Survival Time To Claim Analysis On Travel Insurance Products (UMRAH) Case Study On PT. Jasindo Syariah KC Medan

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Abstract

The analysis of survival time to claim carried out on Umrah travel insurance products at PT. Jasindo Syariah KC Medan can help with risk management, where the main purpose of the research is to understand the duration between policy purchase and claim submission, as well as the factors that affect that time. This study was conducted on a sample of 80 Umrah travel insurance policies that met certain criteria, using a quantitative approach. The population in this study is the entire Umrah travel insurance policy and samples are taken purposively based on predetermined criteria. Descriptive and survival analysis, including Kaplan-Meier estimation, log-rank tests, and Cox proportional hazards regression, were applied. The results showed that the average claim time was 22.89 days with significant variation among participants. Factors such as the type of insurance (group vs individual) and claim status have been proven to affect the duration of the claim. This study emphasizes the importance of analyzing claim patterns in risk management and accurate premium determination, as well as improving the quality of sharia insurance services in meeting the needs of Umrah pilgrims

Keywords: *Survival Time To Claim, Umrah Travel Insurance, Cox Proportional Hazard Regression.*

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INTRODUCTION

Sharia insurance is a form of financial protection based on Islamic sharia principles, where participants help each other in facing risks through fund contributions that are managed transparently and fairly.(Siregar, Rahma, 2023) This concept is different from conventional insurance because it avoids elements that are prohibited in Islam such as usury, maysir, gharar. In sharia insurance, the funds collected are used to help participants who experience disasters, while the company acts as a fund manager by obtaining ujrah (fee) in accordance with the agreed contract.(Siregar, Rahma, 2023). Public understanding of sharia terms in financial products is important to support wider literacy and participation in the Islamic financial system." Therefore, sharia-based financial literacy needs to be improved so that people can understand the benefits and mechanisms of Islamic financial products.(Yafiz, 2019)

Islamic insurance companies play an important role and have a significant influence in modern society. (Aqilah,Marliyah, 2023). One of the Umrah travel

insurance products at PT Jasindo Syariah KC Medan is one of the most popular products, because the Umrah pilgrimage is a trip made by Muslims to the holy land with various preparations, one of which includes protection against risks that may occur during the trip. Islamic Umrah travel insurance is specially designed to provide various protections from all risks that may occur during the travel period such as illness, loss of baggage, accidents, and trip cancellation. This product ensures that pilgrims can carry out worship and be solemn without worrying about all the risks of all unexpected events.(Nasution, 2023). The protection programs provided in travel sharia insurance can increase public confidence, including women as the main participants, so that they are more empowered and independent. For example, female pilgrims who feel financially and risk protected will be more confident and active in participating in worship trips and other religious economic activities.. (Yusrizal, 2019)

The Indonesian government has required Umrah pilgrims to have sharia insurance, one of which is travel sharia insurance and is one of the requirements before departure. This is stated in the Regulation of the Minister of Religious Affairs Number 8 of 2018 concerning the organization of Umrah worship, where the service and protection of pilgrims and Umrah officers includes life insurance such as accidents and illnesses that aim to provide comprehensive protection to pilgrims, given the many risks that may occur during the Umrah worship journey. In the context of Islamic insurance for Umrah travel, risk management is also very important, because the company must be able to anticipate and overcome the risk of claims that may arise during the pilgrims' journey. Therefore, the implementation of appropriate risk management strategies, including claim timing analysis and claim restructuring, can support the sustainability and stability of Islamic insurance products, as well as increase pilgrims' confidence in the protection provided.. (Mukhlasin, 2020)(Mukhlasin, 2020) With affordable premiums, jamahs get protection in accordance with sharia principles. (Dian Adila, Marliyah, 2019)

According to the Fatwa of the Dewan Syariah Nasional (DSN) MUI No.21/DSN-MUI/X/2001 Sharia insurance is an effort to help each other among a number of people or parties through investments in the form of assets and tabarru funds (mutual help) that provide a pattern of returns to face certain risks through contracts in accordance with sharia principles which are certainly prohibited from containing elements of riba (interest), maisir (gambling) and gharar (uncertainty). Islamic insurance companies in Indonesia have provided Umrah travel insurance products with various benefits. For example, PT Asuransi Jasindo Syariah offers protection to Umrah participants / pilgrims from the risks associated with the activities of organizing Umrah worship such as ASPU products that offer reimbursement of medical expenses, compensation for death due to death or permanent disability due to accidents, compensation for death due to illness / other causes while performing Umrah worship, providing refunds of deposits / repayments due to death, accidents, serious illness of participants or immediate family, canceled aircraft, and in the event of a residential fire or floodingThen the ASPU Plus product that provides a sense of security and comfort during worship with compensation for lost luggage or travel documents, and guarantees the cost of Umrah travel caused by failure to depart due to default. This product is designed to ensure the comfort and safety of participants / pilgrims while worshiping in the holy land. (Pertiwi et al., 2021) (Syariah J. , 2020)

Due to the high public interest in performing Umrah, the market potential for Umrah travel insurance in Indonesia is very large. According to data from the Ministry of Religious Affairs, in 2023 the number of Umrah pilgrims reached 1,368,616 people, while until September 2024 the number of Indonesian Umrah pilgrims almost reached 1,800,000 peopleUmrah pilgrims who travel up to 30 days usually follow a regular Umrah package with a duration of 9-30 days, which includes worship in Makkah and Madinah and making pilgrimages to historical places. During the trip they will perform various worship services such as congregational prayers, tawaf, sa'i visiting the Grand Mosque and the Prophet's Mosque and can also visit historical places such as Jabal Uhud, Arafat, Mina, and Mudzdalifah. With a minimum premium of 50,000 per pilgrim, the potential income of Umrah insurance premiums can reach tens of billions of rupiah per year. This shows a significant opportunity for Islamic insurance companies, especially PT Jasindo Syariah, to develop products and services that suit the needs of pilgrims. (Syariah A. J., Asuransi Jasindo Syariah, 2020) (Indonesia, 2023) (Menyapa, 2024)

Based on the data, the increase in Umrah pilgrims reached 1,800,000 people or an increase of 31.5% in 2024, compared to only 1,368,616 people in 2023. The increase in the number of those departing for Umrah has increased significantly, so the potential for failed claims has also increased due to the high volume of claims in the same period. In addition, the hot weather phenomenon that usually occurs from June to August also increases the health risks of Umrah pilgrims and causes an increase in sickness claims. This condition allows the emergence of failed claims due to the unpreparedness of participants in fulfilling administrative requirements such as completeness of documents and others. This phenomenon shows that the surge of pilgrims and extreme conditions are very likely to cause rejection of claims(Ambarwati, 2024).

However, in this context, analyzing the survival time to claim on Umrah travel insurance products is very relevant to find out the pattern of claims and the factors that influence them. As a result of the claim process from Umrah travel participants and the most frequent claims for lost and damaged luggage, lost travel documents, and lost visas, the author conducted a survival time to claim analysis to understand the pattern of claims that occurred in Umrah travel products with a case study conducted at PT Jasindo Syariah Medan Branch Office in order to mitigate the risk of claim patterns that have occurred, where the analysis carried out is expected to help the company to manage risk and optimize premium setting in the future. This understanding is very important for Islamic insurance companies in managing risk, setting the right premium, and improving the quality of service to its participants. So that it can support the comfort and safety of pilgrims in carrying out Umrah worship in the holy land.

METHODOLOGY

The research conducted used a retrospective design with a quantitative approach and an approach that collects and analyzes data from events that have occurred in the past. (Nugrahani, 2022). Historical data of umrah travel sharia insurance participants will be analyzed to evaluate the time to claim submission.

The survival analysis method was chosen to determine the duration of time to claim on umrah travel sharia insurance products at PT Jasindo syariah KC Medan. In research with survival analysis, variables are needed that can explain the time required from the time the insurance policy is issued until the participant submits the first claim

(time to claim distribution) of the insured (participant) protected with umrah travel sharia insurance and characteristics that affect the occurrence of time to claim.(Muthaqin, 2024) (Ilahi,Wahidah, 2024)

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The population in this study includes all participants in Umrah travel sharia insurance products at PT Jasindo Syariah KC Medan for the period 2022-2024 as many as 80 policies that have been part of Umrah travel insurance products. The sample was taken using purposive sampling technique, with inclusion criteria such as participants who have complete data related to claim time, claim status, and type of insurance (group or individual).(Sukmaningtyas et al., 2016).

The data collection technique in this study uses secondary data obtained from the company PT Jasindo Syariah KC Medan. The secondary data includes ID, claim time, claim status (1 = claim, 0 = no claim), product type (1 = individual, 2 = group), type of claim (1 = lost luggage, 2 = lost documents, 3 = medical expenses).

The variables used in this study consist of survival time variables, namely the length of time in days from the time participants are registered in Umrah travel insurance until a claim occurs or until the end of the protection period if no claim occurs (censored). The claim status variable indicates whether the participant made a claim during the protection period (coded 1) and did not make a claim (coded 0). In addition, the researcher also used the type of insurance variable which was divided into 2 categories (individual(1)/group(2)) and the type of claim variable (1 = lost luggage, 2 = lost documents, 3 = medical expenses).

Umrah travel insurance is an insurance product that guarantees the risk during the Umrah pilgrimage for the risk of death due to accident, death due to illness, medical expenses due to illness and accident, loss of luggage and loss of travel documents until cancellation of departure. In the context of Islamic insurance for Umrah travel, the analysis carried out is important to understand the duration between the purchase of the policy and the submission of claims made by participants. This research can help insurance companies manage risk and determine the right premium (Syariah, 2020). In the context of sharia insurance, this protection must be in accordance with sharia principles based on DSN-MUI fatwa No. 21/DSN-MUI/X/2001, which operates based on legal contracts and does not contain elements of usury, gharar. In the context of sharia insurance, this protection must be in accordance with sharia principles based on DSN-MUI fatwa No. 21/DSN-MUI/X/2001, which operates based on legal contracts and does not contain elements of usury, gharar, and maysir. (Pertiwi et al., 2021)

The survival proportional hazards regressions model was first discovered by Sir David R. Cox in 1972 through his scientific paper entitled "Regression Models and Life Tables". The study introduced a model now known as the Cox Proportional Hazards Model, which simplifies the relationship between the hazard function at one time and the covariates that affect it. This model is also the cornerstone of modern

survival analysis and has been widely used in fields such as epidemiology, clinical studies, economics, and insurance.(Sasieni et al., 2014)(Cox, 1972)

Survival analysis was chosen because the procedure is done with statistics to analyze data with time until an event occurs as the response variable.(Sauddin et al., 2021). Analisis survival dipilih karena prosedur yang dilakukan dengan statistik untuk menganalisis data dengan waktu sampai terjadinya suatu peristiwa sebagai variabel respon. (Kvamme et al., 2021).

Previous studies (Muthaqin, 2024) have applied survival analysis to term life insurance products to determine claim patterns, namely the duration of time until the claim occurs based on policyholder characteristics such as age, gender, marital status, premium amount, coverage value, insurance period, and distribution channels. The results show that these factors have a significant impact on claim time (Muthaqin, 2024).

The survival function is the probability that an individual or object will survive longer than a certain time describes the probability that an individual or object will "survive" without experiencing an event (risk) until time t. (Sauddin et al., 2021). Mathematically, the survival function S(t) is defined as the probability that the event time T is greater than t (Sukarma et al., 2023)(Baek et al., 2021).

$$S\ (t) = P\ (T > t)$$

This analysis was conducted to determine the duration of claim time on Umrah travel sharia insurance products at PT Jasindo Syariah KC Medan. The stages of survival analysis carried out in survival time to claim research:

a. Analyzing the variables that affect claims
b. Kaplan-Meier survival function estimation
c. Log-Rank test to compare survival curves between insurance type and claim type
d. Cox Proportional Hazard Regression to analyze the effect of insurance type and claim type on claim time

Kaplan-Meier is used to calculate the probability of surviving without a claim at a given time (Fajarini et al., 2018). The formula:

$$\hat{S}(t) = \prod_{ti \leq t}\ (1 - \frac{di}{ni})$$

Where:
$s(t)$ = survival function at time t.
di = the number of participants who submitted a claim at time ti.
ni = the number of participants who are still at risk just before the time of ti.

Log-Rank test used to compare survival curves between groups vs. individuals (Mufarida et al., 2023).

Hypothesis:
H_0 = There is no difference in survival time to claim between types of insurance, and types of claims.
H_1 = There are differences between survival time to claim between types of insurance, and types of claims.

If the p-value <0.05, there is a significant difference between the two types of insurance.(Ramadhani, Rahmi, Putri, Hidayah, 2023).

Cox Proportional hazard is a regression model used to see the factors that cause an event to occur or can be known as (time-dependent covariate).(Fajarini et al., 2018)(Baek et al., 2021). This model is a regression model that expresses the hazard (risk) of individuals with certain characteristics called covariates. (Hariadi, 2021)(D'Arrigo et al., 2021), the model :

$$h(t) = h_0 (t)exp (\beta_1 X_1 + \beta_2 X_2)$$

Where:

$h(t)$	= hazard rate (risk in time t events).
$h_0 t$	= basic hazard function.
X_1	= claim status.
X_2	= type of insurance.
X_3	= type of claim.
β_1, β_2	= the coefficient that shows the effect of the variable on the claim time.

Interpretation of the Cox model:

a.　　　　If exp(β)>1, the variable increases claim risk faster.

b.　　　　If exp(β)<1, the variable decreases claim risk

Check the p-value to see if the effect is significant

RESULTS AND DISCUSSION

1. Participant Description and Claim Time

Measurements were made through descriptive statistics with a data sample of 80 Umrah travel insurance policies for the period 2022-2024. Descriptive analysis in this study is used to obtain an estimate of the factors that affect the survival of Umrah travel insurance participants. The following descriptive analysis results are given continuously

Table 1. Results of Descriptive Analysis of Participant Survival Time

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Status Klaim	80	.00	1.00	.4875	.50300
Jenis Asuransi	80	1.00	2.00	1.6750	.47133
Jenis Klaim	39	1.00	3.00	2.1282	.83286
Waktu Klaim	80	1.00	30.00	22.8875	9.48416
Valid N (listwise)	39				

Source : SPSS 25

In the table above, it can be seen that the Claim Time variable has an average of around 22.89 days with considerable variation, characterized by a standard deviation of 9.48 days, and the lowest time range of 1 day to the highest of 30 days indicates almost 3 weeks from the issuance of the policy participants submit claims, but there is a considerable variation in claim time indicating that not all participants submit claims in the same time.

As for the Type of Insurance variable, the average value is around 1.6750 with a standard deviation of 0.47133, indicating that the majority of participants come from group insurance, with each category having a fairly balanced but slightly different

number, and the Claim Type variable has an average of around 2.13 out of a total of 3 categories, with a standard deviation of 0.83, indicating a fairly large variation between claim categories.

2. Survival Analysis Using Kaplan-Meier Curve

Survival analysis is performed to determine the distribution of Umrah travel insurance claim time based on the variables of insurance type and claim type, where Kaplan-Meier curves are used to estimate the chances of surviving (surviving the claim) over time.

Table 2. Kaplan-Meier Function Results Proportion of Participant Claims

| Claim Status	Number of Participants	Percentage
Claim (1)	39	48,75 %
No Claim (0 / Censored)	41	51,25 %
Total	80	100 %

Source : Researcher's Process 2025

In this study, out of a total of 80 participants, 41 participants (51.25%) did not submit a claim until the end of the observation period (30 days), so they are included as censored data. This means that until the observation time limit, these participants have not experienced a claim event..

Tabel 3. Average and Median Time to Claim by Type of Insurance

| Type of Insurance	Average claim time (days)	Median claim time (days)
1 (individual)	21,73	26
2 (Group)	23,44	22,89 (Overall)

Source : Researcher's Process 2025
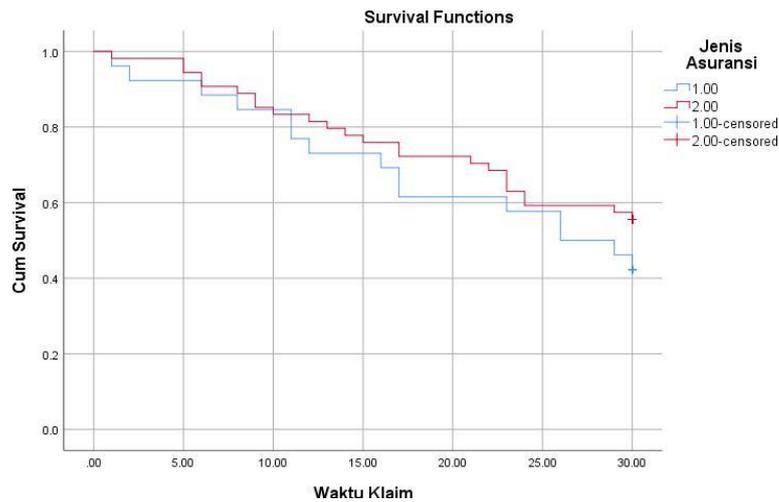
Gambar 1. Kaplan-Meier Curve Type of Insurance

In the Kaplan-Meier curve test results, there is no difference between groups vs. individuals, which indicates that both groups of insurance types have similar claim time patterns. Where insurance type 1 (individual) averages 21.73 days with a median of 26 days while insurance type 2 (group) with an average of 23.44 days with a median of 22.89 days overall.

Tabel 4. Average and Median Time to Claim by Claim Type

Claim Type	Average claim time	Median Claim Time (days)
1	16,36	17
2	13,25	13
3	16,38	15

Source : Researcher's Process 2025
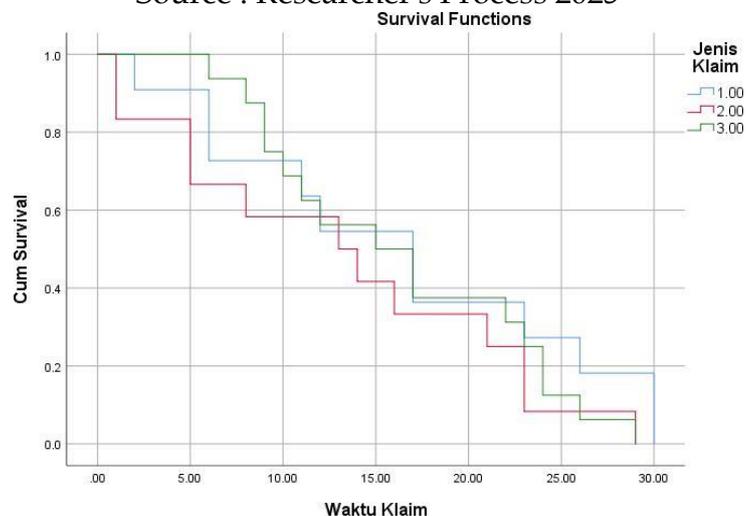
Gambar 2. Kaplan-Meier Curve of Claim Type

The results of the curves and tables show no significant difference in claim time patterns between claim types. It can be seen that the average claim time for different

claim types is 16.36 and 13.25 days but is not statistically significant where the p-value > 0.05.

3. Testing Survival Differences Based on Insurance Type and Claim Type

The Log Rank test is used to analyze data on two related groups, with subjects observed in two different conditions. (Wibowo et al., 2024).

H_0 = There is no difference in survival time to claim between types of insurance, and types of claims.

H_1 = There are differences between survival time to claim between types of insurance, and types of claims.

Tabel 5. Log-Rank Test Results

Variable	Log Rank			Conclusion
	Log Rank	P-Value	Sig	
Type of Insurance	1.066	0.302	0.05	There is no rejection of H_0
Claim Type	1.897	0.387	0.05	There is no rejection of H_0

Source : Researcher's Process 2025

The result of the P-Value shows 0.302 which is greater than the commonly used significance level of 0.05, so 0.302> 0.05 therefore it cannot reject the null hypothesis ($H0$). This indicates that there is not enough evidence to say that there is a significant difference in survival time between individuals with insurance types 1.00 and 2.00. Likewise, the P-value of claim type is 0.387 > 0.05 which indicates that it does not reject the null hypothesis ($H0$).

Based on Kaplan-Meier analysis and Log-Rank statistical test, there was no significant difference in the distribution of claim time between the categories of insurance type and claim type. This means that the general pattern of claim time is similar among all categories. The Log-Rank statistical test also supported this, with P-value results > 0.05 (p = 0.302 for insurance type and p = 0.387 for claim type), indicating no significant difference in claim timing patterns between the categories.

4. Influence of Variables on Claim Time (Cox Proportional Hazards Regression)

Table 6. Cox Proportional Hazards Test Results

Variable	B	SE	Exp(B)	95% CI Exp(β)	P-Value (Sig.)	Interpretasi
Type of Insurance	0.112	0.336	0.894	0.462 – 1.729	0.739	Lower claims risk, not significant

JenisKlaim_1 (Lost luggage)	0.294	0.423	1.342	0.586 – 3.074	0.487	Increasing the risk of claims, not significant
JenisKlaim_2 (Loss of documents)	- 0.266	0.384	0.767	0.361 – 1.627	0.489	Reducing claim risk, not significant
JenisKlaim_3 (Medical expenses)	0.020	0.334	1.020	0.530 – 1.963	0.952	Almost no effect, not significant

Source : Researcher's Process 2025

It can be seen from the table above that the results of the Cox Proportional Hazards regression analysis on the timing of claims show no significant effect from either the type of claim or the type of insurance on the timing of the claim, because all P-Values > 0.05. It can be seen from the JenisKlaim_1 that baggage loss has an Exp(B) value of 1.342 (>1), which means this type of baggage loss claim increases the risk of claiming faster by 34.2% compared to other types of claims. However, the P-Value is 0.489, so it is not significant. Then JenisKlaim_2 (Loss of documents) has Exp(B) = 0.767 (<1), indicating that this type of claim reduces the risk of claims (claims are slower) by 23.3% compared to JenisKlaim_3. However, with a P-Value = 0.489, this effect is also not significant.

And in JenisKlaim_3 (medical expenses), it has Exp(B) = 1.020 (≈1), which means it has almost no effect on claim time. The P-Value = 0.952 indicates that although it often occurs, it does not have a significant effect on the acceleration or deceleration of claim time. JenisKlaim_3 (medical expenses) is the most frequently encountered in the Cox regression test.

Then continued to test the Proportional Hazards Assumption, the interaction variable between the covariate and time that is significant ($p < 0.05$), indicating a violation of the proportional hazards assumption in the Cox Proportional Hazards model. Below are the results of the proportional hazards assumption test.

Tabel 7. Proportional Hazards Assumption Test

Variable	B	SE	Wald	Sig. (p-value)	Exp(B)	description
Time_x_JK1(3)	10.126	3.965	6.523	0.011	24,991.13	Significant – Type of Claim 1 Time
Time_x_JK2(4)	5.841	2.311	6.389	0.011	344.004	Significant – Type of Claim 2 x Time

Time_x_asuransi (5)	4.313	2.069	4.343	0.037	74.649	Significant - Types of Insurance x Time

<div align="center">Source : Researcher's Process 2025</div>

Based on the table above, it can be concluded that the variables Time_x_JK1(3), Time_x_JK2(4), and time_x_asuransi(5) has a p-value less than 0.05. This indicates that the proportional hazards assumption is not met for that variable. Therefore, the interpretation of the Cox model results must be done with caution, or the use of alternative models such as stratification or the extended Cox model should be considered.

Based on the analysis results that have been conducted, researchers found that the type of group insurance has a significant impact on the claims submitted, especially since the majority of participants come from that group. These findings indicate that the type of insurance can play an important role in the frequency and patterns of claim submissions, although it does not directly affect the timing of claimsThis is different from the findings of (Muthaqin, 2024) which show a significant influence of age and gender variables on claim time. The dominant proportion of participants from group insurance is an important reason why the focus on the type of insurance needs to be examined more thoroughly. Unfortunately, this study has not included other potential factors that may affect claim time, such as participants' medical conditions, administrative processes, or other individual characteristics. This is due to the limitations of the data available to researchers, whereas these variables may have a greater contribution in determining how quickly or slowly claims are submitted.

In addition, the proportional hazards assumption test shows violations in several interactions between time and covariates (such as claim type and insurance type), indicating that the Cox model does not fully meet its basic assumptions. Therefore, interpretation of the regression results should be done with caution, and alternative models need to be considered in further research.

CONCLUSION

Based on research results from 80 data of participants in the umrah travel insurance product of PT. Jasindo Syariah KC Medan, which were analyzed using survival analysis methods, several important findings were obtained. The average claim time of participants was recorded at 22.89 days, with a time span ranging from 1 to 30 days. This finding indicates that the majority of participants filed claims within approximately three weeks after the policy was issued. Kaplan-Meier analysis and log-rank tests showed that there were no significant differences in claim time based on the type of insurance or the type of claim. Cox regression also reinforced this result, where all covariates had a p-value > 0.05. Nevertheless, the claims of lost baggage indicate a tendency to speed up the claim time. However, the proportional hazards assumption test shows that some covariates do not meet the model assumptions, such as the interaction between the type of claim and the type of insurance with respect to time. This indicates that the covariate effect on claim time is not constant, so the regression results need to be interpreted with caution. This research is important because it highlights the large proportion of participants from group insurance and the

importance of understanding other factors that have not been analyzed due to data limitations.

The findings in this study provide several important implications, both practically and academically. For PT Jasindo Syariah, the results indicate the importance of paying attention to the characteristics of group insurance participants, which significantly dominate claim submissions. Although not statistically significant, this information can be used to design more appropriate education and communication strategies in claims management and product evaluation. For future researchers, it is recommended to further examine additional variables such as age, gender, medical conditions, or administrative factors that may affect claim timing. Furthermore, advanced modeling approaches such as the stratified Cox model or extended Cox model can be employed to accommodate violations of the proportional hazards assumption, in order to produce a more robust and accurate model in explaining the timing of insurance claims.

EXPRESSION OF GRATITUDE

References :

Ambarwati, I. (2024). *Analisis Penyebab Perusahaan Menolak Klaim Nasabah Asuransi Dalam Perspektif Manajemen Asuransi Syariah (Studi Pada PT Asuransi Jiwa Syariah "Al-Amin" Kediri)*. 1–23.

Aqilah,Marliyah, H. (2023). *Penerapan Akad Mudharabah Dalam Produk Takaful Dana Pendidikan Pada Pt. Takaful Keluarga Cabang Medan*. 03(02), 65–75.

Baek, E. T., Yang, H. J., Kim, S. H., Lee, G. S., Oh, I. J., Kang, S. R., & Min, J. J. (2021). Survival time prediction by integrating cox proportional hazards network and distribution function network. *BMC Bioinformatics*, 22(1), 1–15. https://doi.org/10.1186/s12859-021-04103-w

Cox, D. R. (1972). Regression Models and Life-Tables. *Journal of the Royal Statistical Society Series B: Statistical Methodology*, 34(2), 187–202. https://doi.org/10.1111/j.2517-6161.1972.tb00899.x

D'Arrigo, G., Leonardis, D., Abd Elhafeez, S., Fusaro, M., Tripepi, G., & Roumeliotis, S. (2021). Methods to Analyse Time-to-Event Data: The Kaplan-Meier Survival Curve. *Oxidative Medicine and Cellular Longevity*, 2021. https://doi.org/10.1155/2021/2290120

Dian Adila, Marliyah, M. Y. (2019). *Analisis Pengaruh Dana Pihak Ketiga, Pembiayaan, Bancassurance Terhadap Laba Dan Dampaknya Pada Kesejahteraan Masyarakat (Studi Kasus Bank Syariah Di Indonesia)*.

Fajarini, F. A., Fatekurohman, M., Matematika, J., & Jember, U. (2018). *Analisis Premi Asuransi Jiwa Menggunakan Model Cox Proportional Hazard*. *1*(2), 88–99.

Hariadi, W. (2021). *Analisis Survival Lama Waktu Sembuh Pasien Covid-19 Dengan Metode Kaplan-Meier Dan Log-Rank Di Kabupaten Jember*. *5*(1), 415–425.

Ilahi,Wahidah, S. (2024). *Analisis Survival Terhadap Pasien Penderita Penyakit Gagal Ginjal Menggunakan*. *12*(1).

Kvamme, H., & Borgan, Ø. (2021). Continuous and discrete-time survival prediction with neural networks. *Lifetime Data Analysis*, *27*(4), 710–736. https://doi.org/10.1007/s10985-021-09532-6

Mufarida, A., Saputra, N., Yuriska, R. T., & Liaunillah, Y. (2023). *Analisis Kurva Survival Kaplan Meier Menggunakan Uji Log Rank Pada Pasien Penyakit Kanker Serviks*. *2*(1), 14–18.

Mukhlasin, A. dan M. H. P. (2020). Analisis Penerapan Restrukturisasi Pembiayaan Dalam Upaya Penyelamatan Non Performing Financing (NPF) Pada PT. Bank Sumut Cabang Syariah Kota Pematangsiantar. *Invention*, *1*(1), 33–43.

Muthaqin, L. (2024). *Analisis Survival Time To Claim Pada Produk Asuransi Jiwa Berjangka : Studi Kasus PT XYZ*. *12*(0), 518–527.

Nasution, M. (2023). *Analysis Of Sharia Compliance Implementation In Assessing The Performance Of Agent Of Pt Asuransi Jiwa Syariah Bumiputera*. *6*(3), 1645–1653.

Nugrahani, L. (2022). *Risiko Mortalitas Pasien Covid-19 (Studi Kohort Retrospektif Di Rumah Sakit Rujukan COVID-19)*. *6*(2), 260–267.

Pertiwi, L., & Abidah, A. (2021). Eksistensi Fatwa No.21/DSN-MUI/X/2001 Pada Asuransi Jiwa Syariah di PT. Prudential Life Assurance Cabang Ponorogo. *Invest Journal of Sharia & Economic Law*, *1*(1), 61–73. https://doi.org/10.21154/invest.v1i1.2567

Ramadhani, Rahmi, Putri, Hidayah, T. (2023). *Analisis Survival Terhadap Pasien Penderita Gagal*. *2*(1), 7–13.

Sasieni, P. D., & Brentnall, A. R. (2014). Survival analysis. In *Handbook of Epidemiology: Second Edition*. https://doi.org/10.1007/978-0-387-09834-0_18

Sauddin, A., Nawawi, M. I., & Muhalki, M. (2021). Analisis Survival dengan Menggunakan Metode Kaplan Meier pada Penderita Penyakit Demam Berdarah Dengue (DBD). *Jurnal Sehat Mandiri*, *16*(2), 21–32. https://doi.org/10.33761/jsm.v16i2.358

Siregar, Rahma, S. (2023). *Pengaruh Kualitas Pelayanan Terhadap Loyalitas Peserta Asuransi Jiwa Syariah (Studi Kasus di PT Asuransi Jiwa Syariah Bumiputera Muda)*. *03*(03), 14–26.

Sukarma, M., & Anggraini, M. P. (2023). *Analisis Kurva Survival Kaplan Meier Pada Pasien Penyakit Jantung Koroner (PJK) dengan Dua Treatment Menggunakan Uji Log Rank*. *2*(1), 25–31.

Sukmaningtyas, N., Rintiswati, N., & Ahmad, R. A. (2016). *Prediktor faktor kekambuhan tuberkulosis di kabupaten Bantul Predictors of tuberculosis recurrence in the district of Bantul*.

Wibowo, A. P., Kanaya, N. S., & Ginting, P. A. (2024). *Analisis Survival Pada Penyakit AIDS Menggunakan Metode Kaplan Meier*. *4*, 950–960.

Yafiz, D. (2019). Customers' Perception of the Use of Arabic Terminology in Sharia Banking Products. *KnE Social Sciences*, *2019*, 505–514. https://doi.org/10.18502/kss.v3i19.4881

Yusrizal, S. (2019). Strategi Pengembangan Pariwisata Halal Di Propinsi Sumatera Utara Sudirman. *Sustainability (Switzerland)*, *11*(1), 1–14. http://scioteca.caf.com/bitstream/handle/123456789/1091/RED2017-Eng-8ene.pdf?sequence=12&isAllowed=y%0Ahttp://dx.doi.org/10.1016/j.regsciurbeco.2008.06.005%0Ahttps://www.researchgate.net/publication/305320484_SISTEM_PEMBETUNGAN_TERPUSAT_STRATEGI_MELESTARI

Asuransi Jasindo Syariah. (2020). Dipetik 05 21, 2025, dari https://www.jasindosyariah.co.id/product/ritel/asuransi-perjalanan-haji-dan-umrah

Asuransi Jasindo Syariah. (2020). Dipetik 5 23, 2025, dari Asuransi Jasindo Syariah: https://www.jasindosyariah.co.id/product/ritel/asuransi-perjalanan-haji-dan-umrah

Indonesia, K. A. (2023). *Kementrian Agama Republik Indonesia*. Dipetik 5 23, 2025, dari Kementrian Agama Republik Indonesia: https://kemenag.go.id/

Menyapa, I. (2024). *Indonesia Menyapa*. Dipetik 5 23, 2025, dari Indonesia Menyapa: https://indonesiamenyapa.com/kemenag-catat-hingga-september-2024-jumlah-jemaah-umrah-indonesia-hampir-capai-2-juta/

Syariah, A. J. (2020). Dipetik 5 24, 2025, dari https://www.jasindosyariah.co.id/product/ritel/asuransi-perjalanan-haji-dan-umrah