International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

Application of Apriori Algorithm in Determining Behavioral Patterns and Lifestyle of GERD Patients

Chika Pramudhita[1], Relita Buaton[2], Melda Pita Uli Sitompul[3]

[1,2,3]Information System, [1,2]STMIKKaputama, Binjai, [3]STMIK Kaputama, Binjai

Email address:
[1]chikapramudhita0056@gmail.com (chika Pramudhita), [2]bbcbuaton@gmail.com (Relita Buaton), [3]*meldasitompul19@gmail.com (Melda Sitompul)*

*Corresponding author : chikapramudhita0056@gmail.com

Received: July 2, 2024; **Accepted**: August 16, 2024; **Published**: August 16, 2024

Abstract: Gastroesophageal Reflux Disease (GERD) is a condition of reflux of stomach contents into the esophagus which can cause typical symptoms such as heartburn (burning in the epigastric region), acid regurgitation (bitter taste in the mouth), nausea, and dysphagia which can result in damage to the esophageal mucosa and in the long term can cause complications such as Barrett's esophagus. Based on data on patients with GERD disease in 2020-2023, there were 521 patients obtained at Bidadari Binjai General Hospital, with differences in prevalence caused by socioeconomic and lifestyle changes that can increase the incidence of GERD. The purpose of this study is to obtain the results of the combination between item-sets on the behavior patterns and lifestyles of GERD sufferers which are expected to help the agency in processing data on GERD sufferers into more effective information to determine the behavior patterns and lifestyles of GERD sufferers with the Apriori Algorithm method. From the research conducted, the results obtained rules that meet the value of 30% support and 100% confidence, if unhealthy eating patterns are often late eating, then unhealthy lifestyles are often done sleeping after eating and smoking.

Keywords: Datamining, Apriori Algorithm, GERD

1. Introduction

Information technology is currently developing so rapidly that the need for information is increasing. Information will have no value if it is not managed well, however, if the available data is large, conventional methods will no longer be able to analyze the existing potential data. Therefore, a method is needed that can analyze, summarize and extract data to become useful information. Gastroesophageal Reflux Disease (GERD) is a condition of reflux of stomach contents into the esophagus which can cause typical symptoms such as heartburn (burning feeling in the epigastric area), acid regurgitation (bitter taste in the mouth), nausea, and

DOI: 10.52362/ijiems.v3i2.1593

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

dysphagia which can result in damage to the esophageal mucosa and internal organs. Long periods of time can cause complications such as Barrett's esophagus. According to (Ariyani et al., 2024) the increasing prevalence of GERD in Asian countries such as Iran ranges between (6.3%-18.3%), Palestine shows a higher figure, namely 24%, Japan and Taiwan around (13% - 15%). In contrast to East Asia, the prevalence of GERD ranges between (2%-8%). In Indonesia, there is still no definite epidemiological data on the prevalence of GERD. However, at RSUPN Cipto Mangunkusumo Jakarta, there were (22.8%) cases of esophagitis from all patients who underwent endoscopic examination for indications of dyspepsia. This shows that Indonesia is higher than East Asia. Differences in prevalence in each country are caused by socio-economic and lifestyle changes which can increase the incidence of GERD. Based on data on GERD patients in 2020-2023, there were 521 patients received at Bidadari Binjai Hospital. Based on the background description above, the author is interested in conducting research in writing a thesis with the title Application of the Apriori Algorithm in Determining Behavior Patterns and Lifestyles of GERD Sufferers.

2. Methods

Data mining is the process of discovering interesting data patterns and knowledge from very large data sets. Data sources can include databases, data warehouses, the web, repositories, or data streamed into dynamic systems. (Aziz Muslim et al., 2019)

Data mining is a series of processes to extract added value from a data set in the form of knowledge that has not been known manually from a data set. Data mining can also be interpreted as a process for obtaining useful information from large database warehouses. (Relita Buaton et al., 2019)

Data mining can be categorized into several groups, according to the tasks that can be performed, namely: (Amna et al., 2023a)

1. Description
   Data mining is used in finding simple methods for describing patterns and trends contained in the data. Description of patterns and trends will provide possible explanations for a pattern or trend.
2. Estimation
   Similar to classification, the target variable in estimation is more numerical than categorical. For model building, a complete record is used which provides the value of the target variable as a predicted value. Then in the next review, the value of the target variable is estimated based on the value of the prediction variable.
3. Prediction
   Similar to classification and estimation, prediction can forecast the value of future outcomes. There are several methods and techniques used in classification and estimation that can be used for appropriate circumstances for prediction.
4. Classification

DOI: 10.52362/ijiems.v3i2.1593

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

The process of finding a model or function that describes or distinguishes concepts or classes of objects whose labels are unknown. This technique examines data that has been classified and collected in groups together according to their membership.

5. Clustering
   In record clustering, observing or noticing and forming classes of objects that have similarities is done by clustering. A cluster is a collection of records that are dissimilar to records in other clusters. Unlike classification, clustering does not have a target variable. Clustering does not attempt to classify, estimate or predict the value of the target variable. Instead, the clustering algorithm attempts to divide the overall data into similar or homogeneous groups, where the similarity of records in one group is maximized, while the similarity with records in other groups is minimized.
6. Association
   Association in data mining is tasked with finding attributes that appear at a time. (Amna et al., 2023b)

2.1 Apriori Algorithm

Apriori algorithm is a basic algorithm proposed by Agrawal & Skrikant in 1994 to determine Frequent itemsets for Boolean association rules. Apriori algorithm is a type of association rule in data mining. Rules that express associations between several attributes are often called affinity analysis or market basket analysis. Association analysis or association rule data mining is a data mining technique to find rules for a combination of items. One of the stages of association analysis that attracts the attention of many researchers to produce efficient algorithms is high-frequency pattern analysis (frequent pattern mining). The importance of an association can be known by two benchmarks, namely: support and confidence, support (support value) is the percentage of the combination of items in the database, while confidence (certainty value) is the strength of the relationship between items in the association rule. (Amna et al., 2023b)

The Association Rules function is often called "market basket analysis", which is used to find relationships or correlations between sets of items. This function is most widely used to analyze data for marketing strategy, catalog design, and business decision-making processes. A type of association rule can be expressed as for example: "70% of people who buy noodles, juice and sauce will also buy bread".

Association rules capture items or events in large data sets containing transaction data. With advances in technology, sales data can be stored in large amounts called "data baskets." The association rules defined in the data basket are used for promotional purposes, catalog design, customer segmentation and target marketing.

The formation of association rules that meet the minimum requirements for confidance by calculating the confidance of associative rules A→B, where support is supporting data and confidance is confidence.

The confidance value of rule A→B is obtained from the following formula:

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

$$Support\ (A) = \frac{\sum Transaksimengandung A dan B}{\sum Jumlahseluruhtransaksi} \times 100\% \quad (1)$$

$$Confidance\ (A) = \frac{\sum Transaksimengandung A dan B}{\sum Transaksimengandung A} \times 100\% \quad (2)$$

Find the combination of items that meet the minimum requirement of the support value in the database. The support value of an item is obtained using the following formula:

Support (A)-

$$\frac{Jumlah\ transaksi\ mengandung\ A}{Total\ Transaksi} \quad (3)$$

The support value of 2 items is obtained using the formula:

Support (A,B) = p (A ∩ B)

$$Support\ (A,B) - \frac{\sum Jumlah\ transaksi\ mengandung\ A\ dan\ B}{\sum transaksi} \quad (4)$$

After all the high-frequency patterns are found, then find the association rule that meets the minimum requirement for confidence by calculating the confidence of the associative rule A ∪ B. The confidence value of rule A ∪ B is obtained by the following formula:

$$Confidence - P\ (B|A) - \frac{\sum J\ transaksi\ mengandung\ A\ dan\ B}{\sum transaksi} \quad (5)$$

2.2 GERD Disease

Gastroesophageal Reflux Disease (GERD) is a gastrointestinal disorder that can be characterized by the reflux of stomach contents into the esophagus and can cause symptoms such as heartburn, regurgitation, nausea, heartburn, odinophagia (swallowing pain), and dysphagia (difficulty swallowing). It is a chronic disease that is usually caused by several different mechanisms that can be intrinsic, structural, or both. (Fadilah & Herdiana, 2023)

GERD is a pathological condition due to reflux of gastric contents into the esophagus with various symptoms due to involvement of the esophagus, pharynx, larynx and airway. (Saputera & Budianto, 2017)

Some risk factors for GERD are as follows:

1. Medications, such as theophylline, anticholinergics, beta adrenergics, nitrates, calcium-channel blockers.
2. Food, such as chocolate, fatty foods, coffee, alcohol and cigarettes.

DOI: 10.52362/ijiems.v3i2.1593

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

3. Hormones, common in pregnant and menopausal women. In pregnant women, decreased LES pressure occurs due to increased progesterone levels. While in menopausal women, decreased LES pressure occurs due to estrogen hormone therapy.
4. Structural, generally related to hiatal hernia. In addition to hiatal hernia, LES length <3 cm also has an influence on the occurrence of GERD.
5. Body Mass Index (BMI); the higher the BMI value, the higher the risk of GERD. (Saputera & Budianto, 2017)

The typical signs and symptoms of GERD are regurgitation and hearburn. Regurgitation is a state of reflux that occurs shortly after eating, characterized by a sour and bitter taste on the tongue. Heartburn is a burning sensation in the epigastric region that may be accompanied by pain and stinging. Other symptoms of GERD are bloating, nausea, fullness, burping, hypersalivation, dysphagia to odinophagia. Dysphagia is generally due to stricture or malignancy of Barrett's esophagus. While odinophagia or pain when swallowing is generally due to severe ulceration or in cases of infection. Non-cardiac chest pain, chronic cough, asthma, and laryngitis are extraesophageal symptoms of GERD. (Saputera & Budianto, 2017)

2.3 Lifestyle

Healthy lifestyle is a form of manifestation of healthy living orientation in the culture of individuals, families, and communities, which aims to improve, maintain, and protect their health both physically, mentally, spiritually, and socially and aims to aim to provide learning experiences or create a condition for individuals, groups, families, by opening communication, information, and education channels to improve knowledge, attitudes, and behavior so that the community is aware, willing and able to practice clean and healthy living behavior.

The benefit of implementing a healthy lifestyle in general is to increase public awareness to be willing and able to live a clean and healthy life. This is important to do so that people are aware and can prevent and anticipate or overcome health problems that may arise. In addition, by implementing and practicing PHBS, it is hoped that the community will be able to create a healthy environment so as to improve the quality of life. (Ministry of Social Affairs RI, 2020)

3. Results and Discussion

3.1. Research methodology

The research methodology is carried out to find something systematically using scientific methods and applicable sources to analyze the system using the Apriori algorithm. The following is the sales data that will be used as research support can be seen in Table 3.1.

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

Table 3. 1 GERD Patient Data

No	Age	UNHEALTHY FOOD PATTERNS					UNHEALTHY LIFESTYLE				
		Frequent late meals	Junckfood	Coffee	caffeine drinks	Midnight meal	excessive dieting	Sleep after meals	Staying up late / Insomnia	Drinking Alcohol	Smoking
1	25 Tahun		√	√			√	√			√
2	21 Tahun	√			√	√		√			√
3	40 Tahun			√		√				√	√
4	35 Tahun	√				√			√		√
5	24 Tahun	√	√	√			√		√		√
6	28 Tahun				√	√	√		√		√
7	32 Tahun				√	√	√				√
8	32 Tahun	√	√		√	√				√	√
9	26 Tahun	√			√		√	√	√		√
10	32 Tahun	√					√			√	√
11	23 Tahun					√	√	√			√
12	24 Tahun	√			√	√		√	√		√
13	24 Tahun	√			√			√		√	
14	25 Tahun				√				√		
15	40 Tahun	√	√	√	√		√	√	√		√
16	46 Tahun	√	√	√		√	√			√	√
17	39 Tahun	√	√	√			√				√
18	25 Tahun	√	√		√	√		√			√
19	39 Tahun	√	√			√			√		
20	30 Tahun	√				√	√	√			√

From the research conducted to apply the rule association method to determine the behavior patterns and lifestyles of GERD sufferers using data samples obtained and then used as supporting research can be seen in Table 3.1. The data is a transactional database which will be represented as Table 3.2, 3.3, 3.4.

Table 3.2 Age Data

No.	Age	Code
1	< 25 Years	U1
2	26-35 Years	U2
3	36-45 Years	U3
4	>46 Years	U4

Tabel 3.1 Unhealthy Diet

No.	Unhealthy Diet	Code
1	Frequent late meals	PM1

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

2	Junckfood	PM2
3	Coffee	PM3
4	caffeine drinks	PM4
5	Midnight meal	PM5

Tabel 3.2 Unhealthy Lifestyle

No	Unhealthy Lifestyle	Code
1	excessive dieting	PH1
2	Sleep after meals	PH2
3	Staying up late / Insomnia	PH3
4	Drinking Alcohol	PH4
5	Smoking	PH5

And the data that has been formed in tabular form can be addressed in Table 3.5.

Tabel 3. 5 Data Representation

No	Age				Unhealthy Diet					Unhealthy Lifestyle				
	U1	U2	U3	U4	PM1	PM2	PM3	PM4	PM5	PH1	PH2	PH3	PH4	PH5
1	1	0	0	0	0	1	1	0	0	1	1	0	0	1
2	1	0	0	0	1	0	0	1	1	0	1	0	0	1
3	0	0	1	0	0	0	1	0	1	0	0	0	1	1
4	0	1	0	0	1	0	0	0	1	0	0	1	0	1
5	1	0	0	0	1	1	1	0	0	1	0	1	0	1
6	0	1	0	0	0	0	0	1	1	1	0	1	0	1
7	0	1	0	0	0	0	0	1	1	1	0	0	0	1
8	0	1	0	0	1	1	0	1	1	0	0	0	1	1
9	0	1	0	0	1	0	0	1	0	1	1	1	0	1
10	0	1	0	0	1	0	0	0	0	1	0	0	1	1
11	1	0	0	0	0	0	0	0	1	1	1	0	0	1
12	1	0	0	0	1	0	0	1	1	0	1	1	0	1
13	1	0	0	0	1	0	0	1	0	0	1	0	1	0
14	1	0	0	0	0	0	0	1	0	0	0	1	0	0
15	0	0	1	0	1	1	1	1	0	1	1	1	0	1
16	0	0	0	1	1	1	1	0	1	1	0	0	1	1
17	0	0	1	0	1	1	1	0	0	1	0	0	0	1
18	1	0	0	0	1	1	0	1	1	0	1	0	0	1
19	0	0	1	0	1	1	0	0	1	0	0	1	0	0

DOI: 10.52362/ijiems.v3i2.1593

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

20	0	1	0	0	1	0	0	0	1	1	1	0	0	1
∑	8	7	4	1	14	8	6	10	12	11	9	8	5	17

1. Determine θ (frequent)
   By determining θ>5, then we can determine the frequent itemset. From the table above, it is known that the total θ for k = 1 data is all greater than θ.
2. Determine the Item Set
   Then F1 for the table above whose value is greater than θ is : Age {(U1), (U2)}, Unhealthy Diet {(PM1), (PM2), (PM3), (PM4), (PM5)}, Unhealthy Lifestyle {(PH2), (PH2). (PH3), (PH5)}.
3. Examine the set θ
   The possible sets are {U1 PM1}, {U1 PM2}, {U1 PM3}, {U1 PM4}, {U1 PM5}, {U1 PH1}, {U1 PH2}, {U1 PH3}, {U1 PH5}, {U2 PM1}, {U2 PM2}, {U2 PM3}, {U2 PM4}, {U2 PM5}, {U2 PH1}, {U2 PH2}, {U2 PH3}, {U2 PH5}, {PM1 PH1}, {PM1 PH2}, {PM1 PH3}, {PM1 PH5}, {PM2 PH1}, {PM2 PH2}, {PM2 PH3}, {PM2 PH5}, {PM3 PH1}, {PM3 PH2}, {PM3 PH3}, {PM3 PH5}, {PM4 PH1}, {PM4 PH2}, {PM4 PH3}, {PM4 PH5}, {PM5 PH1}, {PM5 PH2}, {PM5 PH3}, {PM5 PH5}.
   From the data above, if the value of ϕ = 2 is set, the table formed can be seen in Table 3.6 as follows.

Table 3. 6 Calculation of 2 Item sets

K	U1	PM1	*F*
1	1	0	F
2	1	1	T
3	0	0	F
4	0	1	F
5	1	1	T
6	0	0	F
7	0	0	F
8	0	1	F
9	0	1	F
10	0	1	F
11	1	0	F
12	1	1	T
13	1	1	T
14	1	0	F
15	0	1	F
16	0	1	F

K	U1	PM2	*F*
1	1	1	T
2	1	0	F
3	0	0	F
4	0	0	F
5	1	1	T
6	0	0	F
7	0	0	F
8	0	1	F
9	0	0	F
10	0	0	F
11	1	0	F
12	1	0	F
13	1	0	F
14	1	0	F
15	0	1	F
16	0	1	F

DOI: 10.52362/ijiems.v3i2.1593

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

17	0	1	F
18	1	1	T
19	0	1	F
20	0	1	F
Jumlah			5

17	0	1	F
18	1	1	T
19	0	1	F
20	0	0	F
Jumlah			3

From Table 3, the above element T means that the items are related, while F means that there are no related items. The number of item set frequencies must be greater than the number of Itemset frequencies θ. From the table above, we get f3: {U1, PM4, PH2}, {U1, PM4, PH5}, {PM1, PH1, PH2}, {PM1, PH1, PH3}, {PM1, PH1, PH5}, {PM1, PH2, PH3}, {PM1, PH2, PH5}, {PM1, PH3, PH5}, {PM4, PH2, PH5}.

After obtaining 3 itemsets, some data is selected that meets the predetermined value, the value itself is the numerical limit used to obtain the selected number, the support value is 25%, as shown in table 3.7 below:

Tabel 3.7 Support 3 Itemset

ID	***Count***	***Support***
PM1, PH1, PH5	7/20	35%
PM1, PH2, PH5	6/20	30%

From Table 3.7, the above element T means that items are related, while F means that there are no related items. The number of item set frequencies must be greater than the number of Itemset frequencies θ. From the table above, f3 is obtained: {PM1 PH1 PH2 PH5 }.

To determine the relationship or correlation between items the strength of the relationship is determined by 2 factors which are support and confidence, which are obtained by the following formula:

Tabel 3.8 Support 4 Itemset

K	PM1	PH1	PH2	PH5	F
1	0	1	1	1	F
2	1	0	1	1	F
3	0	0	0	1	F
4	1	0	0	1	F
5	1	1	0	1	F
6	0	1	0	1	F
7	0	1	0	1	F
8	1	0	0	1	F
9	1	1	1	1	T
10	1	1	0	1	F
11	0	1	1	1	F
12	1	0	1	1	F
13	1	0	1	0	F
14	0	0	0	0	F
15	1	1	1	1	T

DOI: 10.52362/ijiems.v3i2.1593

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

K	PM1	PH1	PH2	PH5	F
16	1	1	0	1	F
17	1	1	0	1	F
18	1	0	1	1	F
19	1	0	0	0	F
20	1	1	1	1	T
Jumlah					3

After all the high-frequency patterns are found, then look for association rules that meet the minimum requirement for confidence by calculating the confidence or association A→B, with a minimum confidence of 10%.

Tabel 3.9 hasil final asosiasi

Aturan	**Confidence**	
If age <25 years then an unhealthy diet of caffeine drinks.	8/10	80%
If age <25 years then Junckfood unhealthy diet	8/8	100%
If age <25 years then unhealthy living is often done smoking	8/17	47%
If the age is 26-35 years then unhealthy living is often done smoking	7/17	41%
If an unhealthy diet is often late for meals then an unhealthy life is often over-dieting.	11/14	79%
If an unhealthy diet is often eating late, then an unhealthy life is often sleeping after eating.	8/14	57%
If an unhealthy diet is often late eating then an unhealthy life is often done staying up late / insomnia	6/14	43%
If an unhealthy diet is often late eating then an unhealthy life is often smoking	14/17	82%
If an unhealthy diet is often late eating then an unhealthy life is often smoking	8/17	47%
If the diet is not healthy coffee then unhealthy living is often done smoking	6/17	35%
If an unhealthy diet of caffeine drinks then an unhealthy lifestyle that is often done sleeping after eating	9/10	90%
If an unhealthy diet of caffeine drinks then an unhealthy life that is often done smoking	10/17	59%
If an unhealthy diet is eating late at night then an unhealthy lifestyle is often smoking	12/17	71%
If an unhealthy diet is often eating late, then an unhealthy lifestyle is often excessive dieting and smoking.	6/6	100%
If an unhealthy diet is often eating late, then an unhealthy	6/6	

DOI: 10.52362/ijiems.v3i2.1593

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

Aturan	Confidence	
lifestyle is often sleeping after meals and smoking.		100%
If an unhealthy diet is often eating late, then an unhealthy lifestyle is often excessive dieting, sleeping after meals and smoking.	3/3	100%

Lift Ratio is a measure (parameter) to determine the strength of association rules that have been formed from the support and confidence values. The lift ratio value is usually used as a determinant of whether an association rule is valid or invalid..

$$Excepted\ Confidence = \frac{\sum Transactions\ Containing\ Consequences}{\sum Transaction} \text{ x } 100\%$$

Tabel 3.10 *Expected Confidence*

ID	*Count*	*Support*
U1 & PM4	6/20	30%
U1 & PH2	6/20	30%
U1 & PH5	6/20	30%
U2 & PH5	7/20	35%
PM1 & PH1	7/20	35%
PM1 & PH2	7/20	35%
PM1 & PH3	6/20	30%
PM1 & PH5	12/20	60%
PM2 & PH5	7/20	35%
PM3 & PH5	6/20	30%
PM4 & PH2	6/20	30%
PM4 & PH5	8/20	40%
PM5 & PH5	11/20	55%
PM1, PH1, PH5	6/20	30%
PM1, PH2, PH5	6/20	30%
PM1, PH1, PH2 & PH5	3/20	15%

$$Lift\ Ratio = \frac{Confidence}{\sum Expected\ Confidence} \text{ x } 100\%$$

Tabel 3.11 *Tabel Lift Ratio*

DOI: 10.52362/ijiems.v3i2.1593

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

Aturan	Support	Confidence	Expected confidence	Lift ratio
If age <25 years then an unhealthy diet of caffeine drinks.	30%	80%	30%	2.67
If age <25 years then Junckfood unhealthy diet	30%	100%	30%	3.33
If age <25 years then unhealthy living is often done smoking	30%	47%	30%	1.57
If the age is 26-35 years then unhealthy living is often done smoking	35%	41%	35%	1.17
If an unhealthy diet is often late for meals then an unhealthy life is often over-dieting.	35%	79%	35%	2.26
If an unhealthy diet is often eating late, then an unhealthy life is often sleeping after eating.	35%	57%	35%	1.63
If an unhealthy diet is often late eating then an unhealthy life is often done staying up late / insomnia	30%	43%	30%	1.43
If an unhealthy diet is often late eating then an unhealthy life is often smoking	60%	82%	60%	1.37
If an unhealthy diet is often late eating then an unhealthy life is often smoking	35%	47%	35%	1.34
If the diet is not healthy coffee then unhealthy living is often done smoking	30%	35%	30%	1.17
If an unhealthy diet of caffeine drinks then an unhealthy lifestyle that is often done sleeping after eating	30%	90%	30%	3.00
If an unhealthy diet of caffeine drinks then an unhealthy life that is often done smoking	40%	59%	40%	1.48
If an unhealthy diet is eating late at night then an unhealthy lifestyle is often smoking	55%	71%	55%	1.29
If an unhealthy diet is often eating late, then an unhealthy lifestyle is often excessive dieting and smoking.	30%	100%	30%	3.33
If an unhealthy diet is often eating late, then an unhealthy lifestyle is often sleeping after meals and smoking.	30%	100%	30%	3.33
If an unhealthy diet is often eating late,				

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

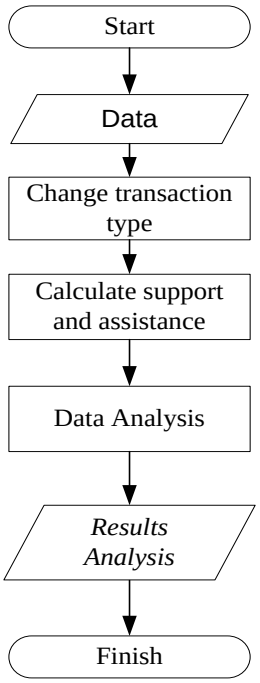
Aturan	Support	Confidence	Expected confidence	Lift ratio
then an unhealthy lifestyle is often excessive dieting, sleeping after meals and smoking.	15%	100%	15%	6.67

After experimenting with the above case with minimum support = 25%, confidence = 100% so that the results of the rules that meet the support and confidence values are obtained:

1. "If age <25 years then an unhealthy diet of Junckfood" then giving value is successful with 30% support, 100% confidence.
2. "If an unhealthy diet is often late eating, then an unhealthy lifestyle is often done excessive dieting and smoking". then giving value is successful with 30% support, 100% confidence.
3. "If an unhealthy diet is often eating late, then an unhealthy lifestyle is often sleeping after eating and smoking". then assigning value is successful with 30% support, 100% confidence.
4. "If an unhealthy diet is often eating late, then an unhealthy lifestyle is often excessive dieting, sleeping after meals and smoking". then scoring is successful with 15% support, 100% confidence.

3.2. Flowchart Design

The flowchart design with rapidminer software can be described as follows:



International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

Figure 3. 1 Flowchart

The information in the figure above is explained starting with start, inputting data according to existing variables, transforming data, calculating support and confidance, analyzing data, getting the results of the finished analysis.

4. Conclusion

From the above research, it can be concluded that if unhealthy eating patterns are often late eating, then unhealthy lifestyles are often done sleeping after eating and smoking, then giving value is successful with 30% support, 100% confidence.

References

[1] Amna, S, W., Putra, T. A., Wahidin, A. J., Syukrilla, W. A., Wardhani, A. K., Heryana, N., Indriyani, T., & Santoso, L. W. (2023a). Data Mining Data mining. In D. Ediana (Ed.), *PT Global Eksekutif Teknologi* (1st ed., Vol. 1, Issue 1). PT Global Eksekutif Teknologi.

[2] Amna, S, W., Putra, T. A., Wahidin, A. J., Syukrilla, W. A., Wardhani, A. K., Heryana, N., Indriyani, T., & Santoso, L. W. (2023b). Data Mining Data mining. In D. Ediana (Ed.), *PT Global Eksekutif Teknologi* (1st ed., Vol. 1, Issue 1). PT Global Eksekutif Teknologi.

[3] Ariyani, F., Martini, Hestiningsih, R., & Fauzi, M. (2024). Gambaran Perilaku (Pengetahuan, Sikap, dan Perilaku) Pencegahan Gastroesophageal Reflux Disease (GERD) Pada Mahasiswa. Jurnal Kesehatan Masyarakat, 12(1), 115–119. https://doi.org/10.14710/jkm.v12i1.39705

[4] Aziz Muslim, M., Prasetya, B., Mawarni, E. L. H., Herowati, A. J., Mirqotussa'adah, Rukamana, S., & Nurzahputra, A. (2019). *Data Mining Algoritma C4.5* (1st ed.). ILKOM UNNES.

[5] Fadilah, S. N., & Herdiana, Y. (2023). Nanoformulasi Untuk Pengobatan Penyakit Gerd. *Farmaka*, *21*(3), 389–398.

[6] Kemensos RI. (2020). Perilaku hidup bersih dan sehat (phbs) penguatan kapabilitas anak dan keluarga. *Penguatan Kapabilitas Anak Dan KeluaPerilaku Hidup Bersih Dan Sehat Atau PHBS Adalah Upaya Untuk Memperkuat Budaya Seseorang, Kelompok Maupun Masyarakat Agar Peduli Dan Mengutamakan Kesehatan Untuk Mewujudkan Kehiduparga*, 1–14.

[7] Mauladi, Weni, I., & Abidin, Z. (2018). Penerapan Metode Association Rules Dalam Menentukan Pola Penyakit Dan Usia Pasien Berdasarkan Data Rekam Medis. *(JUSS) Jurnal Sains Dan Sistem Informasi*, *1*(1), 1–4.

[8] Munazilin, A., & Santoso, F. (2021). *logika dan algoritma pemrograman* (Khumaidi, Ed.; 1st ed.). CV. AA. Rizky.

[9] Nola Ritha, Suswaini, E., & Pebriadi, W. (2021). Penerapan Association Rule Menggunakan Algoritma Apriori Pada Poliklinik Penyakit Dalam (Studi Kasus: Rumah Sakit Umum Daerah Bintan). *Jurnal Sains Dan Informatika*, *7*(2), 222–230. https://doi.org/10.34128/jsi.v7i2.329

International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v3i2.1593
Volume 3 , Issue 2 , August 2024, pp. 146-160

[10] Nurhikmat, T., Maftuhatul, U., Latupono, B., & Widodo, E. (2018). Aplikasi Association Rules Dengan Menggunakan Algoritma Apriori Dalam Mendeteksi Pola Penyakit DBD (Studi Kasus : Pasien DBD Puskesmas Cangkringan Sleman). *KNPMP III*, *2*(1), 481–489.

[11] Permana Putra, C., Rifai, A., & Widianto, K. (2022). Penerapan Metode Associaton Rule Terhadap Pola Data Penyakit Pada RSUD Jakarta Menggunakan Algoritma Apriori. *Universitas Bina Sarana Informatika*, *6*(4), 665–674. https://doi.org/10.52362/jisamar.v6i4.828

[12] Prima Melina Samosir, E. (2023). Analisa Pola Data Penyakit Di Klinik Gigi RDC Dengan Menerapkan Metode Association. *CBIS Journal*, *11*(01). http://ejournal.upbatam.ac.id/index.php/cbishttp://ejournal.upbatam.ac.id/index.php/cbis

[13] Relita Buaton, Zarlis, M., Efendi, S., & Yasin, V. (2019). *Data Mining Time Series* (Vol. 1, pp. XIV–235). WADE GROUP.

[14] Rusmina, E., Volvo Sihombing, & Juledi, A. P. (2024). Analisis Keterkaitan Antara Gejala Penyakit Menggunakan Algoritma Apriori dalam Bidang Kesehatan. *Jurnal Ilmu Komputer Dan Sistem Informasi (JIKOMSI)*, *7*(1), 337–340. https://doi.org/10.33330/jurteksi.v6i3.827

[15] Saputera, M. D., & Budianto, W. (2017). Diagnosis dan Tatalaksana Gastroesophageal Reflux Disease (GERD) di Pusat Pelayanan Kesehatan Primer. *Journal Continuing Medical Education*, *44*(5), 329–332.

[16] Sinapoy, I. W., Jaya, E. F. P., & Putri, L. A. R. (2021). Hubungan Pola Makan dengan Kejadian Gastritis pada Bagian Perlengkapan Rumah Tangga dan Protokoler Pemerintah Daerah Kabupaten Konawe Utara. *Ilmiah Karya Kesehatan* , *2*(1), 42–48.

[17] Swastika, R., Mukodimah, S., Susanto, F., Muslihudin, M., & Ipnuwati, S. (2023). *IMPLEMENTASI DATA MINING (Clastering, Association, Prediction, Estimation, Classification)* (1st ed., Vol. 1). CV. Adanu Abimata.

DOI: 10.52362/ijiems.v3i2.1593