IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 8, Issue 6 Ser. I. (Nov - Dec .2019), PP 19-27
www.iosrjournals.org

Analysis of Risk Factors Affecting Stoma Complications in Patients with Colostomy

Setia Budi[1], Syafruddin Ilyas[2], Asrizal[3]
[1]*Faculty of Nursing, Universitas Sumatera Utara*
[2]*Faculty of Mathematics and Natural Science, Universitas Sumatera Utara*
[3]*Faculty of Nursing, Universitas Sumatera Utara*
Corresponding Author: Setia Budi

Abstract: *Stoma complications are one of the problems that are often experienced by colostomy patients. Stoma complications in colostomy patients can be caused by various factors. The purpose of this study is to analyze the risk factors that most influence the occurrence of stoma complications in patients with colostomy. The design of this research is descriptive with cross sectional approach. This research was conducted from March to July 2019 at RSUP Haji Adam Malik Medan. The number of samples in this study were 53 colostomy patients taken by purposive sampling. The analysis of this study uses the chi-square statistical test and logistic regression. The results of this study indicate that body mass index (BMI) (p = 0.000; RR = 21.00), operating diagnosis (p = 0.033; RR = 4.40), stoma site (p = 0.040; RR = 9.71) , history of diabetes mellitus (p = 0.002; RR = 23.11) had a significant association with the occurrence of stoma complications in colostomy patients (p < 0.05). While gender (p = 0.96; RR = 0.80), age (p = 0.50; RR = 0.2.00), smoking history (p = 0.54; RR = 1.69), type of surgery (p = 0.144; RR = 5.03), stoma type (p = 0.417; RR = 1.91) and stoma care education (p = 0.70; RR = 1.53) have no relationship with the occurrence of stoma complications in colostomy patients. The results of logistic regression analysis showed that history of diabetes mellitus (p = 0.00; OR = 13.61; 95% CI = 2.19-84.57) and body mass index (BMI) (p = 0.00; OR = 12.38; 95% CI = 2.37-64-50) is the most influential factor for the occurrence of stoma complications in colostomy patients. Nurses are expected to be able to consider the most influential risk factors for stoma complications in determining nursing interventions in preventing stoma complications.*

Keywords: *Risk Factors, Stoma Complications, Colostomy*

Date of Submission: 25-10-2019 Date of acceptance: 09-11-2019

I. Introduction

Colostomy is a surgical procedure performed on the large intestine that aims to make a hole in the abdominal wall to remove stool, this hole is known as a stoma. Where colostomy can be temporary or permanent according to the purpose of surgery (Ecomed, 2012). In general, indications of colostomy are carcinoma of the colon and rectum, large bowel obstruction, vesicocolic fistula, to protect anastomosis and several other diseases that disrupt the normal process of faecal discharge. In making colorectal cancer colostomy is one of the main causes of colostomy surgery actions that end in stoma production (WOCN, 2014).

The increase in the incidence of colostomy is influenced by the high prevalence of colorectal cancer as the third most cancer case in the world. In 2017 in the United States there were 95,520 cases of colon cancer and 39,910 cases of colorectal cancer. And colorectal cancer is the second leading cause of male and female cancer deaths with 50,260 deaths (American Cancer Society, 2017). Whereas in Indonesia colorectal cancer ranks third with 12.8 per 100,000 adult population, with a 9.5% mortality from all cancer cases (Ministry of Health, 2017).

The increased prevalence of colorectal cancer is directly proportional to the increase in ostomate patients. This is because almost all patients with colorectal cancer end up making a colostomy. Colostomy surgery can occur in the ascending, transverse, descending, and sigmoid colon that is temporary or permanent. Temporary colostomy aims to rest the intestines that have problems or cancer until reanastomosis is performed again. While permanent colostomy aims to remove the intestine affected by cancer and is usually done on the sigmoid colon (Black and Hawks, 2014).

Normally the stoma looks red or pink, moist, slightly higher than the surrounding skin and the stoma has no sensory nerve endings and is not sensitive to pain, so some stoma complications can occur without the patient being aware of it. So that the assessment on stomah should be done regularly to be very important in the process of stomacolostomy treatment (WOCN, 2014).

Complications of colostomy postoperative stoma is one of the most common problems in patients with colostomy. The increase in the incidence of stoma complications from 23.5% to 68% is a very significant

number, and there are 30.9% incidents of stoma complications in the first three weeks after surgery, such as fistula, leakage, necrosis, retraction, stenosis, injury or irritation in peristoma, stomal hernia, and prolapse (Parmar, Zammit, Smith, Kenyon and Lees, 2010). This is also consistent with the results of the study (Kwiatt and Kawata, 2013) which states that the high stoma complications often occur in the early postoperative period of less than 30 days, this shows that the incidence of stoma complications is relatively high, ranging from 27.1% to 82 %. The most common incidents of stoma complications are peristoma skin irritation 20-55%, necrosis 2-20%, retraction 9%, peristoma hernia 14.1-40%, and prolapse 16-19%.

The high incidence of stoma complications in postoperative colostomy patients makes nurses must be aware that patients with stoma are very vulnerable in the face of stoma complications. In this case post-operative stoma complications can be influenced by several risk factors that cause stoma complications such as age, sex, body mass index (BMI), smoking history, type of surgery, operating diagnosis, stoma site, stoma care education, stoma type and history of illness experienced by patients (Sung, Kwon, Jo and Park, 2010; Pittman, 2011).

The problem of complications in post-operative stoma requires serious action in the process of preventing the occurrence of stoma complications in patients with colostomy. In this case the nurse wound, ostomy, continence (WOC) has a very important role from the preparation of patients pre to post colostomy surgery, because preoperative care services play an important role to be the starting point of further treatment (Cantara, 2008).

Patients with postoperative colostomy have at least one complication related to stoma throughout their lives caused by several risk factors which consequently not only lead to physiological and psychological problems of patients with the stoma. The occurrence of stoma complications in patients with colostomy will greatly impact the healing process and prolonged adaptation to stoma, although minor complications that only require treatment by WOC nurses to severe complications that can damage the condition and around the stoma that require repeat surgery until death can occur in patients with colostomy (Sung, Kwon, Jo and Park, 2010). In addition, prolonged complications result in patient discomfort in carrying out their daily activities. As a result, stoma complications that occur in colostomy patients not only result in physiological problems in the form of damage to the stoma to the peristoma, but will also cause psychological problems such as decreased quality of life in patients who have a colostomy (Kann, 2008). More than that the consequences that occur in stoma complications is the increased financial burden or costs associated with a prolonged patient care process (Doctor and Colibaseanu, 2016).

The importance of the role of nurses in the care of patients with postoperative colostomy in preventing various possible complications. By knowing and understanding the risk factors that trigger the occurrence of complications, it is expected to be able to mengungari even prevent the occurrence of stoma complications in patients with colostomy. Patients with colostomy have the right to live a normal life and still be able to carry out their daily activities such as before surgery, where a person is still able to carry out activities, travel, exercise, play a role in the family and be able to do work even if he has a stoma. Patients with ideal stoma conditions can also improve the ability of patients in stoma care independently to maintain the quality of life of colostomy patients even with existing stomas (Kwiatt and Kawata, 2013).

Based on the phenomena and the results of existing studies the authors are interested in analyzing risk factors that can cause stoma complications in patients with colostomy, seeing the number of patients with colostomy who experience stoma complications.

II. Method

The research design used in this study is quantitative, that is correlation with the cross sectional approach, where the research is carried out only in a certain period and the sampling is done at one time (Polit and Beck, 2012). The purpose of this study was to determine the risk factors that influence stoma complications in patients with colostomy.

This research was conducted at RSUP Haji Adam Malik Medan. The population in this study were 53 patients post colostomy surgery in RSUP Haji Adam Malik Medan. The sampling technique used in the study is purposive sampling by selecting subjects who meet the research inclusion criteria that are included in the study so that the specified number of samples can be met (Polit and Beck, 2012).

The determination of sample size in this study uses the power analysis method. The power analysis method is carried out to estimate the right number of research samples. This power analysis aims to determine the sample size so that it shows significant results, in addition it can also determine the strength of statistical tests (Polit and Beck, 2012).

This study observes post colostomy patients for more than two weeks, in which the data collection instruments in this study are in the form of instruments about the characteristics of research respondents consisting of: age, gender, body mass index (BMI), smoking history, operating diagnosis, stoma site, type of surgery, type of stoma, stoma care education, and a history of diabetes mellitus. As well as the observation sheet of stoma complications in colostomy patients according to the characteristics of the types of stoma

complications such as: lesions, necrosis, peristoma skin irritation, stoma retraction, peristoma hernia, prolapse, stenosis, mucocutaneous separation that occurs in patients with colostomy.

III. Research Results and Discussion

3.1 Results

The results of the study are described through one stage of analysis, namely univariate analysis, to determine the frequency distribution of each variable, bivariate analysis to determine the relationship between risk factors and the incidence of stoma complications in patients with colostomy. While multivariate analysis to determine the factors that most influence on the occurrence of stoma complications in colostomy patients. This study conducted observations on postoperative patients with colostomy for more than two weeks using an observation sheet for the occurrence of stoma complications related to risk factors that exist in the study variables.

Univariate Analysis Results

Description of Research Subjects

Subjects in this study were patients with colostomy. Description of the research subjects consisted of age, gender, body mass index (BMI), smoking history, operating diagnosis, stoma site, type of surgery, stoma type, stoma care education, history of diabetes mellitus. A description of the results of the study can be seen in Table 1 below:

Table 1 Frequency Distribution and Percentage Data Characteristics of Respondents in Patients with Colostomy (n=53)

No	Karakteristik	Jumlah	Persentase (%)
1	Age		
	>60 Years	13	24,5
	< 60 Years	40	75,5
2	Gender		
	Male	16	30,2
	Female	37	69,8
3	Body Mass Index		
	Abnormal	34	64,2
	Normal	19	35,8
4	Smoking History		
	Yes	31	58,5
	No	22	41,5
5	Operating Diagnosis		
	Cancer/Tumor	27	50,9
	Obstruction/Trauma	26	49,1
6	Stoma Site		
	Yes	5	9,4
	No	48	90,6
7	Type of Surgery		
	Emergency	9	17,0
	Elective	44	83,0
8	Stoma Type		
	End Stoma	32	60,4
	Loop Stoma	21	39,6
9	Stoma Care Education		
	Yes	35	66,0
	No	18	34,0
10	History of Diabetes Mellitus		
	Yes	28	52,8
	No	25	47,2

Based on Table 1, data on the characteristics of patients with colostomy at the time of the study the majority of respondents aged < 60 years were 40 people (75.5%), the majority were male as many as 37 people (69.8%), the majority of respondents with a body mass index were not 43 of them are normal (64.2%), the majority of respondents with a history of smoking are 31 people (58.5%), the majority of respondents are

diagnosed with cancer / tumor surgery as many as 27 people (50.9%), the majority of respondents with stoma sites are not conducted as many as 48 people (90.6%), the majority of respondents with the type of surgery performed electively were 44 people (83.0%), the majority of respondents were educated with stoma care as many as 35 people (66.0%), and the majority of respondents with a history of diabetes mellitus as many as 28 people (52.8%).

Stoma Complications

The results of research conducted at RSUP Haji Adam Malik Medan about risk factors for stoma complications in patients with colostomy can be seen in the following table:

Table 2 Stoma Complications in Patients with Colostomy (n=53)

No	Stoma Complications	Total	Percentage (%)
1	Complications	35	66
2	No complications	18	34

The results of univariate analysis of the occurrence of stoma complications in patients with colostomy found that as many as 35 people (66%) had stoma complications and 18 people (34%) had no stoma complications.

Bivariate Analysis Results

Analysis of Risk Factors Affecting Stoma Complications in Patients with Colostomy

The relationship of risk factors that influence stoma complications in patients with colostomy was analyzed using the chi-square test. The following will show the relationship of risk factors and how many times these factors can cause stoma complications in patients with colostomy.

Table 3 Analysis of Relationship Between Risk Factors Affecting Stoma Complications in Patients with Colostomy (n=53)

No	Variabel	Stoma Complications in Patients with Colostomy				Total		P-Value	RR	95% CI	
		Komplikasi									
		Yes		No							
		N	%	n	%	N	%			Lower	Upper
1	Age*										
	> 60 Years	10	76,9	3	23,1	13	100	0,50	2,00	0,47	8,44
	< 60 Years	25	62,5	15	37,5	40					
2	Gender										
	Female	10	62,5	6	37,5	16	100	0,96	0,80	0,235	2,72
	Male	25	67,6	12	32,4	37					
3	Body Mass Index										
	Abnormal	30	88,2	4	11,8	34	100	0,00	21,00	4,87	90,41
	Normal	5	26,3	14	73,7	19					
4	Smoking History										
	Yes	22	71,0	9	29,0	31	100	0,54	1,69	0,53	5,34
	No	13	59,1	9	40,9	22					
5	Operating Diagnosis										
	Cancer/Tumor	22	81,5	5	18,5	27	100	0,03	4,40	1,27	15,18
	Obstruction/Trauma	13	50,0	13	50,0	26					
6	Stoma Site*										
	Yes	1	20,0	4	80,0	5	100	0,04	9.71	0.99	94.78
	No	34	70,8	14	29,2	48					
7	Type of Surgery*										
	Emergency	8	88,9	1	11,1	9	100	0,14	5,03	0,57	43,92
	Elective	27	61,4	17	38,6	44					
8	Stoma Type										
	End Stoma	23	71,9	9	28,1	32	100	0,41	1,91	0,60	6,10
	Loop Stoma	12	57,1	9	42,9	21					
9	Stoma Care Education										
	Yes	22	62,9	13	37,1	35	100	0,70	1,53	0,44	5,30
	No	13	72,2	5	27,8	18					
10	History of Diabetes Mellitus										
	Yes	26	92,9	2	7,1	28	100	0,00	23,11	4,42	120,81
	No	9	36,0	16	64,0	25					

Note: *****) Fisher Exact Test

Seen from Table 3 above, the results of research conducted with statistical tests using chi-square indicate that the variables that have a significant relationship to the occurrence of stoma complications in patients with colostomy with a value ($p < 0.05$) include: body mass index ($p = 0,000$; RR = 21.00), operating diagnosis ($p = 0.033$; RR = 4.40), stoma site ($p = 0.040$; RR = 9.71), history of diabetes mellitus ($p = 0.002$; RR = 23, 11). While the variables that do not have a significant relationship to the occurrence of stoma complications in patients with colostomy with a value ($p > 0.05$) include age ($p = 0.50$; RR = 2.00), gender ($p = 0.96$; RR = 0.80), smoking history ($p = 0.54$; RR = 1.69), type of surgery ($p = 0.144$; RR = 5.03), stoma type ($p = 0.417$; RR = 1.91) , and stoma care education ($p = 0.70$; RR = 1.53).

Multivariate Analysis Results

Factors that Most Influence Stoma Complications in Patients with Colostomy

To analyze the risk factors that most influence the occurrence of stoma complications in patients with colostomy, a multivariate analysis is performed, namely a logistic regression test. Multivariate analysis in this study uses a multiple logistic regression test, one of the mathematical model approaches to analyze the effect of several independent variables on categorical dependent variables that are dichotomous or binary. The method used in logistic regression analysis is the enter method that is by issuing p variables one by one starting from the highest value.

Candidate Variable Selection

In multivathy analysis, a logistic regression test is performed to obtain candidate variables from independent variables. The candidate variable is a variable that has a p value of the correlation test results with the dependent variable that is stoma complications in patients with colostomy with a value ($p \leq 0.250$). Based on the results of the selection conducted on independent variables that will be input in the logistic regression test modeling.

Based on the results of bivariate tests using chi-square, there are most independent variables not included as modeling candidate variables such as: age, gender, smoking history, stoma type and stoma care education. Can be seen in the table as follows:

Table 4 Probability Value (P-Value) of Independent Variable Candidate Selection Results for Logistic Regression Test (n=53)

No.	Independent Variable	Value (P ≤ 0,25).
1	Age	0,50*
2	Gender	0,96*
3	Body Mass Index	0,00
4	Smoking History	0,54*
5	Operating Diagnosis	0,03
6	Stoma Site	0,04
7	Type of Surgery	0,14
8	Stoma Type	0,41*
9	Stoma Care Education	0,70*
10	History of Diabetes Mellitus	0,00

Note: *) Not Candidate Variable ($p \leq 0,250$)

Multivariate Modeling

After obtaining an independent variable that becomes a candidate variable that meets the requirements ($p \leq 0,250$), a multivariate analysis is performed using a logistic regression test using the enter method by issuing one by one variable that has an insignificant p value or value ($p > 0.05$) starts from the highest p value so that the model that persimony meets the significant model and is partially significant, follows the candidate table for multivariate logistic regression modeling:

Table 5 Modeling the First Logistic Regression Test (n=53)

No	Variabel	P-Value	Exp B (OR)	95% CI for Exp (B)	
				Lower	Upper
1	Body Mass Index	0,07*	6,71	0,83	53,95
2	Operating Diagnosis	0,01	27,95	2,07	375,95
3	Stoma Site	0,08**	30,90	0,60	1593,04
4	Stoma Type	0,06*	14,51	0,86	24,87
5	History of Diabetes Mellitus	0,03	10,28	1,20	87,96
	Constanta	0,000	0,001		

Note: *) Meaningless P > 0,05

**) Variables that are not accepted and excluded from modeling p > 0.05 (starting from the highest p value)

Based on Table 5 the first modeling of the logistic regression test results show that the variable that has the largest p value is stoma site (p = 0.08). Then the variable must be excluded from modeling. So that the precision of other variables is still eligible for entry into the second modeling.

Table 6 Modeling the Second Logistic Regression Test (n=53)

No	Variabel	P-Value	Exp B (OR)	95% CI for Exp (B)	
				Lower	Upper
1	Body Mass Index	0,01	12,42	1,83	84,29
2	Operating Diagnosis	0,02	10,66	1,29	87,60
3	Type of Surgery	0,06**	17,04	0,81	354,92
4	History of Diabetes Mellitus	0,01	12,63	1,62	98,03
	Constanta	0,001	0,001		

Note: **) Variables that are not accepted and excluded from modeling p > 0.05 (starting from the highest p value)

Based on Table 6 modeling of the two logistic regression tests the results showed that the variable that had the highest p value was the type of operation (p = 0.06). Then the variable must be excluded from modeling. For the other three variables it is feasible to enter the third modeling.

Table 7 Modeling the Third Logistic Regression Test (n=53)

No	Variabel	P-Value	Exp B (OR)	95% CI for Exp (B)	
				Lower	Upper
1	Body Mass Index	0,00	12,46	2,18	71,13
2	Operating Diagnosis	0,10**	4,34	0,73	25,61
3	History of Diabetes Mellitus	0,00	13,61	2,01	92,06
	Constanta	0,000	0,015		

Note: **) Variables that are not accepted and excluded from modeling p > 0.05 (starting from the highest p value)

Based on Table 7 modeling of the three logistic regression tests the results show that the variable that has the highest p value is the operating diagnosis (p=0.105). Then the variable must be excluded from modeling. For other variables it is feasible to enter the fourth modeling.

Table 8 Modeling the Four Logistic Regression Tests (n=53)

No.	Variabel	P-Value	Exp B (OR)	95% CI for Exp (B)	
				Lower	Upper
1	Body Mass Index	0,00	12,38	2,37	64,50
2	History of Diabetes Mellitus	0,00	13,61	2,19	84,57
	Constanta	0,000	0,035		

Note: **) Variables that are not accepted and excluded from modeling p> 0.05 (starting from the highest p value)

Based on Table 8 from the results of the fourth modeling there are two significant candidate variables with values ($p < 0.05$) so that they have a significant effect on the occurrence of stoma complications in patients with colostomy, namely: body mass index (BMI) with values ($p = 0, 00$) and a history of diabetes mellitus with a value ($p = 0.00$). The strength of the relationship between the candidate variables when viewed from the odds ratio (OR), the most influential variable for the occurrence of stoma complications in patients with colostomy is a history of diabetes mellitus (OR = 13.61) and the strength of the body mass index (BMI) relationship with the value (OR = 12.38).

III. Discussion

Judging from the results of research that has been done shows that the factors that most influence the occurrence of stoma complications in colostomy patients are body mass index and a history of diabetes mellitus.

Body Mass Index

The results of univariate analysis showed that patients with an abnormal body mass index of 34 people or (64.2%) and patients with normal weight of 19 people or (35.8%). Statistical analysis showed that out of 34 people with abnormal body mass index there were 30 people or (88.2%) had stoma complications and 4 people or (11.8%) had no stoma complications, whereas of 19 people with body mass index 5 people (26.3%) had stoma complications and 14 people (73.9%) had no stoma complications. Based on this data it shows that the occurrence of stoma complications in patients with colostomy is more experienced in patients with abnormal body mass index compared to normal body mass index.

The results of the bivariate statistical analysis of this study found that the body mass index had a significant relationship to the occurrence of stoma complications in patients with colostomy with a value ($p = 0.00$). As well as the results of multivariate body mass index analysis is one of the most influential factors in the occurrence of stoma complications in patients with colostomy ($p = 0.003$; OR = 12.38). This study is in line with research conducted by Pittman (2011), suggesting that body mass index has a significant influence on the occurrence of several stoma complications such as: Leakage ($p = 0.01$), peristomal irritation dermatitis ($p = 0.01$), retraction ($p = 0.05$), mucocutaneous supration ($p = 0.05$), and total ostomy complication score ($p = 0.05$).

The normal body mass index limit value is generally 18.5-24.9. Where in this study body mass index is less or more than the normal limit value entered into the body mass index is not normal. Based on these data, colostomy patients with a body mass index that is less than normal can be related to a person's nutritional status, where body mass index is one of the simple ways to measure a person's nutritional status in anthropometry. Patients with nutritional status that are less than normal will affect the structure and integrity of the supporting structures of the skin and internal organs of the body so that it makes the occurrence of various problems or become a complicating factor in the process of healing a disease. In addition, a similar study was conducted (Yunis and Hastuti, 2016), stating that there was a statistically significant relationship between nutritional status and the occurrence of stoma maceration in patients with colostomy ($p = 0.03$). This is related to research conducted by (Agung and Hendro, 2015), which explains that nutritional status has an influence on the wound healing process in which low protein levels (hypoalbumin) have a statistically significant relationship between serum albumin levels and the duration of the healing process wounds with a value ($p < 0.001$).

Whereas in patients with body mass index that is more than normal is associated with increased levels of fat, especially in the abdominal area which causes many abdominal folds so that the determination of the location of the stoma is difficult to determine ideally. Body mass index more than normal will increase the risk of stoma complications, besides that in patients with body mass index more than normal cause mechanical so that the length of the intestine that is released into the abdominal wall filled with fat can damage the intestinal blood flow or high traction in the intestine so can cause stoma complications in patients with colostomy such as bleeding or stenosis and tissue death in stoma (necrotic) (Zakaria, Zakaria, Abdul-Jalal and Ismail, 2014). This is in line with research conducted by (Parmar, Zammit, Smith, Kenyon and Lees, 2010), which states that body mass index (BMI) more than normal has a significant relationship to the occurrence of stoma complications in patients with colostomy with a value ($p = 0.04$). In addition, a similar study conducted by Chun, Haigh, Tam and Abbas (2012) conducted on iliostomy patients showed that obese patients (BMI $\geq$ 30 kg / m) were associated with higher rates of overall ileostomy complications (OR 8.56, 95% CI 1.64-44.74). In patients with body mass index more than normal (obesity) have abdominal skin thickness covered by a layer of fat. In addition, in obese patients there are difficulties in determining the location of the stoma where the colostomy bag is gluing due to the many folds of the stomach which makes the abdomen uneven.

History of Diabetes Mellitus

The results of this study showed no significant proportion between patients with a history of diabetes mellitus and patients who did not have a history of diabetes mellitus, where the results of univariate analysis showed patients with a history of diabetes mellitus as many as 28 people or (52.8%) and patients who had no

history diabetes mellitus as many as 25 people (47.2%). Of the 28 patients with a history of diabetes mellitus there were 26 people or (92.9%) had stoma complications and 2 people did not have stoma complications, while of 25 patients who did not have a history of diabetes mellitus there were 9 people or (36.0%) had complications and 16 people or (64,0) did not experience complications.

The results of the bivariate statistical analysis showed that patients who had a history of diabetes mellitus had a significant relationship to the occurrence of complications in patients with colostomy with a value ($p = 0.00$) and on the results of a multivariate analysis of patients with a history of diabetes mellitus was one of the most influential factors in the occurrence of stoma complications in patients with colostomy ($p = 0.00$; OR = 13.61). These data indicate that colostomy patients with a history of diabetes mellitus are more at risk of developing stoma complications in patients with colostomy. Research conducted (Kwiatt and Kawata, 2013), explains that patients with a history of diabetes mellitus are one of the most influential factors in the occurrence of stoma complications in patients with colostomy.

Patients with colostomy surgery will leave scars, where patients with a history of diabetes mellitus will have difficulty in the process of wound healing, this problem can be attributed to several consequences that can occur in patients with a history of diabetes mellitus from childhood, resulting in increased fat deposits in the area within the walls of blood vessels. These deposits also affect blood circulation, increasing the risk of hardening of the arteries, constriction of blood vessels so that it interferes with blood flow, especially erythrocytes that carry food and oxygen to the network. Another problem that can occur is diabetic neuropathy which causes damage to nerve endings that cannot regenerate so the patient cannot feel pain. Besides high blood sugar levels can affect the immune system in the fight against infection (decreased immune system) (Black and Hawks, 2014). This is caused by immune cells not functioning effectively in wound healing, resulting in an increased risk of infection and colostomy complications that can occur in postoperative colostomy patients.

IV. Conclusion

Based on the results of research conducted on 53 patients with colostomy, it was found that body mass index (BMI), operating diagnosis, stoma site, and patients with a history of diabetes mellitus, had a significant relationship to the occurrence of stoma complications in patients with colostomy. While the factors of age, sex, smoking history, type of surgery, type of stoma, and stoma care education have no relationship with stoma complications in patients with colostomy.

The results of logistic regression analysis conducted in this study found that a history of diabetes mellitus and body mass index were the most influential factors in the occurrence of stoma complications in patients with colostomy. Based on the odds ratio (OR), patients with a history of diabetes mellitus have a 13 times greater risk of developing stoma complications in patients with colostomy. Whereas patients with an abnormal body mass index have a 12 times greater risk of developing stoma complications in patients with colostomy.

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Setia Budi" Analysis of Risk Factors Affecting Stoma Complications in Patients with Colostomy" . IOSR Journal of Nursing and Health Science (IOSR-JNHS), vol. 8, no.06 , 2019, pp. 19-27.