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Full Length Research Paper

Hospital Factors Influencing the Length of Preoperative Stay for Elective Adult Orthopeadic Patients in MOI Teaching and Referral Hospital, Eldoret, Kenya

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Abstract

The practice of elective surgery admission is pegged on the admission day after the consultation. In any hospital both the hospital and the patient contribute to the increase in the length of preoperative stay for elective adult orthopaedic patient. The objectives of the study were to; establish the mean length of preoperative stay for adult elective orthopaedic surgery cases; determine the association between hospital factors and the length of stay the study is significant to the hospital management and future research. A retrospective design was used to examine records of 636 adult orthopaedic patients of 14 years and above in MTRH between 1st January 2015 to 31st December 2015. This formed the target population from which with a sample size of 239 files was achieved through systematic sampling. The data collection instruments comprised documentary analysis and interviews. Data was then transcribed and coded and entered into SPSS where it was analysed using descriptive statistics and inferential statistics at 95 per cent confidence level with significance levels of 0.05. The findings show more males underwent the elective surgeries than females with a mean age being 40.6±19.2 years. There were more injuries that medical conditions, however, 62% of the injuries were concentrated on the lower limbs while arthritis was most common medical conditions. The mean waiting days for selective operative procedures was 12 days with the t – test results indicating that the need for blood transfusion increased the pre-operative by 6 days, implants increased the preoperative days by 4 days, laboratory test results increased the preoperative days by 4 days, while availability for theatre space for these patients inclusive of patients own specific factors increased the pre-operative days by 5 more days. The number of pre-operative days significantly relates with the following hospital factors: the requirements for implants, (χ^2 (5) = 18.837), need for blood transfusion(χ^2 (5) = 15.837), laboratory works (χ^2 (5) = 28.796), processing of blood request(χ^2 (5) = 46.655), availability of theatre space(χ^2 (5) = 30.023) and processing of implant request(χ^2 (5) = 72.520) significantly correlate with the number of preoperative days for the patient. The study findings therefore rejected all the null hypotheses. The study findings therefore conclude that hospital factors are the major determinants of the length of pre-operative stay. The study recommends that the hospital should improve its operations surrounding the surgery procedures.

Keywords: *Orthopeadic, surgery, preoperative, surgery, preoperative length of stay*

Introduction

Traditionally, the practice of elective surgery admission is that patient will be admitted to the ward on the day before surgery after the medical consultation from the outpatient clinic. Usually the date of admission to the operative unit will be planned quite in advance for ward admission. While the patient is admitted to the surgical unit, the medical or physiological condition may be changed (Augstin, 2014) globally an elective surgical operation provides time for the attending health team (surgeon, anaesthesiologist, nursing, laboratory, and operating room staff) to perform the necessary clinical and laboratory workup before an appropriate date and time are set for the procedure. The emotional and psychological effects following admission for elective surgery can be accentuated by delay of performance of the intended surgical intervention (Blasco *et al*., 2011). Delayed elective surgery may lead to increased morbidity and

mortality for the patient, but it may also result in high hospital costs given the prolonged hospital stay (Zoucas & Lydrup, 2014) According to the research done in a tertiary-care teaching public-sector hospital in the developing Jonnalagadda India identified a number of administrative and infrastructural hindrances to the timely performance of elective surgical procedures (Fung 2014).

In Africa, the majority of cancellations of elective surgical interventions were due to a shortage of beds, nurses, and recurrent supplies like linen (Chalya *et al.,* 2011). In a comparable setting, identified delays in surgical interventions in 81.4% of their series of 3,064 patients, which were due to a lack of operation theater space and facilities. This study further revealed that the availability of blood for use during the preoperative time is a key determinant for the timing of elective surgery. Bathla *et al,* (2012) have identified blood shortages as one of the causes of delayed elective surgery in Zambia. According to a research done at Mulago Hospital in Uganda, an elective surgical procedure will be delayed if the attending surgeon makes an order for blood to be used in the preoperative time. Additionally, the more blood that is ordered, the longer the patient has to wait for surgery (Kajja, 2014).

In Kenya, a number of factors come into play in determining the timing of an elective surgical intervention. According to a report carried on Performance Audit Report of the Auditor-General Specialized Healthcare Delivery at Kenyatta National Hospital (2014) it showed that the primary cause of the delays is the Hospital's lack of sufficient financial resources to acquire and maintain the equipment; physical facilities and human resources that it needs to deliver services efficiently due to two main reasons. Firstly, the Hospital does not receive sufficient amounts of annual grants from the Government to meet its operational and investment needs and secondly it does not manage its revenue collection function in an effective manner (Bernard, 2011). Surgery is a collective team effort of surgeons, anaesthesiologists, nurses and the paramedical staff and the delay in performing these procedures can be attributed to inept performance of these groups (Harders, 2014). Operating room delays can negatively impact patients directly, their family members and the staff. Most instances of delay are due to lack of appropriate planning or inadequate utilization of available resources. Preoperative delays are defined as delays due to system deficiencies in the operating room, which were classified in the error data base as failure of process which is delay and failure of equipment (Fung, 2014).

Preoperative delays hinder the optimal flow of patients and are a source of patient frustration. Several studies focused on multiple aspects of preoperative and Preoperative delays in performing the surgical procedures and tried to delineate the causes for operating room delays, so that effective interventions can be implemented to reduce these delays (Edgerbert, 2014). Minimization of these delays with effective intervention and planning can cut down the costs of operating rooms and increase the profit margin to the hospital some of the factors that has a significant impact on Preoperative delays is the delay in starting the first case of the day.

Delayed start for the first case of the day will have a ripple effect as the following cases get delayed which result in patient annoyance and disruption of operating room and staff schedules. Avoiding the delay in first case would not only be beneficial from a financial perspective but the quality of patient care, appropriate utilization of staff time and resources available are improved. This study focused exclusively on the delay in starting the first case each day in the operating rooms of Harrisburg hospital and Community general hospital (Fischman, 2012). The advisory committee has set the national bench mark of 59% for the number of first cases being wheeled in on time in each operating room.

This cut-off mark is for the hospitals who do not accept the 5-minute grace period policy and for those who have the 5-minute grace period policy the bench mark has been set at72%. In March 2009, the percentage of first cases being wheeled in on time was 13% in Harrisburg hospital and 6% in Community general. Both the hospitals were significantly below the appropriate marks set up by the advisory committee (Hahm, 2011). The intervention method designed to be used in the study was the lean six sigma approach Six sigma is a widely approved interventional strategy which was originally designed by Motorola in 1986. This approach measures quality in terms of defect rates and keeps the target error rate to less than 3.4 million opportunities. After its success, it has been applied in several different industries to improve the productivity and minimize the variability in outcomes. Six sigma process employs DMAIC (Define, Measure, Analyze, Improve, Control).

Reducing the length of stay releases capacity in the system but requires proactive planning of the whole process of care, as well as active discharge planning (Wong, 2011). You can achieve this by having a clear pathway of care or flow model through the system for particular conditions. LOS will release capacity in the system, including beds and staff time. A greater focus on treating day surgery (rather than inpatient surgery) as the norm could also release nearly half a million inpatient bed days each year. This increase in capacity will help to minimize waiting times, maximize productivity and improve the patient experience and satisfaction (Hyde, 2012).

The Department of Health (20011) has a clear vision for the future level of day surgery activity. The NHS states "Around three-quarters of operations will be carried out on a day case basis with no overnight stay required" (p. 19). In 1985 less than 15% of all elective surgery was undertaken on a day-case basis (NHS Management Executive Value for Money Unit 2001). Such a rapid change in surgical healthcare delivery over the past 20 years has ensured a major shift in medical and nursing surgical intervention. Patients increasingly spend considerably less time in hospital i.e. average length of stay in a day surgery facility within Europe is currently 6½

hours (Pfisterer*et al* 2001). Intermediate elective surgical episodes once requiring lengthy hospital admission are therefore fast disappearing, never to return as in-patient surgery (Daouid, 2013).

Typical preoperative interventions may be delivered by different disciplines and include interventions targeted at physiological optimization of the cardio-respiratory and musculoskeletal systems to mitigate the effects of general anaesthesia (eg, deep breathing exercises, inspiratory muscle training, exercise training, early mobilization or education aimed at promoting these behaviours both preoperatively and postoperatively). Preoperative interventions are also targeted at improving the patient's ability to cope with major surgery (eg, relaxation, goal setting/ counseling or education aimed at promoting these behaviours both preoperatively and postoperatively). These interventions typically have the goal of preventing or reducing postoperative complications in particular, postoperative pulmonary complications, which are associated with morbidity, mortality and prolonged hospital length of stay and hastening postoperative recovery (Boeke, 2012).

Although three systematic reviews have recently been published, which examine rehabilitation before major surgery, preoperative intervention (exercise and education) in abdominal and thoracic surgery and preoperative inspiratory muscle training they have all grouped multiple surgical populations together. It is possible that intervention effects vary by surgical specialties and it is therefore imperative that reviews focus on intervention effects in specific populations. Whenever there are delays in the operative treatment of patients, it is imperative that the surgical team explains the development to the patient. This not only allays the patient's anxiety, but also reduces the likelihood of litigation even when there are complications like joint stiffness, infections and death arising from such a delay (Calvin, 2011).

Delayed discharge or 'bed blocking' are terms used to describe the inappropriate occupancy of hospital beds. Delay in discharging surgical patients from hospital is a long-standing and common problem Delayed discharges have an impact on hospitals' ability to cut waiting lists and deliver healthcare effectively and efficiently. In acute care hospitals, prolonged length of stay (LOS) not only increases cost, but is also associated with increased rates of complications. LOS is being used to analyze surgical performance as part of efficiency drives and financial pressures have emphasized the importance of expeditious hospital discharge (Kajja, 2014). Identification of the barriers to timely discharge may help direct efforts towards reducing unnecessary hospital stay.

Length of stay for general surgical patients is influenced by many variables. These variables include direct and indirect medical influences such as waiting for investigations and making home arrangements. Despite a multidisciplinary approach to patient healthcare and discharge planning, it was anecdotally noted that surgical patients, particularly the elderly, under the care of one surgical team, were experiencing prolonged stays for reasons which were largely avoidable and not directly related to surgical activity (Miclau, 2012).

Promptness to operative surgical care falls short of the ideal. Theatre inefficiency is a major cause of delay in treating surgical patients in our environment. Theatre facilities should be expanded and made more efficient. There is a need for better communication between surgeons and patients about delays in surgical treatment. Healthcare expenditure is a serious concern, with escalating costs failing to meet the expectations of quality care. The treatment capacities are limited in a hospital setting and the operating rooms (ORs). Their optimal utilization is vital in efficient hospital management. Starting late means considerable wait time for staff, patients and waste of resources (Zoucas, 2014). We planned an audit to assess different perspectives of the residents in surgical specialties and anesthesia and OR staff nurses so as to know the causative factors of operative delay. This can help develop a practical model to decrease start time delays in operating room (ORs).

Patients undergoing procedures, receiving consultations or discharged within 24 hours of the documented time and date of the request or event, were deemed not to have encountered delay. All day case patients (admitted and discharged on same day) and patients who were still in hospital at the end of the 4 month period were excluded from the study (Zoucas, 2014). To facilitate accurate data collection on a busy surgical firm, an integral and dedicated team member, the foundation house officer, entered data daily for every patient onto a flow chart. The duration of the study and thus the number of patients included was based solely on the duration of attachment of the foundation house officer to the firm (Zyara, 2013).

Delays were divided into those that occurred pre- or post-discharge planning. Pre-discharge planning involves medical and nursing staff collectively predicting a date of discharge for each patient. In our unit, predicted date of discharge (PDD) is used to facilitate discharge arrangements for patients whom we anticipate on admission, are likely to require a hospital stay of over five days' duration (Miclau, 2011). Patients identified as having post-discharge planning delay were those who stayed in hospital beyond the date of discharge agreed by the Consultant and nursing staff.

Delays prior to discharge planning due to diagnostic/therapeutic procedures, waiting for consultant opinion (delay following referral for specialist opinion) or errors made by the team (e.g. failure to request in a timely manner a certain diagnostic test) were initially considered potential delays Fung and Cohen, (2011). The data on potential delays was then further assessed on an individual patient

basis by the Consultant and his team at point of discharge to determine whether the delays encountered would have made any impact on the LOS. Potential delays that directly influenced LOS were deemed definite and included in the final analysis. Potential delays regarded as having no impact on LOS were excluded (Zigmond & Snaith, 2013).

Delays due to care of the elderly (COTE) referral for elderly patients aged 65 years and over who required assessment as part of the discharge arrangements and continuing care were included in the analysis when the PDD was breached. COTE referrals are required when patients require discharge to community hospitals, as COTE teams are responsible for the continued care of in-patients in those hospitals Chalya, *et al*, (2011). All such referrals were done as part of multidisciplinary approach and are sent immediately following the decision on PDD. Data was analyzed for total LOS, median LOS, days lost due to delays and factors causing delays.

General objective is to determine the hospital factors that influences of preoperative factors on the length of preoperative stay for elective adult orthopaedic patients in Moi teaching and referral hospital- Eldoret and the specific objective is to establish the relationship between hospital factors and the length of stay

Materials and methods

Study Site

The study was conducted in Moi Teaching and Referral Hospital which is located in Western region of Kenya in Eldoret town, Uasin Gishu district, Rift Valley province. It is about 320 Km North West of Nairobi. This area was selected because of dearth of similar studies and the hospital is believed to give a wide and varied view of the problem under study

Research Design

The study employed a retrospective design. Data was collected on individual characteristics, factors that cause delays, alongside information about the outcome and use of patients' records extracted from MTRH record and data base. In this way, cross-sectional studies provide a 'snapshot' of the outcome and the characteristics associated with it, at a specific point in time. (Orodho, 2003).

Target Population

The study targeted records from adult male and female orthopaedic patients 14 years and above admitted for elective surgeries from1st January 2015 to 31th December 2015 at MTRH. During the period under review, there were 636 orthopaedic patients who attended MTRH for elective orthopaedic surgeries and their records were used as the target population (Health Records Department, MTRH, 2015)

Inclusion and Exclusion Criteria

The study targeted patients14 years and above who were admitted for elective orthopaedic surgery and whose records were available at the Health Records Department of MTRH. The records of patients below 14 years were excluded from the study because their records were not available in the same library with the adults records but rather in the paediatric library where children records are kept. Records with incomplete data that could not help in making a decision were also excluded.

Sample and Sampling Procedures

Kothari (2004) define a sample as part of the target population that has been procedural selected to represent it. Sampling is the process of systematically selecting representative elements of a population. The sample size of the study was calculated using the formula below as recommended by Fisher *et al* (2011) During this period there were 636 orthopaedic patients who attended MTRH for elective surgeries and their records will be used as the target population (Health Records Department, MTRH, 2015)

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

Where;

nf = Sample size (when the population is less than 10,000).
n = Sample size (when the population is more than 10,000); 384.
N = Estimate of the population size; 636

384
1+ 384/636

Sample size for the respondents = 239

The desired sample size for the study was 239 respondents. The most appropriate sampling design used by the study was systematic design which involves drawing every nth element in the population starting with a randomly chosen element between 1 and n. The researcher drew a random number from 1 to 10 and then calculated the quotient of $639/239 = 3$ as the nth number. The random

picked is then used to pick the first number in the files and then picked the 3th number from the 639 until the desired sample size of 239 is attained.

Research instruments
The study used two instruments; document analysis and interviews.

Document analysis
Since the nature of variable in question are secondary in nature, the study used document analysis. Documentary secondary data are often used in research projects that also use primary data collection methods. Documentary secondary data include written materials such as notices, reports, minutes, books and journals, correspondence (including emails), minutes of meetings, diaries, administrative and public records as well as organizations' databases (Saunders *et al*., 2009). The study used patients' records which served as the administrative records used in the management of patients during the hospital stay. A data sheet is a conducive tool for collecting secondary sources of data because it allowed the researcher to retrospectively collect data from documented secondary source. This included the patients' factors and hospital factors related to the patient that have been recorded in their files.

Interviews
Interviews are the primary source of data was carried out on l heads of the orthopedic department. In the case of interviews, the researcher forwarded a list of predetermined questions to the respondents personally during the data collection period.

Validity and reliability of the instruments
Validity addresses the critical issue of the relationship between a concept and its measurement (Depoy & Gitlin, 2011) and is also concerned with the issue of the authenticity of the cause-and-effect relationships (internal validity), and their generalizability to the external environment (external validity) (Sekaran & Bougie, 2010). Reliability is an indication of the stability and consistency with which the instrument measures the concept and helps to assess the goodness of a measure. Reliability indicates the extent to which it is without bias (error free) and hence ensures consistent measurement across time and across the various items (Sekaran & Bougie, 2010).

Data Collection Procedure
After the researcher had acquired an authorization letter from the University, the researcher then sought permission from the IREC to collect data from MTRH. Once the permission was granted, the researcher visited the health records department, MTRH and viewed a sample record to assist amend the research instrument on the exact kind of data that was required. Once the instrument is amended, the 239 records were selected and issued to the researcher to summarize the hospital and patients' factors of the selected records. Once this had been done, the researcher then with the aid of two research assistants filled in the data sheet and coded the information on excel. Later this information was exported to SPSS for analysis. This coding of the secondary sources of information took about 3 working days every day from 8: 00 AM to 5:00 PM and was done by the researcher herself.

Data analysis procedures
Once data has been coded, the researcher principally analysed the data using descriptive and inferential statistics. Descriptive analysis is the elementary transformation of data in a way that describes the basic characteristics such as central tendency, distribution, and variability. Nominal and ordinal scaled data were analyzed using frequency table proportion (percentages) mode or frequency distribution while interval and ratio scaled data were analyzed using measures of central tendencies such as means, and measures of dispersion such skewness, standard deviation statistics (Zikmund *et al*., 2010; Depoy & Gitlin 2011). Once the descriptive analysis had been done, the information was presented through various ways such as tabular format, bar charts, frequency tables and frequency distribution tables.

Inferential statistics uses a random data samples to describe and make inferences about the population and is valuable when it is not convenient or possible to examine each member of an entire population (Garson, 2013). The study used the following inferential statistics: t – test and correlation. An independent samples t-test tests for any significant differences in the means for two groups in the variable of interest and is appropriate when the researcher has a single interval dependent variable and a dichotomous independent variable. The t-test may be used to compare the means of a criterion variable for two independent samples (Garson, 2013). A correlation coefficient is a statistical measure of covariance, or association between two variables which indicates both the magnitude of the linear relationship and the direction of that relationship. Partial correlation highlights the relationship between two variables while holding the other effects constant (Coopers & Schindler, 2014).

Ethical Issues
The study was conducted after academic approval by the school of graduate students, Institutional Research and Ethic Committee of Masinde Muliro University of Science and Technology and Moi University. Permission to carry out the study was obtained from the hospital management and health Records department before the commencement of data collection. Patients file was handled with

confidentiality throughout the study with only authorized persons being allowed to access and handle these files. The results obtained were kept safely and with confidentiality maintained.

Results

Socio-demographic information

Table 1. Socio-demographic characteristics of respondents

Variable	Categories	N	%
Age group in years	14 – 19	22	10.2
	20 – 29	54	25.2
	30 – 39	48	22.3
	40 – 49	30	13.9
	50 – 59	17	7.9
	>=60	44	20.5
	Total	**215**	**100.0**
Mean age in years	Mean±SD (Range)	40.6±19.2 (14 – 89)	
Gender	Male	154	71.6
	Female	61	28.4
	Total	**215**	**100.0**
Marital status	Minors	8	3.7
	Single	59	27.4
	Married	133	61.9
	Divorced/Separated	4	1.9
	Widowed	11	5.1
	Total	**215**	**100.0**
Household size	1 – 3	33	16.2
	4 – 6	81	39.7
	7 – 9	64	31.4
	10 – 12	19	9.3
	>=13	7	3.4
	Total	**204**	**100.0**
Mean household size	Mean±SD (Range)	6.3±2.9 (1 – 19)	

Source: Survey Data (2016)

Nature of ailments

Table 2. Patient condition requiring orthopedic surgery

Variable	Categories	Frequency	%
Nature of ailment	Injury	177	83.5
	Condition	35	16.5
	Total	**212**	**100.0**
Type on injury	Neck - Clavical	2	1.1
	Upper limb - Shoulder scaphoid	6	3.4
	Upper limb - humerus/elbow	17	9.6
	Upper limb - Radius/ulna	14	7.9
	Upper limb - Hand	6	3.4
	Spine - Discs	2	1.1
	Pelvis - acetabulum	10	5.6
	Hip - trochanteric	10	5.6
	Lower limb - Femur	55	30.9
	Lower limb - knee patella/condylar	9	5.1
	Lower limb - tibia/fibular	34	19.1
	Lower limb - foot	13	7.3
	Total	**178**	**100.0**
Medical condition	Diabetes	1	2.9
	Inflammation sepsis	7	20.6
	Ailment cancer/tumour	7	20.6
	Arthritis	9	26.5

	Implant associated problems	4	11.8
	Cellulitis	1	2.9
	Osteomyelitis	3	8.8
	Aesthetics granulation/ rectification	2	5.9
	Total	**34**	**100.0**

Source: Survey data (2016)

Hospital factors

Table 3. Hospital factors

Variable	Category	F	%
Reasons for delay in X-raying	Finance	68	31.8
	Faulty machine	6	2.8
	others	84	39.3
	Finance and faulty machine	3	1.4
	No reason	53	24.8
	Total	**214**	**100**
Laboratory blood test	Normal	177	82.7
	Abnormal	37	17.3
	Total	**214**	**100.0**
Availability of theatre space	Yes	134	62.6
	No	80	37.4
	Total	**214**	**100.0**
Hospital equipment	Autoclave	214	100.00
	Image Intensifier	214	100.00
	Laundry machine	214	100.00
	Other equipment	214	100.00

Source: Survey data (2016)

Table 4. Delays in implant and x-ray request

Variable	Category	F	%
Delay in number of days for X – ray request processing	0 days	201	93.9
	1 to 3 days	3	1.4
	4 to 6 days	6	2.8
	7 to 9 days	0	0
	Above 10 days	3	1.4
Mean days in delays	Mean±SD (Range)	0.40±2.00 (0 – 22)	
Delay in number of days for implant request processing	0 days	94	43.9
	1 to 7 days	70	32.7
	8 to 14 days	30	14.0
	15 to 21 days	7	3.2
	Above 22 days	13	6.1
Mean days in delays	Mean±SD (Range)	5.60±10.50 (0 – 99)	
Delay in number of days for blood request processing	0 days	190	88.8
	1 to 3 days	7	3.2
	4 to 6 days	9	4.2
	7 to 9 days	3	1.4
	10 to 12 days	4	1.9
	Above 13 days	1	0.5
Mean days in delays	Mean±SD (Range)	0.93±5.13 (0 – 69)	

Source: Survey data (2016)

Table 5. Mean number of days for elective operative procedures

Variable	Category	F	%
Delay in number of days for elective operative procedures	1 to 7 days	95	44.4
	8 to 14 days	54	25.2
	15 to 21 days	33	15.4
	22 to 28 days	17	8.0
	29 to 35 days	7	3.3
	Above 36 days	8	3.7
Mean days for operations	Mean±SD (Range)	12.17±13.78 (1 – 125)	
Mean days for operating injury	Mean±SD (Range)	12.73±13.89 (1 – 125)	
Mean days for operating medical conditions	Mean±SD (Range)	9.26±13.08 (1 –58)	

Source: Survey data (2016)

Table 6. T – test results

T – test for blood transfusion						
Group	**Obs**	**Mean**	**[95% Conf. Interval]**		**t – test**	**P values**
Required blood	46	16.91	12.67	21.15	2.674	0.0040
Did not require	168	10.87	8.83	12.91		
Degrees of freedom = 212						
T – test statistics on the implant requirement						
Group	**Obs**	**Mean**	**[95% Conf. Interval]**		**t – test**	**P values**
Implant required	152	13.45	11.25	15.72	2.158	0.0161
Not required	62	9.02	5.85	12.18		
Degrees of freedom = 212						
T – test statistic on blood works						
Group	**Obs**	**Mean**	**[95% Conf. Interval]**		**t – test**	**P values**
Normal	177	10.69	8.73	12.66	3.5115	0.0003
Abnormal	37	19.22	14.44	23.99		
Degrees of freedom = 212						
T – test statistic on the availability of theatre space						
Group	**Obs**	**Mean**	**[95% Conf. Interval]**		**t – test**	**P values**
Space available	134	10.14	7.67	12.62	2.8303	0.0025
Not available	80	15.56	12.93	18.19		
Degrees of freedom = 212						

Source: Survey data (2016)

Table 7. T – test results

T – test for blood transfusion						
Group	**Obs**	**Mean**	**[95% Conf. Interval]**		**t – test**	**P values**
Required blood	46	16.91	12.67	21.15	2.674	0.0040
Did not require	168	10.87	8.83	12.91		
Degrees of freedom = 212						
T – test statistics on the implant requirement						
Group	**Obs**	**Mean**	**[95% Conf. Interval]**		**t – test**	**P values**
Implant required	152	13.45	11.25	15.72	2.158	0.0161
Not required	62	9.02	5.85	12.18		

Degrees of freedom = 212						
T – test statistic on blood works						
Group	**Obs**	**Mean**	**[95% Conf. Interval]**		**t – test**	**P values**
Normal	177	10.69	8.73	12.66	3.5115	0.0003
Abnormal	37	19.22	14.44	23.99		
Degrees of freedom = 212						
T – test statistic on the availability of theatre space						
Group	**Obs**	**Mean**	**[95% Conf. Interval]**		**t – test**	**P values**
Space available	134	10.14	7.67	12.62	2.8303	0.0025
Not available	80	15.56	12.93	18.19		
Degrees of freedom = 212						

Source: Survey data (2016)

Table 8. Chi-square – Hospital factors relationships

Days taken by implant request	**Value**	**df**	**p-value**	Effect
Pearson χ^2	72.520	20	.000	Effect
Likelihood Ratio	69.581	20	.000	significant
Linear-by-Linear Association	24.169	1	.000	
Days taken by blood request				
Pearson χ^2	46.655	25	.005	Effect
Likelihood Ratio	42.991	25	.014	significant
Linear-by-Linear Association	17.443	1	.000	
Theatre space availability				
Pearson χ^2	30.023	5	.000	Effect
Likelihood Ratio	30.689	5	.000	significant
Linear-by-Linear Association	11.805	1	.001	
Laboratory works				
Pearson χ^2	28.796	5	.000	Effect
Likelihood Ratio	31.437	5	.000	significant
Linear-by-Linear Association	20.553	1	.000	
Days for X-ray request processing				
Pearson χ^2	22.830	15	.088	No effect
Likelihood Ratio	18.598	15	.233	
Linear-by-Linear Association	10.564	1	.001	

Conclusion

Determination of relationship between hospital factors and the length of stay

The findings show that laboratory works, χ^2 (5) = 28.796, (p< 0.05), processing of blood request, χ^2 (5) = 46.655, (p< 0.05), availability of theatre space, χ^2 (5) = 30.023, (p< 0.05) and processing of implant request, χ^2 (5) = 72.520 (p< 0.05) significantly correlate with with the number of preoperative days for the patient.

H_{03}: There is no relationship between hospital factors and length of stay

The study findings therefore reject the null hypothesis that there is no relationship between hospital factors and length of stay. Hospital factors such as laboratory works, X-ray request days, blood request days, implant request days and availability of theatre space significantly and positively correlate with number of preoperative days.

Recommendations

Based on the findings, the study recommends that the hospital should seek ways to improve on service delivery by improving its facilities such as blood transfusion services, stock or avail the implants on times, reduce the times for X-ray request times and may other critical services that may impede service provision at the hospital. The study findings show that the hospital related factors significantly determine the length of the preoperative days. Factors such as request for blood and implants, laboratory works, availability of theatre space are controllable and thus can be improved upon. The study was limited to the length of the preoperative

stay at the hospital, there are other factors that could affect the length of the preoperative stay therefore other study could investigate those factors.

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