

**AN APPRAISAL OF THE ELECTIVE SURGICAL SCHEDULING SYSTEM AT THE
KENYATTA NATIONAL HOSPITAL**

DR DUNCAN KIMANI WAWERU

A DISSERTATION SUBMITTED IN PART FULFILMENT OF THE REQUIREMENTS FOR
THE DEGREE OF

DEGREE OF MASTER OF MEDICINE IN UROLOGY

UNIVERSITY OF NAIROBI

DECLARATION

I declare that this dissertation is my original work and has not been submitted for a degree award in any other university

RESEARCHER

DR DUNCAN KIMANI WAWERU

SIGNATURE



MBChB (UON)

POST GRADUATE STUDENT IN MMED UROLOGY PGY5


UNIVERSITY OF NAIROBI.

This dissertation has been submitted for the degree of Masters of MEDICINE IN Urology with my approval as a university supervisor

SUPERVISOR

DR FRANCIS OWILLAH

SIGNATURE



MBChB , MMED SURGERY

FELLOWSHIP UROLOGY MOSHI

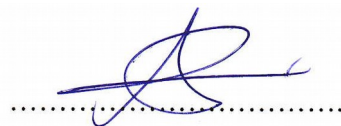
LECTURER DEPARTMENT OF UROLOGY

UNIVERSITY OF NAIROBI

SUPERVISOR

DR MICHAEL MAGOHA

SIGNATURE



MBChB,MMED NEUROSURGERY

LECTURER UNIVERSITY OF NAIROBI

DEPARTMENT OF NEUROSURGERY

Table of Contents

UNIVERSITY OF NAIROBI.....	2
ACKNOWLEDGEMENTS.....	3
DEDICATION.....	5
List of Abbreviations and Acronyms.....	5
Introduction.....	8
LITERATURE REVIEW.....	11
Justification of the study.....	29
Utility of the study.....	30
Main objective of the study.....	30
Specific objectives.....	30
METHODOLOGY.....	31
Study design.....	31
Study population.....	31
Study site.....	32
Sample size calculation.....	32
Sample size determination and formula.....	32
Variables.....	33
Dependent variables.....	33
Independent variables.....	33
Data collection procedures.....	33
Study results dissemination plan.....	34
Limitations of the study.....	34
Quality assurance procedures.....	34
RESULTS.....	35
DISCUSSION.....	46
APPENDIX(A).....	61
APPENDIX 1.....	62
Consent Form.....	62
APPENDIX 2.....	65

ACKNOWLEDGEMENTS

I would like to thank my supervisors Dr Owillah and Dr Magoha for their support in writing this dissertation. Thank you for your supervision and guidance.

I want to thank the consultants and registrars who took time to take part in this study and for their patience and support throughout this program.

I want to also thank the staff at the Kenyatta national hospital outpatient clinic for facilitating this study.

DEDICATION

I dedicate this dissertation to my dear wife Susan and my two sons Jazz and Jozy and my daughter Nia who continue to be an inspiration to keep the momentum up and their support and understanding in the course of this research project. I would also like to recognize my parents and siblings who have been my pillars during the journey through medical career for their inspiration and great spirit. I also dedicate this work to the improvement of health systems in the Kenyatta national hospital as pioneer teaching hospital and the largest hospital in central and sub-Saharan Africa.

List of Abbreviations and Acronyms

KNH	Kenyatta National Hospital
UON	University of Nairobi
VHA	Veterans Health Association
NCEPOD	National Confidential Enquiry into Patient outcome and Death
OR	Operating room
ORS	Operating rooms
QALY	Quality of adjusted life years
WTM	Wait time management
WTMS	Wait time management services
ERC	Ethics and research committee
CPAC	Clinical priority access criteria
MBCHB	Bachelor of Medicine, Bachelor of Surgery
DOS	Day of surgery
KCMC	Kilimanjaro Christian Medical Centre
SPSS	Statistical product and service solutions
WHO	World Health Organization
I.E	among others
E. G	For example
NHIF	National health and insurance fund

TABLE OF FIGURES

Table 1.NCEPOD classification of surgeries.....	11
Table 2.Types of efficiency in health economics.....	17
Table 3 Waiting time management systems tabulations.....	18
Table 4 Waiting time management service strategies.....	20
Table 5 Elective surgery prioritization tools.....	22
Table 6 Method of elective surgery scheduling as per department.....	31
Table 7 Markers of efficiency.....	34
Table 8 Current system inefficiencies according to respondents.....	35
Table 9 Prioritization protocols for elective surgery.....	36
Table 10 Optimum way to deliver services as per the respondents.....	37
Table 11 Perceptions of efficiency in elective surgery scheduling process.....	42

ABSTRACT

Background. The demand for provision of surgical services in Kenyatta National Hospital has always outstripped the supply. Therefore, elective surgery has always been subject to a waiting list. The point of contact between a patient and the health care facility at the clinic plays a big role in the perception of the patient to the overall service they receive at the facility. This study aims to review the scheduling practices at the department of surgery

Main objective of the Study

The evaluation of the elective surgical scheduling system at the Kenyatta National Hospital from the health practitioner's point of view and identifying the efficiency and inefficiencies of each subsystem was assessed.

Study method

The **study design** was a descriptive qualitative research which covered the elective surgery booking clinic at the Kenyatta National Hospital general surgery and surgical subspecialty clinics over the period of 10th April to 4th May. The study population comprised of health practitioners who were defined as Consultant health practitioners and senior registrars in the surgical department responsible for the elective list scheduling over the period of study. Consultants and registrars not based in the surgical departments, and practitioners on leave during study period were excluded. A total of 47 health practitioners participated in this study

Results. Majority of respondents reviewed felt that the current existing elective scheduling system present at the hospital were inefficient in their practice. Some of the existing elective surgical scheduling system did not enable health practitioners to review the prioritization tools in order to benefit the patients and the overall hospital performance suffered as a result. The departments that have the most efficient is the general surgery department. The respondents desire an all-inclusive approach in booking of patients.

Conclusion: The surgical elective scheduling system should be overhauled to be in line with modern technology and good health system practices. The departments that have the most efficient booking systems have a dual system based on an electronic and manual back up. The system which is electronic in nature can be improved to an online system which is the most ideal.

The hospital should adopt a surgical scheduling office at the outpatient department to store and verify and assist the proper scheduling of patients. This will allow checks and balances in the delivery of services.

Introduction

In the surgical practice patients are classified either as emergency or elective. The emergency patients for instance are assessed as high priority and undergo prompt operation. The elective patients on the other hand are booked and placed into a waiting list according to available theatre space. It is on the basis of these classification that these patients receive interventions.

In studies done in 2011 at the Kenyatta National Hospital, an elective surgery cancellation of 20.6 % was noted (1)One of the main avoidable causes was the scheduling of patients[CITATION Nan11 \l 1033]. The lack of time constituted 43.8% and consultant unavailability 6.7%.[CITATION Nan11 \l 1033]. On the contrary, developed countries utilize a system of ranking patients for elective, publicly funded procedures using clinical priority access criteria (CPAC).[CITATION Car05 \l 1033]. According to an Iran study unexpected delay and cancellation of surgery leads to reduced hospital performance and undesirable patient outcomes[CITATION AIT18 \l 1033](2).Patients satisfaction is also negatively affected.

A waiting list arises if the demand for surgical services overwhelms the capacity of the system. [CITATION JJP10 \l 1033]. The patients are captured by a theatre booking list maintained by the registrars rotating in the department under the supervision of the consultant surgeon. In the evaluation of efficiency, the main aspects are maximizing utilization of the resources allocated to surgery, minimizing overrunning and minimizing cancellations on the list. The downside with the current surgical booking system is that the selection of patients by the senior registrar in consultation with the consultant is subjective and in most cases does not follow a formal prioritization criterion. This therefore leads to both allocative and technical inefficiencies as occasioned by a high rate of cancellation of surgery. Advanced healthcare systems in Australia for instance have adopted an online booking system. This system comes with automated text and email reminders and has been noted to be time saving to the doctor and patient and will reduce the costs of lost appointments. The system allows a 24-hour booking period where data can be entered at any time with respect to advance planning of the surgical load of patients. The scheduling system has an urgency classification protocol as a way to base the severity of the

condition and the protocol behind the management of these condition[CITATION gov20 \l 1033]. For instance, a patient who requires 3 monthly reviews will be entered into the system and the system will send those prompts for review in the period for their expected review even if it was missed during discharge or clinics[CITATION gov20 \l 1033].

The study aims to evaluate the current scheduling system in the department of surgery and its efficacy in addressing patient satisfaction and use of proper official prioritization tools. Notably, in each subspecialty there is a mode of booking of surgical patients for theatre. It is therefore the aim of this study to audit the various booking system and evaluate the most efficient system in the clinician's/health practitioner's perspective.

Currently, the surgical booking system in KNH is made up of the check bed system, the surgical booking book log in system, the on-demand calling system and the electronic system. The booking system is usually set at the clinic where the scheduling is done according to the entries and the day of surgery with a note of the contacts and mode of payment, no other form of data is provided.

The study is a follow up to Nancy Okuno study in KNH in 2011 which demonstrated organizational gaps in the department in regards to surgical patient selection and prioritization. (1) The findings of the study were presented in a quantitative manner leading to some departments which had high cancellation rates disadvantaged as each surgical subspecialty department has a different scheduling system and different patient prioritization protocols. This study will attempt to bring this protocols and considerations of each subspecialty to light and gain insight into the practice of surgical scheduling in the department(3). The practice of surgery fundamentally should not only look at the number of procedures done by a particular subspecialty but the surgical complexity of the cases done and the decision making guidelines in the departments for example a radical prostatectomy is a challenging case that requires presence of an experienced consultant surgeon as opposed to a simple prostatectomy(4). This evaluation of the surgical scheduling system will provide insight and unearth the challenges that occur in the selection of patients for surgery(5). This will address the risk of future litigation to the hospital by patients who deteriorate while awaiting surgery or interventions which are not forthcoming due to the ambiguity of the hospitals surgical scheduling system.

In a check bed system, a patient comes to the hospital and requests for surgery as per the available space. More often than not the patient makes numerous visits to the hospital to confirm availability of theatre space. If this patient has no hospital contact and becomes incapacitated, it is difficult to have surgery done and subsequently the fate of the elective procedure becomes a gamble especially if there is a disruptive event such as the corona virus pandemic that the country and the world over is grappling with. The advanced medical care systems in the world shut down their health systems according to categories of surgical elective theatres by deeming some surgeries essential and deeming others non-essential.[CITATION Ken20 \l 1033]This study seeks to establish each of the shortcomings and advantages of existing surgical booking system in the hospital and suggest recommendations to improve the transition rate of patients into successful elective operations. It also seeks to establish whether there is evidence of system thinking in the delivery of elective services to the surgical patient and in the advent of electronic and online services in Kenya a move to a more technology based surgical booking systems.

LITERATURE REVIEW

According to the American Medical Association. "Surgery means a procedure performed for the purpose of structurally altering the human body by incision or destruction of tissues and is part of the practice of medicine for the diagnostic or therapeutic treatment of conditions or disease processes by any instruments causing localized alteration or transportation of live human tissue." The performance of surgery in the hospital is classified as follows according to the NCEPOD classification. (see table) In this study we take a focus on elective surgery procedures. The surgeries allow for planning and preparation unlike the other categories which are inevitable and unpredictable in their presentation. The hospital is rarely thought of as a production line where the inputs are constituted and outputs are expected. However, in the advent of system thinking, we have to place and analyze the hospital systems that are not in an unpredictable environment where the production line theorem works. This is in the general outpatient clinics and the elective surgery process. Emergencies and casualty departments are on the other spectrum where the demand is not predictable and varies day to day.

A Research done in Jordan found that in a referral hospital in the capital city the cancellation rate was at 3.8 % of cases, a laudable achievement with the overall rate in the world ranging from 5% to 40% [CITATION MMe11 \l 1033]. This confounding characteristic of hospitals being found in either extreme, means that the top performers are very efficient in their transition rates to surgery and the bottom performers struggle with inefficiencies in their systems leading to cancellation of elective theatre cases.

The classification of surgery is as follows; -

Table 1.NCEPOD classification of surgeries

CODE	CATEGORY	DESCRIPTION	TIME TARGET	EXAMPLES
1	IMMEDIATE	Immediate {a}life saving {b}limb or organ saving intervention. With resuscitation simultaneously being administered	Within minutes of decision to operate	Penile amputation, Aortic aneurysm, solid organ injury
2	URGENT	Acute onset or deterioration of conditions that threaten life, limb or organ survival, fixation of fractures, relief of distressing symptoms	Within hours of decision to operate and normally once resuscitation is completed	Peritonitis and perforated bowel, eye injuries,
3	EXPEDITED	Stable patient requiring early intervention for a condition that	Within days of decision to operate	Nerve injury, ruptured tendons

		is not an immediate threat to life ,limb or organ survival		
4	ELECTIVE	Surgical procedure is booked in advance or planned for routine hospital admission	Planned	All other conditions not classified under immediate, urgent, or expedited

Cancellation reasons were collected from residents, interns or operating room nurses. The reasons were then categorized into eight groups for data analysis purpose: inadequate preoperative preparation, medical condition changes, no show, no consent, scheduling issue, staff availability and miscellaneous. In order to guide further OR efficiency study, cancellation reasons of general OR were further grouped as preventable which include: inadequate preoperative preparation, scheduling and consent; potentially-preventable which include patient no show, staff availability, OR availability and miscellaneous; and No preventable cause which is medical condition change[CITATION Wei19 \l 1033]

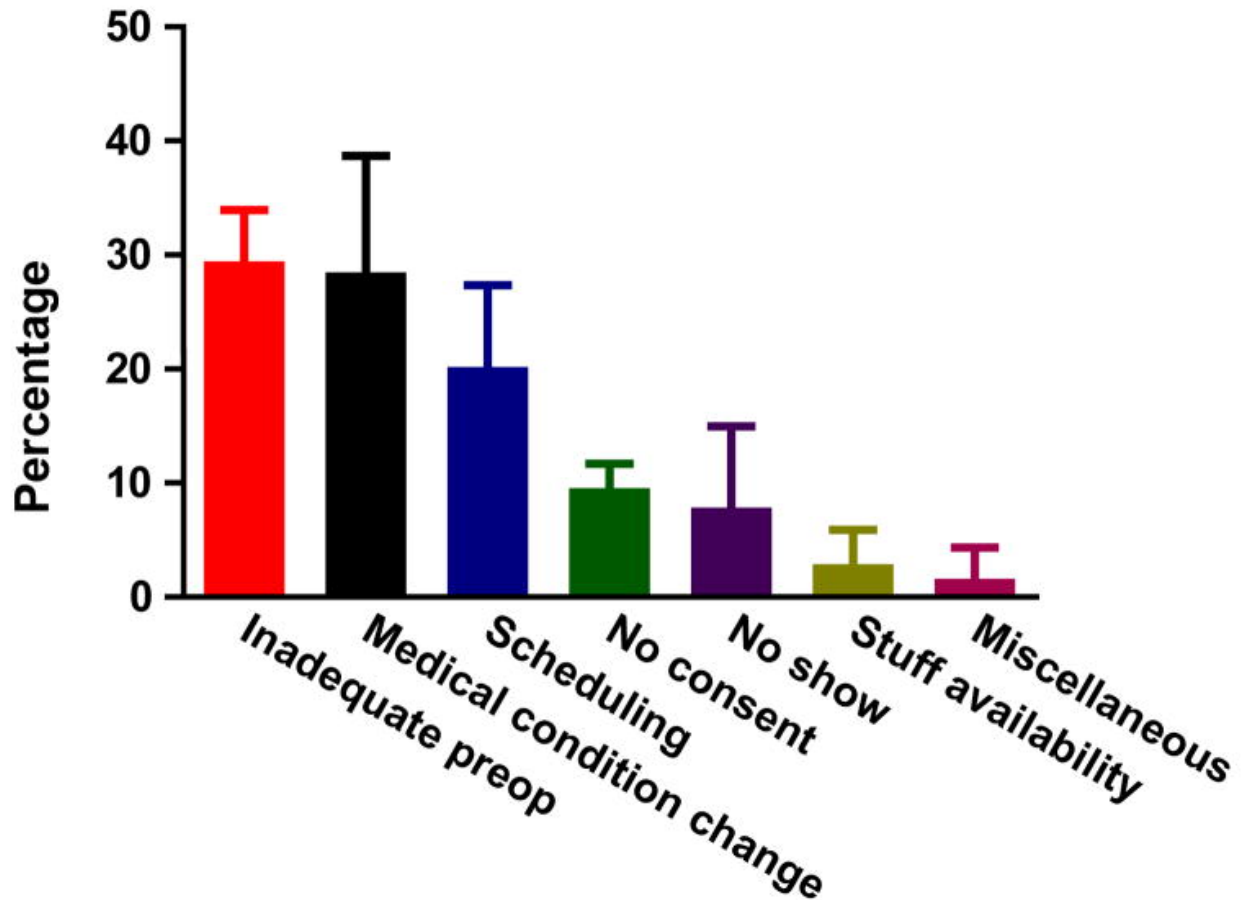
The study found that their “results agree with many studies, in which most cancellations (59.2 ± 8.9%) are preventable. Attempts should be made to decrease case cancellation starting with the most prevalent preventable reasons. For example, in general OR, the leading causes of case cancellation are inadequate preoperative preparation and scheduling related issues which can be and should be prevented. {[CITATION Wei19 \l 1033]}”. A study done by Alfred Ogwal et al Mulago hospital in Uganda found that the “prevalence of cancellation of elective surgical procedures at Mulago Hospital was 28.8%, with the highest cancellation rate found in the specialty of orthopedic surgery. Two-thirds of the procedure cancellations were caused by facility-related reasons, with more than 50% of the observed cancellations being potentially preventable.[CITATION Alf201 \l 1033] Quality improvement strategies are necessary in surgical specialties that are susceptible to procedure cancellations caused by facility factors. In

Tanzania a study carried out in 2019 by Rajaguru et al concluded that Tanzanian hospital KCMC (Kilimanjaro Christian Medical Centre) had a rate of 20.8 % of elective operations which were cancelled. “Optimization of operations and scheduling could functionally improve access to care by allowing for optimal usage of physical resources.” It was also their finding that it was not necessarily the lack of resources and funding that caused the cancellations but in a sense his study unveiled the workflow dynamics that were at play and I quote[CITATION pra \l 1033]. “We observed inefficiencies that can be addressed to reduce case cancellations and improve capacity for the benefit of patients accessing surgical care. Improving resources is not enough to improve access to care - understanding the distribution of volume, workflow and operations, and patient financing are critical considerations to truly improve access to surgical care.”[CITATION pra \l 1033].This study has identified the scheduling of patients for surgery as a key area of improvement and noted that efficiency in booking patients and transparency in communication and prioritization of patients is essential in the provision of quality services to the public.

The resultant findings reveal that whereas the findings of the rate of cancellations are present, no in depth study has been done to reveal what the contribution of surgical scheduling practices have been done in Kenya in regards to the important role of proper scheduling, communication and feedback from the consumers of surgical services the patients. Therefore, the providers who interact with the patients and are conversant with the hospital norms are best placed in giving a comprehensive overview of the various practices in each surgical specialty and the overall trend of adoption of electronic and complex system based surgical scheduling and prioritization systems.

In 2016 a study that assessed the surgeon’s perceptions of treatment risks and benefits influenced their decision to operate. The study noted that in similar clinical scenarios the surgical perceptions of treatment risks and benefits to the patient vary across the board and these are highly predictive of the decision to operate on a patient(6). In a systematic review in 2019 the investigators noted that the surgical perceptions on patients in decision making determined their decision to operate and it was concluded that “Surgeons consistently overestimate mortality risk

and are outperformed by pre-existing tools; prediction of longer-term outcomes is also poor. Surgeons should consider the use of risk prediction tools when available to inform clinical decision-making”(7). The findings are consistent with research done in view of surgeons and the cognitive processes that determine their decision making the fact that in practice, Surgical competence combines the intellectual exercise of decision making with the ability to perform mechanical tasks(8)



(9)

Figure 1. showing reasons for cancellation at pennsylvania medical centre

An article by Franklin Dexter shows that surgical schedules should consider patient safety, access, operating room efficiency, patient service and physician satisfaction. He notes that while it is difficult to assess the efficiency through traditional input output means. The above

intangibles would be a good measure of how a surgical scheduling system is efficient and effective. Other measures utilized in assessing efficiency is allocative efficiency and technical efficiency.

Technical efficiency is the effectiveness with which a given set of inputs is used to produce an output. A hospital for instance would be said to be technically efficient if it is producing a maximum output from the minimum quantity of human resource, medical supplies, technology and capital.

Allocative efficiency is about allocating resources such that the maximum utility is generated in terms of either health outcomes or a broader definition of utility-generating outcomes for instance the quality of life adjusted years in an individual.

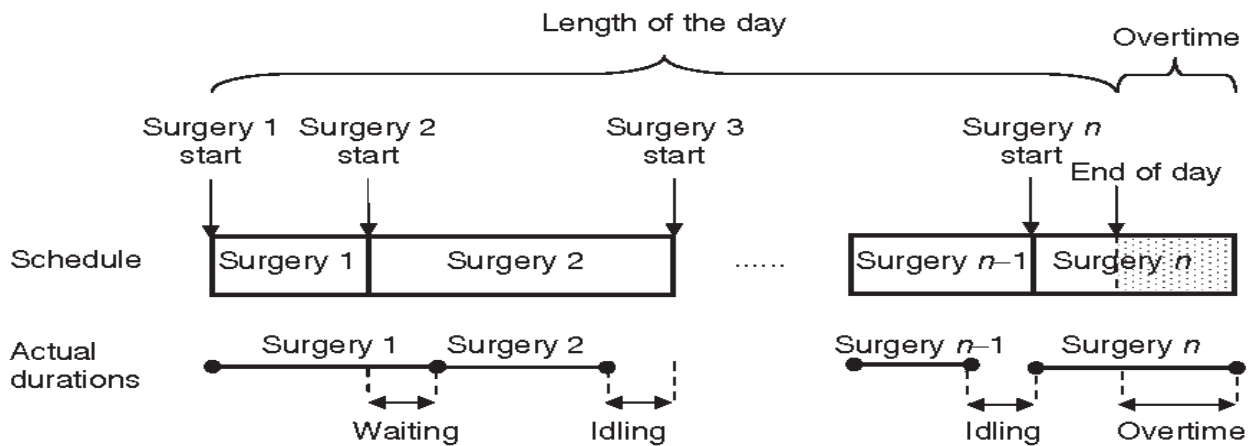
The efficiency measure in a health system is comparative in nature and is complex to understand and evaluate. Therefore, the most practical aspect is to evaluate the perception of the users of the system as each system in health is different and therefore, for the evaluation to be objective. It is not a one size fits all problem. The factors that apply to one subspecialty for instance do not apply to the other subspecialty. For instance, provision of blood which may not be a large factor in ophthalmic surgery may be a big factor in cardiothoracic surgery. The length of surgery in each subspecialty also differs due to the complexity of each specialty. therefore, it is only a user generated introspection of the comparative efficiency that will yield a solution to improvement of service delivery

There are different types of Scheduling in the context of Operation Theaters that are followed in different hospitals:

- Open scheduling: Open scheduling allows surgical cases to be assigned to an operating room available at the convenience of the surgeons.
- Block scheduling: Block scheduling, allows assignment of specific surgeons or groups of surgeons to a set of time blocks, normally for some weeks or months, into which they can arrange their surgical cases. In the pure form, the surgeon or group "owns" their time blocks. None of those time blocks can be released.

- Modified block scheduling: Modified block scheduling is modified into two ways to increase its flexibility. Either some time is blocked based on the surgeries to be performed and some is left open, or unused block time is released at an agreed-upon time before surgery and allotted to another Surgeon. (10).

Figure 2. Schedule OR problem



[CITATION Ayc10 \l 1033] *adopted from Ayca Erdogan 2010*

The surgical scheduling method adopted is a major factor in the successful transition of booked surgical patients to patients that have been operated upon. This is a dynamic that is hard to understand and estimate. The philosophies that determine the utilization and the planning of the surgical practice in the United Kingdom for instance have been borrowed from motor vehicle companies. In essence the capacity that absorbs the demand will at some level create waste (spare unused capacity) and conversely a level of capacity chosen to minimize waste will cause an inadvertent waiting list [CITATION Ros14 \l 1033]. This brings into context the utilization and waste and the objectiveness of managing a waiting list. The six sigma and lean thinking philosophies have been employed. The Gemba kaizen philosophies have been

adopted[CITATION Ros14 \l 1033]. The health ecosystem is plagued by this challenge of being able to gauge its capacity and also gauging the demand that is generated by this capacity. The main factor that the author found that tied the link between capacity and demand is the component of time. This is the whole essence of “waiting”. This is a great component to measure the specific demand generated from the surgical clinic and the capacity which the surgical service can be readily described as the minimum surgical time per week allocated to it.;2

The New Zealand study showed that booking and waiting lists are characteristic of public funded health systems.in New Zealand a system of scoring patients according to their urgency and presentation has been set up[CITATION Sar12 \l 1033]. This allows for the prioritization and open, equitable, justifiable and systematic waiting lists with a degree of certainty for the patients in this lists. There is also a factor for the costs of healthcare of each condition over time and the quality of life QALY taken into consideration. In Denmark and United Kingdom, a component of targeted time by which patients receive the services and the maximum waiting time for each patient are often an indicator of the technical efficiency of the health system.

The New Zealand system features two components and has scores for patient’s condition. The ones with a greater score are prioritized and the second component is the component of certainty. The booking of benign cases is done to give as accurate a time of surgery as is possible. The waiting list is coded and is printed in local newspapers as a sign of transparency. The lists are then culled or enhanced according to the funding available. The interesting aspect is that having more staff and funding does not lead to better surgical turnover. The concept of capacity and demand comes into the fore(13).

Table 2. Types of efficiency in health economics

ref(14)

<i>TYPE OF EFFICIENCY</i>	<i>OUTCOME MEASURES</i>	<i>COMPLEXITY</i>
<i>Technical efficiency</i>	<i>Effects assumed to be the same</i>	<i>Easiest to determine</i>
<i>Allocative efficiency</i>	<i>Unidirectional outcome measure</i>	
<i>Technical efficiency plus allocative efficiency within health sector</i>	<i>Multidimensional outcome measure (health only)</i>	
<i>Technical efficiency and allocative efficiency</i>	<i>Broadest outcome measure</i>	<i>Most difficult</i>

Phase of change	Level of introduction	Strategies
Implementation	<i>Contextual level</i>	Booking systems
		Maximum wait time guarantee
		Software development for WTM (includes simulation)
		Increases in capacity
		Pooled wait lists
		Standards or prioritization tools
		Improved data collection or data analysis
		Other(sending patients for GP fund-holding, GP referral system)
	<i>Local level</i>	Increases in capacity
		Work reorganizations
		Pre-operative clinic
		Pooled wait lists
		Standards or prioritization tools
		Improved data collection or data analysis
	Software development for WTM (includes simulation)	
Sustainability	<i>Contextual level</i>	Standards or prioritization tools
	<i>Local level</i>	Work reorganizations at the local level
		Booking system

Table 3 Waiting time management systems tabulations

Adopted from [CITATION Mar13 \l 1033]

A systematic review by marie –pascal et al 2013 in Canada showed that in essence elective surgeries have an intertwined relationship with other specialized services that may play a big role in the long waiting times in the public service. The imaging services, pathology department and oncology department have contributed immensely to the orderly transition of a patient from first contact to being operated. This is often an overlooked and important component[CITATION Mar13 \l 1033]. In Canada a wait time management service was incorporated. The success of a waiting time management system depends on the stakeholder engagement, good funding and at the organizational level the physician involvement, human resource capacity and information management system are crucial. Consultation with front line staff the nurses and the registrars and establishment of guidelines and adequate financial incentives for staff and dedicated staff played a big role in maintaining the momentum of the initiative (15)

In a study by Paul ward 2017 he noted the political and health service problem waiting times posed. The contrast between the public hospitals and the private hospitals and the impact of trust in the services delivered. The findings showed that as long as a process of determining the waiting time for a patient was fair and equitable and justifiable in the public hospitals the patient often accepted and trusted the services. This patient did not become dissatisfied and were willing to wait. However, those who opted to go to private hospitals felt that the shorter waiting times were the main factor not the level of skill of the practitioners in the system. It was imperative that the patients were more trusting of private health facilities due to the incorporation into their management and the handling of their concerns. In the public system the frustration and anxiety of not knowing where when and how the list will be done meant that the patient was always in a state of limbo and that the patient would be at the mercy of the system. Others having had a bad experience in the public health system would not want to experience the same.[CITATION pau17 \l 1033]

Table 4 Waiting time management service strategies

Best strategies	Practices
1. Greater alignment	Align agendas across healthcare organizations;
2. Increased and strategic communications	Increase communications among stakeholders at the right place and time.
3. Strong data	Establish a strong wait time management (WTM) data repository
4. Clinical and	Clinical and administrative WTMS champions must form a partnership.

Best strategies	Practices
administrative champion-partners	
5. Clear articulations of the value proposition for WTMS	People involved in WTMS must feel that it is part of an integrated strategy measure.’
6. Patient engagement	Engage and activate patients; make the current system dysfunctions transparent understand there are differences in wait times among physicians, and provide them with the option of being seen by the first available physician.
7. Health system trade-offs and patients’ options	Talk about what the health system is for and what the trade-offs are for immediate access.
8. Establish incentives	Create a system with incentives for clinicians that involves paying them for their time.
9. Leadership [CITATION Mar13 \l 1033]	Leadership is required in partnership with payers. Make sure the ministries of healthcare are at the table; otherwise the lack of relationship with them can become a barrier.
10. Expectations management	As a parallel strategy, ‘expectations management’ is recommended around WTMS potential and limitations.

Adopted from Marie pascal et al

In the component of trust there are two forms that patients have. In one aspect continuing trust ``the continuing trust by public patients in the face of negative experiences is a form of exchange trust norm in which institutional trust is based on base expectations of consistency and minimum standards of care and safety’’. [CITATION Mar13 \l 1033] A continuing trust in a health system by the public is mostly based on the institutional reputation and also the institutional memory that the hospital has achieved over the years. The trust therefore become a prominent healthcare issue among patients and doctors as well as the policy makers and public in general. In this regard the patients who have walked down the doors of public hospitals and receive good and satisfactory service act as promoters of the hospitals and the dissatisfied patients act as negative publicity for the hospital and act as the detractors. The challenge in health system attitudes is that

they are very difficult to change. In a system which tries to embody vertical equity where the quality of service is equal no matter who the individual receiving the service is. Have we got the momentum to change the status quo?

Patients often lose confidence in a system when there seems to be constant procrastination without any information forthcoming or reassurance. In a study by Sweetman quoted that “last minute cancellations of elective surgery negatively impact both patients and hospitals leading to inefficient use of resources reduced capacity and increased waiting lists”[CITATION SSw20 \l 1033] the reason this is such a burden to patients in a competitive world is that it leads them to seek services from unqualified and substandard facilities. Whereas a simple phone call would suffice or a reminder or a tracking system to monitor the conditions that require review within a certain period e.g removal of stents in patients and surveillance cystoscopy e.t.c. These patients are usually lost to follow up. “Although not all publicly funded healthcare systems have wait-time problems, wait lists are more likely to be found in public systems. This is because universal access to care, when combined with the government's desire to control health spending, can mean that the supply of treatment does not meet demand. Wait lists thus become a means of rationing the scarce supply”[CITATION Sar10 \l 1033]

In a study done Andrea j Curtis et al it established that the waiting lists should have other considerations other than time of booking or the scoring systems that are utilized but can also take into account socioeconomic and psychosocial factors in evaluating and prioritizing patients “Urologists, non-urologist medical practitioners and lay people considered the severity of benign prostatic hypertrophy symptoms and any resulting psychosocial disturbance as equally important in establishing priority for transurethral resection of the prostate. New prioritization tools should take both into consideration and weight them equally.”[CITATION And07 \l 1033]

Table 5 Elective surgery prioritization tools

Clinical impairment	Functional impairment	Social	Expected benefit	Others
Disease severity (15)	Limitations for doing activities of daily life (17 Limited working capacity)	School attendance or job seeking (12)	Probability and degree of improvement (6)	Time on waiting list

Rate of disease progression (11)		Social role (9)	Comorbidities (6)	Age
Pain (8)		Consumption of resources: caregiver, sick-leave (7)	Probability of improvement (5)	Personal medical decision
Major symptom (9)		Limitation to caring for one's dependents (6)	Degree of improvement (4)	
Risk of complications (9)		Employment status		

A Prioritization tool: M. Solans-Domènech et al. / Health Policy 113 (2013) 118–126

In the unfortunate event that the booking book is misplaced or goes missing, there is no alternative registration system in place. This has the effect of losing very valuable patient data and endangering the lives of patients who have entrusted the healthcare practitioners with their personal and confidential data. This book usually has no back up in its data entry and no standardized way of entering data and scoring patients based on urgency. In the past this has led to critical patients being overlooked and missing the elusive elective theatre space. These patients either end up in the private sector or accepting inevitable fate of living with these conditions if they do not have the means to seek for healthcare interventions elsewhere. We owe them an obligation to better our elective booking system and to interrogate the current elective surgical scheduling practice.

The qualitative research and social sciences method has been proven to provide data that has deeper interpretation and understanding, to a greater extent than traditional quantitative methods according to various research in health policy and health systems management. There is a gross deficit of qualitative research in the healthcare sector[CITATION kar16 \l 1033] .in Kenya it is more often granted that quantitative research looks for definitive and not exploratory methods .the health practitioners have only recently recognized the need to operate within a broader social, political and systemic sphere .therefore there is no precedent study in kenya and east Africa that evaluates the perceptions of health[CITATION kar16 \l 1033]

In the evaluation of the gap the various methods of scheduling will be detailed with the surgical goals of each subspecialty. In the developed world the surgical waitlist is either electronic or online(10).This gives better ability to the surgeons in aiding their capacity planning and delivering surgical services to the demands of the population the hospital serves(20).The evaluation is based on the standard waiting time of patients in the public health system as opposed to private health systems which have minimum to no waiting lists. The evaluation will also aim to discover methods of improvement and shortcomings in each subspecialty and discover through interviewers the following aspects(a) identifying salient features of care to inform service delivery and organization; (b) in exploring organizational and other obstacles to change, notably within the context of healthcare evaluation; and (c) by complementing other research approaches either in the preliminary development of measures or in explaining or implementing findings(21). Criterion in delivery of service to a reasonable degree(8). The data will then undergo a coding process and coding system will be selective. Once the basic set of concepts are identified, the themes patterns and relationships will be applied and analyzed. Of note word and phrase repetitions, both primary and auxiliary data comparison e.g booking books and elective lists will be evaluated to correlate data given. The data will then be summarized and presented to the department in both figures and written manner.

Justification of the study

In the developing countries of East Africa, we have comparable elective surgery cancellations rate with a range of 20.8 % (2019)[CITATION pra \l 1033] in KCMC hospital in Tanzania, a range of 28.4 % (2019)[CITATION Alf201 \l 1033] in Mulago, a hospital in Uganda and in Kenya a rate of 20.8% {2011} [CITATION Nan11 \l 1033]in KNH. We clearly have a challenge in transitioning the patient from his first contact with a health practitioner to the operating room for an elective theatre procedure. We have to endeavor to identify the remedies necessary to solve the systematic issues that plague the transition of the patients from the clinic to the theatre. This study evaluates the elective surgical scheduling of patients and the information flow between the essential links in the surgical services delivery chain

In a top tier national hospital, it is paramount to provide a distinguished model in surgical services delivery. In elective surgery practice, the display of equity in the model of operations

and the booking of patients has to stand scrutiny. It also needs to be systematic in order to optimize the satisfaction of the patients in the surgical clinic in the public sector who are mostly the disadvantaged in the society.

The current surgical booking systems in the country are problematic in the sense that patients are dissatisfied with selection module which is subjective and inhibits service delivery. This predicates migration of patients who are in need of services to the private sector which runs with more efficiency. Consequently, some patients have felt the need to achieve preferential treatment in a desperate attempt to get ahead of the waiting list by attempting to solicit favors from the persons responsible for the elective schedules. These patients have no recourse given that they are to the medical personnel a set of biodata.

The booking system has no way of delineating permanent elective cases and elective cases that could be detrimental if not done within a particular period to the patients' health. The removal of stents and foreign prosthesis in patients who have undergone reconstructive urological procedures is an elective procedure and carries serious consequences if it is delayed or not done within a particular time frame. Surveillance cystoscopy after bladder resection of a tumor is also essential in ensuring the cancer does not metastasize and is essential in the optimization of management of these patients but has been in some cases missed. The research attempts to review the scheduling of cases with intention to provide a snapshot of the situation on the ground and aspires to provide the resultant internally generated solutions.

Utility of the study

The study will aim to bring to light the solution for seamless elective booking of surgical patients with an aim to minimize the avoidable cancellations of surgeries. This action will optimize the output of the surgical wards in provision of surgical services to the general public. This is in light that this is the premier public hospital in Kenya.

Main objective of the study

Assessment of the surgical scheduling system and the department of surgery at the Kenyatta national hospital and the perceived efficiencies and inefficiencies of each subsystem.

Specific objectives

1. To establish the elective surgical scheduling systems used by healthcare practitioners in the department of surgery and subspecialties at KNH.
2. To assess the perception of the healthcare practitioners that utilize the current elective surgical scheduling model at KNH.
3. To evaluate the gaps in the efficient current elective surgical scheduling system at KNH.
4. To detail the suggested solutions that the health practitioners find to increase the efficiency of the surgical scheduling system.

METHODOLOGY

Study design

The study was a descriptive qualitative study.

The study took a descriptive approach and the main way of sampling was non-probability sampling and the method of choice being purposive sampling. The subset of purposive sampling was maximum variation sampling of the consultants and senior registrars that participated in elective theatre scheduling. The tool of data collection was transcription through a questionnaire that attempted to provoke exploratory answers. The respondents were interviewed through a questionnaire that captured the experience of each of the participants and also elicit the challenges that the process of elective theatre scheduling.

This data was then processed and analyzed and the findings detailed. The study covered a one-month period where the assessment of the scheduling system and prioritization of the patients that the elective list was done.

Study population

The evaluation of health practitioners who manage the elective surgery patients booked and reviewed at the general surgery and subspecialty surgical clinics.

Recruitment and consenting procedures

The respondents comprised of;

1. Level 4 and above registrars in the department of general surgery and subspecialties clinic
2. Consultants in the surgical booking clinic

Inclusion criteria

The consultant surgeons from Kenyatta National Hospital and consultants' surgeons from the University of Nairobi working in the outpatient clinics in the general surgery and surgical subspecialties

Senior registrars at the department of surgery. Level 4 and above

Exclusion criteria

Health practitioners in the surgical rotation who are on leave, in external rotations or on sabbatical.

Health practitioners in non-surgical specialties

Junior registrars in the surgical department

Study site

The study was carried out in the outpatient department of surgery clinic at the Kenyatta National Hospital. KNH is the largest public hospital in Kenya, it is a teaching and referral hospital, with specialist medical surgical and oncology services. The study site is the main surgical outpatient

clinics (clinic 23), other respective specialty clinics .The booking of elective surgical patients is done at the outpatient clinics and preparation of elective surgical lists is done in the wards.

Sample size calculation

Sample size determination and formula

The sample size in a qualitative study is ideally the sample that captured the highest diversity of opinions without being too large and repetitive. In a pure qualitative study, the sample size should be large enough to sufficiently describe the phenomenon of interest and address the research question. According to grounded theory “Accordingly, in this type of research the purpose of sampling is to continue theoretical inquiry until theoretical saturation is reached, rather than to ensure representativeness of samples.

Theoretical saturation is reached when data collection can no longer find new properties relevant to a category”.[CITATION sau12 \l 1033] A sample size of 30-40 health practitioners from different cadres would suffice[CITATION Jan01 \l 1033] .In this study which inductive theoretical information was generated by consultants surgeons and senior chief registrars as key informants were determined by purposive maximum variation sampling done at the general surgical clinics and specialty outpatient clinics .

The hospital has a general surgical and subspecialty departments as follows, the ENT department, the plastic reconstructive and aesthetic department, the neurosurgery department, the maxillofacial department, pediatric surgery department, urologic surgery department and cardiothoracic surgery department, ophthalmology department, dental surgery, obstetrics and gynecology department and orthopedic department

Variables

Dependent variables

- The variability of the surgery and subspecialties medical data entry system in each department

Independent variables

- Occurrence of industrial action that may disrupt the elective theatre schedule

Data collection procedures

Key informant interviews were conducted primarily via face to face interviews in the surgical outpatient clinics and via recorded phone interviews by the two research assistants who were trained over the relevant data acquisition protocols. The use of a digital voice recorder was used in conjunction with the interviewer's questionnaire which assisted in the transcription of the recorded statements. The device used was a Sony icd-px470 Digital voice recorder and transcription of the interview was done within 24 hrs. by the principal investigator.' The digital recordings were stored in an encrypted laptop by the principle investigator which was password protected. Transcripts were kept under lock and key. The interviewer obtained consent and then proceed to conduct the interview. The interviewer sought to obtain the following data.

1. Respondent's bio data i.e., cadre, sex
2. Method of elective surgery data entry respondent uses
2. Whether respondent views a challenge with elective surgery scheduling process
3. Where the respondent feels there is a challenge in service delivery
4. Optimum way to deliver efficient and just elective surgical services
5. The respondent method of prioritizing the patients on the elective scheduling system

Study results dissemination plan

The results will be made available to the University of Nairobi research library, KNH/UON Ethics and research committee and will be available for review by participants. The findings will also be presented for publication, with the department of surgery UON and KNH affiliated with the publication.

Limitations of the study

1. Interviewing key health care providers in the process of elective surgery in Kenyatta national hospital may be a challenge due to the busy schedules of the consultants.

2. Qualitative study method is novel in the scientific world and answers to the questions may vary across the various units in the department
3. The Covid-19 interruption in the general surgery and subspecialties elective scheduling.

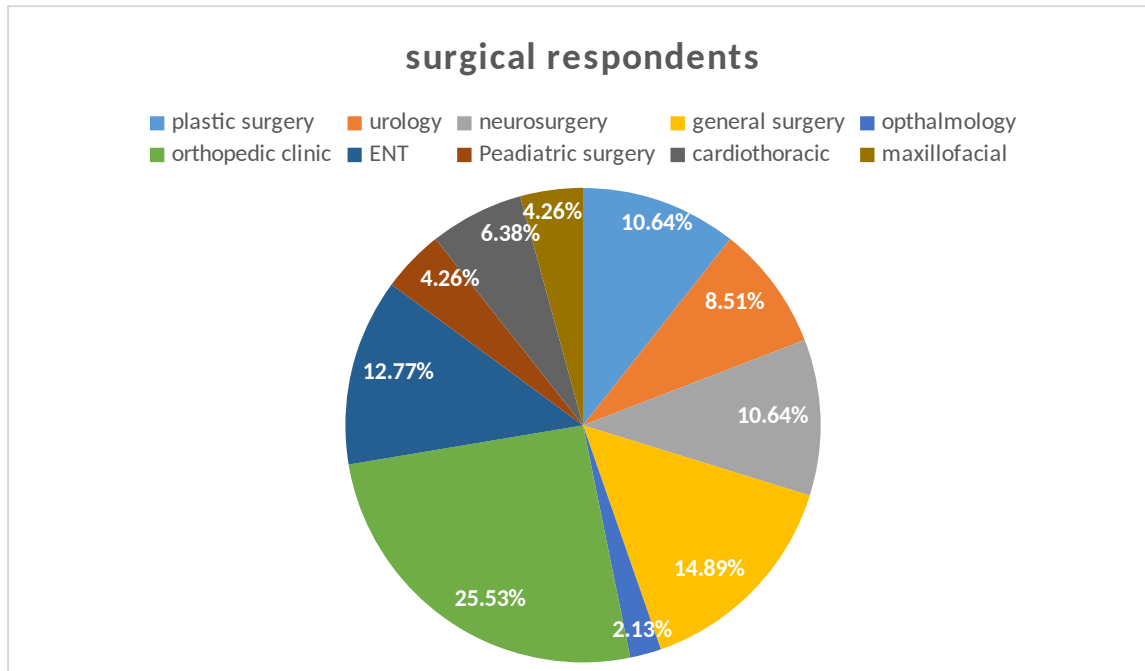
Quality assurance procedures

- Data collection was subjected to strict quality control:
- All the data was collected and entered into the data sheet by two research assistants in conjunction with the principle investigator.
- Routine random sampling of collected data was done to ensure completion of data retrieval.

RESULTS

The results of the study were collected from the 4th of April to 4th of May at the various departmental outpatient clinics. The respondents were interviewed through key informant interviews. The interviews were recorded and transcribed in a questionnaire by the research assistant. All COVID 19 protocols were adhered to, and utmost confidentiality maintained. The respondents were mainly senior registrars in the department of surgery. The distribution of surgical specialties reviewed were as follows and the number of respondents were 47.

Figure 3 Respondents as per department



The main types of scheduling present in the hospital were varied in most of the departments. Some departments like used one system while general surgery was noted to have two systems one as a backup system of the primary system as detailed. The open booking system was the highest scheduling system in incidence with 27 respondents claiming it's the system they use constituting 50.9%. The check bed system is utilized by 17 respondents constituting 32.1%. Electronic system is utilized by 4 respondents constituting 7.5%. Block scheduling is utilized by 2 respondents constituting 3.8%.the ad hoc system is utilized by 3 respondents who constituted 5.7%

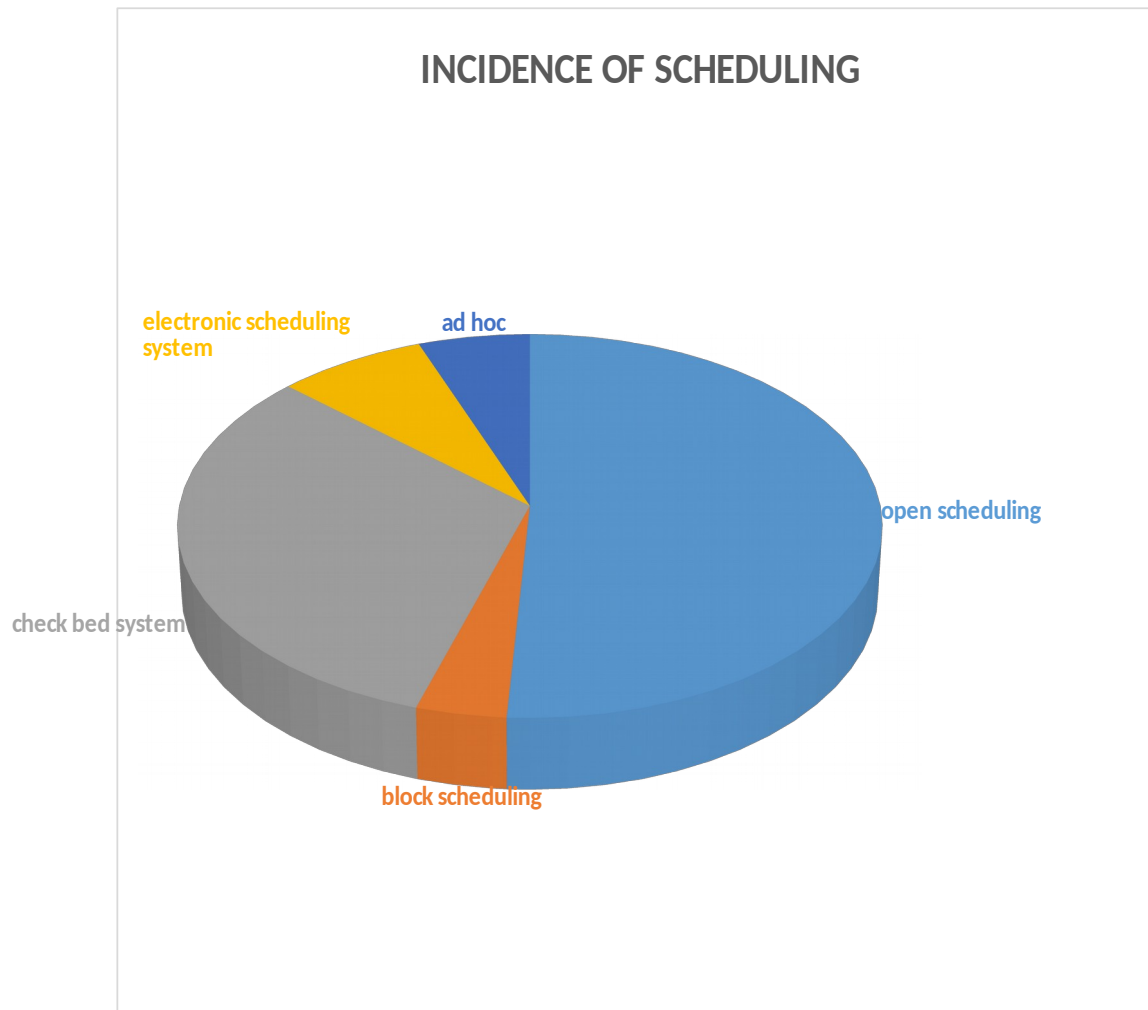


Figure 4 Incidence of scheduling

Table 6 Method of elective surgery scheduling as per department

Registrar's Specialty	Method of elective surgery scheduling data entry method utilized
Plastic surgery	Open scheduling
	Electronic scheduling system
	Ad hoc
Urology	Open scheduling

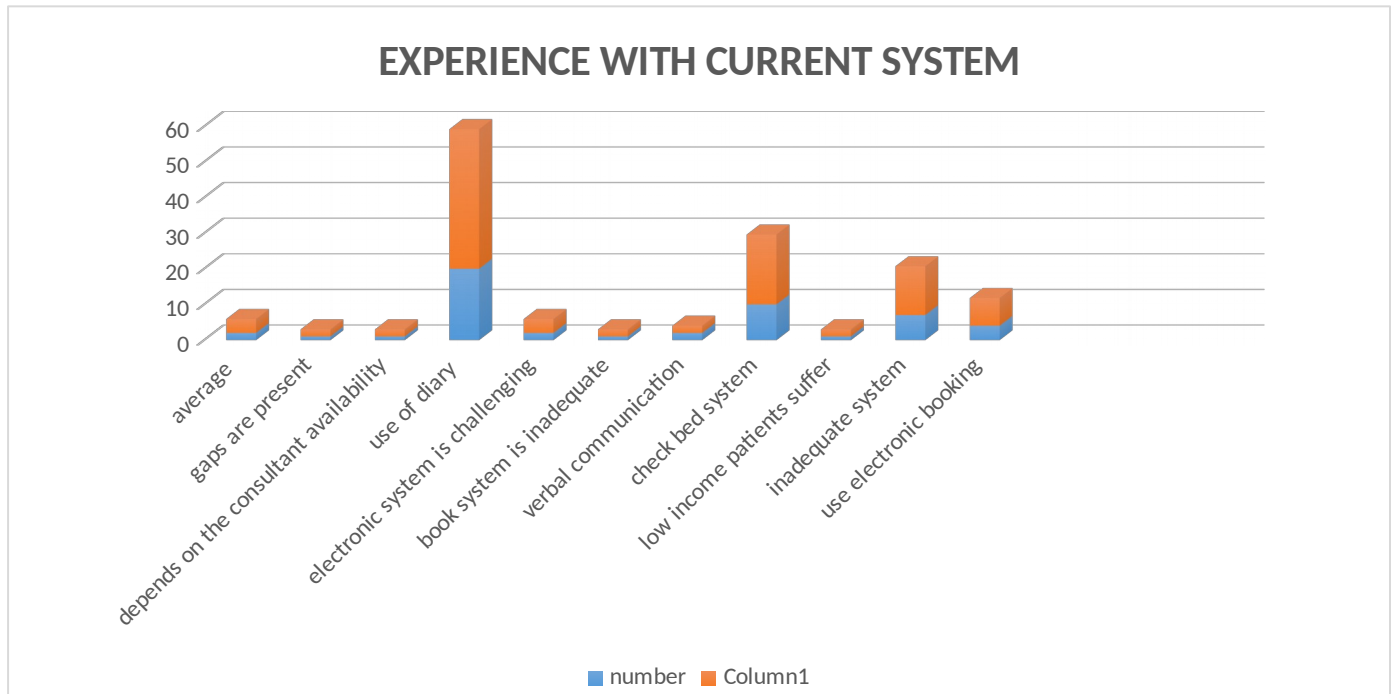
	Check bed system
Pediatric surgeon	Open scheduling
	Check bed system
Neuro-Surgery	Open scheduling
General surgery	Open scheduling
	Electronic scheduling system
	Check bed system
Ophthalmology	Open scheduling
Orthopedic	Open scheduling
	Check bed system
	Ad hoc
ENT Surgery	Open scheduling
	Block scheduling
	Check bed system
Cardiothoracic	Open scheduling
Oral & Maxillofacial surgery	Open scheduling
Orthopedic & Trauma surgery	Check bed system
	Open scheduling

The respondents in each department detailed the systems that are utilized in the scheduling of patients. It was elucidated that the respondents with more than one system used one system as a backup for their main system. This was especially true in electronic system use where the manual systems were used as a reference.

What is the experience of the health practitioner with the preferred scheduling method?

The respondents were asked their experience of utilizing their surgical scheduling system and entry of data in the department of interest. 20 respondents (42.6%) reported use of diaries which were maintained by the registrars as the main data entry system. 10 respondents (21.3%) also reported utilizing a check bed system where a patient would be required to inquire at a certain determined date whether space was available. 4 respondents reported utilizing an electronic system was efficient but 1 respondent reported difficulty entering data using this system. 7 respondents felt that the existing systems were inadequate in terms of data entry, 2 respondents noted that low income patients tended to suffer in the booking, due to priority being given to NHIF accredited patients. 1 respondent reported that consultant availability determined the schedule in their department and 2 respondents felt the scheduling systems were average.

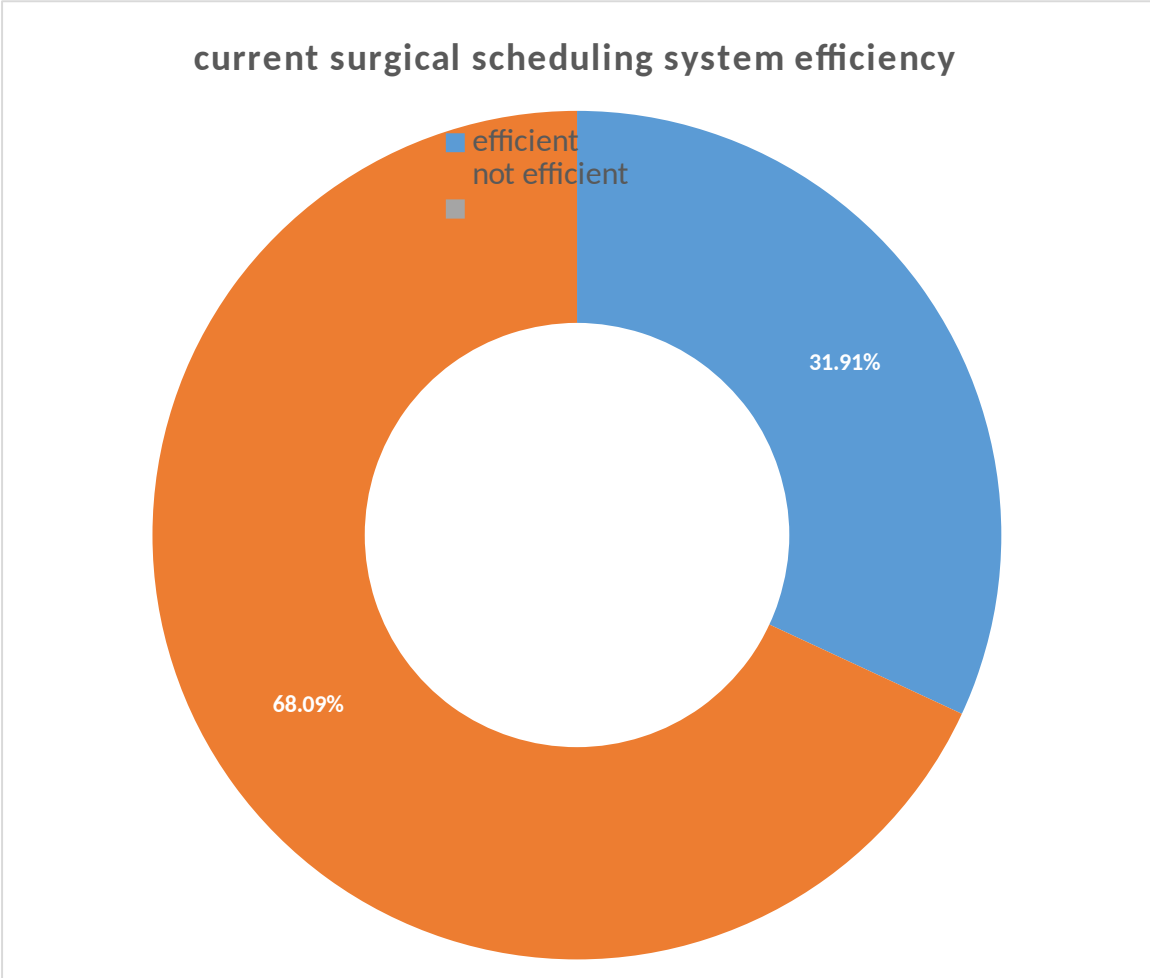
Figure 5 Experience with current system



Does the respondent view the elective surgery scheduling process in the respective department as efficient?

Out of the 47 respondents who were interviewed majority (32) reported that the current existing scheduling systems were not efficient as currently constituted while a minority (15) reported the current system in the department being efficient. The respondents subsequently detailed the reasons that the respondent’s departments elective system was efficient and reasons why the system was inefficient

Figure 6 Current surgical scheduling system



Among the respondents who felt that the systems were efficient as constituted they listed the reasons as detailed as the below table shows

Table 7 Markers of efficiency

		Responses		Percent of Cases
		N	Percent	
\$q4a ^a	Emergencies are prioritized	3	8.6%	15.0%
	Few patients booked for surgery	1	2.9%	5.0%
	Few numbers booked shorter waiting time	1	2.9%	5.0%
	Custodian of the book is known	1	2.9%	5.0%

Detailed patient info/ diagnosis/ procedures	5	14.3%	25.0%
Elective surgeries done as scheduled	2	5.7%	10.0%
Patient follow-ups via phone calls	6	17.1%	30.0%
Efficient for children	1	2.9%	5.0%
Prioritize according to needs	3	8.6%	15.0%
Enable consultants to plan for surgeries	1	2.9%	5.0%
Easy access from any location	1	2.9%	5.0%
Easy to tell surgeries already done	1	2.9%	5.0%
Available to all stakeholders	1	2.9%	5.0%
Easy to track those on the waiting list	5	14.3%	25.0%
Ease to access online tool on status	3	8.6%	15.0%
Total	35	100.0%	175.0%

Table 8 Current system inefficiencies according to respondents		Responses		Percent of Cases
		N	Percent	
\$q4b ^a	The book can only be accessed from the clinic	3	2.9%	6.8%
	Not protected from Covid-19	1	1.0%	2.3%
	Double booking	1	1.0%	2.3%
	Cancel surgeries due to Covid-19	2	1.9%	4.5%
	Patients not well prepared for surgery	2	1.9%	4.5%
	Bias in booking patients	5	4.8%	11.4%
	Resident's transition causes delays	1	1.0%	2.3%
	Inadequate theatre space for elective surgeries	2	1.9%	4.5%
	Many patients on the waiting list	5	4.8%	11.4%
	Long waiting period	17	16.2%	38.6%
	Hard to fast-track	2	1.9%	4.5%
	Hard to identify who has been operated on or not	9	8.6%	20.5%
	Lack of NHIF card is a barrier	11	10.5%	25.0%
	Urgent cases dont get attention	2	1.9%	4.5%
	It's easy to forget a patient	2	1.9%	4.5%
	Book might get misplaced	4	3.8%	9.1%
	Over prioritizing learning needs	2	1.9%	4.5%
	Unable to identify who has waited for long	5	4.8%	11.4%
	Complex cases takes long so few patients seen	3	2.9%	6.8%
	Lack major details on patients	5	4.8%	11.4%
Aspects of repetition	1	1.0%	2.3%	
Lost to follow-up	4	3.8%	9.1%	

	Poor coordination from clinic/ ward/ theatre	2	1.9%	4.5%
	Long hospital stay-no space for others	1	1.0%	2.3%
	NHIF cards take long to be activated	1	1.0%	2.3%
	Residents not in touch with the booking	1	1.0%	2.3%
	Lack of hospital beds	4	3.8%	9.1%
	Limited capacity to operate	3	2.9%	6.8%
	Few nurses for pottering patients	2	1.9%	4.5%
	Poor communication to patients-pre/ post-surgery	1	1.0%	2.3%
	Ortho surgeries always picked from the wards	1	1.0%	2.3%
Total		105	100.0%	238.6%

a. Group

The current inefficiencies in the existing system were noted as above by the respondents who felt that the system is not efficient as constituted. The respondents who felt that the systems did not give optimum results for the department's elective scheduling practice in the hospital

Table 9 Prioritization protocols for elective surgery

		Responses		Percent of Cases
		N	Percent	
\$q5 ^a	All malignancies	18	15.1%	38.3%
	Very sick / severity/ emergencies	24	20.2%	51.1%
	Injuries	2	1.7%	4.3%
	Children/ students	16	13.4%	34.0%
	Older patients	4	3.4%	8.5%
	Extreme poor patients	1	0.8%	2.1%
	How well the patient is prepared	9	7.6%	19.1%
	1st come 1st served	3	2.5%	6.4%
	Depending on the procedure	5	4.2%	10.6%
	Patients on the waiting list for long	3	2.5%	6.4%
	Financially able/ NHIF Holders	12	10.1%	25.5%
	Learning needs of Residents	3	2.5%	6.4%
	Availability of theatre	1	0.8%	2.1%
	Open fractures	1	0.8%	2.1%
	Spinal injury	1	0.8%	2.1%
	Depends on sub-specialty	4	3.4%	8.5%
	Conditions affecting the airways	4	3.4%	8.5%
	Compressive Disorders	1	0.8%	2.1%
	Availability of personnel and equipment's	4	3.4%	8.5%
	Political/ high social status	2	1.7%	4.3%
To in-patients compared to walk-ins	1	0.8%	2.1%	

The respondents were asked to define what in their view would improve the efficiency in their respective department's surgical scheduling system and deliver the best services in the provision of elective surgery in KNH.

Table 10 Optimum way to deliver services as per the respondents

	Responses		Percent of Cases	
	N	Percent		
\$q6 ^a	Electronic system with patient details	23	24.2%	50.0%
	System accessible to all stakeholders	10	10.5%	21.7%
	Interactive with all cadres	3	3.2%	6.5%
	Able to track surgeries done	3	3.2%	6.5%
	Have 2 long cases & 2 short cases	1	1.1%	2.2%
	Collaboration venture with other firms	7	7.4%	15.2%
	Theatre space for elective surgeries	14	14.7%	30.4%
	Timeline for elective surgeries	2	2.1%	4.3%

	1st come 1st served basis	2	2.1%	4.3%
	Pre-operative checklist to patients	2	2.1%	4.3%
	Information to patients about the surgery	2	2.1%	4.3%
	Increase wards for elective cases	3	3.2%	6.5%
	Availability for theatre 24 hours	3	3.2%	6.5%
	Theatre spaces in other facilities to reduce influx	3	3.2%	6.5%
	More specialists to reduce influx/ nurses 4 scheduling	3	3.2%	6.5%
	More resources/ equipment's needed	3	3.2%	6.5%
	Social support for patients after surgery	1	1.1%	2.2%
	Financial support/ insurance cover	3	3.2%	6.5%
	Improve turnaround time in theatre	4	4.2%	8.7%
	Improve pottering efficiency	3	3.2%	6.5%
Total		95	100.0%	206.5%

DISCUSSION

The Kenyatta national hospital is a tertiary level 6 hospital. It is a hospital that hosts specialties and subspecialties and serves both patients in Kenya and surrounding countries. In 2011 Nancy Okuno et al noted an overall 20.6% cancellation rate in surgery with cardiothoracic surgery having a cancellation rate of 38.4% to private wing having a cancellation of 6.4%. In Brazil the average overall rate of surgical cancellation was 18.45% with general surgery having a rate of 25.5%. The error in surgical scheduling was pegged at 7% in the unit (26). The hospital therefore requires review of its existing systems periodically to achieve the desired goal of providing quality, just and equitable medical services to the population. The hospital therefore has adapted policies that have allowed adoption of the most efficient practices in the provision of services in various departments in the hospital. The surgical department and specialty departments have grown in both demand and supply sides from a health systems perspective. It is therefore necessary to evaluate the practices of elective surgical scheduling in the various specialties and subspecialties in the hospital as it is currently constituted and offer an appraisal of the perceptions of the users of the efficiencies in the system that they use. A study in Ethiopia in Hawassa University a tertiary referral hospital in 2018 noted that the most common reason for cancellation was surgeon related 35.8%. Improper scheduling contributed to 20.5% of all cancellations (27).

The departments reviewed had consultants and registrars who had views linked to the perspective of efficiency from the end user point of view. The various departments were reviewed through key informant interviews which each department gave their current scheduling method. The systems review was necessitated by the fact that there is a variance between the departments in regards to demand for services, urgency of services to be delivered and parameters that govern elective surgical practice.

In the assessment of registrars, the historical status quo of the department played a big role in the way the scheduling is done. The registrars in each department except the departments with an electronic system have maintained the booking systems in place due to the traditions of the department. The registrars have utilized these systems despite holding reservations as to their effectiveness in delivery of equitable, just and quality service. On a general basis, majority of the respondents felt that these departments have systems that have proved inefficient and errors have been made in their execution that have disadvantaged the end consumer of surgical services the patient. Overall 27 respondents who have practiced open scheduling have reported that they use a diary or a booking book to collect the scheduling data. The challenges with data entry in a manual diary is that it is very subjective. Some of the entries are poorly made and some of the entries are illegible. The diary is also not constantly updated and therefore it is difficult to tell the patients who have been operated upon vis-à-vis those not operated upon. The confidentiality and security of the data entered is also not guaranteed as the registrars have no office and roam with the diaries. In some departments reports of poaching of patients from the data recorded have been claimed. This is possible as there is no established chain of custody for these patients. Respondents reported of patients who have complained of not being called after their data has been entered especially patients from low socioeconomic status who may not have the funds to maintain regular clinic visits. There is also discrimination by virtue of mode of payment where patients without NHIF are more disadvantaged than those with NHIF due to department policy beyond the control of the registrars. The patients without NHIF are more likely to be unable to afford the payment in the hospital and may end up being retained in the ward as discharge in patients. Due to this patient with NHIF are prioritized. The respondents also reported that the operating schedule is dependent upon availability of the respective consultants in the particular departments. In a study in the united states it was shown that heuristic principles are essential in optimizing surgical scheduling (28) the onjob training and maneuverability of the time by the

consultants is key to success of the OR SCHEDULING. Consultants tend to have areas of interest in the particular surgeries and they determine the particular surgeries being carried out according to the subspecialty of the consultant or area of interest. This is disadvantageous to procedures deemed benign routine or palliative as they receive the least attention and patients with these conditions may be delayed overlooked or in some unfortunate circumstances never be operated upon. The entry is also not adequate in the books in regards to the overall condition of the patients as the entry is brief and concise with the diagnosis only and the procedure with no reference to grading, staging and prognostic indicators.

The 17 respondents who use the check bed system report that it is more subjective to the patient and is the system that is most inconveniencing to the patient. As reported by the study by ayca Erdogan et al “the Poor scheduling prevents health-care providers from matching patient demand with available capacity, causing inefficient use of resources, decreased return on investment, and long waiting lists for patients” (10) the check bed system depends on the availability of space and the surgeon and many patients have been disadvantaged by these systems due to the unpredictability of the outcome of their visit to the hospital. Patients who live far from the hospital may expend their resources to come to the hospital and not successfully get a bed. The patients may also be inconvenienced by complex instructions to the wards and some present to the hospital totally unprepared. This system is not suitable for a modern hospital which has the capacity to incorporate technology. The surgical list may change at a whim and patients sent home with the advent of an emergency or a more priority surgical case e.g a malignancy .These patients are also disadvantaged in case of cancellations beyond the departments control e.g theatre closed for renovations or closure due to surgery workshops as these changes are not communicated to the patient. These patients with relatively benign cases e.g colostomy patients, urethral strictures, hydroceles etc,may always be sidelined for more emergent cases and in some settings some of these patients have stayed for even years waiting for a list with no success. This leads to dissatisfaction with the services at the hospital and the erosion of public trust with the hospital as some feel that it is only through bribery or canvassing that operations are done. Some departments have adopted a modified check bed system which uses a call only system which patients can only come when called. Due to the transitions that occur in these departments as registrars rotate every three months some patients have fallen through the cracks and failed to be

operated on time, as alluded to earlier the institutional trust is eroded as the cases of “forgotten” patients arise.

The ad hoc system was used by some respondents. This system is utilized in departments which surgical schedules are determined in the last meeting prior to the surgical operation. Two departments used this system. Plastic surgery and orthopedic surgery utilized this system in determining their schedules. The ad hoc system is the least equitable and just system as patients are picked as they walk in on a first come first serve basis and is at best an adjunct system used in departments with multiple theatre days

Block scheduling is done in ENT surgical scheduling where each subspecialty is given a block of time in which to operate. This system is not commonly used in other departments in KNH but it is used extensively in the private sector where each surgeon is assigned a specific time in which to schedule his patients as a block and that time is locked out from other surgeons or other departments. This is feasible in very highly efficient centers where dedicated theatre space is maximally used. This block system can be hampered by consultant surgeon availability. The procedures done in this system must be timed exactly as there is no room for extension, as one tends to eat into another surgeon’s block. In private hospitals with two or three theatres the competition for space in periods of high demand is present. A block system is therefore utilized to allow accommodation many specialties and doctors. This system is however very rigid and restricts surgeons to doing procedures which are less complex and have little chance to extend except in unforeseen circumstances.

The electronic system is used by two departments and it is the most technological advanced system in hospital. It is used as the main system with a manual entry as a backup as this system has been found to be the most just equitable and efficient system in high volume center’s for example in KNH. This system can be simple as preparing an excel sheet and entering data on every clinic with a shared email where it is posted all the way to an online system which is a software system which can be accessed in real time and modified by those with administrative rights. It is able to enhance service delivery as it can be programmed to give reminders, coding of data and is superior in evaluation of demand of services administered. This system is used by the developed health systems all over the world. The system also allows more detailed data entry as templates are present. With good compliance this system has been shown to be superior in data storage and

especially in patients who require repeat scheduled visits e.g surveillance removal of prosthesis and stents .This system can be programmed to send alerts to patients and health care providers. The system however requires training and a steep learning curve as the system depends on the quality of data entered. The GIGO (Garbage in Garbage out) applies here extensively. Entry is ideally done with manual back up carefully by a dedicated data clerk or registrars in the department who are well trained. The system is dependent on availability of computers and software which is purchased at a higher cost. The investment is however trivial compared to the benefits. The respondents also reported on the difficulty in enforcing use of template use and tedious data entry to the less technologically inclined. This system however shows the greatest promise in improving efficiency, data security and storage and inclusivity in decision making.it is no surprise that the principle researcher in this study highly recommends it as the system which all surgical departments should adopt.

The most efficient system of surgical scheduling as per the respondents is the general surgery department which had the most positive review by the residents the residents and consultants who were interviewed reported utilizing an electronic surgical scheduling system as their main surgical scheduling system and utilizing the manual system as a back up to this system. This system was introduced due to the respondents noting the gaps in the previous system that they were utilizing. Some of the respondents reported both vertical and horizontal consultation on the electronic list which is in custody of the consultant. This study therefore found this as a satisfactory system that can be improved by going online fully. The fully online system would allow adequate coding of patient flexible reviews of the demand of the surgery and ability to vary the inputs in real time e.g noting expected duration of surgeries, creating automated reminder messages to patients and applying software to create prioritization protocols.

Table 11 Perceptions of efficiency in elective surgery scheduling process

Efficiency of elective surgery scheduling process in the respective departments	
Resident's Specialty	Response
Plastic surgery	<ul style="list-style-type: none"> • No, the scheduling book is only accessible from the clinic • Yes • Yes, only four patients are booked per schedule- no assurance that patients will get surgeries
Urology	<ul style="list-style-type: none"> • No/ not really/ not efficient • We can do better with a more modern system
Pediatric surgeon	<ul style="list-style-type: none"> • Yes, it's not the best but it works • Not really • Patients miss theatre affecting the booking flow
Neuro-Surgery	<ul style="list-style-type: none"> • No • Not efficient • No, it is bad and poor way of recording

General Surgery	<ul style="list-style-type: none"> • Yes, it is efficient (Majority vote) • Not very efficient (one response)
Ophthalmology	<ul style="list-style-type: none"> • Yes, it is efficient
Orthopedic surgery	<ul style="list-style-type: none"> • No, not efficient (majority) • Yes and no • Yes, from preparing, running lab works and pottering, so it is efficient
ENT Surgery	<ul style="list-style-type: none"> • Yes -11 • No-11 • Yes and no-1 • Needs improvement
Cardiothoracic surgery	<ul style="list-style-type: none"> • Yes- 1 • No-11
Orthopedic & Trauma surgery	<ul style="list-style-type: none"> • Less than optimal efficient • Only efficient during Rapid Response Initiative • Fairly efficient in the current health setting with minimal tools for online scheduling • Not efficient-11
Oral & Maxillofacial surgery	<ul style="list-style-type: none"> • No

The respondent's responses on the efficiency of the respective departments show that they believe that there is a great room for improvement in the surgical scheduling system. The current systems are very rudimentary and disadvantage the clinician and the patient in service delivery. The security of the data that is carried in the booking books is lax at the best as there is no custodian of this books. The ideal scenario would be that the booking diaries would be official KNH registers that would be in the custody of the records departments. The risk of data loss in the event of book misplacement or loss is great. The books or diaries also are not properly updated and therefore the patient data entry is sketchy in some cases, bad handwriting and illegible data entry due to non-standard entries can lead to grave consequences to the patient. In contrast a study done in a tertiary hospital in brazil states that" Results displayed an average increase of 37.2% in OR occupancy, allowing an average increase of 4.5 in the number of

surgeries performed daily, and reducing the variance of intervals between surgeries' completions by 55.5%. A more uniform distribution of patients' arrivals at the PACU was also observed.” (30) This study shows how transformative electronic software and good supervision can improve service delivery. The lack of an electronic system in the departments also means that the data entry cannot be adequately utilized to project demand ,planning of surgical expansion and strategic planning in a prospective manner.in some departments the consultants are not the main custodians of the scheduling diaries and therefore are not aware of the full demand of service in the hospital in their department as the registrar's keep custody of the books.in departments such as general surgery the use of electronic data entry systems with manual back up is in use and has transformed patient management in this department as per the respondents. The general surgery team is able to create an electronic list every clinic that is updated to the main list and therefore the consultants in the department are able to discuss the patients who are due for the next elective list with full knowledge of the pending demand. There is a manual back up and this system has more comprehensive data entry. The supervision of patients is done in concert with the consultant as the head and the residents as the effectors .this according to the respondents in this department has made work easier and satisfaction to the patients is present as they are assured of an all-inclusive system .the general surgery team has also reported use of features such as group email to ensure the consultative process is done and the list is accessible online. This system also has room for improvement and requires dedication and training but according to our assessment it is the best system.

PRIORITISATION

The respondent's prioritization protocols were in lieu with what was considered an urgent elective case for instance malignancies, life threatening conditions, very debilitating conditions and rapidly worsening conditions as patients who would get prioritized.in some departments. Patients were prioritized on a first come first serve basis with exception of the above criteria. Patients were also prioritized in some departments depending on the procedure. In a study by Curtis prioritization of prostatectomy patients led to better outcomes overall (4) .If it is a rare procedure that is of interest to the registrars and consultants presented a learning opportunity, it would be prioritized. Cases were also prioritized according to the availability of equipment and personnel in the department as some of these departments are subspecialized. If a subspecialist in

the departments was away on leave the patients in that field would not be prioritized until the consultant returned. Patients who were of high social standing and political standing were also prioritized over poor and patients of low socioeconomic status. This is rife in departments where implants and expensive gadgets are utilized as the patients cannot simply afford the cost of these implants. Patients who also missed theatre previously and in patient patients in other departments also were given a higher priority in the list rather than walk in patients to the clinic.

The prioritization protocols were on a case to case basis and other than the overt prioritization of malignancies and life-threatening conditions, including conditions that are rapidly deteriorating, there was no tangible prioritization protocol in the hospital. In other more developed public health systems other aspects of health such as quality adjusted life years and institutionalized and marginalized patients are placed in consideration. This is not present in the surgical department. Therefore, there is a great disadvantage to people from low socioeconomic backgrounds with benign conditions, prisoners, elderly and school going children. These patients may be on the list for long periods of time and may be unable to obtain work or retain gainful employment as the condition is preventing them from working comfortably. The recommendation would be for the individual departments to come up with proper prioritization protocols and score each patients based on these protocols. These would allow the relative efficiency to improve. a prioritization tool is available in the literature review as a template.

The last question to the respondents was geared towards developing user generated solutions for the departments as some felt that the systems present were not available to all the stakeholders, other respondents were recommending the ability to track and detail patients who have been operated upon and an electronic surgical scheduling system.

RECOMMENDATIONS

Incorporation of a surgical scheduling office in the hospital to register and maintain the records of all patients booked for surgery would revolutionize the management and handling of data by the hospital and create room for projection of demand for surgical services.

The hiring of a surgical scheduling clerk to maintain all the bookings patients' details and to contact and update the patients on the status of their elective surgery schedule. This is a practice common in public facilities in the developed countries. **Surgery schedulers** typically need a high school diploma, along with relevant coursework and experience. (28). This will not cost the hospital much but will improve the efficiency.

The conversion of booking systems from manual to electronic in each department of surgery. The incorporation of surgical scheduling software in the process of scheduling which coordinates surgical bookings and is able to send automated notifications to patients

Creation of prioritization protocols .in Italy the surgical waiting list info system project (SWALIS) developed a software based system to prioritize patients (29). The pre-admission model provided patients and users with useful tools to manage waiting lists. Providing an equitable, just and efficient system. Therefore, this prioritization can be agreed upon by the heads of units in each department in surgery

A comprehensive on-job training of registrars in the documentation of relevant data. Patient counselling and information delivery skills. Use of electronic technology and adherence to standard operating procedures will go a long way in ensuring compliance with each unit's

guidelines in the department of surgery. A study of perceptions of health practitioners showed that the transfer of responsibility to them was tedious and bureaucratic (31). Therefore, supervision and refresher courses occasionally would go a long way.

A departmental review/meeting to discuss all pending cases and creating an all-inclusive platform to discuss the pertinent issues and prioritization of patients. This can also be done as an online meeting

The institution of surgical workshops for patients who have been on the list for more than 6 months should be adopted as a bare minimum in the provision of services. This should be adopted by the hospital to ensure patients are not kept in perpetual waiting lists. Patients with minor surgical conditions can also be transferred to their resident hospitals

CONCLUSION

The evaluation of the current surgical scheduling system in Kenyatta hospital has revealed that within the department of surgery there is diversity in scheduling practices. The respondents with the most efficient scheduling methods incorporated a primary electronic scheduling system with a supplementary manual system. In the facet of surgery, the use of technology in the day to day activities in the hospital cannot be overemphasized. The revelation by the majority of respondents that the scheduling systems were inefficient should not be taken lightly and remedial measures should be undertaken to make the scheduling all-inclusive and efficient. Establishment of a surgical scheduling office would go a great length in ensuring patients get timely feedback and surgeons can utilize the data that is generated in real time to predict the demand for services and respond accordingly.

REFERENCE

1. Nancy ON. of Elective Inpatient Surgery At Kenyatta National Hospital a Dissertation Submitted in Part Fulfillment of the Requirements : F Jr the Degree of Master of Medicine L ~ Anaesthesia , University of Nairobi.
2. Al Talalwah N, McIltrout KH. Cancellation of Surgeries: Integrative Review. *J Perianesthesia Nurs* [Internet]. 2019;34(1):86–96. Available from: <https://doi.org/10.1016/j.jopan.2017.09.012>
3. Gillett WR, Peek JC, Herbison GP. Development of clinical priority access criteria for assisted reproduction and its evaluation on 1386 infertile couples in New Zealand. *Hum Reprod*. 2012;27(1):131–41.
4. Curtis AJ, Wolfe R, Russell COH, Costello AJ, Travis DG, Snow R, et al. Prioritizing patients for prostatectomy: Balancing clinical and psychosocial factors. *ANZ J Surg*. 2007;77(3):112–7.
5. May JH, Spangler WE, Strum DP, Vargas LG. The surgical scheduling problem: Current research and future opportunities. *Prod Oper Manag*. 2011;20(3):392–405.
6. Morris AM. Rational vs . Intuitive Judgment in Surgical Decision Making. 2016;264(6):887–8.
7. Dilaver NM, Gwilym BL, Preece R, Twine CP, Bosanquet DC. Systematic review and

- narrative synthesis of surgeons' perception of postoperative outcomes and risk. 2019;
8. Hall JC, Ellis C, Hamdorf J. Surgeons and cognitive processes. 2002;
 9. Xue W, Yan Z, Barnett R, Lee F, Liu R. Different dynamics of elective case cancellation for inpatient and outpatient in an academic center. *J Anesth Clin Res*. 2013;4(5).
 10. Erdogan SA, Gose A, Denton BT. Online appointment sequencing and scheduling. *IIE Trans (Institute Ind Eng)*. 2015;47(11):1267–86.
 11. Simon RW, Canacari EG. Surgical Scheduling: A Lean Approach to Process Improvement. *AORN J [Internet]*. 2014;99(1):147–59. Available from: <http://dx.doi.org/10.1016/j.aorn.2013.10.008>
 12. Derrett S, Cousins K, Gauld R. A messy reality: An analysis of New Zealand's elective surgery scoring system via media sources, 2000–2006. *Int J Health Plann Manage*. 2013;28(1):48–62.
 13. Doughty C, District C, Board H, Maccormick AD, Hider P, Kirk R. THE NEW ZEALAND. 2005;(May 2014).
 14. Ntembwa HK, Van Lerberghe W. Improving Health System Efficiency. *World Heal Organ WHO [Internet]*. 2015;1–28. Available from: (www.who.int/about/licensing/copyright_form/en/index.html)
 15. Pomey MP, Forest PG, Sanmartin C, DeCoster C, Clavel N, Warren E, et al. Toward systematic reviews to understand the determinants of wait time management success to help decision-makers and managers better manage wait times. *Implement Sci*. 2013;8(1):1–16.
 16. Ward PR, Rokkas P, Cenko C, Pulvirenti M, Dean N, Carney AS, et al. “Waiting for” and “waiting in” public and private hospitals: A qualitative study of patient trust in South Australia. *BMC Health Serv Res*. 2017;17(1):1–11.
 17. O'Dwyer AJ, Pridgeon S, Green JSA. Preventing ‘same-day’ cancellations in elective urological surgery: Are different strategies needed for inpatient, day case and procedural admissions? *J Clin Urol*. 2015;8(5):334–41.

18. Allin S, Hernández-Quevedo C, Masseria C. Measuring equity of access to health care. *Perform Meas Heal Syst Improv Exp Challenges Prospect*. 2010;51:187–221.
19. Kaddoum R, Fadlallah R, Hitti E, El-Jardali F, El Eid G. Causes of cancellations on the day of surgery at a Tertiary Teaching Hospital. *BMC Health Serv Res* [Internet]. 2016;16(1):1–8. Available from: <http://dx.doi.org/10.1186/s12913-016-1475-6>
20. Pandit JJ, Pandit M, Reynard JM. Understanding waiting lists as the matching of surgical capacity to demand: Are we wasting enough surgical time? *Anaesthesia*. 2010;65(6):625–40.
21. Pope C, Van Royen P, Baker R. Qualitative methods in research on healthcare quality. *Qual Saf Heal Care*. 2002;11(2):148–52.
22. Saunders M, Lewis P, Thornhill A. Chapter 4: Understanding research philosophy and approaches to theory development. *Research Methods for Business Students*. 2019. 128–171 p.
23. Morse JM. Analytic strategies and sample size. *Qual Health Res*. 2015;25(10):1317–8.
24. Bradley EH, Curry LA, Devers KJ. Qualitative data analysis for health services research: Developing taxonomy, themes, and theory. *Health Serv Res*. 2007;42(4):1758–72.
25. Raskind IG, Shelton RC, Comeau DL, Cooper HLF, Griffith DM, Kegler MC. A Review of Qualitative Data Analysis Practices in Health Education and Health Behavior Research. *Heal Educ Behav*. 2019;46(1):32–9.
26. Sylvania lopes pinheiro,Raisa ottes Vasconcelos,joao Lucas Campos,Deborah christina ignacio.Surgical cancellation rate.quality indicator at a public university hospital.vl 21 2017/07/01.
27. Melaku desta,Addasu manaye,Ablot terera,Negeso Gobena,Alemitu Wale.Incidence and causes of cancellations of elective operation on the intended day of surgery at a tertiary referral academic medical centre in Ethiopia(2018).Patient safety in surgery
28. Rafael Calegari, Flavio S. Fogliatto, Filipe R. Lucini, Michel J. Anzanello & Beatriz D. Schaan Surgery scheduling heuristic considering OR downstream and upstream facilities

and resources

BMC Health Services Research volume 20, Article number: 684 (2020)

29 Study .com How to Become a Surgery Scheduler: Education and Career Roadmap .Mar
05, 2020

30 Rafael Calegari, Flavio S. Fogliatto, Filipe R. Lucini, Michel J. Anzanello & Beatriz D.
Schaan

Surgery scheduling heuristic considering OR downstream and upstream facilities and
resources

BMC Health Services Research volume 20, Article number: 684 (2020)

31 Michelle S. Lee, BA1; Kristin N. Ray, MD, MS2; Ateev Mehrotra, MD, MPH1; et al

Primary Care Practitioners' Perceptions of Electronic Consult Systems A Qualitative
Analysis

June 2018.

ACTIVITY	JULY -SEPTEMBER	OCTOBER- JANUARY	JANUARY- MARCH	MARCH – APRIL	APRIL- MAY
PROPOSAL DEVELOPMENT	X				
ETHICAL APPROVAL		X	X		
DATA COLLECTION				X	
DATA ANALYSIS					X
PRESENTATION					

APPENDIX(A)

Table 6. Study Timeline /Time Frame

BUDGET ITEM	COST
Research KNH ERC	2,000
Statistician consultation fee	30,000
Stationery	5,000
Printing	5,000
Toner cartridge	4,000
Binding	4,000
Recorder	10000
Research assistants	20,000
Contingency	10,000

Total cost	90,000
------------	--------

Table 7. Study Budget

Ethical considerations

The study will begin following approval by the department of surgery, UON and KNH Ethics and Research Committee.

Data collected will be stored by the principal investigator under lock and key and those entered into the computer will be under password protection. No access will be given to anyone except the statistician for analysis. Data will be stored for up to 3 years after publication, thereafter it will be destroyed.

Data management (data entry, cleaning, storage, security and quality assurance, statistical analysis plans etc.) Auxiliary data will be collected from the elective lists and surgical scheduling books. The data will be initially coded based on the recurrent themes patterns and relationships through selective coding. The data coding will be done through qualitative data analysis software. The qualitative software ATLAS ti 6.0 is one of the tools I will utilize in analysis

APPENDIX 1

Consent Form

This informed consent has three sections

I. Information sheet (to share information about the research with you)

II. Certificate of consent (for signatures if you agree to take part)

III. Statement by the researcher

SECTION ONE: INFORMATION SHEET

Study title

AN APPRAISAL OF THE ELECTIVE SURGICAL SCHEDULING SYSTEM AT THE KENYATTA NATIONAL HOSPITAL

My name is Dr. Duncan Kimani Waweru. I am a postgraduate student at the University of Nairobi,

Department of Surgery. I am conducting a study on the processes and the chain of events that determine successful elective surgery procedures at the Kenyatta national hospital. This will encompass experience of seen in the out-patient clinics, surgical wards, operating theatres and wards for adult patients.

I am inviting you to participate in this study.

The purpose of this consent form is to enable you decide whether or not to participate in this exercise. I reiterate that you are free to participate in this study immediately or later upon reflection. You are free to consult any other party with whom you are comfortable regarding your participation.

The study has been approved by the KNH/UON Ethics and Research Committee and as per procedure has been assigned protocol number viz: _____.

The investigator or assistant investigator will be available to answer any questions that may arise in the course of filling out the consent form and/or thereafter.

If you agree to participate, you will be asked to provide personal information and other details with regard to your condition. All the information that is garnered will be kept confidential and no one apart from the investigators will access it. The information packet will be assigned a unique number and your name will not appear anywhere. There is no additional cost to participating in this study.

If you choose to take part in this study, it will be out of your own free will. You may withdraw your participation at any time without any consequence.

The participant's involvement in this research will be through an interview or questionnaire. The data collected will be used for research purposes only.

RISKS AND HARMS ASSOCIATED WITH THE STUDY:

No risk or harm will come to you by participating in this study. No personal information will be collected and data collected will remain anonymous and will not be traced back to you.

BENEFITS OF PARTICIPATING IN THIS STUDY:

The information you provide will help us better understand how to improve: our elective surgery scheduling and transition to successful surgery and follow-up, subsequent intervention will be done where indicated.

QUESTIONS AND CHOICES:

If you have any questions, you can contact the primary investigator on the phone number and email address provided on the bottom of this page, you are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of benefits.

APPENDIX 2.

Data collection procedures

Data will be collected using a structured questionnaire and will include:

DATA ABSTRACTION TOOL

Part 1: Demographic data

- 1. Outpatient clinic _____
- 2. Date _____
- 3. Department _____
- 4. Registrars specialty _____
- 5. Consultants department.....

Part 2: Pre-operative variables

1.Method of elective surgery scheduling data entry method utilized by the respondent

- 1.Open scheduling.....
- 2.Block scheduling.....
- 3.Modified block scheduling.....
- 4.Check bed system.....
- 5.Electronic scheduling system.....

6. Online scheduling system.....

7. Ad hoc.....

What is the experience of the health practitioner with the preferred scheduling method?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

3. Does the respondent view the elective surgery scheduling process in the respective department as efficient

.....

.....

.....

.....

.....

.....

4. According to the respondent where does the efficiencies or inefficiencies in the elective surgical booking system lie?

6. According to the respondent what is the optimum way to deliver efficient and just elective surgical services

.....

.....

.....

AN APPRAISAL OF THE ELECTIVE SURGICAL SCHEDULING SYSTEM AT THE KENYATTA NATIONAL HOSPITAL

COLLEGE OF HEALTH SCIENCES
P. O. Box 19676 - 00202 KNH
NAIROBI
TEL: 2722890 / 2726300, Ext. 43773

90% Confirmed
Kibung'u

Dr. M. K. Kibung'u

ORIGINALITY REPORT

9%

SIMILARITY INDEX

8%

INTERNET SOURCES

7%

PUBLICATIONS

4%

STUDENT PAPERS

PRIMARY SOURCES

1	implementationscience.biomedcentral.com Internet Source	2%
2	bmchealthservres.biomedcentral.com Internet Source	1%
3	www.omicsonline.org Internet Source	1%
4	Solans-Domènech, Maite, Paula Adam, Cristian Tebé, and Mireia Espallargues. "Developing a universal tool for the prioritization of patients waiting for elective surgery", Health Policy, 2013. Publication	1%
5	www.ncbi.nlm.nih.gov Internet Source	1%
6	erepository.uonbi.ac.ke:8080 Internet Source	1%
7	Submitted to University of Derby Student Paper	1%



UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

Ref: KNH-ERC/A/107

Dr. Duncan Kimani Waweru
Reg. No.H58/87755/2016
Dept.of Surgery
School of Medicine
College of Health Sciences
University of Nairobi

Dear Dr. Waweru

RESEARCH PROPOSAL – AN APPRAISAL OF THE ELECTIVE SURGICAL SCHEDULING SYSTEM AT THE KENYATTA NATIONAL HOSPITAL (P593/10/2020)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 23rd March 2021 – 22nd March 2022.

This approval is subject to compliance with the following requirements:



KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202

Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

23rd March 2021





UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC

Email: uonknh_erc@uonbi.ac.ke
Website: <http://www.erc.uonbi.ac.ke>
Facebook: <https://www.facebook.com/uonknh.erc>
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC



KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/107

23rd March 2021

Dr. Duncan Kimani Waweru
Reg. No.H58/87755/2016
Dept.of Surgery
School of Medicine
College of Health Sciences
University of Nairobi



Dear Dr. Waweru

RESEARCH PROPOSAL – AN APPRAISAL OF THE ELECTIVE SURGICAL SCHEDULING SYSTEM AT THE KENYATTA NATIONAL HOSPITAL (P593/10/2020)

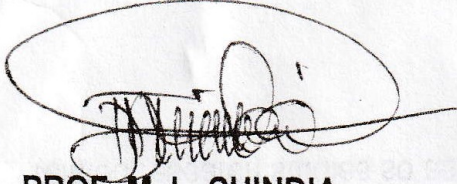
This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 23rd March 2021 – 22nd March 2022.

This approval is subject to compliance with the following requirements:

- a. Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- b. All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
- c. Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
- d. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
- e. Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
- f. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- g. Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,

A handwritten signature in black ink, enclosed in a large, hand-drawn oval. The signature is stylized and appears to read 'M. L. Chindia'.

PROF. M. L. CHINDIA
SECRETARY, KNH-UoN ERC

- c.c. The Principal, College of Health Sciences, UoN
 The Senior Director, CS, KNH
 The Chairperson, KNH- UoN ERC
 The Assistant Director, Health Information Dept, KNH
 The Dean, School of Medicine, UoN
 The Chair, Dept. of Surgery, UoN
Supervisors: Dr. Francis A.Owillah, Dept.of Surgery,UoN
 Dr. Michael Magoha, Dept. of Surgery, UoN



KENYATTA NATIONAL HOSPITAL
P. O. Box 20723, 00202 Nairobi

Tel: 2726300/2726450/2726550
Fax: 2725272
Email: knhadmin@knh.or.ke

Ref: **KNH/HOD/GEN-SURG/7/VOL.I**

Date: **7th April, 2021**

Dr. Duncan Waweru
Reg. No. H58/87755/2016
Dept of Surgery
College of Health Sciences
University of Nairobi

Dear Dr. Waweru

RE: APPROVAL TO COLLECT DATA FROM KNH GENERAL SURGERY DEPARTMENT

We acknowledge your request on the above, together with a study registration form and a KNH/UoN ERC approval letter on the study titled "**An appraisal of the elective surgical scheduling system at the Kenyatta National Hospital**".

Approval has been granted for you to collect data on the management of scheduling of elective surgery patients booked and reviewed at general surgery and subspeciality surgical clinics at Kenyatta National Hospital.

By a copy of this letter, SACN In-charge of General Surgery is informed and requested to facilitate.

Note, we would like you to forward a copy of the study report to the undersigned after completion of the study.

Dr. Alex Ndung'u

Aq. HOD GENERAL SURGERY

Copy to: SACN In-charge
General Surgery

