.

Research participants were recruited from the clinical healthcare team using quota sampling technique based on four categories of the workers, mainly medical specialists, medical officers, clinical officers, and nurses. IREC members as key informants were sampled purposively, where identification was done using a list obtained from IREC office.

Saturation point during data collection determined the sample size. Data saturation was reached when the ability to obtain additional information was achieved; no additional data was found to give newer properties of categories and relationships and further coding was no longer feasible. This was with in-depth interviews of four key informants and by use of researcher administered guestionnaires (unstructured) of 54 healthcare providers. The data was subjected into SPSS software program where repetition of themes became even clearer.

Quota sampling was used in recruiting the healthcare providers drawn from various departments of the hospital, where quarters were obtained as per their various categories, then purposively sampling potential participants from each quarter. Purposive sampling was used to recruit the key informants; the researcher sampled the participants from their work offices in the hospital guided by a list of the institutional research and ethics committee members obtained from IREC office. These non-probability sampling techniques allowed the researcher to use cases that had the required information with respect to the objectives of the study.

#### Data Analysis

Thematic analysis of data with the help of a Special Program for Social Scientists (SPSS) was done. The process followed the following six phases; familiarization of data; generating initial codes; searching for themes among codes; reviewing themes; defining and naming themes; and producing the final report. This was with the aid of frequencies and non-parametric correlation techniques of Multiple Correspondence Analysis (MCA) and nonlinear canonical correlation analysis (OVERALS). Non-parametric techniques were chosen because the data was nominal or ordinal. The methods of MCA and OVERALS were used because the data was either nominal or ordinal and the methods do not require stringent assumptions about the data, such as, randomness of the data (the study used non -probability sampling), as in classical statistical techniques<sup>15</sup>. They also present the correlations in an aesthetically appealing graphical form. The methods transform observed data in a nonlinear way in order to obtain transformed objects, which are as much homogeneous as possible. MCA analyse variables which are in a single set, while OVERALs analyse variables in two or more sets. However, when the multiple sets in OVERALS contain just one variable, as was the case in this study, the output of OVERALS and MCA are essentially the same<sup>16</sup>. Thus, this study used both techniques every time, choosing one over the other on the basis of the best fit of the model. The fit of the model was measured by the amount of variance (also, referred to as inertia) the model could explain in the original values (lowest: 0% and highest: 100%). The eigen value indicates the level of relationship shown by each dimension. In addition, MCA also computes a Cronbach's Alpha for measuring the reliability of the model (Minimum: 0 and Maximum: 1). On the other hand, for OVERALS the amount of

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unexplained variance is labelled as 'loss' whereas explained variance is the 'fit' (Gifi, 1990). The degree of correlation in both techniques is measured by the closeness of the variables on the graph; the closer the higher the correlation<sup>15</sup>.

#### Results

The study consisted of 54 healthcare providers and four key informants (n=58, 100%). Descriptive results showed that most of the respondents were aged between 31 and 40 years (n=31, 53%), followed by those aged between 41 to 50 years, and 51 to 60 years (both, n=12, 21%)

The ages of three participants (5%) were between 21 and 30 years, while no (0%) respondent was more than 60 years, suggesting that a relatively youthful and middle-aged workforce was among the healthcare providers.

# How Was Informed Consent Process Obtained in Survey Studies?

The respondents were asked how informed consent process was obtained from them in survey studies at MTRH. This information is presented in Table 1 below.

The results indicated that, overwhelmingly, no consent is sought from participants before being asked to participate in research studies. All 14 (100%) clinical officers, 20 (95%) nurses, 8 (80%) medical specialists, and 7 (70%) medical officers, had never taken through the contents of consent forms before being asked to participate in studies. For

instance, in response to this question, most participants answered that, "I was requested to fill a questionnaire" which was done by a friend or a member of staff, "I was just asked to fill a questionnaire", or "I was given a form to fill brought by Head of Department who said we should". In fact, the results suggest that there could be some element of coercion in the recruitment process. For example, some nurses answered, "I was given a questionnaire and told that all nurses should participate". Some medical practitioners stated that consent had been sought from them, "I agreed to participate upon agreeing to go through the consent form", "there was some form of selection criteria" whereas others said, "I was informed what the study involved and its purpose". Some medical specialists declined to participate in the studies" I declined to participate because of lack of time", which implied that they appreciated the consent process, which gives a potential participant the right to refuse to participate in the study.

The results suggest that the informed consent process was unlikely to take place as expected among the healthcare providers. The process was characterised by requests to fill questionnaires and orders from higher level of authorities. There could be elements of coercion into participation, no researcher responsibility and a cultural practice of lack of informed consent process appeared to be embedded. The participants confirm the same since they had even taken the malpractice as a routine. It is germane to reverse these wrong practices in order to safeguard human dignity.

			Profession				Tatal
			Medical specialist	Medical officer	Clinical officer	Nurse	l otai
	No con- sent	Frequency	8	7	14	19	48
Consent		%	80.0	70.0	100.0	95.0	88.9
Consent	Some con-	Frequency	2	3	0	1	6
	sent	%	20.0	30.0	.0	5.0	11.1
Total		Frequency	10	10	14	20	54

Table 1: Involvement of participants in survey studies

# Survey Studies in which the Healthcare Providers Had Previously Participated

The respondents were asked about the type of survey studies, in which they had participated in the last one year at MTRH. This information is presented in Table 2 below.

The number of responses for this question was 55, which was more than the number of participants (54) in the study. This was because some respondents had participated in more than one type of study. In other words, the question was a multiple response type. The study found that the type of studies in which respondents had participated could be divided into five broad types: alcohol and drug abuse; general healthcare, quality assurance/satisfaction studies; student-related studies; and nursing.

The results showed that the studies in which most respondents participated were quality assurance/ staff/customer satisfaction (42% of the 55 responses), general healthcare (36% of the 55 responses) and studies related with nursing (13% of the 55 responses). Very few health workers participated in alcohol and drug- abuse (2% of the 55 responses) and student-related research studies (7% of 55 responses). General healthcare involved an assortment of studies, for instance, diabetes, reproductive health (erectile dysfunction and family planning), surgery (ankle brachial pressure and cervical cancer evaluation), and diarrheal diseases (benefits of zinc in treatment of gastro-intestinal diseases). Others were infection prevention, malaria, and mental health studies. Nursing related topics included nursing process, nursing care, and effects of nurses' duties on their health, especially those that are back related and effectiveness of 12 hour shift for nurses at MTRH.

Medical officers mostly participated in general healthcare studies (seven (64%)), while medical specialists participated equally (four (44%)), in general healthcare and quality assurance studies. Although many (seven(47%)), nurses participated in quality assurance studies, they are the ones who are more 5(33%) likely to take part in nursing-related studies compared to any other group. Clinical officers, on the other hand, were found to take part in all (alcohol and drug abuse: one (5%); healthcare: seven (35%); quality assurance: 1(5%); nursing-related studies: one(5%)) the five types of studies, suggesting that they could be the most versatile.

		Responses		Porcont of Casos	
		Ν	Percent	reicent of Cases	
	Alcohol and drug abuse	1	1.8	2.2	
	General healthcare	20	36.4	44.4	
Type of Studies	Quality assurance	23	41.8	51.1	
	Student-related	4	7.3	8.9	
	Nursing	7	12.7	15.6	
Total		55	100.0	122.2	

Table 2: The type of survey studies in which the respondents had participated

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Profession Total Medical Medical Clinical Nurse specialist officer officer Alcohol and drug 0 1 Frequency 0 0 1 abuse % .0 .0 5.0 .0 Frequency 4 7 7 2 20 General heathcare % 44.4 63.6 35.0 13.3 Type of 10 Frequency 4 2 23 7 Study Quality assurance 18.2 50.0 44.4 46.7 % Frequency 0 2 1 1 4 Student related % .0 18.2 5.0 6.7 1 0 5 Frequency 1 7 Nursing % 11.1 .0 5.0 33.3 9 Total Frequency 11 20 15 55

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Table 3: Cross tabulation of respondents' profession and types of studies

#### Discussion

#### The practice of informed consent process

There was no due process of informed consent being followed in the survey studies involving healthcare providers at MTRH. Therefore, the process is not valid as Emanuel and Flory (2004) argued that, for informed consent to be ethically valid, more than disclosure of information is demanded; participants should also understand the disclosed information. All (100%) clinical officers in the study, and nurses (95%), medical specialists (80%), and medical officers (70%), were not taken through the contents of consent forms before participating in studies.

The study also found that the process is characterised by requests to fill questionnaires and orders from higher level of authorities and hence there could be elements of coercion. This was despite the fact that most respondents had participated in one to two studies in just the past year, hence, providing ample opportunity for the implementation of the informed consent process. In fact, the group, which scores the worst on the consent process – the nurses – had participated in as many as five to six studies and over six studies, with one having participated in as many as 20 studies, in just a year.

The respondents also participated in wide-ranging research studies, which provided, once again, sufficient opportunities for the application of the consent process, but was not done. Research findings indicated that healthcare providers participated in many quality assurance/staff/ customer satisfaction studies, general healthcare, and studies related to nursing. A few also took part in alcohol and drug-abuse and student-related research studies. Many of these studies, especially on general health, for instance, erectile dysfunction, ankle brachial pressure surgery, cervical cancer evaluation, are fairly invasive, and hence, the process of informed consent is expected to be rigorous<sup>17</sup>. However, the actual practice at MTRH suggests that the consent process could be slack.

#### Conclusion

Conclusion was reached through analysis and interpretation of the study findings with guidance of the research question. The study determined the understanding of steps and practice in informed consent process on survey studies involving healthcare providers as participants at MTRH. It also studied the practice of Informed consent Process by determining how IREC members as key informants implement follow-up of the informed consent process.

Despite the workers having gone through formal education on research ethics in their former institutions of higher learning, they did not understand all the steps of informed consent process. Consent takes place without adherence of required steps, hence not valid. The workers had plentiful opportunities for participating in survey studies and the sources of information on consent process were mainly class and workshops.

IREC do a conscientious job in reviewing studies but proper implementation of approved informed consent forms is not up to date due to challenges

on follow up and in ensuring that participants have adequate understanding of the consent process. Although IREC has mechanisms such as monitoring and evaluation subcommittee, having researchers, reports and use of whistle blowers to monitor implementation of research projects, they have not effectively facilitated follow-up of approved consent forms. Most of the steps taken are merely *ad hoc* measures. IREC is required to make researchers responsible in due consent procedures if ethical standards of research are to upheld.

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### Socio-Economic Determinants That Influence the Effectiveness of Community-Based Tuberculosis Care in Meru County, Kenya

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WJMER, Vol 20: Issue 1, 2019

#### Abstract

**Background**: Tuberculosis is strongly linked to poverty and a range of other socioeconomic determinants (Lonnroth *et al.*, 2009). Tuberculosis remains a major public health problem, and rates have not decreased significantly over the last ten years, despite increased funding, better public health evidence about how to manage the disease, and targeted public health intervention designed to decrease the burden of tuberculosis (Viney *et al.*, 2011).

**Methodology**: This was a descriptive cross-sectional study which collected quantitative data on factors influencing community-based tuberculosis care implementation. A structured questionnaire was used to collect data among 345 respondents in rural Kenya. **Results:** A total of 345 patients were recruited to participate in the study. The mean age of the respondents was 37.12, with a median 35.0 and a standard deviation of 12.488. Majority of the respondents had social group support 297(86.1%), out of which was mainly community support groups (147(42.6%)) and self-help groups (119(34.5%)); only 31(9.0%) were part of a youth group.

The majority of the respondents in the study received food support (320(92.8%)). A minority of the respondents (25(7.2%)) received other forms of support, which varied from money, prayers, and accompaniment to the health facility during clinic visits. The main source of income of the study respondents was employment (217(62.9%)). The majority of the respondents were involved in casual jobs (312(90.4%)). Majority of the respondents level of income was less than Kshs. 10,000 (262(75.9%)), and only a minority had an income of Kshs. 10,000 and above (83(24.1%)). Those who had social support group and family support found community-based tuberculosis care more effective compared to those who did not have any social support group and family support. Community-based tuberculosis care showed an association with social support group and family support with p-0.042 and p-0.006, respectively. Association with the Catholic Church (OR-1.0(Cl= 0.00, 0.00)- showed that community-based tuberculosis was more effective as compared to those who were affiliated with the Protestants denominations (OR-0.74(Cl=0.48,1.15)). **Conclusion**: The majority of the community members affected by tuberculosis are people

conclusion: The majority of the community members affected by tuberculosis are people of reproductive age. Social support from family friends and community members is crucial for an effective community-based tuberculosis care program. The main source of income and level of income determines the effectiveness of community-based tuberculosis care program.

#### **Key Words**

Tuberculosis; Socio-Economic; Community-Based

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#### Introduction

Tuberculosis (TB) is an infectious disease, and delay in any part of the process of healthcare seeking by the patient will increase chances of disease spreading. An untreated smear-positive patient may infect more than 10 contacts annually, on average, and more than 20 during the entire natural history of the disease until (WHO, 2013).

Globally, the burden of TB is increasing. Poverty, migration, HIV/AIDS, and population growth are the foremost factors for the unlimited risk of TB in the

world. (Mfinanga *et al.*, 2008; Ukwaja *et al.*, 2013). The source of infection is untreated smear-positive Pulmonary Tuberculosis (PTB) patients who are discharging the bacilli (Datiko *et al.*, 2010). TB continues to be under funded as a major health concern in public health policies, campaigns and the mainstream media. The absence of sufficient discourse and successful intervention strategies with respect to the disease has been attributed to the high prevalence of the disease among the poor and vulnerable population in urban and rural population (Christianne, 2011).

Sub-Saharan Africa carries the greatest proportion of new TB cases per population, with over 225 cases per 100,000 populations in the year 2012. The TB burden increased with the advent of HIV/AIDS in the early 90s. People infected with HIV are 21-34 times likely to be infected with TB (WHO, 2012).

The global tuberculosis report of 2012 states that nine million people develop TB every year, and three million are missed by health systems. The disease is transmitted through inhalation of droplets by coughing or sneezing. Symptoms include coughing, night sweat, fever, chest pain, and loss of appetite. If not treated, each person with active TB infects an average of 10-15 people every year (WHO, 2012).

Kenya, with a population of about 48 million people, continues to shoulder the burden of TB, with approximately 132,000 new TB cases and incidence of 142 new sputum smear positive cases per 100,000 population every year. Kenya is ranked 15<sup>th</sup> among 22 high TB burden countries that collectively contribute 80% of TB cases (MOH, 2014). TB is treatable, and can be prevented and controlled if the internationally recommended strategy for TB treatment, prevention and control is adhered to (WHO, 2013).

**Objective**: To consider the socio-economic determinants that influence the effectiveness of community-based TB care in Meru County, Kenya.

#### **Materials and Methods**

#### **Research Design**

The study was a descriptive cross-sectional study. The study was carried out in Meru County over a period of three months, from March 2018 and May 2018. Ethical approval was sort from Meru University ethical review committee. Permission was also sort from county health managers and individual respondents.

#### Study Area

The study was conducted in Meru County health facilities implementing community-based TB care. Meru County is located on the Eastern slopes of Mt. Kenya. It shares its border with five other counties which include Isiolo to the North, Nyeri to the South West, Tharaka Nithi to the South West, and Laikipia to the West. It covers an area of 6,936 square kilometres; with a population of 1,365,301 people (KNBS, 2009). The sampled area of the study was Imenti South and Imenti central subcounties which are high burden and low burden TB control zones, respectively.

#### Study Population and Sample Size

The target population was TB patients attending health facilities implementing community-based TB care in Meru County, Kenya and had resided in the area for more than six months. The sample size was calculated using Fisher *et al.*, (1998) formula.

$$n = \frac{z^2 pq}{d^2} = \frac{1.96^2 x 0.5 x 0.5}{0.05^2}$$

Where n=sample size.

 $Z^2$  = coefficient of interval, 1.96

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q = 0.5.
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d = margin of error, 0.05.

P= 0.5

Sample size was 384.

The population of the patients registered under TB program in Meru County was 3,358 (NTLD, 2013) Since the target population is 3,358 which is less than 10,000 correction formula by Mugenda and Mugenda, 2003)

$$nf = \frac{n}{1 + \frac{n}{N}}$$

Where nf = the desired sample size (when the target population is less than 10,000).

n= the minimal sample size by (fisher et al, 1998)

N= the estimated of the population size

nf =345

#### **Sampling Method**

Multi-stage sampling method was applied. Since the majority of the health facilities involved with community-based TB care were government facilities (60%) in both control zones, 40% were mainly faith based facilities, at least one faith-based facility was included in each control zone in order to cover for the population that did not utilise government facilities (SPA, 2010).

At the control zones level, 12 health facilities were selected using simple random sampling method; a table of random number was used to draw the number of health facilities in both government health facilities and faith-based health facilities respectively. Six health facilities were selected from both high volume tuberculosis control zone and low volume tuberculosis control zone respectively. Proportionate sampling was used to identify the

Health Facility	Annual Report, 2017	Sample Size
Imenti South		
Kanyakine Hospital	155	65
Consolata Hospital	205	86
Mitunguu Health Centre	120	50
Kirogine Dispensary	20	8
Nkubu G.K Dispensary	35	15
Kieni Kia Ndege Dispensary	15	6
Imenti Central		
Githongo Hospital	50	20
Gatimbi Health Centre	107	44
Kaongo Dispensary	32	13
Mujwa Dispensary	21	9
Cottolengo Hospital	62	25
Kiija Dispensary	10	4

Table 1: Sample size

number of respondents to participate in each facility, as shown in Table 1. At the facility level, respondents were identified using simple random sampling method using the patient register at the facility level as the patients came for re-supply of drugs.

#### Results

A total of 345 patients were recruited (zone A = 230(66.7%); zone B = (115(33.3%)) to participate in the study. The mean age of the respondents was 37.12, with a median 35.0 and a standard deviation of 12.488. Majority of the respondents had social group support (297(86.1%)), out of which were

mainly; community support groups (147(42.6%)), self-help groups (119(34.5%)); only 31(9.0%) belonged to a youth group.

Family support is very crucial during the process of treatment for most TB patients. Majority of the respondents in the study received food support (320(92.8%)). This was attributed by the occupation of the community where they rely on farming to meet their daily needs. A minority of the respondents (25(7.2%)) received other forms of support which varied from money, prayers, and accompaniment to the health facility during clinic visits, as shown in the table below

#### World Journal of Medical Education and Research:

Community Medicine DAUIN 20190155

An Official Publication of the Education and Research Divisio	n of Doctors Academy
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Variable	Frequency (n=345)	Percentage (%)
Social group		
Yes	297	86.1
No	48	13.9
Kind of group		
Youth group	31	90
Community group	147	42.6
Self-help group	119	34.5
Family support		
Food support	320	92.8
Other forms of support	25	7.2
Religious affiliation		
Catholic	184	53.3
Protestants	161	46.7
Source of knowledge		
Friends	103	29.8
Health provider	149	43.2
Media	91	26.4
IEC materials	2	0.6

The main source of income was employment (217(62.9%)). This was attributed by the fact that the majority of the respondents were people of reproductive age. Majority of the respondents level of income was less than Kshs. 10,000, that is 262(75.9%), and a significant minority had an income of Kshs. 10,000 and above (83 (24.1%)).

Variable	Frequency (n=345)	Percentage (%)
Source of income		
Farming	128	37.1
Employed	217	62.9
Form of employment		
Casual jobs	312	90.4
Permanent	33	9.6
Level of income		
<= Kshs. 10,000	262	75.9
>Kshs.10, 000	83	24.1

 Table 2: Social factors that influence community-based TB care

Those who had social support group and family support found community-based TB care more effective compared to those who did not have any social support group and family support. Community-based TB care showed an association with social support group and family support with p-0.042 and p- 0.006 respectively.

 Table 3: Economic determinants' effectiveness that influence community-based TB care

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being associated with Catholic Church (OR -1.0( CI =0.00,0.00)) showed that community-based TB was more effective compared to those who were affiliated with the Protestants denominations (OR-0.74(CI=0.48,1.15)) as shown in table below.

Variable	Effectiveness		OR	95% C	:1	P-value
	Fred/%		Lowe	r	Upper	
	Yes	No				
Social Group						
Yes	111(37.4)	186(62.6)	1.00	0.00	0.00	0.000
No	25(50)	25(50)	0.60	0.36	0.98	0.042
Family Suppor	t					
Yes	104(35)	193(65)	1.00	0.00	0.000	0.000
No	11(22.9)	37(33.3)	0.06	0.01	0.43	0.006
Religious Affili	ation					
Catholics	78(42.4)	106(57.6)	1.00	0.00	0.00	0.000
Protestants	57(35.4)	104(64.6)	0.74	0.48	1.15	0.185

Table 4: Association between social factors and effectiveness of community-based TB care

Study respondents who relied on farming as a source of income (OR- 1.00(CI= 0.00,0.00)) showed that community-based TB was more effective than among those who were employed (OR-0.86(CI=0.55,1.35)). This was attributed to the fact the catchment population relies mainly on farming.

Those who were employed on a permanent basis and had a monthly income of more than Kshs. 10,000 (OR -1.00(CI=0.00,0.00)) showed that community-based TB was more effective as compared to those who were on a temporary form of employment and a monthly income of less than Kshs.10,000 (OR-1.04(CI=0.62,1.72)), as shown in the table below.

Variable	Effectiveness		OR	95% C	P-value	
	Fred/	%		Lower	Upper	
	Yes	Νο				
Source of incom	ne					
Farming	53(41.4)	75(58.6)	1.00	0.00	0.00	0.000
Employed	82(37.8)	135(62.2)	0.86	0.55	1.34	0.506
Form of employ	ment					
Casual	120(38.5)	196(61.5)	1.00	0.00	0.00	0.000
Permanent	6(50)	6(50)	1.60	0.50	5.08	0.425
Level of income	9					
<=Kshs.10, 000	102(38.9)	160(61.1)	1.00	0.00	0.00	0.000
>Kshs.10, 000	33(39.8)	50(60.2)	1.04	0.62	1.72	0.0893

Table 5: Association between economic factors and effectiveness of community-based TB care

Discussion

The mean age group of the respondents was 37.12 years, which corroborates with a study done in Embu County which had the most prevalent age group was 30-39 years (Ndwiga *et al.*, 2015).

Social support was crucial for effectiveness of community-based TB care. These findings corroborate with a study done in Ethiopia which found out that social support was important for patients during the course of treatment (Gebremariam *et al.*, 2010).

The findings showed that the main source of income for the majority of the respondents was informal jobs. This concurs with a study done in Kisumu, which found that the majority of the respondents were involved in informal jobs which did not have a meaningful engagement. Hence, the nature of employment of an individual is a key determinant of the health of a population (Adamna, 2015).

Religious affliation was a positive predictor to community-based TB care effectives. This corroborates with a study done in Nigeria (Desalu *et al.*, 2013).

#### Conclusion

The majority of the community members affected by TB are people of reproductive age.

Social support groups targeting TB patients at the community level through family groups and community groups can help improve the effectiveness of community-based TB care programs through group therapy.

Income generating activities for tuberculosis patients on treatment can help during the course of treatment for those who are not on permanent employment.

Religion affiliation had a positive influence on effectiveness of community-based TB.

#### **Recommendations**

Increase the number of support groups that sre family groups.

Promote income-generation activities to reduce the level of unemployment.

Encourage faith-based organisations to participate in community-based TB activities.

#### Acknowledgements

I would acknowledge the support from TB coordinators of Meru County Government and School of Health Sciences during the entire process of data collection. Special thanks to the study respondents and research assistants whose

partnership contributed to the study's success.

#### Authors contribution

Jane K. Mberia; Robert M. Kei: study conception, study implementation.

Jane K.Mberia: data collection, data entry, manuscript drafting.

Jane K. Mberia: data analysis, interpretation and manuscript drafting.

Jane K.Mberia, Robert M. Kei: read and approved the manuscript for publication

**Funding**: The researchers received no external funding.

**Conflict of interest**: The authors declare no conflict of interest

**Data availability**: The data used to support the findings of this study are available from the corresponding author upon request.

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