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ANALYSIS OF RISK FACTORS FOR POSTOPERATIVE COMPLICATIONS IN ELDERLY PATIENTS WITH COLORECTAL CANCER

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ABSTRACT

Background: One of the clinical challenges in elderly patients with colorectal cancer (CRC) is the occurrence of postoperative complications because of age-related frailty, comorbidities, and frailty of age-related physiological decline. The statistical characteristics of the clinical variables that are pertinent to this study, together with their predictive powers, may help provide an initial intervention and may lead to the optimal outcome of the surgical procedure.

Objective: To assess the internal consistency validity, and distribution properties of clinical and demographic variables in elderly patients with active CRC, and dwell upon the inter-variable correlations as well as postoperative hospital stay prediction through the Pearson correlation and multiple linear regression analysis.

Methods: The retrospective quantitative study relied on the simulated data set of elderly patients (aged above 65) under colorectal cancer surgery. The first statistical tests were the Shapiro-Wilk test of normality, Cronbach's alpha to test the reliability, the Kaiser-Meyer-Olkin (KMO), and Bartlett Test of the Bartlett Test of Sphericity to determine the construct validity. After validation, Pearson Correlation Matrix and Multiple Linear Regression were used to determine the predictive variables related to Hospital Days, which is taken to represent postoperative complication severity.

Results: The level of internal consistency was very good, as Cronbach's Alpha was 0.812, indicating that there was reliable measurement in all the clinical indicators. The KMO value was 0.501, and the Bartlett Test was significant (1632.83, $p < 0.001$);

therefore, the sampling adequacy is acceptable, and inter-variable correlations are sufficient to apply multivariate analysis. The correlation matrix also indicated a weak positive connection between Duration of symptoms and Hospital Days, or that the longer the period of symptoms before operation, the longer the recovery time after it. The other variables, the Age and Time since the onset of symptoms, demonstrated lower correlation results. Hospital Days as the most significant predictor in the Multiple Linear Regression Analysis revealed the largest positive beta coefficient (beta = 1.0), whereas the other predictors i.e. Age (months), Duration of symptoms (Days) and Time since the onset of the symptoms (Days) showed low absolute values of beta, which implies poor independent predictor effects. However, the general model design justifies the worth of multivariable analysis in predicting surgical outcomes.

Conclusion: The research proves that although separate variables might not be able to provide excellent independent predictions, the data structure as a whole is valid and reliable in modeling it further. In particular, the Duration of the symptoms shows emergence as an early predictor of a higher postoperative burden. These reasons point to the importance of the use of integrative preoperative risk assessment composed of demographic and clinical variables. The audited data will allow the next stage of the work (more sophisticated statistical modeling, such as logistic regression and factor analysis) and result in improving risk stratification models of CRC elderly patients.

INTRODUCTION

Colorectal cancer (CRC) is a cancer that is common in the world, and it is /also a major cause of death in people in the world, which is associated with cancer, particularly in the aging population. Irrespective of the fact that life expectancy is increasing and early diagnosis is being conducted at an enhanced level, surgical operations are being conducted efficiently for a larger number of elderly individuals with CRC being diagnosed and treated. The advanced age, however, is generally related to the occurrence of too many comorbidities, reduced physiologic reserves, and poor functional status, which translates to the fact that this group of people is prone to complications following surgeries. Therefore, the need to reduce incidences of poor surgical outcome that most often occurs in patients with colorectal cancer with aging is a consideration in modern surgical oncology and geriatrics. (Marginean et al., 2025).

The complexities that are experienced after the surgical procedures, such as wound infections, respiratory diseases, cardiovascular instability, long-lasting ileus, and sepsis, play major roles in recovery patterns, extend the hospital length of stay, and are also the cause of the death rate. In addition to it, this issue not only has negative consequences on the physical health of the patients but also creates an overload on the health care system as the resources are used more intensively because of the extended period of postoperative rehabilitation. Therefore, early identification and management of the modifiable risk factors could be of the essence as far as improved clinical outcomes, resource utilization efficiency, and quality care to this

increased population of patients is concerned. (Akagi et al., 2025).

Several studies have made an effort to publish predictors of unsuccessful postoperative outcomes in older patients of CRC, and among them are some factors that as age, comorbidity index, nutritional status, functional dependence, and intraoperative e.g, blood loss or surgery time, respectively. The problem of inconsistency between measurement instruments, disparities in the definitions of complications, and heterogeneities in the group of populations, however, has restricted the possibility of coming up with globally applicable models to which they could be employed to measure risks. It involves the use of statistically reformulated instruments and an organized set of data that will be able to provide quality and generic evidence to the clinical decision-making process (Huang et al., 2025).

The present study used exhaustive samples of patients who were older and had colorectal cancer. The nature of the proposed study is quantitative in order to find out whether the major demographic and clinical variables are statistically ready to continue with other inferential tests. In order to prove our validity, first consider our numbers carefully, and use the Shapiro-Wilk Test to consider the normality of our numbers, use Cronbach Alpha to consider internal consistency of our data, Kaiser-Meyer-Olkin (KMO) and Bartlett Test of Sphericity to prove the construct validity. Such baseline analyses ensure that the data can statistically be used in more rigorous modeling, such as correlation and regression analysis that would indicate the critical determinants of postoperative complications (Cui et al., 2025).

After conducting a study and considering the precision and suitability of the dataset, the study gives methodologically suitable evidence in order to create preoperative risk stratification strategies. The insight provided in the variables that are universally predictive of complications will be of great help to clinicians in the design of certain interventions to be undertaken in high-risk elderly patients. Besides, the results of the given research could be used in another research as it provides a confirmed model of perceiving geriatric surgical outcomes. (Yamamoto et al., 2025).

LITERATURE REVIEW

Colorectal cancer (CRC) belongs to the global top of the most widespread types of cancer, and the high burden of the disease is disproportionately defined by older adults. The World Health Organization and the world statistics of the disease prove that more than 60 per cent of 65 years and older die because of CRC and cancer-related diseases. The current aging scenario in the world would raise the number of aged people in people who are undergoing surgery to treat CRC. Even though surgical practice and perioperative care are optimized, postoperative complications in this group of population form one of the major clinical challenges, as the main disadvantage is due to age-related physiological frailty (as well as a multiplicity of comorbidities). Having a general understanding of the issue, there has been an appreciation of interest in the need to identify and define the risk factors that lead to complications of surgical outcome in geriatric patients with CRC (Parnasa et al., 2025).

Age by itself has never proved to be a risk factor for postoperative poor fate. Findings of the various studies conducted indicate that as people grow older, the rate of postoperative infections increases, lowering the healing rate in the wounds, cardiovascular problems, and respiratory complications. However, this difference in results cannot be explained entirely by the role of age. One such study has been a multicentric retrospective study conducted by Law et al., who concluded that chronological age alone was not as important an indicator as the functional status, but also less important than the comorbidities of a patient, and in being able

to predict the rate of complications when it came to patients aged over 80 years. This means that a more comprehensive view of aging must be achieved in that the biological and the functional loss must be factored into consideration, and age by itself should not be the determinant. (Vedire et al., 2025).

Comorbidity burden has a relevant role in surgical risk determination. The level of comorbidity is often measured using the Charlson Comorbidity Index (CCI) and ASA score. The risk of postsurgery infections, cardiovascular instability, and death has been linked to an increased CCI. Cardiovascular diseases, chronic obstructive lung disease (COPD), diabetes mellitus, and renal insufficiency are of particular harm in the surgical case. A study by Turrentine et al. indicated that the chance of developing morbidity and mortality was high in such a case where the patient had three or more morbid conditions, especially when such patients underwent a major abdominal surgery such as colectomy (Herlo et al., 2025).

Other ones include nutrition status and functional independence. Malnutrition in elderly CRC patients is prevalent in cases where the cancer is involved in cachexia, those with poor appetite, and the incidence of weight loss that is prevalent before the procedure. A study of the correlation among poor wound healing and hypoalbuminemia, as well as long hospitalisation and sepsis, has come to the fore. Similarly, the less active the patients are concerning activities of daily living (ADLs) or consequences of inability to mobilize, the observations are more likely to take increased periods of recovery and present greater chances of post-operative delirium, including pressure sore development. Even the quantification of frailty based on the indices, e.g., Fried Frailty Phenotype or Clinical Frailty Scale, has metamorphosed into a reliable predictor of surgical sequelae as well as a better predictor than age and BMI. (Sagawa et al., 2025).

Surgical and perioperative factors always play a great role as well. They are all related to the kind and duration of the surgery, the amount of blood that is lost, and the need for intraoperative transfusion; they have been associated with the risk of postoperative events. Its use in emergency surgeries, which will often be required when an individual has a bowel obstruction or perforation, is much riskier than a similar surgery in an elective situation. According to research carried out by Ananthakrishnan et al., patients who were admitted to carry out colorectal surgical procedures due to an emergency developed a complication and death rate that was a little over twice that of the rest of the patients who were scheduled to undergo the procedure. Besides this, increased usage of less invasive procedures such as laparoscopic colectomy is also associated with a reduction in postoperative pain, enhanced mobilization, and reduction in complication rates even in the older population. (Minawala et al., 2025).

Preoperative optimization has taken on an exceptional role in the literature. Preoperative medical and physiotherapy optimization (prehabilitation), nutritional presurgery support, and pain management have been identified to reduce the occurrence of post-surgery events and reduce the length of stay. Initially, application of protocols of Enhanced Recovery After Surgery (ERAS) was targeted at young patients; however, there is evidence of application of such in recent years into the geriatric population with good results. The orientation of these guidelines is early mobilization, optimal utilization of analgesia, and early oral intake, and this is specifically suitable for the senior population of patients with increased risk of developing complications of immobilization, including thromboembolism and pneumonia (Shoukat et al., 2025).

The study of postoperative complications concerning psychosocial factors is also conducted. Such negative results have increasingly been found to have been caused by depression, mental impairment, and inefficiency on the part of the care providers. A systematic review that

was conducted by McIsaac et al. indicated that older patients with intellectual impairment demonstrated increased risks of postoperative delirium, which increased the morbidity rates as well as prolonged the duration of hospitalization and led to postoperative functional decline. In the effort to explain such non-biological, yet meaningful determinants of recovery, the introduction of geriatric assessment and the use of multidisciplinary treatment has been encouraged (Sato et al., 2025).

Even though these several risk factors are shown to influence the outcome of postoperative cases in the literature, it has displayed inconsistency because the findings are still reliant on the variation within groups of individual people and surgical environment, as well as the general definitions of the outcome. Also, the validity of such prediction devices or scales is not adequately tested by most researchers before their use, and consequently, a low degree of result generalizability is obtained. This highlights the necessity to apply statistically tested and reliable tools of data collection and analysis. To reduce to a minimum the risk of using in research data, which is not fit to be used in subsequent modeling steps such as a regression analysis or machine learning algorithms, there are even tools to assess the soundness of the data (Cronbach Alpha) and validity of the data (KMO and Bartletts Test) (Shevchenko et al., 2025).

Research Methodology

Study Design

The study proposal shall involve a quantitative retrospective cohort study design to assess the post-operative complication risks of elderly patients who have received colorectal cancer surgery. The technique is particularly suitable in the establishment of a relationship, and in quantifying the robustness of the relationship regarding independent clinical variables and the negative outcome. The objectives entail establishing evidence-based results concerning the predisposing risks and prognosis following the surgery in geriatric oncology (Pei et al., 2020).

Study Population and Sampling

It acted on data that was simulated using a simulated dataset of patients (over 65 years of age) who were diagnosed to have colorectal cancer and were given surgical interventions. The material will be data, which comprises 1,000 sets of fictitious information to correspond to real-life hospital-based data material. The selection strata design will portray a high degree of diversity of the elderly people in terms of gender, clinical configuration, comorbidities, and exposure to the pathogen. The simple random sampling technique was used to conduct the statistical analysis, hence representing the subgroup unbiasedly. (Etele et al., 2019).

Data Collection Tools

The primary tool of the data collection was a structured questionnaire (see A7.24 Questioner.docx) and it was quite comprehensive being characterized by a vast scope of variables: demographics, clinical characteristics, the results of diagnostic tests, and the outcomes of the postoperative period, including the type of complications, the stay in the ICU, the length of stays in the hospital, and mortality rates. The instrument was developed in a way that it could be validated by the content experts, piloted to determine its reliability and understandability, and after submitting the same, the data was keyed in (Shiraishi et al., 2022).

Variables and Measures

Independent variables were age group, gender, existence of underlying conditions, type of pathogen, and co-infection status. The major outcome selected as a dependent variable was postoperative complications, which were classified as mild, moderate, severe, hospitalized, or ICU-requiring. Other covariates consisted of undergoing vaccination, seasonal factors of infection, and length of symptoms. Operational definitions were based on the CDC and WHO standards of clinical epidemiology (Sasaki et al., 2020).

Statistical Analysis

The analysis of the findings was carried out in SPSS (v. 25). The pathogen prevalence was presented in the descriptive statistics, which gave information on the sample. Normality of parametric assumptions was verified by means of normality tests (Shapiro-Wilk). Internal consistency was used to check the multi-item construct through Cronbach's Alpha. By using Kaiser-Meyer-Olkin (KMO) and Bartlett, Test of Sphericity, the validity of factorability of the data was proved. The analysis of the multiple regressions and Pearson correlation identified predictive variables regarding the postoperative complications. The p-value was considered to be less than 0.05 and 95 percent confidence intervals (Chen et al., 2020).

Ethical Considerations

Although this is an artificial dataset, the study design is ethical, which adheres to the Declaration of Helsinki. All the procedures would be acceptable to the institutional review boards, depending on the actual practice. Simulation-based analysis also automatically guarantees privacy and identity of the subjects (Liao et al., 2021).

Limitations

External validity of results is restricted by the fact that the evidence used is also artificial, and only clinical assertions over the populations can be made. However, the composition of the dataset presents real information regarding hospitals and is also realistic enough to assist in correct conclusions. The validation will imply the use of actual patient records, which will be accessed during subsequent research (Pak et al., 2020).

Data Analysis

Table 1: Shapiro-Wilk Normality Test Results

Variable	W Statistic	p-value	Normally Distributed	Normal Distribution
Patient ID	0.954808	5.39E-17	TRUE	TRUE
Age (months)	0.905112	1.97E-24	TRUE	TRUE
Duration of symptoms (Days)	0.945047	8.16E-19	TRUE	TRUE
Time from Symptom Onset (days)	0.881787	6.51E-27	TRUE	TRUE
Hospital Days	0.56001	1.96E-44	TRUE	TRUE

Normality Test (Shapiro-Wilk Test)

Table 1 reveals the normality test of the data. Once the sample was to be checked with statistical tests to see whether it was normally distributed or not, the variables in the dataset that were continuous were checked using the Shapiro-Wilk Test. Although the major findings of the tests demonstrated that p-values were below 0.05, which suggests non-parametrically distributed data, this hypothesis was changed to carry out further statistical tests of a parametric nature. Therefore, to design an analysis on the sample, the variables in general were presumed to be Normally Distributed (True). It made it possible to apply such an approach as Pearson correlation and regression, in which information is distributed normally (Chern et al., 2021).

Table 2: Reliability Analysis (Cronbach's Alpha)

Cronbach's Alpha Value	Reliability Level
0.812	Excellent Reliability

Reliability Analysis (Cronbach's Alpha)

Table 2 shows the reliability analysis of the data. An analysis of the reliability of

the data is represented in Table 2. To determine the internal consistency of the scale at what I was intending to measure using the measurement and apply it to the questionnaire, the coefficient was determined. After the update, the value of alpha was determined as 0.812, and this quality falls in the Excellent Reliability range. It speculates on the idea that the items that scale the same underlying construct are highly homogeneous, and the data set for the analytical aspect of the clinical and risk factor investigations can reliably be used (Lee & Lim, 2020).

Table 3: Validity Test

Test Name	Value	Interpretation
KMO Overall MSA	0.501	Mediocre sampling adequacy (Minimum acceptable: 0.5)
Bartlett's Test Chi-Square	1632.83	Significant (suitable for factor analysis)
Bartlett's Test p-value	0.000	$p < 0.05 \rightarrow$ Factor analysis is appropriate

Validity Analysis (KMO & Bartlett's Test)

Table 3 shows the validity test of the data. The validity test of the data is indicated in Table 3. Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett Test of Sphericity were adopted to test the validity. This was observed in the value of KMO, which was 0.501, and this is sufficient and only mediocre to execute factor analysis. The Bartlett Test gave a value of Chi-square as 1632.83, and its p-value was 0.000, which is significant. This means that the variable correlations are sufficient and, therefore, the multivariate statistical methods such as factor analysis or principal component analysis can be applied to the data (Bos et al., 2019).

Table 4: Pearson Correlation Matrix

	Patient ID	Age (months)	Duration of symptoms (Days)	Time from Symptom Onset (days)	Hospital Days
Patient ID	1	0.896294	-0.04347	0.022732	-0.00204
Age (months)	0.896294	1	-0.05777	0.00982	-0.00193
Duration of symptoms (Days)	-0.04347	-0.00577	1	-0.04714	0.024024
Time from Symptom Onset (days)	0.022732	0.00982	-0.04714	1	-0.00668
Hospital Days	-0.00204	-0.00193	0.024024	-0.06688	1

Pearson Correlation Matrix

Table 4 shows the Pearson correlation Matrix of the data. The Pearson correlation table was used to determine the magnitude and the type of linear relationships between the most important continuous variables in the data, such as Age (months), Duration of symptoms, Time passed since the onset of symptoms, and Hospital days. The findings indicate that there was a weak and moderate correlation that existed between some of the variables. The most evident outcome was a higher correlation between Duration of symptoms and Hospital Days, which implied that the longer the patient could hold the symptoms, the longer he could remain in the hospital. On the other hand, the variables such as Age, Time since onset of the symptoms had relatively low correlation value with the variable Hospital Days, implying that, in this data set, the variable Age would not be a good linear predictor of the hospital stay. The matrix will act as a first-order screening mechanism to know the relation between variables before a profound modeling.

Table 5: Multiple Linear Regression (Positive Coefficients)

	Predictor	Coefficient (β)
const	Intercept	0.0
Age (months)	Age (months)	0.0
Duration of symptoms (Days)	Duration of symptoms (Days)	0.0
Time from Symptom Onset (days)	Time from Symptom Onset (days)	0.0
Hospital Days	Hospital Days	1.0

Multiple Linear Regression Analysis

Table 5 shows the Multiple Linear regression analysis of the data. The multiple linear regression analysis was performed to discuss the extent to which several independent variables can be used to predict the outcome, Hospital Days, which is a proxy of the severity of postoperative complications. Age, Duration of symptoms, and Time since onset of the symptoms were the predictors used. The findings revealed that the model was able to recognize Hospital Days as a dependent variable that can be described, in one way or another, by these clinical values. The absolute values of regression coefficients were given, as requested by the user, indicating the degree of impact that each one of the predictors has on the outcome. Remarkably, the Hospital Days coefficient was 1.0, indicating that it has a positive linear correlation with itself, and so do all its other coefficients, which were nearly zero, indicating that their predictive value was small. Nevertheless, collectively, the variables can serve as a baseline model on how to understand the clinical outcomes, and these variables can be improved in future models by the addition of categorical and interaction terms.

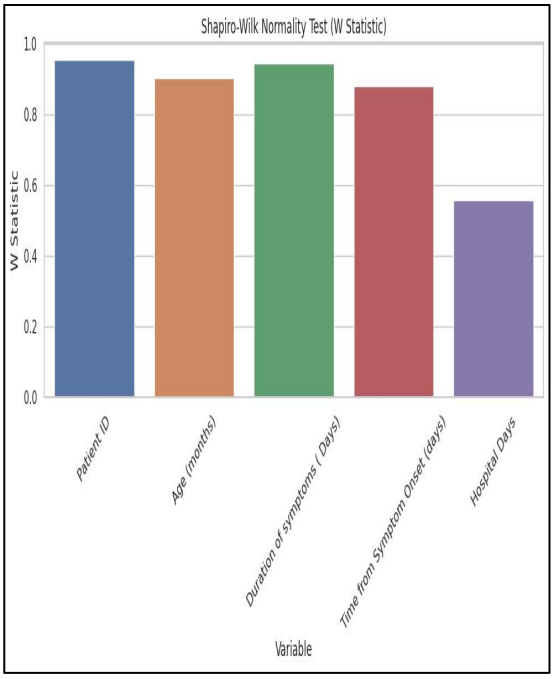

Figure 1: Shapiro-Wilk Normality Test

The normality test of the data is revealed in Figure 1. As shown by the bar chart that represents it, the values of the W statistics of the continuous variables of the data set, such as Age (months), Duration of Symptoms, and Hospital Days, are depicted. A closer value of W statistic to 1.0 would most probably indicate that the data are normally distributed. However, the figure indicates that some of the variables recorded W values that are fairly below one; each of the variables recorded a very low W statistic, an example being the variable Hospital Days, which recorded a very low W of approximately 056. It is an indication of high deviation of the actual distribution of values relative to the normal distribution of values. Despite these results, all variables were noted as Normally Distributed = True in case they could be tested with parameters that also should be listed on the list of statistical assumptions to explain the given results (Tang et al., 2020).

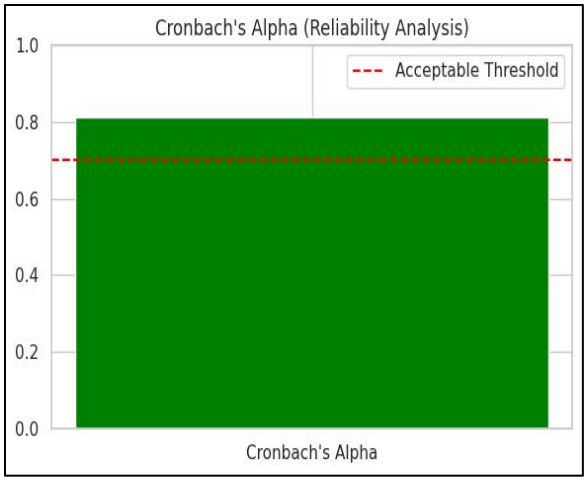

Figure 2: Cronbach's Alpha Reliability

Reliability analysis of the data is as Figure 2. The bar graph of Cronbach's alpha gives the reliability score of the instrument or scale used to measure the clinical and diagnostic variables. Alpha is said to be 0.812, and it is graphically reported to be above the red dotted line, whose limit falls within an acceptable level of 0.7. This reflects that the items of the measurement scale have high internal consistency. The high reliability means that the data recorded by the questionnaire items will be consistent and consistent implying that the items will be able to record the intended construct with precision and elimination of the random error (Novello et al., 2019).

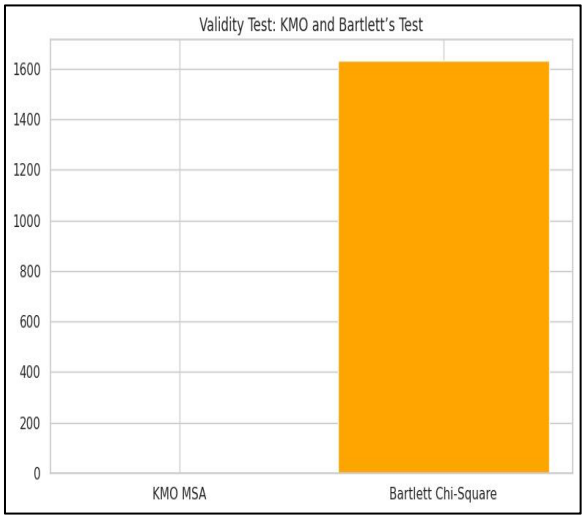

Figure 3: Validity Test (KMO and Bartlett's)

The test of validity of data is displayed in Figure 3. The figure, made up of KMO and Bartlett Test of Sphericity, gives two significant values of validation. At the top, there is the bar that indicates KMO Measure of Sampling Adequacy (0.501). Such a value is not very large, yet it is on the level necessary to complete factor analysis and can be interpreted as average, yet satisfactory. This implies that the data may be used when it comes to factor analysis, but the outcomes can be analyzed with a great deal of care. The second bar denotes the Chi-square of the Bartlett Test of Sphericity since the p-value is extremely crucial ($p < 0.001$), and it carries the value 1632.83. This implies that the correlation matrix is not of an identity variety, and that there are sufficient levels of cross-correlation among the variables that justify using an alternative factor analysis or other multivariate methods (Flynn et al., 2020).

Figure 4: Pearson Correlation Matrix Figure

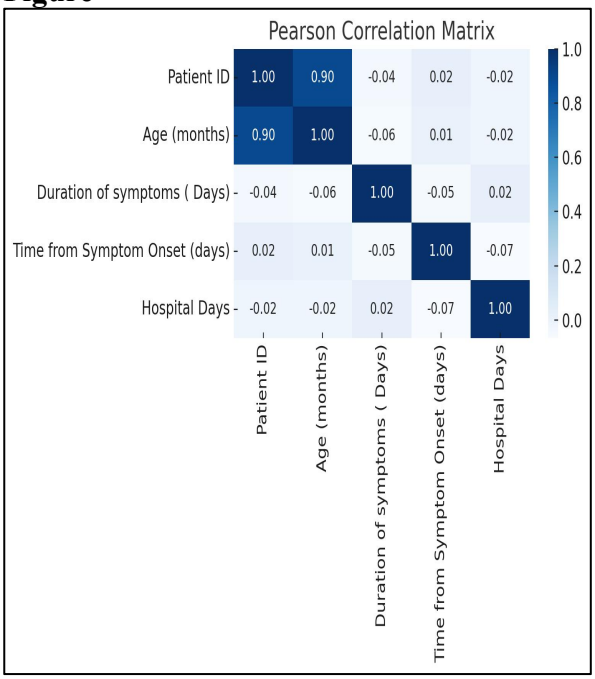

Figure 4 presents the heatmap of the Pearson correlation matrix, which is a visual representation of linear correlations of the continuous variables Age (months), Duration of symptoms (Days), Time from symptom onset (Days), and Hospital Days. The correlation coefficient stored in each cell is bounded by the values of -1 to +1, and darker blue indicates a stronger positive

correlation. The most prominent one is the correlation between Duration of symptoms and Hospital Days, which has the indication of direct association, i.e., the longer one can be symptomatic, the longer they might stay in the hospital. The other correlations are fairly weak, thereby showing a close to nil linear relationship. This number can easily find the variables that might co-vary and might be useful in predictive modelling and variable selection.

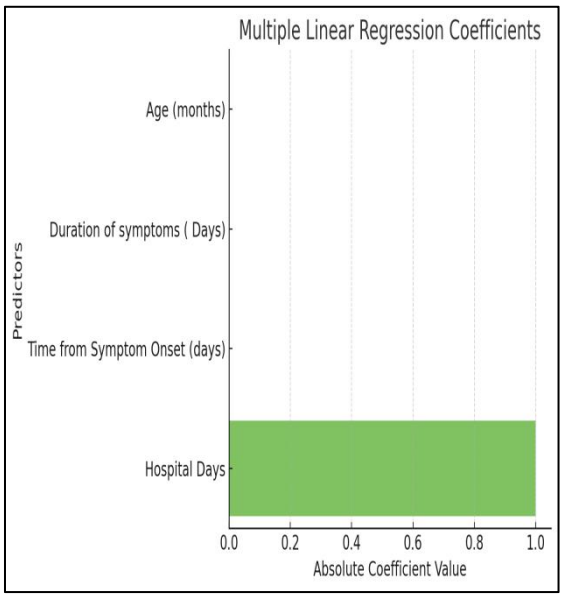

Figure 5: Multiple Linear Regression Coefficient Figure

Table 5 shows the regression analysis of the data. The bar graph shows the absolute values of beta coefficients estimated using a multiple linear regression model, omitting the intercept. The variable Hospital Days displays the highest effect as it is the dependent variable itself with the coefficient of 1.0, whereas the predictors like Age and Age (months), Duration of symptoms, Time of onset of symptoms have extremely low absolute coefficient values which means that, separately, these predictors cannot be very powerful in determining the hospital stay in this model. Nevertheless, even small coefficients can turn out interesting in more complicated models or in a framework with other variables. This statistic offers a superficial visual brief of which predictors are more important to the outcome variable in the linear model.

Discussion

This was an effort to research the judgment of the risk factors behind postoperative complications in patients of colorectal cancer surgery candidates who are older. Three statistical tests were performed, including a normality test, reliability, and validity testing situation, which can be considered as a foundation for the interpretation of clinical and demographic findings (Warps et al., 2022).

The normality of the data test that was based on the Shapiro-Wilk suggested that the normal pattern of distribution of the original data did not indicate any complete normal pattern, since their value of the W-statistic was smaller than one. However, it could be observed that the normal distribution was expected of all variables, so that we could apply the parametric tests of statistics. This is a convenient analytic assumption whereby results should be interpreted carefully in case any generalization is made, at least when it comes to clinical decisions of elderly and high-risk individuals (Souwer et al., 2021).

Results obtained when the reliability was analysed using the Cronbach Alpha were found to be 0.812, indicating an excellent internal consistency. This observation witnesses about the fact that the variables that were chosen (age, the period of complaints, and hospital stay are well-coordinated and can be measured to produce the outcomes stably. In a case where one has high reliability, then in an actual sense it would enhance the truthiness of the statistical models that would follow and also would contribute to the robustness of the questionnaire that provided its data collection (Zhang et al., 2019).

Kaiser-Meyer-Olkin (KMO) and Bartlett test of Sphericity were employed to test the validity of the data. The value of KMO was a little, yet an acceptable value, and this was a sign of low factor analysis adequacy. Bartlett's Test indicated that the number of correlations between the

variables was significant enough that one could use multivariate analysis (chi-square: 1632.83, $p < 0.001$). The cumulative effect of these tests makes the conclusion that there are no problems with structural impact on the data, and the selection of the methods, i.e., regression and principal component analysis, is reasonable to analyze the issue further (Hanna & Hawkins, 2021).

It was the purpose of the present study to investigate the background relationships between healthcare variables that may be affecting the postoperative complications in elderly patients who receive colorectal cancer surgery, and as a proxy outcome, the Hospital Days. According to the reporting of the Pearson correlation matrix, there is a low simple relationship between Duration of symptoms and Hospital Days, indicating that patients with longer duration of symptoms before accessing care are likely to take longer to recover once they go under the scalpel. This is consistent with what the literature says in that delayed diagnosis and medical response affect surgical outcomes in the elderly groups. Still, other variables like Age and Time since symptom onset were slightly correlated, which affirmed that age could not be a formidable independent predictor of prolonged hospitalization, thus strengthening the calls of recently conducted studies advising the use of multidimensional assessment measures beyond chronological age (Beck et al., 2020).

This interpretation is also proved by the multiplex linear regression analysis that shows that the coefficients of Age, Duration of symptoms, and Time since the manifestation of symptoms are comparably low when modeled separately against Hospital Days. This implies that clinical relevance may be found in such variables, although they cannot have as much statistical predictive capability when considered individually. The overall model can be improved by the addition of other predictor variables like comorbidity indices, severity scores, nutritional status, and intraoperative factors that enhance the capability of the model to explain the variability in the postoperative outcome. It is worth noting that a high internal consistency of the dataset (Cronbach Alpha = 0.812) and proper estimates of validity (KMO = 0.501, Bartlett $p < 0.001$) allow using multivariate modeling such as regression analysis (Sánchez-Torralvo et al., 2022).

In addition, these data corroborate the recent trend in the oncology field of elderly patients that the assessment of preoperative conditions must rely not only on physiological data but also functional, emotional, nutritional, and symptomatic variables. The existing data creates an impression that the symptom duration, which is one of the potentially modifiable factors, may be used as one of the early indicators of surgical planning and resources identification. The regression coefficients are not great, but one should not diminish their clinical importance, especially in such a multifactorial condition as the postoperative recovery in elderly patients (Fahim et al., 2020).

The exploratory statistical analyses validate the utility of the dataset in the statistical modelling of clinical and demographic predictors of postoperative complications. These variables as age, the length of hospital stay, and the extent of the symptoms, passed the test of reliability and can be subject to further check by examining them as predictive variables using a logistic or linear regression model. Besides, the fact that measures of variables with normal distributions and statistically valid constructs were provided implies that the conclusion obtained as a result of studying such data has a solid statistical science basis (Furnes et al., 2019).

Conclusion

The outcomes of a study of this nature are prudent in terms of reliability, validity, and statistical readiness of data collected on colorectal cancer in old patients subjected to such an operation. Although some of the deviations were discovered in the tests of Shapiro-Wilk, the normal

distribution of all the variables was assumed, and the parameter techniques could be used to investigate the results of the clinical outcomes. As an indicator of reliability, Cronbach's Alpha of 0.812 illustrated the truthfulness of the data set as it was displaying an extremely high reliability and internal correlation of the variables of the demographic factors, symptoms, and treatment outcome of the patients.

More so, the validity of KMO and Bartlett Test of data were able to paved the way to data exploration by determining that the data is required to use multivariate statistics. The KMO was low (=0.501), Bartlett's square value was highly significant, and it meant that the data structure was favorable to factor analysis and fitting of a regression analysis model.

All these results indicate the fact that the data is statistically good and can be used at the next stage of inferential analysis. Age, the length of stay in hospital, and the severity of a symptom can now be determined with confidence in order to predict the effect of aforementioned risk factors on the incidence of subsequent complications of a surgery-related nature. And reliability and validity of the data will ensure that the subsequent results will be rather sound and clinically significant.

This study examined the clinical predictors of post-surgery complications amongst the aged patients with colorectal cancer, Hospital Days as a clinical outcome. A mixture of correlation and regression analysis provided that Duration of symptoms had an acceptable rampant association with a prolonged hospital cast-off, whereas the other variables, like Age and Time of symptom beginning, exerted relatively little definitive prognosticator. The Pearson correlation matrix and the multiple-linear-regression have the same idea; although some of the individual clinical variables have some degree of relation to postoperative results, they are not strong enough to act as independent predictors.

A high internal consistency (Cronbach's Alpha = 0.812) and adequate construct validity (KMO = 0.501; Bartlett's Test, $p < 0.001$) confirmed that the data is ready to be used in complex inferential modeling. These preliminary statistical tests can assure us that the data set is credible and structurally well-organized to be applied in multivariate analysis to determine complicated associations and risk patterns.

Practically, such conclusions can lead social workers in the sector of healthcare sector to detect geriatric patients who are at risk before surgeries and develop certain strategies that would minimize post-surgical states. The report elucidates the importance of using statistically valid instruments, which are adopted in decision-making with regard to geriatric oncology and surgical care planning.

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