FACTORS ASSOCIATED WITH ELECTIVE SURGERY PATIENT CANCELLATION IN ESWATINI

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ABSTRACT

Elective surgical patient cancellation is a widespread health challenge, with resultant poor patient outcomes. This study assessed the prevalence of elective surgical procedure cancellation in three (3) Hospitals in Eswatini, which were obtained through cluster sampling. A quantitative descriptive correlational design was used. Data were collected from 344 participants booked for elective surgery. Data were analyzed using descriptive statistics, Pearson's Correlation, and Chi-square. The mean age of the participants was 32.7 years and ± 3.04 years standard deviation. Seventeen percent (17.4%, n= 60) of the participants had surgery cancelled. The 17.4% prevalence of elective surgery cancellation exceeded international baseline of theatre efficiency measure of less than 5%. Most participants were booked for orthopedics (31.1% n=107) and general surgery (22.7%, n=78). The findings revealed that most cancelled participants were in advanced age and had more co-morbidities compared to younger participants (r=0.457, p= 0.001).There was an association between gender and surgery cancelation (X^2=5.397, p=0.023) indicating that gender contributed to cancellation. More males (23%, n=33) had elective surgical procedure cancelled compared to females (13%, n = 27). The majority (83.3% (n = 50) of cancellations were a result of avoidable factors. Furthermore, 37% (n= 22) of cancellations were a result of facility-related, 23% (n=14) patient-related, 20% (n=12) surgeon–related, and 20% (n=12) anaesthesia-related factors. The introduction of pre-operative clinics by the Ministry of Health in all health facilities of Eswatini performing surgeriesis imperative.

Key words: Elective surgery, Cancellation, Optimization, Avoidable, Unavoidable.

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INTRODUCTION

Surgical patient cancellation is a widespread health challenge, with resultant poor patient outcomes. Patients whose surgical procedure is cancelled are more likely to have prolonged hospital stay, increasing the risk of developing complications and contracting nosocomial infections with increased hospital bill. The Lancet Commission on Global Surgery 2030 which aids at achieving Sustainable Developmental Goals (SDGs) was adopted in September 2015 by United Nations advocates for improved and affordable, safe anaesthesia and timely surgery (Meara, Leather, Hagander, Alkire, Alonso, & Ameh, 2015) . Despite the global efforts to improve management of surgical patients, surgical patient cancellation is a long standing worldwide problem for health care institutions (Dimitridis & Evgeniou, 2013; Shiferaw, 2016). Surgical patient cancellation globally, accounts for five (5) billion people who are unable to access safe, affordable and timely surgery (Meara, et al., 2015).

Cancellation of surgeries on the scheduled day of operation is a documented problem worldwide and a known quality problem in healthcare systems (Dimitridis & Evgeniou, 2013; Desta, Manaye, Tefera, Worku, Mebrat, & Gobena, 2018; Shiferaw, 2016). Most health facilities in developed countries invest considerable resources in maintaining operating theatres and having surgeons and theatre staff available on an agreed schedule (Chalya, Gilyoma, Mabula, Simbila, Ngayomela, Chandika, & Mahalu, 2012). In Africa on the contrary, where resources are always limited elective surgical procedure cancellation on the day of surgery is common due to both avoidable and unavoidable factors. Avoidable factors are issues such as scheduling errors, equipment shortages, list overrun, patient non-appearance and inadequate preoperative evaluation. Unavoidable factors are elements such as emergency case superseding the elective schedule, and unexpected changes in the patient's medical status (Kaddoum, Fadlallah, & Hitti, 2016). The cancellation of elective surgery has negative implications on the health care team, health facility, patient, family, and country's economy. When a surgical procedure is cancelled the health care team's time is wasted, their effectiveness is decreased which negatively impacts their productivity and the country's economy (Kaddoum, et al, 2016). There may be instances where the health care team remains idle because the elective surgical patient's procedure has been cancelled. The patient who returns to the ward following surgical procedure cancellation increases the ward health care team's workload and institutional resources utilized on him or her (Kajja & Sibinga 2013).

Consequently, the patient's risk of contracting nosocomial infection and developing complications and risk for mortality is increased (Kierans, et al, 2013). In some instances, patients who develop complications will require to be referred to neighboring countries such as South Africa and Mozambique through Government funding and this increases the economic burden on the country. The patient whose surgical procedure has been cancelled is negatively affected physiologically, emotionally, psychologically and socially and may develop stress related disorders accompanied by poor patient outcomes (Azari-Rad, Yontef, Aleman & Urbach, 2013). Mutwali et al. (2016) reported that elective surgery cancellation created financial burden associated with extended hospital stay, repetition of pre-operative preparations as well as increased lost time

at work and reduced family income. Furthermore, the patient exposed to prolonged hospitalization may have limited chances of promotion at work with resultant poverty in the family.

In accordance with Mutwali (2016), cancellation of surgery may prolong the post-operative rehabilitation period and could lead to fear and loss of trust and confidence in the health care system. However, there is limited literature in Eswatini of factors associated with elective surgical procedure cancellation, thus the current study. Internationally, surgery is considered the heart of many theatres as it generates a substantial part of the health facility revenue (World Health Organization, 2017). Day of surgery cancellations have consequences in both high and low income countries (Meara et al., 2015). A study conducted retrospectively in two (Dimitridis & Evgeniou, 2013) hospitals in the United Kingdom, revealed that surgery cancellation was associated with loss of revenue and waste of resources, as well as significant psychological, social and financial implications for the patients and their families (Kaddoum, Fadlallah, & Hitti, 2016).

In the African continent surgery cancellation rates are still high compared to most hospitals in the developed world (Shiferaw, 2016). Hence, the need for the health care team to put more effort in cost-effectiveness in every aspect of patient care. A retrospective study conducted in Kamazu Hospital Lilongwe, Malawi, revealed that low and middle income countries especially in Africa had a lopsided share of global disease burden and struggled to provide care with the limited resources. The study concluded that 84.8% of their 44.2% cancelled surgical patients was resultant of infrastructural limitations (Prin, Eaton, Mtalimanja, Charle, 2018). In the current study, it is unknown if infrastructure issues have any effect on surgical patient cancellation in Eswatini. However, since Malawi and Eswatini are both in the African region, these countries are likely to share many similar challenges.

A study conducted in Nigeria (Okeke, 2018) reported the issue of brain drain as critical in the Africa region which contributed to surgical patient cancellation. The migration of health professionals to European countries placed an intolerable burden on the public health system. In Eswatini however, brain drain of health professionals is overwhelming, currently the doctor to patient ratio is 10: 10000 which means that one doctor is responsible for 1000 patients (Magagula, 2017). Brain drain in Eswatini was found to be associated with poor working conditions, and discontentment of the medical professionals (Magagula, 2017).

The Sub-Saharan region is one area singled out as having the greatest unmet surgical needs globally (Grimes, Law, Borgstein, Mkandawire, & Lavy, 2012). A prospective study was conducted in a teaching hospital on the incidence, cost, and emotional impact of elective surgical procedure cancellation in Burkino Faso, West Africa (Lankoande, Bonkoungou, Ki, Kabore, Ouangre, & Salvadogo, 2017). The findings showed that 60% of the cancelled elective procedures were rescheduled and the average waiting time for these patients was three (3) weeks, additional 10% of cases were cancelled more than once. Having a patient to wait for surgery for such a period is likely to increase the risk of developing complications. In the worse scenario, life could be lost whilst waiting for surgery (Lankoande et al., 2017). Another study conducted in Pietersburg, South Africa, reported that people who suffered most were those of low income, because they depended entirely on the public health services for their healthcare needs (Bhuiyan, Mahvungu, &

Machowoski, 2017). In Eswatini, the majority of the population depends on subsidized government funding in the health sector which caters for approximately 63% of Swazis who live below poverty line (Magagula, 2017). Moreover, the situation is complicated by the high levels of trauma, cancers, HIV and TB in Eswatini. Trauma is a leading cause for admission in all regional hospitals and for patients who require a surgical procedure (WHO, 2018; Magagula, 2017).

In Eswatini there are very few specialists. The limited specialist may be related to economic constraints which restrict the number of general medical practitioners that are sent for speciality training, Moreover, specialty education in the medical field is offered beyond the borders, which makes it even more expensive for Eswatini Government. On the other hand, medical specialist who complete training and work in public sector tend to leave for greener pastures, because working conditions under Government sector are usually not attractive (Magagula, 2017). Despite the magnitude of the problem, there is scarcity of studies which investigate elective surgical patient cancellation in the Kingdom of Eswatini, hence this study was conducted.

This study investigated factors associated with elective surgical procedure cancellation in Eswatini. There were four (4) objectives of the study, which were to: assess the prevalence of elective surgical procedure cancellation; establish patient-related factors associated with cancellation of elective surgical patients; identify health facility-related factors associated with cancellation of elective surgical procedure; and examine the relationship between factors (patient-related, health facility-related) associated with cancellation of elective surgical patients on the day of surgery in Eswatini.

MATERIALS AND METHODS

This study used the quantitative research approach. The study was conducted in Government institutions comprising of one (1) national referral hospital and two (2) regional, which were obtained through cluster sampling. The sample size was computed based on Lipsey (2013) predetermined sample size. Using study power of 0.82, $p \leq 0.05$, effect size = 0.20 the sample size was 344 participants. All patients scheduled for elective surgery during the study period were included in the study. A questionnaire developed by the investigator from literature based on the research objectives was used to collect data. To ascertain reliability the data collection tool was pretested on 45 participants in a regional hospital (Piggs Peak Government Hospital) which was not included in the main study. The Cronbach's Alpha from the pretest on the four (4) factors (patient, facility, surgeon, anesthetist-related) was 0.515, suggesting that the items had relatively moderate internal consistency. Since the data collection tool was used for the first time during the study, the investigator gave the tool to a surgical expert at the Mbabane Government Hospital and the research supervisor at the University of Eswatini, to review it for content and face validity.

Data were entered into the Statistical Package of Social Sciences (SPSS) version 20. The data were analyzed using descriptive statistics, and inferential statistics (Pearson's Correlations Coefficient and Chi-

square). Ethical clearance was sought and obtained from the National Human and Health Research Review Board (NHHRRB 00523/19). In addition, permission was sought from the health facilities' management and participants where the pretesting and main study data collection was done. All the three (3) ethical principles for research which are respect for persons, justice and beneficence were adhered to in the study.

RESULTS

Socio-demographics characteristics

The majority of the study participants were females. Fifty eight percent (58.4%, n=201) were females and only 41.6% (n=143) were males. Most (21.8%, n = 75) participants reported that they were aged between 31 – 40 years. The mean age of the participants was 33 years and ± 3.0 years was the standard deviation. The majority (29.1% n=100) of participants reported that they had secondary school education. Participants who resided in rural areas were the majority (70.9% n=244) in the study, and 29.1% (n=100) reported that they resided in urban areas. Most (65.7% n=226) participants were in ASA II of the American Society of Anesthesiology Classification. The majority (31.1% n=107) of participants were scheduled for orthopedics. The sample socio-demographic data is summarized in Table 1.

Table 1: *The socio-demographic characteristics of participants (N=344)*

Characteristic	Frequency/Mean	Percentage (%)/ SD
Gender		
Male	143	41.4
Female	201	58.6
Age	33	3.0
Level of education		
No education	30	8.7
Primary	83	24.1
Secondary	100	29.1
High school	78	22.7
Tertiary	25	7.3
Not started school(under 5 year-olds)	28	8.1
Place of residence		
Rural	244	70.9
Urban	100	29.1
ASA Classification		
I	77	22.4
II	226	65.7
III	39	11.3
IV	2	0.6
Type of surgery		
General surgery	78	22.7
Neurology	10	2.9
Urology	6	1.7
Obstetrics	53	15.4
ENT	23	6.7
Maxilo-facial	5	1.5
Ophthalmology	4	1.2
Gynecology	58	16.9
Orthopedics	107	31.1

Associations between socio-demographic data

The data supported an association between age and level of education (r=0.423, p= 0.001). Younger participants were more likely to have higher educational level (α = 0.05) compared to older participants. There was a relationship between age and place of residence (r=-0.106, p=0.049), which indicated that younger participants were most likely to reside in rural settings (α = 0.05) than older participants.

The study further showed an association between age and ASA (r=0.457, p= 0.001), which meant that older participants were most likely to have a higher ASA classification, that is, they had more comorbidities. There was a relationship between age and surgery performance (r=0.156, p=0.004). Younger participants were most likely to have their surgery performed compared to older participants. There was an association between ASA classification and level of education (r=-0.158, p=0.003), reflecting that participants with lower ASA classification were most likely to have higher educational level. The identified associations between socio-demographic variables are presented in Table 2.

Table 2. *Associations between socio-demographic variables of participants (N = 344)*

Variables	**Pearson's Correlation (*r*)**	***p*-value ≤ 0.05**
Age and level of education	-0.423	0.001**
Age and place of residence	-0.106	0.049*
Age and ASA classification	0.457	0.001**
Age and surgery performance	0.156	0.004*
Level of education and surgery performance	-0.114	0.034*
Place of residence and level of education	0.300	0.001**
ASA classification and level of education	-0.158	0.003**

Cancellation of elective surgery

Cancellation of elective surgery was the study's dependent variable. Out of all (100%, n = 344) the participants, 17.4% (n= 60) had their surgical procedures cancelled and 82.6% (n=284) had their surgical procedures performed. Most participants whose elective surgical procedure was cancelled were senior citizens. Twenty three percent (23.4%, n=14) of the participants cancelled were aged 61 years and above.

Moreover, participants whose elective surgical procedure was cancelled were males. Fifty five percent (55%, n=33) of male participants had their surgical procedure cancelled, whilst only 45% (n = 27) females were cancelled. The majority of cancelled participants were in ASA II classification. The majority (38.3%, n=23) participants with cancelled elective surgery had secondary education. The surgical specialty with most cancelled participants for elective surgery was general surgery (35%, n=21).

Associations between surgical procedure cancellation variables

The data revealed that 55% (n =33) of males had their surgical procedure cancelled compared to 45% (n =27) females (X^2=5.395, p= 0.020). The current study findings revealed an association between avoidable and unavoidable surgical factors and elective surgery cancellation (X^2=344, p=0.001). The 60 out of 344 participants in the study who had their surgical procedure cancelled provide enough evidence to conclude that avoidable and unavoidable factors cause elective surgical procedure cancellation. Eighty three percent (83.3%, n = 50) participants whose surgical procedure was cancelled was related to avoidable factors and 18.7% (n =10) were related to unavoidable factors.

Independent variable (factors)

Facility-related factors: The study revealed that a majority of participants whose surgeries were cancelled was because of facility time constraints (40.9%, n=9).

Patient-related factors: The most common reasons reported for surgical procedure cancellation were change in patient medical status (21.4%, n=3) related to co-morbidities, patient not showing up on the day of surgery (21.4% n=3), and not consenting (21.4%, n=3).

Surgeon-related factors: A majority (33.3%, n=4) of participants were cancelled due to lack of time in the surgeon. An equivalent proportion (25.5%, n=3) had the elective surgical procedure cancelled because they needed further evaluation and the unavailability of the surgeon, respectively.

Anaesthesia-related factors

Forty one percent (41.7%, n=5) of the participants has abnormal test results, another 41.7% (n=5) were not optimized for surgery hence they had their elective surgical procedures cancelled.

Summary of independent variable

The study findings revealed that facility-related factors were the most (37%, n=22) frequent cause for elective surgery cancellation, followed by patient-related factors (23%, n=14). An equal proportion (20%, n=12) accounted for surgeon-related and anaesthesia-related factors, respectively, that contributed to cancellation of surgical procedure. A summary of the independent variables (patient-related, surgeon-related, facility-related and anaesthesia-related factors) is graphed in Figure 1.

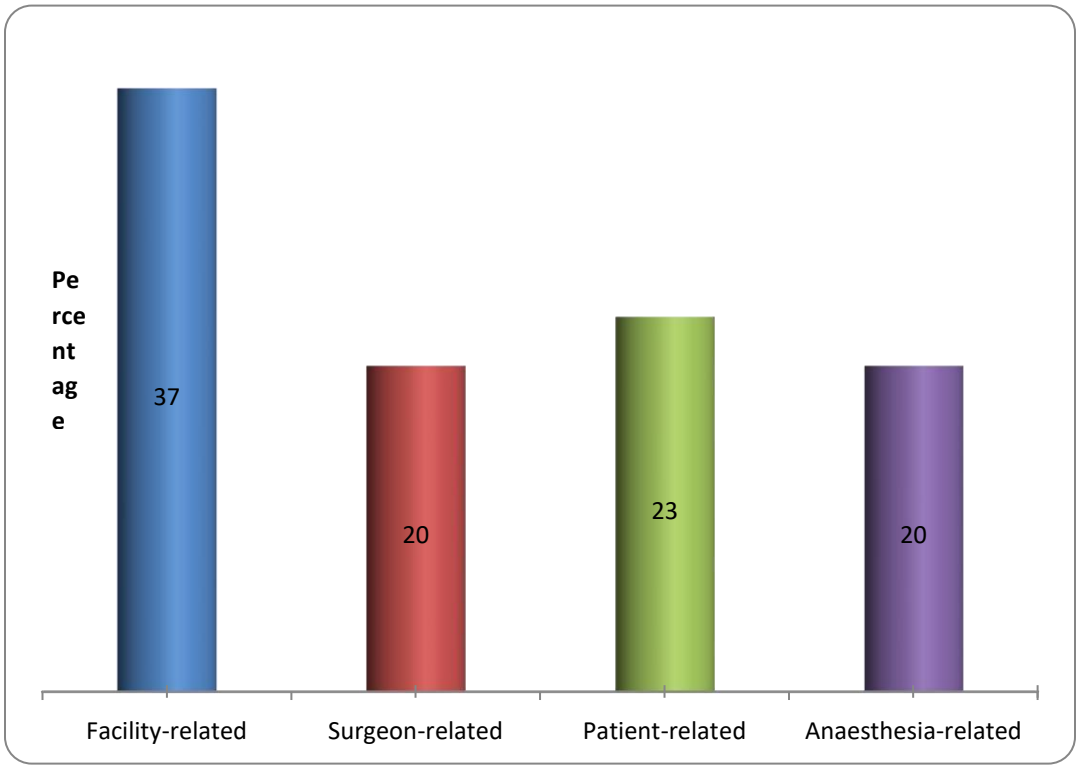

Figure 1: Factors related to surgical procedure cancellation (n = 60).

Analysis of association between independent and dependent variable

The data supported an association between patient-related factors and surgical procedure cancellation (X^2= 47.105, p=0.001). The 14 participants out of 60 participants who were cancelled because of patient–related factors provide enough evidence to conclude that patient-related factors cause elective surgical procedure cancellation.

There was a significant relationship between facility-related factors and elective surgical procedure cancellation (X^2=83.249, p=0.001). The 22 participants out of 60 participants whose surgical procedure was cancelled because of facility–related factors provide enough evidence to conclude that facility-related factors cause surgical procedure cancellation at p ≤0.05.

There was a significant relationship between surgeon-related factors and surgical procedure cancellation, (X^2 = 36.490, p=0.001).The 12 participants out of 60 participants whose surgical procedure was cancelled because of surgeon–related factors provide enough evidence to conclude that surgeon-related factors cause surgical procedure cancellation at p ≤ 0.5.

There was a significant relationship between anesthesia-related factors and surgical procedure cancellation (X^2 = 37.483, p=0.001). The 12 participants out of 60 participants whose elective surgical procedure was

cancelled because of anaesthesia–related factors provide enough evidence to conclude that anesthesia-related factors cause surgical procedure cancellation at p ≤0.05.

DISCUSSION

The current study revealed a 17.4% of elective surgery procedure cancellation rate which indicates some inefficiencies in preoperative health system in Eswatini. This is in harmony with studies conducted in Burkina Faso 21.9% (Lankoande et al., 2017), India 27.2% (Nanjappa, Kabeer, & Smile, 2014), and the United Kingdom 15% (Chughtai, Michael, Qurashi, 2014). But the finding from the present study is higher when compared to studies from the United States of America 1.96% (Trentman, Mueller, & Fassett, 2010), Korea 8.8% (Hanninen-Khoda, Koljonen, & Yla-Kotola, 2018), Finland 5.5% (Kim & Lee, 2014), Iran 1.87% (Maimaiti, Rahini, & Afzal, 2016), and Bosnia 4.58% (Solak et al., 2019). This inconsistency may be a result of economic differences. In addition, Eswatini operating theatres lack preoperative clinics, emergency theatres, surgical supplies and instruments, and surgical skilled specialists all which contribute to elective surgical procedure cancellation.

More males had their surgeries cancelled compared to females. This finding is consistent with various studies conducted in Tanzania, Ethiopia and Kenya (Chalya et al., 2012; Shiferaw, 2016; Dowden et al., 2019) which reported that males delayed seeking health services, and risked having their surgical procedures cancelled from complications that had emerged. In addition, in general males have been reported to be reluctant to undergo any form of surgery (Dowden et al., 2019). In most African countries including Eswatini males are heads of families and are involved in making critical family and community decisions, having to undergo surgery might make them feel threatened that they may lose their lives and their important positions. However, there is need for further research to investigate the health seeking behaviors of Eswatini males.

The majority of participants in this study had mild to severe systemic disease which was a threat to the outcome of surgery if they were to be rushed into theatre for surgery without considering their ASA classification. A study in Indonesia (Zulfika et al., 2020) revealed that a majority (60%, n=28) of participants who were in ASA II and of these 46% (n=6) had their surgery cancelled. The ASA House of Delegates (American Society of Anesthesiologists, 2014) on the other hand, emphasizes that the classification system alone does not predict the peri operative risks, but should be used with other factors such as frailness of the patient before surgery. In Eswatini much like in other countries, every patient has to be evaluated before surgery. Hence preoperative clinics need to be established in regional hospitals.

Consistent with research (Mutwali et al., 2016) in the present study some patients did not honor the surgical procedure date. Patient non-appearance on their scheduled surgeries was “alarming”(Mutwali et al., 2016). The patients who do not show-up for surgery need to be followed so that their reasons for not honoring the surgical appointment could be scientifically documented and specific policies and interventions could be strengthened or developed, to reduce the prevalence of surgical procedure cancellation.

Time constraint was the major factor that contributed to elective surgical procedure cancellation in the current study. Consistent with the current study, studies conducted in India (Kumar & Gandhi, 2012), Uganda (Ogwal et al., 2020), and Ethiopia (Shiferaw, 2016) reported that time was consumed with tardy start of surgical operations due to lack of surgical supplies. In addition, other delays included escorting of surgical patients from surgical wards to theatre by nurses, yet the nurses maybe engaged with other patients. On the other hand, a study conducted in the United Kingdom (Kaddoum et al., 2016) revealed that surgical operations that took longer than planned made the theatre to be behind schedule, leading to some patients having the surgical procedure cancelled. Globally, time is considered as a major factor for theatre efficacy, emphasis should be on avoiding overbooking and early commencement of the operating theatre surgical list by theatre team through effective communication.

The major surgeon-related factor that contributed to surgical procedure cancellation in the current study was insufficient time to perform surgeries. In harmony with current findings, a study conducted in Uganda (Ogwal et al., 2020) reported that surgeries that took longer than planned led to elective surgery cancellation. Taking longer in performing a surgical procedure could be associated with quality care and better patient outcomes. Probably the time interval between procedures need not to be too stringent. Research has alluded to that high volume of surgical cancellation was because some procedures were complex, time consuming, and required special attention (Grimes et al., 2012).

However, a study in Ethiopia reported that deliberate over-scheduling of elective surgeries by surgeons with the hope of increasing chance of their performance led to surgical cancellation (Shiferaw, 2016). In addition, some surgeons allowed junior doctors to develop surgical schedules and also performed some surgeries (Desta et al., 2018) which in turn contributed to cancellation. Eswatini has a deficit of specialized surgeons, most surgeries are performed by general medical officers and junior doctors. This practice may compromise the quality of surgeries performed, negatively affect the patients' prognosis, and increase the risk of legal suits against the institutions.

Abnormal test results of surgical patients and poor optimization of patients booked for surgery were the leading causes of elective surgical cancellation in anaesthesia-related factors in the current study. This finding was consistent with a study in Uganda (Ogwal et al., 2020) which reported that surgical cancellations resulted from low hemoglobin levels among the participants (Mutwali et al., 2016). However, in the current study results of patients were ordered the previous night of surgery and interpreted on the day of surgery which made it hard to optimize patients once results were deranged leading to surgical cancellation.

RECOMMENDATIONS

Based on the current study findings recommendations were made for the four (4) pillars of the nursing discipline; practice, education, research, and management or policy.

Nursing practice

1. The Eswatini Ministry of Health should introduce pre-operative clinics in all health facilities where there are theatres so as to reduce avoidable factors that eventually result in surgical procedure cancellation.
2. There must be effective collaboration between health facility's surgical teams and surgical wards to reduce avoidable surgeon, anesthesia, and facility-related factors that lead to surgical procedure cancellation.
3. Health facilities must establish male user-friendly services that will encourage males to consult for primary prevention services for improved male health outcomes.
4. There is need to strengthen focus on primary prevention of chronic disorders in rural settings which might reduce elective surgeries through promotive nursing programs.

Nursing education

The pre-service and in-service curriculum needs to empower nurses on consequences of surgical procedure cancellation so that proactive actions on avoidable factors are taken.

Nursing research

1. Future research needs to explore the health seeking behaviours related to elective surgery among males in Eswatini.
2. There is a need to replicate the current study so as to validate the findings and contribute to evidence based practice.
3. There is need for further research to seek the scientific explanation of the high operating theatre inefficiency in Eswatini.

Nursing Management

1. The Eswatini Ministry of Health in collaboration with her developmental partners need to establish interventions to curb the backlog of surgeries mainly in orthopedics and general surgery by educating more surgical specialties, theatre science nurses and anaesthetists.
2. The Ministry of Health needs to improve the operating theatres infrastructure to accommodate emergency surgical procedures.
3. The Ministry of Health needs to strengthen her efforts on prevention and control of chronic and non-communicable diseases to reduced comorbidities among surgical clients.

4. The Ministry of Health needs to introduce electronic documentation of surgical clients so as to minimize communication breakdown between the surgical team members.

Strengths and limitations

The study followed the positivism paradigm and principles of quantitative research which are based on objectivity. In addition, cluster sampling was used to identify the three (3) sites from which data were collected. Moreover, the sample size was adequate (N = 344). The findings of the study therefore, can be inferred to Eswatini and beyond. This is the first documented study on elective surgical procedure cancellation in Eswatini, which will serve as a reference for future related research. However, the descriptive nature of the study could not establish the cause and effect relationship between the variables.

CONCLUSION

In the current study, the prevalence of elective surgery cancellation was elevated compared the baseline of theatre efficiency measure of less than 5%. The study revealed that the majority of elective surgical procedure cancellation was a result facility-related avoidable factors.

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