p-ISSN 2830-0580 | e-ISSN 2830-4608

JMHSJ | Jambura Medical and Health Science Journal

Vol. 2 No. 1
July 2023

JMHSJ
Jambura Medical and Health Science Journal

Penerbitan Fakultas Kedokteran
Universitas Negeri Gorontalo
Jl. Jend. Sudirman No. 6, Kota Gorontalo. Kode pos 96128
https://ejurnal.ung.ac.id/index.php/JMHSJ/index

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PENGANTAR EDITOR

Salam sehat,

Alhamdulillah edisi ke satu volume ke dua Jambura Medical and Health Science Journal kembali dapat diterbitkan. Sebagaimana pada edisi sebelumnya, maka jurnal terbitan Fakultas Kedokteran (FK) UNG pada edisi kali ini menampilkan 4 *Original Article* yang ditulis oleh sejawat dari FK UNG dari penelitian kolaboratif dengan mahasiswa yang dilakukan. Selanjutnya ada 2 *Review Article* yang ditulis oleh sejawat dosen di lingkungan FK UNG. Terakhir ada 1 *Case Report* yg ditulis oleh sejawat kita Febi Iswandi. Ahli bedah ini melaporkan kasus karsinoma rektal pada seorang remaja pria dan merupakan kasus yang langka. Hal ini menunjukkan JMHSJ juga diminati oleh para peneliti dari sekitar institusi Universitas Negeri Gorontalo

Topik yang diangkat pun bervariasi mulai dari hubungan BMI dan siklus haid, batu empedu ,karsinoma tiroid, TB paru, tantangan dan solusi pendidikan kedokteran masa kini, serta kanker kolorektal. Semoga kedepan akan lebih banyak tulisan dari berbagai disiplin ilmu kedokteran yang diangkat dalam JMHSJ. Selamat membaca.

Gorontalo, 31 Juli 2023

Dr.dr. Muhammad Isman Jusuf,Sp.N

Chief Editor

JMHSJ
Jambura Medical and Health Science Journal
A peer-reviewed and open-access journal
E-ISSN 2830-4608 | P-ISSN 2830-0580

TABLE OF CONTENT

JMHSJ
Jambura Medical and Health Science Journal
A peer-reviewed and open-access journal
FAKULTAS KEDOKTERAN
UNIVERSITAS NEGERI GORONTALO
E-ISSN 2830-4608 | P-ISSN 2830-0580

TABLE OF CONTENT

Jambura Medical and Health Science Journal, Vol.2 No.1 (July 2023)
p-ISSN 2830-0580 | e-ISSN 2830-4608

ORIGINAL ARTICLE **Open Access**

The Relationship between Body Mass Index and Menstrual Cycle of Female Students in SMK Negeri 2 Gorontalo

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ABSTRACT

Introduction: The menstrual cycle is a regularly coordinated hormonal process in a woman's body which can be an indicator to describe a woman's reproductive health. Riskesdas (2018) shows that 11.7% of Indonesian youth experience menstrual cycle disorders. Body Mass Index (BMI) can be a factor that can interfere with the menstrual cycle, so the purpose of this study was to analyze the relationship between Body Mass Index (BMI) and the menstrual cycle in female students at SMK Negeri 2 Gorontalo.
Method: This study used a *cross-sectional* design. The sample was selected using a *probability sampling* technique utilizing simple random sampling with a total sample of 173 people, the instruments used were scales and meters for body mass index data and menstrual cycle questionnaires. The study was conducted in November 2022. The relationship between BMI and the menstrual cycle was tested using the *Spearman correlation* test.
Results: Out of 173 respondents whose data were analyzed, 128 respondents (74%) had a normal BMI, 19 respondents (11%) were underweight, and 26 respondents (15%) were overweight. Among the total respondents, 117 (67.6%) had a normal menstrual cycle, while 56 (32.4%) had an abnormal cycle. There were 14 respondents (10.9%) with normal BMI, 18 respondents (94.7%) with underweight BMI, and 24 respondents (92.3%) with overweight BMI who had an abnormal menstrual cycle. There was a significant correlation between BMI and menstrual cycle among female students of SMK Negeri Gorontalo, with a p-value of 0.019.
Conclusion: significant association exists between BMI and menstrual cycle among SMK Negeri 2 Gorontalo female students. This study can serve as a recommendation for the school to provide information regarding reproductive health, particularly menstrual cycles.

Key words: Body mass index, female student, menstrual cycle

JMHSJ Jambura Medical and Health Science Journal

Published by:
Universitas Negeri Gorontalo

Address:
Jl. Jend. Sudirman No.6, Gorontalo City, Gorontalo, Indonesia

Mobile number:
+62852 3321 5280

Email:
jmhsj@ung.ac.id

Article History:
Received 09 February 2023
Accepted 31 July 2023
Published 31 July 2023

DOI:
https://doi.org/10.37905/jmhsj.v2i1.18834

Introduction

Adolescence begins at 10-19 years, marking the transition from childhood to adulthood, and is characterized by the onset of menstruation. Furthermore, the menstrual cycle is one relevant indicator that can depict women's reproductive health.[1] Menstruation is the cyclic and regular shedding of the uterine wall in response to interactions of hormones produced by the hypothalamus, pituitary gland, and ovaries.[1] One of the factors that can disrupt the menstrual cycle is the Body Mass Index. Although various hormones play a role in influencing the menstrual cycle, research has indicated that a high Body Mass Index can lead to amenorrhea, irregular menstrual cycles, heavy or prolonged menstruation, and menstrual pain.[2]

Based on the data from the 2018 Riskesdas (National Basic Health Research) cited in Arum et al. (2019), approximately 11.7% of Indonesian adolescents aged 15-19 years experience menstrual cycle disorders.[3] The Body Mass Index can be calculated as body weight divided by height, where body weight is in kilograms and height is in meters. The percentage of body fat can be predicted using the Body Mass Index. Fat is one of the compounds in the body that plays a crucial role in forming reproductive hormones, such as androgen and estrogen. When estrogen levels increase, it indirectly leads to an increase in androgen levels, causing disruptions in follicle development. Limited body fat can decrease aromatized androgen hormone levels into estrogen, leading to irregular menstrual cycles.[4]

Women with low body fat levels have significantly lower estrogen levels. Therefore, weight loss can restore regular menstrual function by reducing the aromatization of androgen into estrogen in adipose tissue.[2] Obesity is linked to excessive estrogen levels. Estrogen is a primary reproductive hormone that can influence the menstrual cycle. Obesity can also increase the risk of gynecological conditions, including infertility, polycystic ovary syndrome, and irregular menstrual cycles, although various hormones also play a role.[2]

The Riskesdas in 2010 reported that 13.7% of women aged 10-59 in Indonesia experienced irregular menstrual cycles in the past year. The highest percentage of irregular menstruation was found in the Gorontalo region (23.3%), while the lowest was in Southeast Sulawesi (8.7%), with Lampung at 11.3%. Several factors that can influence the menstrual cycle include disruptions in hormone function, systemic abnormalities, thyroid disorders, and excessive prolactin hormone.[5] According to Riskesdas data from 2010 and 2013, Gorontalo was among the 15 provinces with a high prevalence of obesity.[6]

Vocational high school (SMK) students have different activities compared to students in junior and senior high school, as they engage in practical training outside regular school

hours. They enter the workforce directly, so they need to be aware that their activities can affect their Body Mass Index (BMI), which can influence their menstrual cycles. Regular menstrual cycles are essential for proper reproductive organ function and to avoid disruptions in the students' activities.

Methods

Observational analytic study with a cross-sectional approach held on month November 2022 and take place in SMK Negeri 2 Gorontalo. Study This uses primary data in the form of questionnaire cycle menstruation, index data mass body obtained with weight to respondent's height.

Population and Sample

Sampling used a probability sampling technique using simple random sampling, namely as many as 173 respondents. The inclusion criteria for this study were female students aged 15-18 years who were already menstruating and willing to participate. The exclusion criteria for this study were female students with menstrual cycle disorders caused by gynaecological diseases and female students who were not willing to be the research sample.

Data Collection Procedures

The source of data in this research is primary data. This study used scales and measuring tape to obtain Body Mass Index data by collecting data on body weight three times for more accurate results and a questionnaire to obtain data on the menstrual cycle, age, age at menarche, and family history.

Method of Data Analysis

Data processing and analysis in this study used the statistical package for social science (SPSS) version 16.0 program (IBM, USA), which is presented in tabular form to view data on respondent characteristics in the form of age, menarche age, weight, height as well as a table of the relationship between body mass index and menstrual cycle. After that, the researcher will perform univariate analysis to see the frequency and distribution of data and bivariate analysis using the Spearman correlation test, and it is said that the research results are significant if the results are $p<0.05$.

Results

Respondents of this study consisted of 173 people who met predetermined criteria. Respondents were then analyzed based on the primary information provided. The analysis shows that most respondents were 16 years old, namely 78 people (45.1%), while the minor

age group is 17, totalling 13 people (7.5%). The majority of respondents got their first menstruation (menarche) aged > 13 years, namely 94 people (54.3%).

Table 1. Characteristics of Study Participants

Characteristics	Frequency (n)	Percentage (%)
Age		
15 Years old	41	23.7
16 Years old	78	45.1
17 Years old	13	7.5
18 Years old	41	23.7
Menarche Age		
<11 Years old	17	9.8
11-13 Years old	62	35.8
>13 Years old	94	54.3
Weight		
40-50 kg	110	63.6
51-60 kg	35	20.2
61-70 kg	28	16.2
Height		
140-150 cm	71	41
151-160 cm	69	39.9
161-170 cm	33	19.1

Table 2 reveals the distribution of BMI for SMK Negeri 2 Gorontalo female students. The majority of respondents have a normal BMI comprising 128 people (74%), and the underweight BMI category is the least, with only 19 people (11%).

Table 2. Distribution of Frequency and Percentage of Body Mass Index for Study Participants

Body Mass Index	Frequency (n)	Percentage (%)
Very underweight	0	0
Underweight	19	11
Normal	128	74
Overweight	26	15
Obesity	0	0

Table 3 shows the distribution of menstrual cycle abnormality of SMK Negeri 2 Gorontalo female students. The respondents had a normal menstrual cycle, comprising 117 individuals (67.6%). Out of 56 respondents with abnormal menstrual cycles, 11 individuals (6.4%) experienced Polymenorrhea, 15 individuals (8.7%) had Oligomenorrhea, one individual (0.6%) had Hypermenorrhea, one individual (0.6%) had Hypomenorrhea, eight individuals (4.6%) had Brachymenorrhea, four individuals (2.3%) had Menorrhagia. The majority experienced Dysmenorrhea, totalling 16 individuals (9.2%).

Table 3. Distribution of Frequency and Percentage Menstrual Cycle Abnormality of SMK Negeri 2 Gorontalo Female Students

Menstrual Cycle Type	Frequency (n)	Percentage(%)
Normal	117	67.6
Polymenorrhea	11	6.4
Oligomenorrhea	15	8.7
Hypermenorrhea	1	0.6
Hypomenorrhea	1	0.6
Brachymenorrhea	8	4.6
Menorrhagia	4	2.3
Dysmenorrhea	16	9.2

Table 4 indicate the association between BMI and menstrual cycles in SMK Negeri 2 Gorontalo female students. Most female students have a normal menstrual cycle, comprising 117 respondents (67.6%), while 56 students (32.4%) have an abnormal menstrual cycle. Out of 19 students in the underweight BMI category, the majority experienced Dysmenorrhea, totalling eight individuals (4.6%). Among the overweight BMI category, out of 26 students, most experienced Oligomenorrhea, totalling 12 individuals (6.9%). In the normal BMI category, out of 128 students, 14 individuals (8.1%) had an abnormal menstrual cycle. The research results indicate that the analysis of the association between BMI and menstrual cycle in female students of SMK Negeri 2 Gorontalo using the Spearman rank test yielded a p-value of 0.019. This value is smaller than α=0.05, which means there is a significant association between Body Mass Index and menstrual cycle in female students of SMK Negeri 2 Gorontalo.

Table 4. The Association between Body Mass Index and Menstrual Cycles in SMK Negeri 2 Gorontalo Female Students

Menstrual Cycles	Body Mass Index								*p-value*
	Normal		Underweight		Overweight		Total		
	n	(%)	n	(%)	n	(%)	n	(%)	
Normal	114	65.9	1	0.6	2	1.2	117	67.6	0.019
Polymenorrhea	3	1.7	2	1.2	6	3.5	11	6.4	
Oligomenorrhea	2	1.2	1	0.6	12	6.9	15	8.7	
Hypermenorrhea	1	0.6	0	0	0	0	1	0.6	
Hypomenorrhea	0	0	1	0.6	0	0	1	0.6	
Brachymenorrhea	3	1.7	5	2.9	0	0	8	4.6	
Menorrhagia	2	1.2	1	0.6	1	0.6	4	2.3	
Dysmenorrhea	3	1.7	8	4.6	5	2.9	16	9.2	
Total	**128**	**74**	**19**	**11**	**26**	**15**	**173**	**100**	

Discussion

The research data shows that most respondents had a normal body mass index, namely 128 people (74%). This is appropriate with Arisman's statement that economic and technological developments have led to improvements in nutrition compared to previous decades.[7] Adolescent diet is very influential on adolescent health, including nutritional status. Nutritional status should be in adequate conditions to ensure further growth and development. Being overweight in adolescents can occur due to lack of activity or lifestyle, such as smoking, lack of sleep, and eating fast food can exacerbate this condition. Doing physical activity is one of the efforts to prevent unhealthy body conditions. Healthy activities like walking and small exercise are less attractive to teenagers, and most prefer walking in malls. This can be a fun physical activity.[8] Based on the results of research conducted by Oktaviani et al. (2012) concerning the relationship between fast food consumption habits, physical activity, consumption patterns, and characteristics of adolescents and parents with body mass index (BMI) showed the results of statistical tests showed a relationship between food consumption patterns and BMI.[9]

Nutritional status in adolescents will affect BMI, where BMI is one of the factors that can affect the menstrual cycle. The menstrual cycle is said to be normal if it lasts for 21-35 days, with menstrual periods ranging from 3-7 days. During menstruation, the amount of blood is no more than 80 ml per day, with a frequency of changing pads 2-6 times per day.[10]

The research data shows that most 173 respondents had normal menstrual cycles. The results of research conducted by Gilbert et al. (2022) concerning the relationship between BMI and menstrual cycles also showed that the majority of the 113 respondents had normal menstrual cycles, as many as 85 people (75.2%).[11] Shortening the follicular period causes shorter menstrual cycles (polymenorrhea), which is associated with decreased fertility and miscarriage. Meanwhile, prolongation of the menstrual cycle (oligomenorrhea) is related to the incidence of anovulation, infertility, and miscarriage.[12]

One of the factors that can interfere with the menstrual cycle is BMI. Although various hormones play a role in influencing the menstrual cycle, research has suggested that a high BMI can cause amenorrhea, irregular menstrual cycles, heavy or long periods, and painful menstruation.[2] It has known that BMI affects the menstrual cycle through the role of the hormone estrogen. The hormone is produced in the placenta, ovaries, adrenal glands, and adipose tissue. Low body fat lowers estrogen levels. This is related to infertility. High estrogen in the body can cause prolonged menstrual cycles.[4]

The study's results were from 128 respondents with a normal body mass index. 117

respondents (67.6%) had normal menstrual cycles, while 14 (8.1%) had abnormal menstrual cycles. Respondents in this study have different characteristics. Some have a normal BMI but have an abnormal menstrual cycle. Some have an abnormal BMI but have normal menstrual cycles. Here it should be noted that in the female reproductive system, good nutrition and psychological factors influence. Even though the nutrition is good, if a woman experiences psychological disorders, it will disrupt her reproductive system. This research is in line with the study conducted by Sitepu in 2018 entitled "Relationship of Body Mass Index and Menstrual Cycles in Young Girls at SMA Negeri 1 Tigapanah Kab. Karo in 2018." The test used in this study was the Spearman Rank test, with the results showing a significant correlation between body mass index and the menstrual cycle.[13]

The menstrual cycle in women with high body fat levels is due to increased production of androstenedione, an androgen that acts as a precursor for reproductive hormones. Androgens are converted to estrogens through the aromatization process of granulosa cells and adipose tissue assisted by the aromatase enzyme. Increased estrogen levels can cause negative feedback of GnRH secretion in the hypothalamus. This also results in FSH levels not reaching their peak, and follicular development will stop so that ovulation does not occur. This situation can cause amenorrhea or oligomenorrhea. Fat levels in the body are related to the hormone leptin, which regulates appetite, energy consumption, and the sympathetic nervous system. People who are overweight will experience leptin resistance, so leptin fails to control fat in the body. Uncontrolled fat levels can cause an increase in estrogen levels.[14]

The results showed that of the 26 obese respondents, 12 (6.9%) had oligomenorrhea. Fat is one of the compounds in the body that has an essential role in forming reproductive hormones, namely androgen and estrogen hormones. When estrogen levels increase, androgen levels indirectly increase, causing disturbances in follicular development. Limited fat in the body can cause androgen hormone levels which aromatize to become hormones, to decrease so that the menstrual cycle is irregular.[14]

Women who are overweight have excess fat, so estrogen synthesis in the body will increase, causing negative feedback in the hypothalamus and inhibiting follicular development, resulting in no menstruation (amenorrhea) and elongation of the follicular period (oligomenorrhea). Obese women can also experience dysmenorrhea. The research data showed that of the 26 respondents (15%) with a high body mass index, 5 (2.9%) experienced dysmenorrhea. This is because excess fat tissue can cause pressure on blood vessels or vascular hyperplasia by fatty tissue in the female reproductive organs so that blood that

should flow during menstruation is disrupted and causes pain.[10]

Women with thin bodies found low levels of FSH and estrogen and changes in the ratio of FSH to LH. Sometimes high prolactin levels are found.[14] The results showed that out of 19 respondents (11%) with a low body mass index, eight (4.6%) had dysmenorrhea. This is due to the lack of hormone synthesis and small fat reserves in women, which can cause menstrual cycle irregularities because the lack of body fat levels can cause a decrease in androgen levels which are aromatizing with estrogen. Being underweight can result in decreased production of androgen hormones for the secretion of luteinizing hormone (LH) and follicle-stimulating hormone (FSH), which can harm the menstrual cycle. It can also result in a shortening of the luteal phase.[4] Women with low BMI are at risk of experiencing dysmenorrhea, and this is due to a weak body condition that causes resistance to pain.

The limitation of the research is that this study only analyzes the relationship between BMI and the menstrual cycle in female students at SMK Negeri 2 Gorontalo. However, research on the factors that affect the menstrual cycle cannot be carried out.

Conclusion

Based on the research results that have been done, it is concluded that there showed high acceptance and satisfaction of the digital illustrator in practical skills. The learners expressed high perceived usefulness, ease of use, and intention to use the digital illustrator in learning practical histology skills. The learners also found the materials relevant, effective, enjoyable, and exciting and would recommend them to their fellow students for use. The expressed high acceptance of and satisfaction with the video-based instructional materials was, to a large extent, also uniform among the respondents of the three study centers. Thus, irrespective of location, the learners generally appeared optimistic about their experiences using the digital illustrator to learn histology practicals in medical faculty.

Conflicts of Interest

Nothing to declare

Funding sources

Nothing to declare

Acknowledgments

Nothing to declare

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Jambura Medical and Health Science Journal, Vol.2 No.1 (July 2023)
p-ISSN 2830-0580 | e-ISSN 2830-4608

ORIGINAL ARTICLE **Open Access**

Profile of Cholelithiasis Underwent *Laparoscopic Cholecystectomy* Patients at The Aloei Saboe Hospital

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ABSTRACT

Introduction: Cholelithiasis is one of the critical health problems. Modern lifestyles can allow gallstone disease in Indonesia to become a health problem that needs attention. The research objective is to know the profile of patients with cholelithiasis who performed laparoscopic cholecystectomy in Aloei Saboe Hospital.
Method: The research design is a retrospective descriptive study. The population of this study was cholelithiasis patients who underwent laparoscopic cholecystectomy and were treated from January 2020 - December 2021, totaling 234 people. The number of samples is 86 people. We were using a purposive sampling data analysis technique, namely univariate analysis.
Results: Regarding the distribution of patients based on sex, the most results were obtained from females (70 people, 81.4%), the largest age group is 46-55 years old (23 people, 26.7%), and the majority of patients did not have a history of diabetes mellitus (76 people, 88.4%).
Conclusion: The distribution of cholelithiasis patients who underwent laparoscopic cholecystectomy in the Aloei Saboe Hospital is most common in women aged 46-55, and most patients have no history of diabetes mellitus. This finding may offer a primary data reference for further research adding the number of variables to determine the risk factors for cholelithiasis.

Key words: Cholecystectomy, cholelithiasis, gallstones, laparoscopic

JMHSJ Jambura Medical and Health Science Journal

Published by:
Universitas Negeri Gorontalo

Address:
Jl. Jend. Sudirman No.6, Gorontalo City, Gorontalo, Indonesia

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Article History:
Received 09 February 2023
Accepted 31 July 2023
Published 31 July 2023

DOI:
https://doi.org/10.37905/jmhsj.v2i1.18845

Introduction

Cholelithiasis is a gallstone disease found in the bladder bile, bile ducts, or both. Gallstones, mainly Cholesterol-type gallstones, are primarily formed in the gallbladder.[1] Cholelithiasis At present, it has become a public health problem because of the frequency of its occurrence, causing financial and social burdens.[2] According to WHO data (World Health Organization), the prevalence of cholelithiasis globally is 11.7%.[3] In the United States 2017, data was obtained from cholelithiasis sufferers of around 20 million people (10 - 20% adult population).[4] According to recent data, the prevalence of cholelithiasis in Japan is approx 3.2%, in China 10.7%, in North India 7.1%, and in Taiwan 5.0%.[5] Research in Indonesia at Home Koja Jakarta Regional General Hospital on 05 October – 31 December 2015 obtained 101 cases of cholelithiasis.[6] Meanwhile, the medical record data at the Kandou Hospital Manado, in October 2015 - October 2016, obtained 113 cases.[7]

Based on oral cholecystography studies, cholelithiasis occurs most in women (76%) than in men (36%) with the age of the patient > 40 years.[2] Cholelithiasis is often associated with "5F" risk factors: Fat, Female, Forty/Family history, Fair, and Fertile.[8] In addition, cholelithiasis can also occur due to factors other risks such as excessive secretion of bilirubin, genetic disorders, diabetes mellitus, total parenteral nutrition, metabolic syndrome, drug use, and other risk factors.[4] Cholelithiasis can cause complications in the form of acute cholecystitis and may cause perforation and peritonitis, obstructive jaundice, cholangitis, pancreatitis, and malignant change.[9] About 80% of people with cholelithiasis are found without symptoms during diagnosis or monitoring. Hence, most cases of cholelithiasis are said to be "silent" or also called asymptomatic.[10]

Management of cholelithiasis can be divided into two types: surgery and non-surgery. Non-surgical therapy can be in the form of stone splitting, namely stone dissolution with preparations of cholelytic bile salts, Extracorporeal Shock Wave Lithotripsy (ESWL), and endoscopic removal. At the same time, surgical therapy can be done by laparoscopic cholecystectomy, open cholecystectomy, and exploration of the choledochal canal.[9] Cholecystectomy is the gold-standard therapy for cholelithiasis. Laparoscopic and open surgical methods can perform this procedure. Laparoscopic cholecystectomy offers faster gallstone healing with invasive procedures, minimal pain, mild pain, and early return to total activity. Currently, laparoscopic cholecystectomy is the treatment of choice for symptomatic gallstones.[11] Based on initial observations made by the author at the Aloei Saboe Hospital Gorontalo in 2020 - 2021, data was obtained on the number of cases of cholelithiasis patients

in whom 234 people performed laparoscopic cholecystectomy.

Cholelithiasis is a significant health problem in Western countries. Meanwhile, in Indonesia, it is suspected that the incidence of gallstone disease is still lower compared to Western countries. However, with the lifestyle trend, Modern technology can allow gallstone disease in Indonesia in the future to become a health problem that needs attention. Based on the description, this study aims to determine the profile of patients with cholelithiasis whose laparoscopic cholecystectomy was performed in the Aloei Saboe Hospital from January 2020 –December 2021.

Methods

This research was conducted using a retrospective descriptive study, namely analysis describing the social demographic factors on the incidence of cholelithiasis in hospitals of Prof. Dr. H. Aloei Saboe. The data were collected from medical records from January 2020 – December 2021 that fit the inclusion criteria. Furthermore, the collected data was compiled to determine the profile of cholelithiasis patients who have performed laparoscopic cholecystectomy at the hospital.

Population and Sample

The population in this study were all patients with cholelithiasis laparoscopic cholecystectomy performed in the Aloei Saboe Hospital treated in January 2020 – December 2021, namely 234 people. The inclusion criteria in this study were patients undergoing inpatient and outpatient care at Aloei Saboe Hospital and patients diagnosed with cholelithiasis or one the diagnosis was cholelithiasis, and a laparoscopic cholecystectomy was performed. Criteria Exclusions in this study were incomplete patient medical records (no CM number, data on age, sex, and history of blood sugar checks) and patients diagnosed with cholelithiasis without laparoscopic cholecystectomy. From the population of 234 people, using the purposive sampling technique obtained a sample of 92 people with CM numbers. Then it got 86 people who met the criteria for the variable under study.

Data Analysis

The data obtained in this study were processed using a device Microsoft Excel software and Statistical Product and Service Solution (SPSS) version 25.0 for Windows (IBM, USA) and presented in tabular form to see the profile of cholelithiasis patients. Laparoscopic cholecystectomy was performed in the form of age profile, gender, and history of diabetes mellitus.

Results

Based on the research conducted, the characteristics of cholelithiasis patients are shown in Table 1. It shows the characteristics of the study sample by category last education; the majority of patients are at the high school level (SMA)/equivalent (26 people, 30.2%), with the majority of patients being housewives stairs (53 people, 61.6%).

Table 1. Demographic Characteristics of Study Participants

Characteristics	Total (n)	Percentage (%)
Final Education		
Elementary school/equivalent	26	30.2
Middle School/Equivalent	20	23.3
High School/equivalent	27	31.4
3rd Diploma	2	2.3
1st degree	9	10.5
2nd degree	2	2.3
Profession		
Housewife	53	61.6
Self-employed	7	8.1
Farmer	5	5.8
Honorary	4	4.7
State Civil Service	3	3.5
Retired	3	3.5
Civil Servants	2	2.3
Contract worker	1	1.2
Police	1	1.2
TNI	1	1.2
Nurse	1	1.2
College student	1	1.2
Casual Worker	1	1.2
Unemploy	3	3.5

Table 2 shows the characteristics of the research sample based on the diagnosis category; the highest result was cholelithiasis (71 people, 82.6%). Based on complications, most patients had difficulties (69 people, 80.2%), with the most complications, namely cholecystitis + GB adhesions (27 people, 31.4%). Based on comorbidities, most patients had comorbidities (50 people, 58.1%), with the most comorbidities, namely hepatomegaly (8 people, 31.4%). Based on blood pressure, the highest results were obtained typically (120-129 and/or 80-84 mmHg) (33 people, 38.4%). Based on blood sugar levels, The highest results obtained were normal blood sugar levels (GDS <200 mg/dL and GDP < 126 mg/dL) (79 people, 91.9%).

Table 3 shows the distribution of cholelithiasis patients carried out

Laparoscopic Cholecystectomy at Aloei Saboe Hospital from January 2020 – December 2021 based on gender, age, and history of diabetes mellitus. The most results were women (70 people, 81.4%), from age group 46-55 years (23 people, 26.7%), and had no history of diabetes mellitus (76 people, 88.4%).

Table 2. Clinical Characteristics of Cholelithiasis Underwent Laparoscopic Cholecystectomy Patients at The Aloei Saboe Hospital

Characteristics	Total (n)	Percentage (%)
Diagnosis		
Cholelithiasis	71	82.6
Multiple cholelithiasis	15	17.4
Complication		
Yes	69	80.2
No	17	19.8
Comorbidity		
Yes	50	58.1
No	36	41.9
Blood Pressure (mmHg)		
120 and < 80	23	26.7
120-129 and/or 80-84	33	38.4
130-139 and/or 84-89	0	0
140-159 and/or 90-99	18	20.9
160-179 and/or 100-109	14	4.7
≥ 180 and/or ≥ 110	0	0
≥ 140 and < 90	8	9.3
Blood Glucose (mg/dL)		
< 200	76	88.4
≥ 200	7	8.1
≤ 126	3	3.5

Table 3. Distribution of Cholelithiasis Underwent Laparoscopically Cholecystectomy Patients at Aloei Saboe Hospital Based on Gender, Age, and History of Diabetes Mellitus

Characteristics	Total (n)	Percentage (%)
Gender		
Female	70	81.4
Male	16	18.6
Age (years)		
17 – 25	2	2.3
26 – 35	9	10.5
36 – 45	22	25.6
46 – 55	23	26.7
56 – 65	19	22.1
≥ 65	11	12.8
History of Diabetes Mellitus		
Yes	10	11.6
No	76	88.4

Discussion

Based on the results of this study, it was found that most of the patients with cholelithiasis who underwent laparoscopic cholecystectomy were women. From the results, we can conclude that most cholelithiasis patients were women. The results of research conducted by Albab (2012) on patients with cholelithiasis at Central General Hospital of Dr. Wahidin Sudirohusodo Makassar found that the proportion of cholelithiasis patients based on sex, most were women (61 people, 70.12%) and the lowest were men (26 people, 29.88%).[12] This research is in line with research by Nurhikmah et al. (2018) in cholelithiasis patients in the digestive surgery department of RSI Siti Rahmah Padang; it was found that as many as 11 patients (57%) were women and eight men (42.1%).[14]

Research conducted by Sueta (2014) at Central General Hospital of DR. Wahidin Sudirohusodo Makassar showed that of the 114 patients, most of them female (88 people, 77.2%) and the lowest was male (26 people, 22.8%). This research is in line with research in America conducted by Stender (2013) found 265 cases of cholelithiasis in women and 89 cases in men. This study, based on gender, found a significant relationship between the genders of women with cases of cholelithiasis. The highest incidence of cholelithiasis evidence is in females than males.[15] The influence of hormones on women is one risk factor for the increasing number of female patients compared to males. Estrogen suspected. It plays an essential role in women, where estrogen can stimulate liver lipoprotein receptors and increase the formation of bile cholesterol.[13]

Research by Girsang (2012) on patients with cholelithiasis being treated while staying at Elisabeth Hospital in Medan found that the majority of patients were male (56 people, 55.4%), and the lowest were women (45 people, 44.6%).[16] This research aligns with Zamani's report in Iran, obtained based on gender; the highest yield was male (3057 people, 57.1%).[17] In both studies, it was found that most cases of cholelithiasis were men. It does not mean the type male genitalia are more at risk for suffering from cholelithiasis. Still, because of sufferers, more men who go to hospitals in Iran and Elisabeth Hospital in Medan are men than women.[16,17]

Epidemiological and clinical studies show that the prevalence of cholelithiasis is two times higher in women than men of all ages in every population studied. The hormonal changes that occur during pregnancy put women at greater risk higher. The increase in estrogen levels during pregnancy induces significant metabolic changes, including the formation of cholesterol and bile supersaturation and reduced gallbladder motility

(gallbladder hypomotility), both factors which increase the formation of gallstones.[18,19] Women, especially during the fertile period, are twice as likely to experience stones bile as men. This is due to the influence of the sex hormone estrogen, which can increase cholesterol absorption in food and the secretion of bile cholesterol.[10]

The present study found that 86 patients with cholelithiasis performed laparoscopic cholecystectomy, most in the age group of 46-55 years (23 people, 26.7%) and the lowest in the age group 17-25 years (2 people, 2.3%). Research from Febyan (2017), at Koja Hospital, the age of most sufferers of cholelithiasis is> 40 years (88 people, 86%). This research aligns with research by Nurhikmah et al. (2018) in the digestive surgery department of RSI Siti Rahmah Padang. It was found that most cholelithiasis patients were in the age group of 40-49 years (7 people, 36.8%), and the lowest was in the age group 70-79 years (1 person, 5.3%).[14] Research from Andra (2017), in the Surgery Department of Central General Hospital of DR. M. Djamil In Padang, reveals the prevalence of cholelithiasis patients was 7.5%. Most of the age group is 50, with an average age of 51.9.[20] Results of this study are in line with what was done by Girsang (2012) on cholelithiasis patients who were hospitalized at Elisabeth Hospital in Medan obtained most of the samples in the age group > 40 years (64 people, 63.4%). However, the lowest was in the age group ≤ 40 years (37 people, 36.6%). Age > 40 years more at risk of developing cholelithiasis due to increased cholesterol secretion in the liver bile. In addition, as we get older, gallstones are very rare spontaneous dissolution.[16]

Research by Sueta (2014) at DR. Wahidin Sudirohusodo Hospital in Makassar found that age ≤ 40 has a significant relationship with the incidence of cholelithiasis was 95 cases (83.3%) compared to age > 40 years, namely 19 cases (16.7%).[13] The same results in a study in Taiwan showed an increase in cases of cholelithiasis in the age group of 20-39 years. This condition shows the presence of change in high-risk age cohorts with cholelithiasis.[21] Incidence increase in cholelithiasis at the age of <40 years is probably caused by an interaction of other factors such as the gender of the patient is female or male, the patient's age is <40 years also comorbid diabetes mellitus, obesity, and hyperlipidemia.[13]

The age group over 40 years has a high risk of cholelithiasis because increasing age is associated with hypersecretion of cholesterol, decreased secretion of bile salts, and decreased bile acids.[10] Epidemiological and clinical studies have found that cholelithiasis is rare in children and adolescents, and the prevalence of cholelithiasis increases parallel to age in both sexes.[22] With increasing age occurs an increase in cholesterol levels in the body that causes an increased risk of gallstone formation. In addition, the contractility of the gallbladder

decreases with time. Increasing age causes relative stagnation of bile which causes gallstones and their complications.[19]

This study found that of the 86 patients with cholelithiasis who underwent laparoscopic cholecystectomy, most did not have a history of diabetes mellitus (76 people, 88.4%). Moreover, the lowest were patients with a history of diabetes mellitus (10 people, 11.6%). The results of research conducted by Muzakki (2017) on gallstones patients with dyslipidemia and diabetes mellitus at the Central General Hospital Fatmawati found the proportion of cholelithiasis sufferers who had a history of diabetes mellitus as many as 11 people (13.9) and who did not have a history of diabetes mellitus as many as 68 people (86.1%).[18] Research by Sueta (2014) at the Wahidin Sudirohusodo Hospital in Makassar found the highest number of cholelithiasis sufferers who had a history of diabetes mellitus, as many as 103 patients (90.4%) and who had no history diabetes mellitus in 11 patients (9.6%).[13] From this explanation, it can be explained that patients with a history of diabetes mellitus or newly diagnosed diabetes mellitus from complaints and blood glucose laboratory results can be at risk of causing gallstones.[18]

Theoretically, the main risk factors for cholelithiasis are the 5F, namely: Fat, Female, Forty/Family history, Fair, and Fertile. 8 However, other risk factors are wrong, including diabetes mellitus. Diabetes mellitus is a closely related disease associated with the risk of developing cholelithiasis. It cannot explain the definitive cause of gallstones in diabetes mellitus patients certainty. However, due to the influence of neuropathy, the autonomic disorder in the gallbladder's contractility causes hypomotility so that the ability to empty the gallbladder decreases and has implications on gallbladder over-volume as a risk factor for gallstone formation.[23] Patients with diabetes mellitus have high blood glucose levels, which can inhibit gluconeogenesis, so that should be converting the fat into glucose to energy will accumulate in the tissues, causing cholesterol synthesis increases and will produce cholesterol deposits in the gallbladder.[24]

The author had yet to examine some of the other risk factors in the present study, such as the assessment of cholesterol levels that may contribute to the incidence of cholelithiasis. Further study must accommodate this limitation.

Conclusion

The results of the distribution of cholelithiasis patients who underwent laparoscopic cholecystectomy in the Aloei Sabote Hospital in the period January 2020 – December 2021 found the most incidents in patients who were female (70 people, 81.40%) age group 46-55

years (23 people, 26.7%). Most patients had no history of diabetes mellitus (76 people, 88.4%). This finding may offer a primary data reference for further research by increasing the number of variables to explore the risk factors for cholelithiasis.

Conflicts of Interest

Nothing to declare

Funding sources

Nothing to declare

Acknowledgments

Nothing to declare

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p-ISSN 2830-0580 | e-ISSN 2830-4608
Jambura Medical and Health Science Journal, Vol.2 No.1 (July 2023)

ORIGINAL ARTICLE **Open Access**

Characteristics of Thyroid Neoplasm Patients in the Department of Anatomic Pathology, Aloei Saboe Hospital

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ABSTRACT

Introduction: Thyroid Neoplasm is a tumor originating from the thyroid gland. Thyroid neoplasms encompass both benign and malignant tumors. Thyroid malignancies are among the most frequently encountered malignancies of the endocrine glands. Thyroid neoplasms generally have a relatively good prognosis when detected early. This study aims to determine the characteristics of thyroid neoplasm patients in the Department of Anatomic Pathology, Aloei Saboe Hospital.
Method: This study is descriptive research using secondary data from medical records. Data was collected using a total sampling technique with a sample size of 58 patients. The study was conducted in the Department of Anatomic Pathology, Aloei Saboe Hospital, from January 2021 to October 2022.
Results: The distribution of thyroid neoplasm patients is highest in late adulthood (36-45 years) with 15 patients (25.9%), followed by early elderly (46-55 years) with 15 patients (25.9%). The gender distribution shows more female patients, accounting for 43 (77.6%). The most common histopathological type is Colloid Goiter, with 20 patients (34.5%).
Conclusion: The distribution of thyroid neoplasm patients is most prevalent between the ages of 35 to 55 years, predominantly in females, with the most common histopathological finding being Colloid Goiter. This study is expected to serve as a valuable source of information, enhancing public knowledge and awareness regarding thyroid neoplasm patients' characteristics.

Key words: Aloei Saboe Hospital, characteristics, thyroid neoplasm

JMHSJ Jambura Medical and Health Science Journal

Published by:
Universitas Negeri Gorontalo

Address:
Jl. Jend. Sudirman No.6, Gorontalo City, Gorontalo, Indonesia

Mobile number:
+62852 3321 5280

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Article History:
Received 09 February 2023
Accepted 31 July 2023
Published 31 July 2023

DOI:
https://doi.org/10.37905/jmhsj.v2i1.18835

Introduction

A thyroid neoplasm is a tumor that originates from the thyroid gland. It includes both benign and malignant neoplasms. Thyroid malignancy is one of the most commonly found malignancies among endocrine gland cancers. Generally, thyroid neoplasms have a relatively good prognosis if detected early. According to data from the World Health Organization (WHO) in 2020, thyroid cancer ranked 10th among the most prevalent types of cancer worldwide, with a total of 586,202 cases, and its prevalence has been steadily increasing over the last five years, accumulating to 1,984,927 cases.[1] In Indonesia, the prevalence of thyroid cancer during 2006-2010 was recorded as 318 cases across all ages and genders.[2] Based on data obtained from medical records at the Department of Anatomic Pathology, Aloei Saboe Hospital, there were 58 cases of thyroid neoplasm from January 2021 to October 2022. Furthermore, according to data from the Indonesian Association of Pathologists' Cancer Registration in 2008, thyroid malignancy ranked 5th among Indonesia's ten most common malignancies.[3]

The *American Cancer Society* explains that the incidence of thyroid cancer in females compared to males is 3:1. Approximately 1.7% of all cancers in females are thyroid cancer. In comparison, it accounts for only 0.5% of cancers in males.[4] Out of the 13,114 cases reported in Indonesia in 2020, it can be detailed that females had a higher prevalence of thyroid cancer, with 9,053 cases ranking as the 6th most common cancer among females in the country. The remaining 4,061 cases were diagnosed in males.[5]

The risk of thyroid nodules increases with age, and low sodium intake triggers thyroid nodules. Additionally, radiation exposure contributes to the growth of thyroid nodules and increases the risk of thyroid nodules becoming malignancies. Based on histopathological findings, papillary, anaplastic, medullary, and follicular thyroid carcinomas are estimated to account for 90% of thyroid malignancy cases.[6]

Various modalities for establishing a definite diagnosis of thyroid nodules and determining their types are well-known in medicine. These range from simple anamnesis and physical examinations to supporting tests such as thyroid scans, *fine needle aspiration cytology* (FNAC), and thyroid histopathology *as* the *gold standard* for diagnostic investigations. The initial examination typically involves measuring the *thyroid stimulating hormone* (TSH) levels. Further testing may include *free tetra-iodothyronine* (FT4) and *free tri-iodothyronine* (FT3) measurements if abnormal TSH values are found. Thyroglobulin testing is usually conducted in the advanced step because of the limitation to differentiating between benign and malignant tumors, except when there is a significant increase in

thyroglobulin levels.[6]

The description above indicates that the incidence of thyroid nodule risk factors depends on age and gender. Histopathological diagnosis serves as the *gold standard* for supporting examinations in establishing the diagnosis of thyroid nodules. This research was conducted to understand and provide information about the characteristics of thyroid neoplasm patients at Aloei Saboe Hospital. Therefore, it is expected to enhance knowledge and understanding for the public, clinicians, and future researchers.

Methods

The research method used was descriptive research using secondary data from medical records as the subjects of the study. This research was conducted in the Department of Anatomic Pathology, Aloei Saboe Hospital. The study was carried out during the period of October-November 2022.

Population and Sample

The population in this study comprised all thyroid neoplasm patients in the Department of Anatomic Pathology, Aloei Saboe Regional General Hospital, from January 2021 to October 2022. The total number of thyroid neoplasm patients was 58. The inclusion criteria for this study were patients diagnosed with thyroid neoplasm by a pathologist based on histopathological examination in the Department of Anatomic Pathology, Aloei Saboe Hospital. The exclusion criteria were patients who did not have medical records in the Department of Anatomic Pathology, Aloei Saboe Hospital, records that need to be included, unreadable, or incomplete.

Data Collection Procedure

The data used in this research is secondary data obtained from medical records of thyroid neoplasm patients in the Department of Anatomic Pathology at Aloei Saboe Regional General Hospital. The data collection tools and research instruments used are writing utensils and tables to record the data obtained from the medical records.

Data Analysis

The data analysis used in this research was a univariate analysis conducted on each variable, and the research findings were analyzed descriptively to determine the distribution and presentation of each variable. Data analysis is performed using the Statistical Product and Service Solutions (SPSS) program (IBM, USA), where the predetermined variables will be presented in descriptive form through tables and narratives.

Results

This research was conducted for approximately three weeks between October and

November 2022. Table 1 shows the frequency distribution of age among thyroid neoplasm patients at Aloei Saboe Hospital from January 2021 to October 2022 was highest in the late adulthood group (36-45 years) with 15 patients (25.9%) and early elderly group (46-55 years) with 15 patients (25.9%). The distribution continues with eight patients (13.8%) in the early adulthood group, seven patients (12.1%) in the late adolescence group, seven patients (12.1%) in the late elderly group, five patients (8.6%) in the elderly group, and the least number in the early adolescence group (12-16 years) with one patient (1.7%). The frequency distribution of gender among thyroid neoplasm patients at Aloei Saboe Hospital from January 2021 to October 2022 shows that the highest number is in females, with 45 patients (77.6%), while males account for 13 patients (22.4%).

Table 1. The Characteristics of Thyroid Neoplasm Patients

Variable	Frequency (n)	Percentage (%)
Age		
Early Adolescence (12-16 years)	1	1.7
Late Adolescence (17-25 years)	7	12.1
Early Adulthood (26-35 years)	8	13.8
Late Adulthood (36-45 years)	15	25.9
Early Erderly (46-55 years)	15	25.9
Elderly (56-65 years)	7	12.1
Late Erderly (>65 years)	5	8.6
Gender		
Female	45	77.6
Male	13	22.4
Total	**58**	**100**

The results from Table 2 show that the frequency distribution of thyroid neoplasm patients based on histopathological findings is highest in the histopathological type called Colloid Goiter, with 20 patients (34.5%). Papillary Thyroid Carcinoma follows this with 18 patients (31.0%), then Follicular Thyroid Adenoma with eight patients (13.8%), Thyroid Cyst with three patients (5.2%), Adenomatous Goiter with three patients (5.2%), Hashimoto Disease with two patients (3.4%), Anaplastic Thyroid Carcinoma with two patients (3.4%), Hurthle Cell Adenoma with one patient (1.7%), and Squamous Cell Carcinoma with one patient (1.7%).

Table 2. The distribution of thyroid neoplasm patient characteristics based on histopathological findings.

Histopathological Picture	Frequency (n)	Percentage (%)
Benign		
Adenoma Follicular Thyroid	8	13.8
Hashimoto Disease	2	3.4
Colloidal Struma	20	34.5
Thyroid Cyst	3	5.2
Hurthle Cell Adenoma	1	1.7
Adenomatous Struma	3	5.2
Malignant		
Papillary Thyroid Carcinoma	18	31.0
Squamous Cell Carcinoma	1	1.7
Anaplastic Thyroid Carcinoma	2	3.4
Total	**58**	**100**

Discussion

Based on the results of the study, it was found that the highest frequency of patients with thyroid neoplasms occurred in the late adult age group (36-45 years), as many as 15 patients (25.9%), and early elderly (46-55 years) as many as 15 patients (25.9%)), then at least it was found in the early adolescent age group (12-16 years) as many as one patients (1.7%). It was in line with research conducted by Saputri, in which she argued that thyroid neoplasms based on age characteristics mainly occur in the age group 40–49 years and 50–59 years. It just means the age of patients who experience thyroid neoplasms starts from adulthood to old age.[6] This is also in line with Nugroho's research, which found that most thyroid nodule sufferers were 36−40 years.[7]

It was supported by the theory put forward by Masjhur, who stated that the hormone tyrosine produced by the thyroid gland would do enormous work in producing hormones. A deficiency in the hormone tyrosine can cause the anterior pituitary gland to secrete excessive amounts of TSH. TSH then causes thyroid cells to secrete large quantities of thyroglobulin into the follicles and causes the thyroid gland to enlarge.[8]

The theory put forward by Vani also supports this, that this happens because the endocrine system and especially the endocrine organs, including the thyroid, experience functional changes with age. The prevalence of thyroid disorders increases with age, and the morphology and physiology of the thyroid gland undergo many changes with age increase.[9]

Based on the study's results, the frequency of gender was the highest in the female sex, with as many as 45 patients (77.6%); in men, there were as many as 13 patients (22.4%). It was in line with a study conducted by Crosby, in which he stated that the highest incidence of thyroid nodules was in women, with 196 sufferers (80.3%), while in men, there were 48 sufferers (19.7%).[10] It's also in line with a study conducted by Kurniawan, in which he found that out of 36 patients diagnosed with thyroid nodules, 33 were mainly female, while the remaining 3 were male.[11] It was also supported by the theory put forward by Heriady, in which he argued that there were more cases of thyroid nodules in women than men; this was due to the association of estrogen receptor expression in the thyroid gland epithelium, while estrogen has carcinogenic properties, namely which stimulates the emergence of excessive cell growth or what is often referred to as malignancy. It was supported by the theory put forward by Crosby, who argued that the influence of hormones on women is one of the predisposing factors to the increasing number of female patients compared to men. Estrogen can increase thyroid-binding globulin (TBG) levels, which works as a transport of T4 and T3 in the blood, decreasing free T4 levels. It stimulates TSH so that glandular hyperplasia occurs as a compensatory mechanism to form more thyroid hormone so that serum T4 and T3 levels can return to normal.

The present study reveals that the frequency of histopathological appearance was found in the benign category, namely Struma Kolloides, in 20 patients (34.5%), and the malignant category, namely Papillary Thyroid Carcinoma, in 18 patients (31.0%). It was in line with a study conducted by Heriady, where he found that out of 71 patients, the histopathological picture of the thyroid nodule was mostly the adenoma group. It is also in line with a study by Widarso; of 288 cases of thyroid nodules, the histopathological examination found 259 cases of thyroid adenomas and 29 cases of malignant thyroid tumors.[12] The results of this study are supported by the theory put forward by Maitra, who said that thyroid goiter is the most common thyroid disease. Maitra also noted that the most common type of thyroid carcinoma found was papillary carcinoma and follicular carcinoma in second place, and the rarest were medullary and anaplastic carcinomas.[13] It just follows the theory put forward by Kumar that a deficiency in thyroid hormone synthesis will lead to an increase in TSH production, which will have an impact on increasing the number and hyperplasia of thyroid gland cells and, if this occurs continuously, will trigger goiter or nodules in the thyroid gland.[14]

The theory put forward by Ertek, namely the increase in cases of follicular variant, tends to be caused by the rapid and quite extensive spread of lesions, the higher age factor,

and also, this variant often appears to have had vascular and extrathyroidal invasions.[15] The theory put forward by Kumar is that papillary carcinoma is the most common type of thyroid cancer. This tumor can occur at any age and is a thyroid carcinoma most commonly associated with a history of exposure to ionizing radiation.

The limitation of this study is that the analysis was carried out in a univariate manner so that it can only provide a descriptive description of the characteristics of patients with neoplasms so that further research is needed to determine whether there is an association. Then in this study, some factors were not examined, such as histopathological features included in the borderline category.

Conclusion

The results of the distribution of cholelithiasis patients who underwent laparoscopic cholecystectomy in the Aloei Sabote Hospital in the period January 2020 – December 2021 found the most incidents in patients who were female (70 people, 81.40%) age group 46-55 years (23 people, 26.7%). Most patients had no history of diabetes mellitus (76 people, 88.4%). This finding may offer a primary data reference for further research by increasing the number of variables to explore the risk factors for cholelithiasis.

Conflicts of Interest

Nothing to declare

Funding sources

Nothing to declare

Acknowledgments

Nothing to declare

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Jambura Medical and Health Science Journal, Vol.2 No.1 (July 2023)
p-ISSN 2830-0580 | e-ISSN 2830-4608

ORIGINAL ARTICLE **Open Access**

Identification of Respondent Characteristics and Relationship of Clinical Manifestations with Chest Radiograph Lesion in Pulmonary Tuberculosis Patients at Aloei Saboe Hospital

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ABSTRACT

Introduction: Tuberculosis (TB) is an infectious infectious disease caused by *Mycobacterium tuberculosis*. This study aimed to determine the relationship between clinical manifestations and the results of chest radiographs in adult pulmonary TB patients at Aloei Saboe Hospital.
Method: The research design used in this study was cross-sectional by examining the relationship between clinical manifestations and chest radiography results in adult pulmonary TB patients at Aloei Saboe Hospital from October to November 2022. The population of this study was adult pulmonary TB patients using accidental sampling as a sampling technique. The research instrument used was the medical record which contained the patient's anamnesis status and the results of the chest radiography examination. The relationship between variables was then analyzed using the Kolmogorov-Smirnov test.
Results: Of the 44 samples, the most common clinical manifestations were dyspnea and chest pain in 12 patients (26.67%). The most chest radiographic results were fibrotic in 21 patients (47.7%). According to the American Thoracic Association (ATA) classification, extensive lesions were predominantly found in 21 patients (47.7%). There was an association between productive cough and chest radiography results (p=0.012). Meanwhile, chest radiographs were not associated with productive cough, hemoptoe, and dyspnea.
Conclusion: There is a relationship between productive cough and chest radiography lesions. Further study may determine samples for research that are minimally biased so that the results obtained are more representative of the population.

Key words: Chest radiograph, clinical manifestation, lung tuberculosis

JMHSJ Jambura Medical and Health Science Journal

Published by:
Universitas Negeri Gorontalo

Address:
Jl. Jend. Sudirman No.6, Gorontalo City, Gorontalo, Indonesia

Mobile number:
+62852 3321 5280

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Article History:
Received 14 July 2023
Accepted 31 July 2023
Published 31 July 2023

DOI:
https://doi.org/10.37905/jmhsj.v2i1.21392

Introduction

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis.* The main symptom of pulmonary TB patients is a productive cough for two weeks or more. Cough may be followed by additional symptoms, namely hemoptoe, shortness of breath, weakness, decreased appetite, decreased body weight, malaise, night sweats without physical activity, and malaise for over a month.[1]

In addition to the findings of clinical symptoms, the diagnosis of pulmonary TB can also be established from the results of additional investigations. One of the supporting examinations for TB is a chest X-ray. Based on data from the evidence-based guidebook, only 5% of reactive pulmonary TB patients have normal chest X-rays, while the rest are abnormal. The sensitivity and specificity of chest X-rays in diagnosing pulmonary TB are 86% and 83% if apical lesions, cavities, and reticulonodular features are found.[2]

The worst impact of TB disease is death.[3] Pulmonary tuberculosis causes physical effects such as weight loss and pale appearance. This situation will affect self-esteem and other psychological aspects of pulmonary tuberculosis patients.[4]

Geographically, in 2020 the most TB cases within the scope of the World Health Organization (WHO) work area are in Southeast Asia (43%). Indonesia is the third country with a percentage of 8.4% after India (26%) and China (8.5%).[5] Data from the Ministry of Health of the Republic of Indonesia shows that the number of pulmonary TB cases found and treated in 2021 is 824,000. In Gorontalo Province, particularly the Gorontalo City area, the number of pulmonary TB patients in 2021 was recorded at 925 cases.

In clinical events, clinical manifestations of pulmonary TB did not determine the presence of chest radiographic findings typical of pulmonary TB. Based on the description above and to find out whether patients with clinical manifestations of TB will show a typical chest radiographic lesion of TB and support the 2020-2024 Tuberculosis Control Strategy program in Indonesia, the characteristics of respondents and the relationship between clinical manifestations and radiographic examination results must be confirmed at Aloei Saboe Hospital.

Methods

This research was conducted at the Aloei Saboe Hospital, Gorontalo City, Gorontalo Province, in October 2022. The research design used in this study was cross-sectional with observational analytic research, which was analyzed descriptively by studying the relationship between clinical manifestations and chest radiographic lesions of adult

pulmonary TB patients in Aloei Saboe Hospital. The independent variable in this study was the clinical manifestations of adult TB patients, and the dependent variable was the chest radiograph of adult pulmonary TB patients.

The population of this study was adult pulmonary TB patients at Aloei Saboe Hospital from September to October 2022. In determining the sample, the inclusion and exclusion criteria were applied. In taking the sample of this study using accidental sampling technique obtained from hospital medical records. The secondary data source was obtained from medical record archives of adult pulmonary TB patient status at Aloei Saboe Hospital.

Univariate analysis was used to determine the frequency distribution of tuberculosis. Tuberculosis was analyzed to describe the respondents' characteristics, including age and gender. In addition, univariate analysis can also be used for both variables, namely clinical manifestations and chest radiographic examination results in pulmonary TB patients. Bivariate analysis was used to determine whether there was a statistically significant relationship between the dependent and independent variables using the Kolmogorov-Smirnov test using SPSS 25.0 For Windows.

Results

Table 1 shows the characteristics of the 44 patients who were sampled. Based on age, the most were aged 46-55 in 13 patients (29.5%), where the youngest patient was 20 years old and the oldest was 80. Based on gender, the TB patients were 27 men (61.4%) and 17 women (38.6%). The most common clinical manifestations were dyspnea and chest pain in 12 patients (26.67%), respectively, hemoptoe in 11 (24.44%) patients, and lastly, productive cough in 10 patients (22.22%). Based on chest radiograph results, most of the patients had fibrotic lesions in 21 patients (47.7%), then patchy consolidation in 13 patients (29.5%) and cavities in 10 patients (22.7%). The dominant ATA classification lesions found in the sample were far advanced lesion in 21 patients (47.7%), followed by minimal lesions in 20 patients (45.5%).

Table 2 shows the relationship between age and gender with chest radiographic features. Patchy consolidation was mostly found in the late elderly (46.1%) and male gender (69.2%). In comparison, cavity lesions were mostly found in late adulthood and early elderly (30%) in males, while fibrotic lesions were most commonly found in the early elderly (36.8%) and males.

Table 1. Baseline Characteristics of The Lung Tubeculosis Patients

Characteristics	Frequency (n)	Percentage (%)
Age (Years)		
17-25	3	6.8
26-35	2	4.5
36-45	7	15.9
46-55	13	29.5
56-65	12	27.3
>65	7	15.9
Gender		
Male	27	61.4
Female	17	38.6
Clinical Manifestation		
Productive Cough	10	22.22
Hemoptoe	11	24.44
Dyspnea	12	26.67
Chest Pain	12	26.67
Chest Radiograph		
Patchy consolidation	13	29.5
Cavity	10	22.7
Fibrotic	21	47.7
ATA Classfication		
Minimal lesion	20	45.5
Moderate lesion	3	6.8
Far Adcanced lesion	21	47.7

ATA: American Thoracic Association

Table 2. Age and Gender Categories Based on Thoracic Radiography

Characteristics	Chest Radiograph Finding (n,%)		
	Patchy Consolidation (N=13)	Cavity (N=10)	Fibrotic (N=21)
Age (Years)			
17-25	1 (7.7)	0 (0)	2 (10.5)
26-35	0 (0)	2 (20)	1 (5.2)
36-45	2 (15.4)	3 (30)	2 (10.5)
46-55	3 (23)	3 (30)	7 (36.8)
56-65	6 (46.1)	3 (30)	5 (26.3)
>65	1 (7.7)	1(10)	4 (21)
Gender			
Male	9 (69.2)	7 (70)	11 (52.3)
Female	4 (30.7)	3 (30)	10 (47.6)

Table 3 shows the relationship between clinical manifestations and chest radiographic findings. There was a significant association between productive cough and chest radiology results (p=0.012). In contrast, there was no significant association between hemoptoe, dyspnea, and chest pain with the chest radiography findings (all p > 0.05).

Table 3. Relationship of Clinical Manifestations with Chest Radiography Results

Clinical Manifestation	Chest Radiograph Finding (n,%)			p-value
	Patchy Consolidation (N=13)	Cavity (N=10)	Fibrotic (N=21)	
Productive cough				
Yes	4 (30.8)	5 (50)	0 (0)	0.012
No	9 (69.2)	5 (50)	21 (100)	
Hemoptoe				
Yes	4 (30.8)	1 (10)	6 (28.6)	1.000
No	9 (69.2)	9 (90)	15 (71.4)	
Dyspnea				
Yes	4 (30.8)	2 (20)	6 (28.6)	1.000
No	9 (69.2)	8 (80)	15 (71.4)	
Chest Pain				
Yes	1 (7.7)	2 (20)	9 (42.9)	0.172
No	12 (92.3)	8 (80)	12 (57.1)	

Kolmogorov-SmirnovTest

Table 4 shows the relationship between clinical manifestations and the classification of lung lesions based on ATA. There was no significant relationship between productive cough, hemoptoe, dyspnea, and chest pain with the classification of lung lesions by ATA (all p> 0.05).

Table 4. Association of Clinical Manifestations with Classification of Lung Lesions by the American Thoracic Society

Clinical Manifestation	ATA Classification (n,%)			p-value
	Minimal lesion (N=20)	Moderate lesion (N=3)	Far Advanced lesion (N=21)	
Productive cough				
Yes	3 (15)	1 (33.3)	5 (23.8)	0.996
No	17 (85)	2 (66.7)	16 (76.2)	
Hemoptoe				
Yes	6 (30)	1 (33.3)	4 (19)	0.991
No	14 (70)	2 (66.7)	17 (81)	
Dyspnea				
Yes	6 (30)	1 (33.3)	5 (23.8)	1.000
No	14 (70)	2 (66.7)	16 (76.2)	
Chest Pain				
Yes	5 (25)	0 (0)	7 (33.3)	0.992
No	15 (75)	3 (100)	14 (66.7)	

Kolmogorov-Smirnov Test

Discussion

Based on age, in this study, the most were aged 46-55 in 13 patients (29.5%), where the youngest patient was 20 years old and the oldest was 80 years old. This is following

Indonesia's health profile in 2018. The highest positive smear TB cases were in the age group 45-54 years.[6] This is thought to be influenced by the adult group being a productive group interacting more socially. Adults have high mobility and social interaction due to various work activities, education, religion, hobbies, sports, arts, organizations and other crowds. During social interaction, TB transmission can occur.[7] Another assumption could also be due to decreased local immunity in the lungs of the elderly. This is related to lifestyle (smoking) or comorbid conditions that can cause susceptibility to reactivation in the lungs.[8]

In this study, based on gender, the most TB patients were 27 patients (61.4%), then 17 women (38.6%). This follows previous research that the respondents predominantly constituted males (66%), and there was a relationship between gender and the incidence of pulmonary TB (p-value = 0.006). This is presumably due to the movement and working hours of men, which are higher than women. Moreover, the habit of smoking and drinking alcohol, which can alleviate the immmun, significantly increases the risk of developing TB. With these factors, men are much more susceptible to TB disease bacteria than women.[9] In addition, in the 2018 Indonesia Health Profile, the highest number of TB cases were in men.[6]

The most common clinical manifestations in the present study were dyspnea and chest pain, followed by hemoptoe and productive cough. This is not in line with a previous study which found that the most frequent complaint as the reason for patients coming to the hospital was productive cough. According to the theory of respiratory symptoms, productive cough for more than three weeks is the most common symptom in active TB. This difference is assumed to occur because as many as 34 patients in this study were patients with long active pulmonary TB, so the symptoms encountered by researchers were symptoms with extensive lung parenchymal damage, namely shortness of breath and chest pain.[8] Symptoms of shortness of breath arise if there is an enlargement of the lymph nodes at the hilus that press on the bronchi or pleural effusion, extension of parenchymal inflammation or billions. Meanwhile, chest pain is usually pleuritic due to the involvement of the pleura in the disease process.[10]

Patients with the most chest radiology results were fibrotic in 21 patients (47.7%), then patchy consolidation in 13 patients (29.5%) and cavities in 10 patients (22.7%). These results are not following previous studies, which found patchy consolidation as the most (79%) radiological finding.[8,11] Meanwhile, according to the ATA classification, patients with the most results were extensive lesions in 21 patients (47.7%), then minimal lesions in 20 patients (45.5%) and moderate lesions in 3 patients (6.8%). This is following a literature

review by Fariadi and Parhursip which suggests that most radiological lesions are far advanced lesions.[6,12] Researchers assume that these results are related to the many old pulmonary TB patients with chronic infections who were identified. Fibrosis usually occurs due to chronic infection in the form of scar tissue. Fibrosis is a thread-like radiopaque appearance (more opaque than infiltrate) with the traction of the lung parenchyma around.[11]

This study had a significant relationship between productive cough and chest radiology results. This aligns with Karim's study which revealed significant relationship was obtained between productive cough and chest radiology. Theoretically, at the beginning of lung inflammation, until lung destruction finally occurs, dead tissue and cells will be removed as a cough reflex. Therefore, pulmonary TB patients generally have a productive cough with lots of bacilli in it so that the initial damage, which is depicted by cloud shadows and spots that have unclear boundaries with low density over time, will experience the process of destruction of lung tissue so that it will form cavities, namely the formation of holes due to softening of caseous necrosis which is often seen on chest X-ray images of cavities with smooth-walled walls.[13]

There was no significant relationship between hemoptoe and radiological lesions. This is in line with research by Karim (2013), which stated that there was no significant relationship between hemoptoe and the results of a chest radiolograph images.[8] In addition, Thorson et al., (2007) also showed that hemoptoe can show non-specific features such as cavities, pleuritis and miliary shadows.[14]

No significant relationship exists between dyspnea and the appearance of radiological lesions. This is in line with Thorson et al, (2007), who stated that patients with symptoms of shortness of breath often display pleurisy.[14] In addition, there is no significant relationship between chest pain and radiological lesions. This is not following the literature that chest pain arises when there is pleural involvement (infiltration to the pleura) in the disease process.[10]

Based on the ATA classification, there was no significant relationship between productive cough and hemoptoe with radiological lesions. These results are not in line with research by Karim (2013), which states that there is a significant relationship between productive cough and the results of a chest photo examination based on the ATA Classification (p-value = 0.000). However, in the same study, there was no relationship between hemoptoe and ATA classification. According to the theory, it is estimated that pulmonary TB directly affects the pulmonary arteries and causes coughing up blood so that lesions in the form of cavities, infiltrates and atelectasis are found. Cavities in TB patients in

any position will still be round shadows but are superposed with other lesions and are not certain to involve blood vessels.[8] However, based on a case report on a TB patient by Doroftei et al. (2021), coughing up blood was found even without lesions in the lungs with long-term inflammation and only bilateral reticular shadows were found. Researchers assume that the extent of TB patients' lesions in long-term or chronic inflammation can give a more dismal picture so that the difference between coughing up blood and the area of the lesion cannot influence.[15]

Based on the ATA classification, the absence of a relationship between dyspnea and the lesion size is not in line with the literature, which describes that dyspnea is found when lung damage is extensive. However, there is no association between dyspnea and lesion size, according to Karim's study. It is also possible that shortness of breath occurs due to pleural abnormalities in TB patients, such as pleural effusion, so pleural thickening is seen, which is difficult to relate to the extent of the lesion purely due to pulmonary TB. In addition, chest pain that is not related to the size of the lesion based on the ATA classification is not following the literature that chest pain arises when the nervous system in the pleura is affected, so it is difficult for researchers to relate it to the size of the lesion.[13]

The recent results found in this study mostly have no relationship between the variables. This is due to the results of the chest radiography examination, which cannot stand alone to determine the specific clinical manifestations that occur. According to Ismail, radiographic abnormalities in pulmonary TB patients also have similarities with other lung diseases, such as lung disorders caused by fungi, because the lesions are most often found in the upper lung fields and accompanied by the formation of cavities. In addition, pulmonary TB lesions can also resemble infiltrates, such as upper lobe lobar pneumonia, which is in its resolution period and takes the form of patches resembling tuberculosis nests.[10]

Main limitation of the study was regarding the sampling technique, namely accidental sampling. In addition, only taking the research location in one hospital so that the sample was not representative of new and old pulmonary TB cases, which caused bias when grouping clinical manifestations and chest radiographic results.

Conclusion

From the results of the study, it was found that the latest elderly showed radiological images of cloudy shadows and spots (46.1%), the most frequent cavity images were in late adulthood (30%), and the most fibrotic features were found in early elderly age (36.8%). The male gender, on all radiological features, is more dominant in patchy consolidation (69.2%),

cavities (70%) and fibrotic (52.3%). The most common clinical manifestations were dyspnea and chest pain in 12 patients (26.67%). Patients with the most chest radiology results were found to be fibrotic in 21 patients (47.7%), while according to the ATA classification, patients with the most results, namely extensive lesions, were 21 patients (47.7%). The results of the statistical hypothesis test with Kolmogorov-Smirnov obtained a p-value =of 0.012. It can be concluded that there is a significant relationship between productive cough and chest radiology results.

Conflicts of Interest

Nothing to declare

Funding sources

Nothing to declare

Acknowledgments

Nothing to declare

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Jambura Medical and Health Science Journal, Vol.2 No.1 (July 2023)
p-ISSN 2830-0580 | e-ISSN 2830-4608

REVIEW ARTICLE **Open Access**

Medicial Education Strategy In The Era of Digitalization and Disruption

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ABSTRACT

Background: This article aims to (1) examine the current condition of education in the digitalization and disruption era and (2) examine medical education strategies in the digitalization and disruption era. Writing scientific papers is based on library research, whose object of study uses library data in the form of books as a data source.
Content: Based on the literature review, it was found that: (1) global medical education currently uses the SPICES strategy (student-centered learning, problem-based, integrated, community-based, elective, and systematic), accompanied by nine educational trends; (2) SPICES is a medical education strategy that will produce graduate profiles that refer to World Health Organization (WHO) and World Organization of Family Doctor (WONCA) conference agreements. A doctor must have six-star doctor characteristics, namely: care provider, decision makers, communicators, community leaders, managers as well as creators and innovators; (2) the minimum standard of competence for doctors in Indonesia, constitute of seven areas of graduate competency namely; has noble professionalism, is always aware and develops himself, can communicate effectively, is reliable in managing information, always has a scientific basis in medical science, has clinical skills and can manage health problems well.
Conclusion: A special strategy for medical education is required in the era of digitalization and disruption by applying a lifelong education approach. Indonesian medical education uses the SPICES strategy to create six-star doctors and master the seven defined competency areas.

Key words: Digitalization, disruption, medical education

JMHSJ Jambura Medical and Health Science Journal

Published by:
Universitas Negeri Gorontalo

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Jl. Jend. Sudirman No.6, Gorontalo City, Gorontalo, Indonesia

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Article History:
Received 15 December 2022
Accepted 21 July 2023
Published 31 July 2023

DOI:
https://doi.org/10.37905/jmhsj.v2i1.17479

Introduction

The global development of the world of education continues to increase in line with advances in science and technology. One of the most extraordinary advances, namely digital technology in the era of disruption (disruption), has penetrated (pervasiveness) space and time so that the world seems to be without boundaries. In the education sector, the acceleration of digital technology is increasingly driven by extraordinary events, namely when the world, including more than 189 countries, has been infected with COVID-19 since the end of 2019, which was later declared a pandemic.

At the beginning of the Covid-19 pandemic, the world of education was also affected. However, it then rose, existed, and even experienced extraordinary leaps due to the transition from face-to-face (conventional) methods to massive online based on digital technology. In this regard, all elements of global governance (including Indonesia) are taking strategic steps in responding to the new era of education. So the implementation of education continues to be reformed; the goal is to guarantee the quality of education, and even the quality must be better than in previous times. Education in medicine and health also adapts to current conditions, where digital-based technology continues to be developed.

Based on the Ministry of Education and Culture's report (2020), since March 2020, this institution has made various regulations that adjust various policies and provide various suggestions and solutions during the Covid-19 pandemic. In April 2020, the Ministry of Education in Indonesia provided free quotas, launched the Guru Berbagi portal, and relaxed using "bantuan operasional sekolah" (BOS) and "bantuan operasional pendidikan" (BOP) funds to pay tea honorariums, and online learning. Next in May s.d. In June 2020, the Ministry of Education and Culture, among other things: provided Single Tuition Fee assistance for around 410 thousand students and BOS funds. Following July s.d. August 2020, they launched the curriculum in the emergency conditions of the Covid-19 pandemic and provided learning modules for early childhood education programs and elementary education levels. The next policy in September to December 2020, provided subsidized internet quota assistance for students, teachers, university students, and lecturers. This situation means the Indonesian government has been remarkably anticipatory in responding to changes by preparing various regulations. One of the new regulations or policies was made through the Guidelines for Developing a Higher Education Curriculum in the Industrial Age 4.0 to Support Free Learning-Independent Campus.[1] Various Medical Faculties in Indonesia have implemented the intended policy, at the Faculty of Medicine, University of Gorontalo

(Fakultas Kedokteran Universitas Negeri Gorontalo, FK UNG), for example, has issued Chancellor's Regulation Number 02 of 2020 concerning Academic Regulations at Universitas Negeri Gorontalo, which was then followed up by compiling a Competency-Based Curriculum Policy (Revised) by the Dean of FK UNG in 2021. This policy was made as a guideline for implementing Bachelor of Medicine education at Universitas Negeri Gorontalo and is expected to be used up to the Medical Profession Program.

Even though the government has issued various policies, the results of research at several tertiary institutions between 2020 – 2022 show that the post-Covid-19 online learning system in the era of digitalization and disruption is seen as still lacking in efficiency and effectiveness, particularly those related to 'social networks' internet. This incident then has an impact on the quality of student learning outcomes. In this regard, examining the Medical Education Strategy in the Era of Digitalization and Disruption is necessary. This article examines the current conditions in medical education and the proper strategies to implement in the digitalization and disruption era.

Digitalization and Disruption Era

Until the end of 2022, experts see the world experiencing a technological or industrial revolution in the fourth wave (4.0). This is known as the digitalization revolution or cyber-physical system. The concept of implementing the industrial revolution 4.0 describes a series of major changes that have occurred in industry in the world. The concept popularized by Klaus Schwab, an economist from Germany, is centered on automation involving information technology so that effectiveness and efficiency in a work environment will increase. In this sophisticated 4.0 era, some technologies are very popular and have been implemented by various groups: geolocation, robotics, the Internet of Things (IoT), smart things, Big Data, Artificial Intelligence (AI), Cloud Computing, and Additive Manufacturing.[2] Even a big step from Japan, namely announcing the possibility of revolutionizing the concept of Industry 5.0, which is referred to as the era of society's awakening. The main focus is not only on technology but on combining and utilizing it with various aspects, including human aspects.[3]

From the aspect of etymology, the word digital is taken from the Greek digitus, which means the fingers or toes of a person whose number is ten (10). Digitalization is a change process from analog mechanical and electronic technology to digital technology. From the 1980s until the end of this decade, digitizing technology has continued to evolve. This matter is a manifestation of globalization, namely an integrated process carried out globally due to the exchange of world views, thoughts, products, and various other socio-cultural aspects due to improvements in internet telecommunication infrastructure and modes of transportation.[4]

Regarding the term disruption (English), which later became a standard term in Indonesia (disruption), it is contained in the Big Indonesian Dictionary (Kamus Besar Bahasa Indonesia, KBBI), which means 'things uprooted from their roots.' In the English – Indonesian Dictionary, Echols and Sadily (2000:189) means translated as 'disturbance,' 'chaos.' This means that disruption is an innovation or a threat that will replace the entire old system with a new way, system, or idea. Disruption replaces old, physical-mechanical technology with digital technology that produces something new, more efficient, and more useful (Kasali, 2017 p. 34). Popular terms in various circles, such as disruption, disruptive innovation, disruptive technology, disruptive mindset, and disruptive leader, have become a habit and are very familiar to the general public, especially the millennial generation and the educated. Rhenald Kasali, in his book Disruption, states that the term "disruption" originally appeared in the context of business, investment, and finance. However, its influence expanded in many areas of life: politics, entertainment, government, society, leadership, and education. In the context of education, it is then termed by experts as an educational disruption.[5,6]

Based on the descriptions and views of experts, it shows that the industrial revolution 4.0 had a significant impact on all lines of human life. This also means that in the digital and disruption era, digital-based technology is necessary for humanity in all sectors, including education.

The World of Education from Conventional to the Era of Digitalization and Disruption

Hidayat (2019: 3) defined education as an effort to develop the potential that God has bestowed on humanity so that it can humanize humans, which at the Islamic level is called al-insan kamil (whole human being; plenary; kaffah). Furthermore, he said that the process of teaching, learning (ta'lim and tadris), cleansing and habituation (tahdzib and ta'dib), and tadrib (practice) can be realized through education.

Some experts believe that the principle of education is the acquisition of knowledge or knowledge in rational reasoning. The principle of education also means that it is a gradual process of bringing life changes in a positive direction and can help improve one's thinking. Education is a basic need for a nation to become developed, independent, and civilized. On a more micro scale, if individuals neglect their education, stupidity, backwardness, and poverty of insight will certainly befall them. This means a fatal mistake if the state, region, or every individual gives priority to, let alone ignores, education. Many facts show the high degree reachable for knowledgeable people (*Allah will exalt those who believe among you and those who are given knowledge of several degrees: QS al-MujJadilah: 11*). In the Islamic

perspective education is, first and foremost, the Prophet Muhammad SAW received the first revelation related to "education; Study; reading = Iqra'." Students in madrasas or pesantren are always taught pearls of wisdom; adagio or mahfudzat, for example: "utlubul ilma even though it is bissin" = seek knowledge even though it reaches China or "utlubul 'ilma minal mahdi ilal lahdi", seek knowledge from the cradle to the grave.

This Islamic concept became actual again, particularly with the publication of Paul Lengard's book 'An Introduction to life long education' in 1970, which was later developed by UNESCO.[7] The meaning of Education from an Islamic perspective that has been practiced since 15 centuries ago, is very much in line with the views of education experts (non-Muslim-secular), particularly with the birth of the conception of lifelong Education. One of the philosophers who conforms to this Islamic perspective is the educational theory of Ivan Illich (1926-2002). As a humanist and religious (Catholic) thinker, Illich tends to define Education in a broad sense. For him, Education equals life. According to Kartikasari (2018: 61) and Sutirna and Samsudin, 2015: 24). Education is a matter that exists in human life and is the influence of a process of growth and development. Education can be meaningful as a person's learning experience throughout life. Illich stated that: "education is a learning experience that takes place in various environments and processes throughout the ages."[7,8]

The conception of lifelong education emphasizes that the educational process takes place continuously from the time a person is born until he dies, whether implemented through formal, non-formal, or informal education. From an Islamic perspective, Lifelong Education is not only an idea or concept but has become part of the behavior of life. Nevertheless, in a modern (western) concept, recommendations have been received to become a parent in educational innovation efforts.[9] Related to the concept of long-life learning, the European Commission, which consists of 35 countries, made a study in 2002 regarding indicators of the quality of Lifelong Education (European Commission. Directorate General for Education and Culture, 2002: 7-8). The commission's report states that there are 15 indicators of the quality of Lifelong Education which can be grouped into four categories and indicators. Area A: which is referred to as Skills, Competencies, and Attitude. This area includes a) Literacy, b) Numeracy, and c) New Skills in the Learning Society. Area B: This area is called Access and Participation, including: a) Access to Lifelong Learning and b) Participation in Lifelong Learning. Area C: referred to as Resources for Lifelong Learning, includes: a) Investment in Lifelong Learning, b) Educators and Training, and c) ICT in Learning. Area D: referred to as Strategies and System Development, including: a) Strategies of Lifelong Learning, b) Coherence of Supply, and c) Counseling and Guidance.

The Lifelong Education Approach from the European Commission is stated as a policy strategy for building citizenship, social cohesion, employment, and fulfilling personal needs. In the Indonesian context, the meaning of education prioritizes religious values and culture but remains sensitive to the times, as stated in Law Number 20 of 2003 concerning the National Education System. This regulation emphasizes that national education in the Republic of Indonesia is based on Pancasila and the 1945 Constitution. A very principled affirmation is the mention: "rooted in religious values, national culture and responsive to the demands of changing times." This situation shows that the meaning of education globally and in the Indonesian context is compatible or under religious (Islamic) principles. It can also be interpreted that national education in Indonesia prioritizes the values of religiosity and culture and continues to pay attention to technological modernization that continues to develop.

In the context of education in the era of digitalization and disruption (industrial revolution 4.0), its main feature is the use of digital technology in the teaching and learning process (cyber system) so that the inheritance of knowledge and competencies can take place continuously without always having to meet face to face (offline) in the classroom. In other words, teaching materials can reach students anytime without being limited by space and time. There are several strategies or ways of implementing education (including education in the field of medicine) in the era of digitalization and disruption (technological revolution 4.0 and society 5.0, namely, (1) in the teaching-learning process, digital technology devices should be prepared in advance. This statement makes one benchmark in the era of digitalization, and disruption is the foundation of technology; (2) a curriculum following current conditions is urgently needed. This means that there is only medical education with modernizing the curriculum under the demands of the times and (3) Ensuring lecturers who are competent in applying information technology to learning.[10] Previous study reported that the application of digital technology requires educators (teachers, lecturers) to develop knowledge (hardware and software), pedagogy (teaching methods), and lesson content). This condition means that this point makes it imperative that teaching staff (also educational staff) be competent and smart.[11]

There are at least three main pillars in formulating an educational strategy that can be adopted in medical education in the digitalization and disruption era, namely: (1) preparation of modern technological infrastructure or facilities; (2) the presence of a curriculum that is continuously updated; and (3) the intelligence or skills of teaching and educational staff in applying IT. On the third point, students do not mention their student elements because, in this era, students are generally the latest generation who are technology literate.

Several studies report the implementation of online learning/education processes in tertiary institutions, including the Faculty of Medicine, in the era of digitalization and disruption after the Covid-19 pandemic. For example, the results of research by Eka Ramadanti et al. from the State University of Malang (2021) show that online learning models need fixing for students. For example, there are extra fees for data packages, and learning could be more optimal, impacting the Rating Index value.[12] Subsequent research from the Bandung Institute of Technology (ITB) by Permana and Wiyanti (2021) concluded that: changes in the learning system from offline to online (Distance Learning system) are seen as not being effective and efficient because of the disparity in education in Indonesia, particularly at the tertiary level.[13] Another study from the Faculty of Medicine, University of Sam Ratulangi Manado shows that internet connectivity impacts the quality of learning. Apart from that, it is constrained by the availability of supporting tools and materials and laboratory skill modules that still need to be standardized and related to psychological readiness and devices in terms of preparing for online learning.[14]

Research reveals that after the Covid-19 pandemic, the IT-based (online) learning process has yet to provide optimal results. Concerning the three research results, at Nurtanio University, Bandung, online lecture activities are carried out through a page provided by the campus designed by BTSI (Bureau of Technology and Information Systems) called f-learning. In order to streamline the learning process and anticipate problems with IT applications, some lecturers use applications on the Play Store by utilizing Google Classroom, Schoology, Zoom, and Edmodo.[15] This case shows that, although there are many obstacles in the learning process by utilizing information technology, there are tips that can be implemented as practiced by Nurtanio University, Bandung. In fact, since 2020, the Ministry of Education has launched Merdeka Learning Kampus Merdeka (MB-KM), where one of the learning characteristics is student-centered or Student-Centered Learning (SCL). In this study, the things that are put forward are creativity, capacity, personality, student needs, and student independence. SCL refers to constructivism learning theory, where students must construct their knowledge to learn effectively.[1]

It cannot be denied that the current era of digital technology has greatly influenced the world of education and influenced many countries to invest in education technology. Apart from developed countries, developing countries like Indonesia continue to make IT-based education policies and programs. Countries that are seen as (poor) like Uganda also make educational policies on a technology basis.[10]

Strategy for Medical Education in the Era of Digitalization and Disruption

Education in the perspective of medical education has been regulated in Law Number 20 of 2013 concerning Medical Education. The regulation states that there are two types of education, namely academic and professional education, which produce competent graduates. The derivation of rules related to medical education, as outlined in the Minister of Research and Technology Regulation Number 18 of 2018 concerning National Standards for Medical Education, states that there are 17 (seventeen) standards for professional medical education, including a) graduate competency standards (covering attitude competence, knowledge, and skills); b) standard content (a minimum criterion for the depth and breadth of learning materials); c) process standards (among other things: the characteristics of the learning process include interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centered). In addition, process standards focus on: the academic education process is carried out with student-centered learning strategies based on individual and community health problems and scientific and technological developments that are horizontally and vertically integrated, selective, structured, and systematic.

The definition of strategy has been put forward by many experts, including Schumaker & Deshler, (1992) as quoted https://cambriancollege, states that "A learning strategy is an individual's way of organizing and using a particular set of skills in order to learn content or accomplish other tasks more effectively and efficiently in school as well as in non-academic settings". This means that the learning strategy is a way of organizing and using certain skills to complete tasks effectively and efficiently in educational institutions.

Prior to implementing the student-centered learning strategy, problem-based, integrated, community-based, elective, and systematic (SPICES), Hardem (1982) said that the old curriculum was the Plexner model (1911), the nature of this model was: teacher-centered on information gathering, discipline-based, hospital-based, uniform, and internship based. That means the focus of the medical education curriculum is to produce doctors who can work in hospitals by prioritizing curative and rehabilitative services. This curriculum model cannot answer public health problems and does not respond to science and technology. In its development, a new approach to the medical education curriculum was put forward with the following characteristics: student-centered learning, problem-based, integrated, community-based, elective, and systematic (SPICES). The SPICES strategy approach then becomes the basis or principle for compiling the Competency-Based Curriculum (CBC) (Saiful Batubara, 2012: 2). SPICES is also following the Indonesian Doctor's Professional Education Standards (SPPDI). Assessment of the application of the SPICES model in the educational curriculum is

very important in determining the direction of ongoing learning.[16]

Regarding the implementation of the SPICES strategy, a study has been carried out, for example, at the Faculty of Medicine UNHAS Makassar by Iskandar (2022: 27). The results of his research show that learning strategies using the SPICES approach, the accumulative proportions of the assessment are clearly described. However, it was found that there were weaknesses, including; the curriculum is only prepared by the team and internal stakeholders; there is no clear description of the roles, functions, and duties of team members; milestones are not yet clear; and there is no detailed description of the implementation of the SPICES components in the implementation of the curriculum.[17] The limitations experienced by several medical faculties in Indonesia are also experienced by FK UNG, where there are limited capabilities in curriculum development strategies. Elements of infrastructure and systems also need to be revised. This matter was realized from the start of the pioneering establishment of the UNG FK in 2019. However, the faculty of medicine management and UNG continued to try to minimize these limitations by conducting training for educators/lecturers.

There are nine Trends in Medical Education Strategies. First, minimum competency standards with the need for general competence. General competencies include bioethics and skills (communication, interpersonal, and information technology). Second, Community orientation in medical education (COME). This trend, among others, is based on public needs, health protocol, and disease prevention. Third, Self-directed learning/learner-centered learning). The learning model is education in adults (adult learning). Fourth, Problem-based learning (PBL) and Task-Based Learning (TBL) are the trend or tendency toward embodying self-directed and learner-centered learning. Fifth, early clinical contact/exposure) contact with patients from the initial assessment. At this point, an integrated medical discipline approach is needed with other sciences. Sixth, Continuing professional development, meaning that medical education is sustainable and of all time. Seventh, Unification between education and practice. That education at the Faculty of Medicine is legally obligatory to access community health service centers. Eighth, the Best evidence in medical education is that medical decisions must be based on evidence (scientific facts), not on non-scientific conjectures. Ninth, Information, and communication technology, it is mandatory to utilize ICT in various aspects, such as services, research, and education.[18]

Regarding the SPICES Medical Education Strategy and the nine trends in medical education, it is a necessity that cannot be negotiated anymore because the use of these strategies is an inseparable part of the principles of benefit, humanity, balance, responsibility,

equality, curriculum suitability, and affirmation, truth—science as stated in the Law on Medical Education. In addition, it is believed that the medical education strategy will produce graduate profiles according to WHO and WONCA (World Organization of Family Doctors) standards which have been set since 1994, namely the character of a six-star doctor, which includes: care provider, decision maker, communicator, community leader, manager as well as creator and innovator.

Regarding the SPICES strategy, which is used as the basis for compiling the Competency-Based Curriculum (CBC) in the medical field, it is deemed necessary to pay attention to Kelvin's view (2020: 3), saying that the higher education curriculum should also refer to standard-based education and outcome-based education. In this regard, the Indonesian Medical Council (KKI), based on the mandate of Law Number 29 of 2004, has ratified the Professional Education Standards and Competency Standards for Indonesian Doctors, whereby a doctor in Indonesia has a minimum graduate competency standard based on 7 (seven) competency areas, namely; has noble professionalism, is always aware and develops himself, can communicate effectively, is reliable in managing information, always has a scientific basis in medical science, has clinical skills and can manage health problems well. Furthermore, KKI believes that "in response to change, it takes a way of thinking that is adaptive, anticipatory, creative, innovative. The value and benefits of these changes are expected to solve various problems and build communication, teamwork, networking, and the support of parties.[19,20]

Furthermore, Suwandi said that along with the era of Industry and Technology 4.0 and Society 5.0, curriculum design must be able to respond to various challenges. Even the updated curriculum produces graduates who have new literacy competencies (data, technology, and noble human literacy). At the same time, literacy includes various intelligences (IQ, EQ, SQ) accompanied by adaptability to developments in the flow of technology and information.[21]

Te best educational strategy is not easy but certainly not something impossible to apply. In the end, it can be emphasized that when entering the era of digitalization and disruption, an innovative medical education strategy is urgently needed while prioritizing religious values, national cultural roots, and keeping up with the times, in this case, science and technology. This matter is relevant to the educational goals set out in Law Number 20 of 2003 concerning the National Education System.[7,22]

Conclusion

Techniques for implementing modern education in the era of digitalization and

disruption, which need special attention, include: (1) Preparing digital technology devices for the implementation of the Teaching and Learning Process, (2) Preparing a curriculum that is per the times (FK uses CBC). , and (3) Ensuring teaching staff have skills in utilizing IT for learning. In addition, the lifelong education approach is a religious (Islamic) concept later adopted by the European Commission Directorate General for Education and Culture as a policy strategy for developing citizenship, social cohesion, employment, and fulfilling personal needs. Meanwhile, global medical education uses the SPICES strategy (student-centered learning, problem-based, integrated, community-based, elective, and systematic), accompanied by nine educational trends. SPICES is a medical education strategy that will produce graduate profiles that refer to (1) WHO and WONCA (World Organization of Family Doctors) conference agreements, namely a doctor has the character of a six-star doctor, namely: care provider, decision maker, communicator, community leader, manager as well as creator and innovator; (2) the minimum standard of competence for doctors in Indonesia, namely seven areas of graduate competency namely; has noble professionalism, is always aware and develops himself, is able to communicate effectively, is reliable in managing information, always has a scientific basis in medical science, has clinical skills and can manage health problems well.

Conflict of Interest

Nil

Funding Sources

Nil

Acknowledgment

Nil

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Jambura Medical and Health Science Journal, Vol.2 No.1 (July 2023)
p-ISSN 2830-0580 | e-ISSN 2830-4608

REVIEW ARTICLE **Open Access**

Challenges for Medical Student in the Society 5.0 Era

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ABSTRACT

Background: For health workers, the faster flow of globalization develops many challenges. Indonesia's health workers also face internal challenges. In contrast, in the 5.0 society era, the challenges are in the form of an emphasis on the quality of character, morality, and competence of the health workers.
Content: A medical student should be formed in the Community and Family Health Care with Inter-Professional Education (CFHC-IPE) education program, which develops competencies related to ethics, communication, teamwork, and roles and responsibilities in a team from the first day at college. The new challenge for medical education is applying the three new literacies, namely data, technology, and humanity, to produce Indonesian doctors who can adapt and meet national and global needs. Every graduate must meet the competency standards of doctors, which not only provide services to the community through professional practice but can also maintain the noble values of the medical profession.
Conclusion: Medical students in the 5.0 era have challenges that take work, particularly in developing new skills in data literacy, technology, and humanity, while still fulfilling their primary competencies.

Key words: Disruption, medical student, society 5.0

JMHSJ Jambura Medical and Health Science Journal

Published by:
Universitas Negeri Gorontalo

Address:
Jl. Jend. Sudirman No.6, Gorontalo City, Gorontalo, Indonesia

Mobile number:
+62852 3321 5280

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jmhsj@ung.ac.id

Article History:
Received 25 December 2022
Accepted 9 February 2023
Published 31 July 2023

DOI:
https://doi.org/10.37905/jmhsj.v2i1.21391

Introduction

For health workers, the increasingly rapid flow of globalization is one of many challenges.[1,2] n Indonesia, health workers also face internal challenges, where in the era of Society 5.0, the emphasis is on the quality of character, morality, and competence of the health workers themselves. This is understood to be the era of human civilization and digital technology without eliminating real human identity—the concept in which society is obliged to humanize humans with technology. If the 4.0 revolution allowed us to access and provide information on the internet, the 5.0 era is when all technology is part of human origin. Based on the explanation of the Japanese prime minister, Shinzo Abe, that in society 5.0, it will no longer be capital that connects and drives everything, but data that will reduce the gap between the rich and the less fortunate.[3,4]

Medical and educational services, from elementary to tertiary level and will reach remote villages. The internet is not only for information but for living life so that technological developments can minimize gaps in humans and economic problems in the future. In facing the 5.0 revolution era, global education plays a crucial role in enhancing the quality of human resources. This causes education to be an aspect greatly affected by technological advances.[5]

Indonesia is a country in Southeast Asia which is a developing country. Factors influencing a country to develop as a developed country means human resources. [6] There are still many things that need to be improved in Indonesian education, starting from early childhood education to tertiary education, especially at the tertiary level. As the next generation, medical students need to prepare themselves to face the 5.0 revolution.[7]

Challenges for Medical Student in the Society 5.0 Era

The way health workers think, including doctors in the 5.0 era, must begin at university, where the Faculty of Medicine is responsible for carrying out education to achieve competencies for medical student graduates. Students need to train and hone their abilities so that later they can survive in the revolutionary era. In the era of technological advances, a lot of work and human physical and manual tasks will begin to be replaced by artificial intelligence and automation systems.[8] Adam Jezard at World Economics said several primary abilities are needed in the future, namely cognitive abilities, social and emotional abilities, or what is commonly called “soft skills,” as well as the ability to use technology.[9] Students, particularly medical students who will become doctors in the future, need cognitive abilities, namely being able to think critically, solve complex problems and cases, and reach perfect

decisions. Medical students also need to learn and practice soft skills. This includes how to communicate and negotiate, empathy, and the ability to adapt and work in a team. In addition, students need to master IT skills, how analyze data, and use software, because, in the future various health and global medical services will make much use of and intersect with technology.[8,10]

A medical student should be educated in Community and Family Health Care with Inter-Professional Education (CFHC-IPE) education program, which seeks to shape and develop competencies related to ethics, communication, working in teams, and roles and responsibilities in a team from the first day at school—attending college.[11] The new challenge for medical education is how to apply the three new literacies, namely data, technology, and humanity, to produce adaptable Indonesian doctors who can meet national and global needs. Every graduate must meet the competency standards of doctors, which not only provide services to the community through professional practice but can also maintain the noble values of the medical profession.[12,13] As an example of one of the leading faculties, Unissula Medicine offers opportunities for students to learn about technology in the medical field abroad. Currently, Unissula Medicine is affiliated with various international campuses, including the Faculty of Medicine And Health Sciences Universiti Sains Islam Malaysia, the Department of Plastic And Reconstructive Surgery Korea University/ Korea University College of Medicine, the Faculty of Medicine Prince of Songkla University, Faculty of Medicine Gunma University Japan, Bangladesh Journal of Medical Science and others -other. Another example is that in each course in the family medicine study program, a medical student must always emphasize thinking as a whole so that it encourages students to think laterally and practice it in more concrete professional skills acquired in each course. Medical students must be able to interact personally with family or society and work with other professions. Apart from that, from the first year of studying medicine, students must be deployed to the community and family. The family is the smallest unit of society is the suitable medium for students to sharpen their ability to communicate and work together, which is a part of Inter-Personal Education (IPE).[14]

With the learning method of the modern Faculty of Medicine, medical students will try to get to know their partners' family members and develop good relations with the family, as a result of which the idea will be formed from the start that curing a disease must come from the upstream, namely the family. A healthy family will also create a healthy environment so that a healthy human being will also be created when a community lives in a healthy environment.[15,16]

With this concept, there is no need to worry about the decline in the work of doctors and being replaced by new technology. The humanism side of doctors that has been built from the beginning will create a deeper emotional bond and increase the chances of maintaining health so that it can prevent the effects of more severe illnesses. Technology is support for creating better communication between doctors and families and encouraging the realization of direct health and the family in a preventive manner. Literacy in technology issues is an unavoidable thing. In the end, humanity and technology issues can coexist to create optimal citizen health services.[10,12]

Therefore, Indonesian medical students must be proud that they will become Indonesian doctors one day. When a sense of pride is instilled in being an Indonesian doctor, a passion will grow to love Indonesia and the spirit to prepare oneself to face various future challenges.

Conclusion

In the era of society 5.0, as it is today, there are many challenges that various components of society must face. Medical students in this era face challenges that take work, particularly in developing new skills in data literacy, technology, and humanity. Apart from developing these skills, a medical student must still be able to fulfill his essential competencies as a doctor, both in knowledge, skills, ethics, and behavior.

Conflict of Interest

Nil

Funding Sources

Nil

Acknowledgment

Nil

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Jambura Medical and Health Science Journal, Vol.2 No.1 (July 2023)
p-ISSN 2830-0580 | e-ISSN 2830-4608

CASE REPORT **Open Access**

Colorectal Cancer in a 17-Year-Old Boy: A Case Report

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ABSTRACT

Introduction: Colorectal cancer is the fifth most common malignant neoplasm worldwide. Commonly found in adults, the adolescent population is scarce. Colorectal cancer diagnosed and treated late is potentially associated with the worst prognosis.
Case: A 17-year-old boy was admitted to the hospital due to a distended abdomen and abdominal pain, nausea, and vomiting that he had been experiencing seven days prior. The patient neither had a bowel movement nor flatus for the day. Abdominal ultrasound showed a regional intraluminal mass on the right upper quadrant with a suspicion of an appendical mass with a differential diagnosis of intussusception, colon tumor, and obstructive ileus. Acute abdominal series showed small bowel obstruction. When the surgery was performed, there was a tumor in the hepatic flexure of the colon. Histopathological examination revealed colon adenocarcinoma.
Conclusion: The incidence of colorectal cancer in adolescents has increased. Right extended hemicolectomy was performed in this case, but the patient refused the chemotherapy. The patient was readmitted to the hospital five months later , was only given palliative therapy in the Intensive Care Unit, and died two weeks later. We believe that had the chemotherapy been performed, the patient might have had a better prognosis. This case report will help increase awareness among doctors and surgeons in including colorectal carcinoma as a differential diagnosis in adolescents so that it can shorten the delay in diagnosis, which in turn will endanger the patient's prognosis.

Keywords : Adenocarcinoma colon, adolescents, bowel obstruction

JMHSJ Jambura Medical and Health Science Journal

Published by:
Universitas Negeri Gorontalo

Address:
Jl. Jend. Sudirman No.6, Gorontalo City, Gorontalo, Indonesia

Mobile number:
+62852 3321 5280

Email:
jmhsj@ung.ac.id

Article History:
Received 23 October 2022
Accepted 10 June 2023
Published 31 July 2023

DOI:
https://doi.org/10.37905/jmhsj.v2i1.16816

Introduction

Colorectal cancer is a malignancy that occurs exclusively in the colon or rectum and is caused by aberrant proliferation of glandular epithelial cells from the colon.[1] It is caused by an interaction between tumor suppressor genes and oncogenes in colorectal carcinogenesis.[2] Colorectal cancer develops when epithelial cells acquire a series of genetic or epigenetic changes that allow them to become hyperproliferative.[3] These rapidly growing cells form benign adenomas, which can develop into cancer and metastasize via several pathways, including microsatellite (MSI), chromosomal instability (CIN), and serrated neoplasia.[4] Cancer begins as a small adenoma that becomes an adenoma giant and, lastly, cancer.[5]

Colorectal cancer is generally considered an elderly disease, with more than 90% of patients diagnosed after age 55.[6] However, the incidence of colorectal cancer in young individuals has increased by 2% to 8% annually over the past two decades.[7] Recent studies have shown that as many as 7% of patients who develop colorectal cancer are under 40 years of age, and this incidence continues to increase.[8] The incidence of colorectal cancer varies across countries, with a higher prevalence in developed countries than in industrialized ones.[9] In the pediatric group aged 20 years, the incidence of colorectal cancer is rare compared to adults. Colorectal cancer can be fatal, but early diagnosis and better management have reduced mortality since the 1980s.[10]

Diagnostic tools for colorectal cancer, including barium enema, abdominal ultrasound examination, colonoscopy, abdominal CT, and therapeutic surgical resection may be performed. [11] However, barium enema takes longer than abdominal CT. Generally, early detection of cancer is difficult.[12]

Treatment of colorectal cancer depends on the stage of cancer. [13] Cancer patients can be treated with surgery and chemotherapy as the first line of therapy. However, patients with metastatic disease historically have a poor prognosis. Surgery with a total resection technique is required in early-stage cases to remove the tumor altogether.[14] Nearly a quarter of colorectal cancer cases are diagnosed at an advanced stage, and 20% of the remaining cases acquire metachronous metastases. Therefore, surgical resection alone is insufficient to reduce colorectal carcinoma mortality. [5] Chemotherapy or radiotherapy can be used before or after surgery to help shrink or stabilize the tumor. Chemotherapy currently consists of single-agent therapy (primarily fluoropyrimidine (5-FU)) and multi-agent regimens, including oxaliplatin (OX), irinotecan (IRI), and capecitabine (CAP or XELODA or XEL). Combined therapy

regimens FOLFOX (5-FU + OX), FOXFIRI (5-FU + IRI), XELOX or CAPOX (CAP + OX), and CAPIRI (CAP + OX) remain the primary approach in first-line treatment.[14]

The prognosis of colorectal cancer patients varies widely between patients, with 5-year survival rates ranging from 90% to 10% depending on the stage and other factors. As much as 35% to 50% of patients have distant metastases at diagnosis, and this can reduce less than 10% of 5-year survival rate. Chemotherapy is used primarily for palliative purposes and increases median survival from 5 to 18 months.[15]

Case

A 17-year-old boy was admitted to the hospital due to a distended abdomen and abdominal pain, nausea, and vomiting that he had been experiencing for seven days prior. The patient neither had a bowel movement nor flatus for the day, but a day prior, he passed a watery stool with yellow lumps with neither mucus nor blood. The patient also had a history of losing approximately 4 kg over one month. Before the onset of symptoms, there were no signs of malignancy, and he had not had a thorough abdominal examination until then. The physical examination results found that the abdomen was tense all over the abdominal area, distended, and there was generalized abdominal tenderness. Blood examination results showed leukocytosis (27.2 x 10^3 u/L), decreased hematocrit (37.5 vol%), and increased segmented neutrophils (83%). Initial management was performed on the patient in the emergency room by placing a nasogastric tube and urinary catheter; abdominal ultrasound and an acute abdominal series were scheduled. The abdominal ultrasound showed a regional intraluminal mass on the right upper quadrant with a suspicion of an appendical mass with a differential diagnosis of intussusception, colon tumor, and obstructive ileus (Figure 1). The acute abdominal radiograph showed that intestinal air is minimally distributed to the distal colon, dilatation of intestinal loops, herringbone appearance, and air-fluid level (Figure 2).

The patient was diagnosed with obstructive ileus caused by suspected perforated appendicitis from anamnesis, physical examination, and diagnostic tests. The abdominal ultrasound examination and acute abdominal series results confirmed the diagnosis. The patient was then scheduled for an immediate exploratory laparotomy.

During the operation, there was dilatation of the colon and a tumor on the hepatic flexure with a size of + 8 x 9 cm, fixed with hard consistency; there were adhesions in the liver and posterior peritoneum. Adhesiolysis was performed, followed by right extended hemicolectomy from the terminal ileum, ± 20 cm from the ileocecal valve to the transverse colon to the left branch of the middle colic artery (Figure 3). Subsequently, end-to-end

anastomosis was performed between the terminal ileum and the transverse colon. Further exploration of the liver revealed a smooth surface without nodules. After surgery, the patient was diagnosed with Hepatic Flexure Tumor with a suspicion of malignancy. The tumor mass was then examined for histopathological examination.

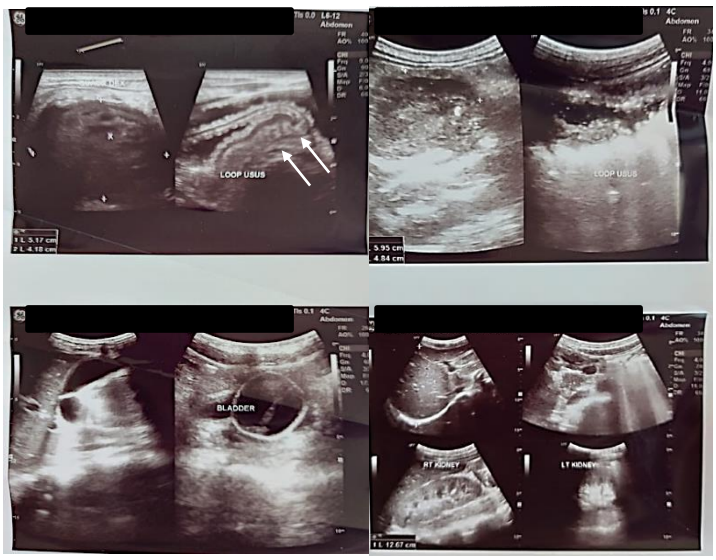

Figure 1. The result of the abdominal Ultrasound of the patient.

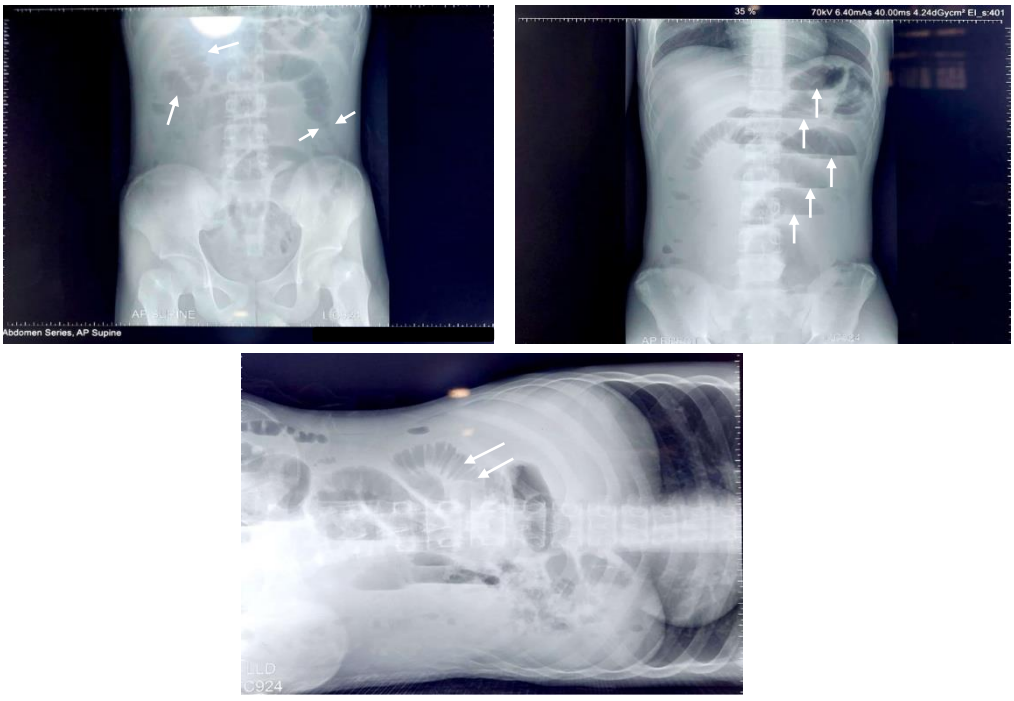

Figure 2. The result of the acute abdominal series from the patient.

After the right extended hemicolectomy, a temporary mild improvement in the patient's condition was reported. The patient was treated for three days in the Intensive Care Unit (ICU) during an 11-day hospitalization. Histopathological biopsy was then performed on

the excised tumor mass, and a week later, the results were colon adenocarcinoma and malignant round cell tumor with a suspicion of poorly differentiated carcinoma with a differential diagnosis of neuroendocrine carcinoma. The patient was then diagnosed with stage III colon cancer with T4aN2bM0. Accordingly, the patient would be referred to the chemotherapy facility, but the patient refused.

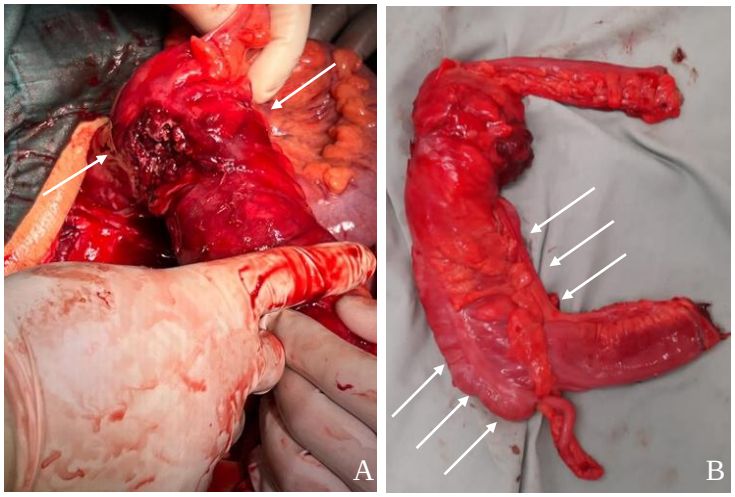

Figure 3. Tumor on the flexura hepatica of colon. (A) It shows a tumor with a size of ± 8 x 9 cm, fixed with hard consistency. (B) Dilatation in the colon.

Five months later, the patient was readmitted with the same complaint. His parents still denied chemotherapy. He was treated at the ICU and was only given control and conservative therapy. The patient died two weeks later after intensive care in the ICU.

Discussion

According to GLOBOCAN 2020 data, colon cancer has the fifth most incidence globally, with 1,148,185 new cases worldwide.[12] In Southeast Asia, the incidence of colon cancer in the standard population is 17.6 per 100,000 in men and 11.6 in women. In Indonesia, the incidence of colon cancer is 34,189 (8.6%) per 100,000 adult population, with a mortality rate of 9.4% of the entire colon cancer cases.[12] Yusuf & Paterasari (2019) reported cases of colorectal cancer in young people aged 24 and 33 years in Bali.[7] Lugito et al. (2014) also reported a similar case in Tangerang, where the patient was 21 years old.[15]

Recent data from the National Cancer Institute (NCI) reveal that there has been an increase in the incidence of colon cancer in young adults.[15] In our case, the affected patients occur very rarely at the age of 17; only a few pieces of literature reported the incidence of colon cancer in adolescents.

In our case, a 17-year-old boy presented with acute abdominal pain, vomiting, and losing 4 kg of body weight over one month. The patient also had no history of malignancy in his family. In our patient, abdominal ultrasound was performed, which showed suspicion of an appendical mass and a colon tumor, followed by an acute abdominal radiograph showing small bowel obstruction. However, in our case, an abdominal CT scan was not performed.

One case of colon cancer at a young age was also reported in Korea by Ahn & Kim (2017). In this case, an 18-year-old girl presented with acute abdominal pain and hematochezia. She had had stomach pains more than thrice and lost 10 kg in the last six months. The patient had no chronic disease or digestive problems before the onset of symptoms and no family history of colon cancer or other malignancies. Plain radiographs showed an ileus state with mechanical obstruction, after which an abdominal CT scan was immediately performed. The CT scan showed adenocarcinoma of the descending colon.[10]

In our case, a CT scan was not performed due to the unavailability of CT scans in our health facility. CT Scans are only available in other provinces, so the patients must be referred. However, a referral was impossible because the patient's condition was an emergency. Common diagnostic methods for colon cancer patients include ultrasound diagnosis, CT scan, and MRI. MSCT has been widely applied because of its power in observing the lesion site.[15-17]

In our case, the patient was diagnosed with stage III colon cancer (T4aN2bM0) after an extended hemicolectomy was performed. He was recommended to be referred to the chemotherapy facility, but the patient refused. The patient was readmitted to the hospital, refused chemotherapy, and was only given control and conservative therapy. The patient died two weeks later after intensive care in the ICU.

Koh et al. (2015) also reported a similar case of colon cancer in Taiwan. In this case, the stage of cancer was T4aN2aM1b. A right hemicolectomy was performed. The patient was then transferred to a pediatric oncology center for chemotherapy with the regimens of bevacizumab and irinotecan and completed the chemotherapy protocol smoothly without any significant complications.[18]

Late diagnosing and treating colon cancer are potentially associated with the worst prognosis.[19] Physical examination, including digital rectal examination, laboratory test, abdominal and pelvic CT scan for colon cancer, high-resolution pelvic MRI for local evaluation of rectal cancer, and colonoscopy, is a crucial standard for establishing the diagnosis.[11,20] Colonoscopy is the recommended examination and is the most sensitive and specific screening test.[21]

Colon cancer cases in adolescents are often diagnosed late because of their rare prevalence.[6,21,22] Based on this, it is necessary to pay attention to the symptoms of colon cancer in adolescents, proper physical examination, and available diagnostic testing facilities so that colon cancer in adolescents can be detected and treated immediately.

Conclusion

Colorectal cancer has the worst prognosis. Therefore, early detection and definitive treatment can increase the possibility of curing cancer. A right extended hemicolectomy was performed in this case, but the patient refused the chemotherapy. The patient was readmitted to the hospital five months later, only given palliative therapy in the Intensive Care Unit, and died two weeks later. We believe that had the chemotherapy been performed, the patient might have had a better prognosis. Early screening for colorectal cancer in Indonesia is still not achieved, especially among adolescents. Given that the prevalence of cancer increases in this age group, it is necessary to pay attention to symptoms in this population and conduct new studies to evaluate the possible benefits of performing early screening to improve the prognosis of colorectal cancer in adolescents.

Conflict of interest

Nothing to declare

Fundig Sources

Nothing to declare

Acknowledgnments

Nothing to declare

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JAMBURA MEDICAL AND HEALTH SCIENCE JOURNAL
e-ISSN : 2830-4608
p-ISSN : 2830-0580
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ISSN 2830-0580