

Quantitative analysis in early detection of drug abuser relapse: Effectiveness of data-driven predictive models

Marryo Borry WD¹, Rima Semiarty², Hasbullah Tabranny³, Effa Yonnedi⁴

^{1,2}Graduate School of Public Health, Faculty of Medicine, Universitas Andalas, Indonesia

³Faculty of Public Health, Universitas Indonesia, Indonesia

⁴Faculty of Economics and Business (FEB), Universitas Andalas, Indonesia

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ABSTRACT

The purpose of this study is to analyze the description of early detection of relapse in drug abuse and to see the relationship between factors that significantly influence relapse in drug abuse. This study uses a quantitative design to describe the implementation of early detection of relapse prevention in drug abuse in Padang City and determine the determinants that are most related to the occurrence of relapse. The results of the statistical test showed that the variables of age, gender, education level, and marital status had a $p > 0.05$, which means that there was no relationship between these variables and the incidence of relapse in drug abusers. However, the variable of employment status had a $p < 0.05$, indicating a relationship between employment status and the incidence of relapse in drug abusers. Furthermore, the variables of age, education level, and employment status met the assumption test with the condition of $p < 0.25$ at the next stage. The results of the statistical test showed that there was no relationship between the variables of age, gender, education level, and marital status with the incidence of relapse in drug abusers ($p > 0.05$). However, there was a relationship between employment status and the incidence of relapse ($p < 0.05$). In addition, the variables of age, education level, and employment status met the assumption test at the next stage ($p < 0.25$).

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Corresponding Author:

Marryo Borry WD,

Faculty of Medicine,

Universitas Andalas,

Limau Manis, Kec. Pauh, Kota Padang, Sumatera Barat 25175, Indonesia

Email: marryowd210386@gmail.com

INTRODUCTION

Drug problems have become a significant global issue with 296 million users in 2021, an increase of 23% in a decade, and 39.5 million people suffering from drug use disorders, an increase of 45% in 10 years. Drug abuse causes a global loss of 250 billion dollars every year. In Indonesia, drug abusers reached 4,827,619 in 2021, up from 4,470,500 in 2020. Rehabilitation services were accessed by 11,290 people in 2021, up from 4,364 in 2020 (Hikmah Harun & Firdaus Mohamad, 2022).

Drug abuse occurred most in the productive age (15-64 years), with 66.1% working, 9.2% still in school, 13.8% taking care of the household, and 11% not working. Research shows that 63%

of drug users are 12-25 years old with a high school education level (78%). In the last decade, the number of drug abusers in Indonesia has increased by 68% (Boroumand et al., 2018). The prevalence of the past year was 1.80%, or about 3.4 million people aged 15-64 years. Drug abuse has also penetrated the countryside, with a high prevalence in productive age (25-49 years) and a prevalence of the past year above 2.5%. The increasing number of drug abusers is causing various problems, including crime (Wininger et al., 2019).

Treatment programs can reduce crime by addressing the causes of criminal behavior and providing support for productive living. A 2021 study found the impact of drugs on physical, emotional, family relationships, educational, career, financial, criminal, and spiritual health. As many as 55% of offenses were committed under the influence of drugs, and nearly 20% of federal inmates reported offenses to earn money to buy drugs (Ahwan et al., 2021). In the post-rehabilitation stage, drug abusers are prone to relapse, with more than 50% of addicts experiencing relapse in the past decade. Research shows that the relapse rate can reach 80% in the first six months and 50% in two years (MacLachlan et al., 2018).

Diverse definitions of relapse cause differences in numbers in Indonesia. The Ministry of Health recorded a relapse rate of 24.3% in 2018, while BNN stated 90% before rehabilitation. After rehabilitation at Lido Bogor, the relapse rate dropped to around 7% (Kose, 2020). One way to prevent drug addiction is through rehabilitation and post-rehabilitation programs, which help drug users restore physical and mental health, as well as overcome physical illnesses, mental damage, character changes, and comorbidities such as HIV/AIDS, syphilis, and hepatitis (Dewi & Ruidahasi, 2020).

As part of the "right to health" universally recognized by the WHO, which encourages the same health care as patients with other diseases. Rehabilitation and post-rehabilitation programs aim to restore the physical and mental health of drug addicts. Rehabilitation services, such as community-based intervention programs, are designed to address the problem of drug abuse (Akintola et al., 2016). Nonetheless, a lack of family support and motivation can affect the effectiveness of rehabilitation. Instruments such as the DAST-10 are used to detect relapses and measure the severity of drug abuse problems, while other instruments such as SRRS and PWB are also used for similar purposes (Hemalatha & Visantini, 2020). Some countries have developed additional instruments, such as the DAST-20, to focus on internal and external relapse risks. This diversity of instruments provides a comprehensive way to evaluate and prevent relapse in drug abusers (Lis & Szyszka, 2020).

The purpose of this study is to analyze the description of early detection of relapse in drug abuse and to see the relationship between factors that significantly influence relapse in drug abuse.

RESEARCH METHOD

This research was carried out with a quantitative research design using a correlation descriptive research design with a cross sectional approach method. To identify demographic data of drug users including age, gender, education, economic status, employment status, and family history of drug use. In addition, the researcher also identified knowledge, family support, peer support, self-efficacy, coping strategies, access to services and financing (Yunda Sari et al., 2020).

The research was carried out in October 2020 – March 2024 in Padang City, with a sample of 126 drug abusers who are undergoing rehabilitation, in the post-rehabilitation program and completed the program at RSJ HB Saanin Padang, BNNP West Sumatra Clinic, Karunia Insani Foundation in Padang City.

The study used several instruments to collect data, including the Drug Use Questionnaire (DAST-20), the Stimulant Relapse Risk Scale (SRRS), and Health Related Quality of Life (HRQOL). DAST-20 contains 20 questions on the Guttman measurement scale. The DAST-20 score has a severity that ranges from none to severe. The SRRS has 35 statements that measure six domains, including anxiety, emotional problems, and drug compulsivity, with a five-point Likert scale.

RESULTS AND DISCUSSIONS

Characteristics Responden

The respondents in this study were drug abusers who were undergoing rehabilitation, in the post-rehabilitation program and completed the program at HB Saanin Padang Hospital, West Sumatra BNNP Clinic, Kurnia Insani Foundation in Padang City. The respondents in this study were 126 people. In this study, a statistical test was carried out to obtain the frequency distribution and proportion of the characteristics of the research subject. The general overview of the respondents was presented in the form of frequency distribution consisting of: age, gender, education level, employment status and marital status. The description of the research subject can be described as follows.

Table 1. Characteristics of school teachers (n=126)

Characteristic	Frequency (r)	Percentage (%)
Age		
Early Adulthood (18-39 years)	111	88,1
Late Adulthood (\geq 40 years old)	15	11,9
Gender		
Man	116	92,1
Woman	10	7,9
Education level		
Primary (Elementary, Junior & Senior High School)	100	79,4
High (Diploma, S1 & S2)	26	20,6
Employment Status		
Not working	36	28,6
Work	90	71,4
Marital Status		
Not married	67	53,2
Marry	59	46,8

Source: Primary data processing results, 2024

Based on the table above, it shows that the age difference of respondents has an imbalance between the age of early adulthood and late adulthood. The number of early adult respondents was more, namely 111 (88.1%) with the lowest age of respondents being 18 years old and the highest age being 46 years old. The male gender was the highest at 116 (92.1%) with the education level of elementary, junior high and high school at 100 (79.4%). Respondents were working for 90 (71.4%) and 67 (53.2%) were married.

Relationship of respondent characteristics with drug abusers who experience relapse

Table 2. Cross table of respondent characteristics with relapse (n=126)

Characteristic	Relapse				Sum		p value
	Light		Heavy		f	%	
	f	%	f	%			
Age							
Early Adulthood (18-39 years)	54	93,1	57	83,8	111	100	0,109
Late Adulthood (\geq 40 years old)	4	6,9	11	16,2	15	100	
Gender							
Man	53	91,4	63	92,6	116	100	0,793
Woman	5	8,6	5	7,4	10	100	
Education level							
Primary (Elementary, Junior & Senior High School)	43	74,1	57	83,8	100	100	0,181
High (Diploma, S1 & S2)	15	25,9	11	16,2	26	100	
Employment Status							
Not working	22	37,9	14	20,6	36	100	0,032
Work	36	62,1	54	79,4	90	100	
Marital Status							

Characteristic	Relapse				Sum		p value
	Light		Heavy		f	%	
	f	%	f	%			
Not married	33	56,9	34	50	67	100	0,439
Marry	25	43,1	34	50	59	100	

Source: Primary data processing results, 2024

The results of the table above show the relationship between the characteristics of respondents and drug abusers who experience relapse. In this table, it is explained that 111 respondents with early adulthood (18-39 years) had a severe relapse incidence of 57 respondents (83.8%). Meanwhile, 15 respondents were in the late adult age range (≥ 40 years) and had a severe relapse incidence of 11 respondents (16.2%). The variable of education level obtained by 100 respondents was at the low education level (elementary, junior high & high school) had a severe relapse incidence of 57 respondents (83.8%). Respondents who had higher education (Diploma, S1 & S2) were obtained by 26 people with 15 respondents (25.9%) having mild relapse events. The variable of employment status of respondents had a total of 90 jobs, 54 respondents (79.4%) had a severe relapse event.

Based on the results of the statistical test, it was found that the variables of age, gender, education level and marital status had a $p > 0.05$, meaning that there was no relationship between the variables of age, gender, education level and marital status with the incidence of relapse in drug abusers. Meanwhile, the work status variable has a $p < 0.05$, meaning that there is a relationship between work status and the incidence of relapse in drug abusers. In the next stage, the variables of age, education level and employment status met the assumption test with the condition of $p < 0.25$.

The relationship between self-efficacy and drug abusers who experience relapse

Table 3. Cross table of self efficacy and relapse (n=126)

Characteristic	Relapse				Sum		p value
	Light		Heavy		f	%	
	f	%	f	%			
Self efficacy							
Tall	24	41,4	43	63,2	67	100	0,014
Low	34	58,6	25	36,8	59		

Source: Primary data processing results, 2024

Table 3 explains the relationship between self-efficacy and drug abusers who experience relapse. In this table, there are 67 respondents with high self-efficacy with 43 respondents (63.2%) having severe relapse events. Meanwhile, 59 respondents had low self-efficacy with 34 respondents (58.6%) having mild relapse. Based on the results of the statistical test, a value of $p = 0.014$ was obtained, which means that there was a significant relationship between self-efficacy and the incidence of relapse in drug abusers.

The relationship of peer support with drug abusers who experience relapse

Table 4. Cross-table of peer support relationships with relapse (n=126)

Characteristic	Relapse				Sum		p value
	Light		Heavy		f	%	
	f	%	f	%			
Peer support							
Good Support	26	44,8	38	55,9	64	100	0,216
Poor support	32	55,2	30	44,1	62	100	

Source: Primary data processing results, 2024

Table 4 explains the relationship between peer support and drug abusers who experience relapse. In this table, there are 64 respondents who have good support with 38 respondents (55.9%) having severe relapse events. Meanwhile, 62 respondents had poor peer support, 32 respondents (55.2%) had mild relapse. Based on the results of the statistical test, a value of $p = 0.216$ was obtained, which means that there was no significant relationship between peer support and the incidence of relapse in drug abusers.

The relationship of peer support with drug abusers who experience relapse

Table 5. Cross table of family support relationship with relapse (n=126)

Characteristic	Relapse				Sum		p value
	Light		Heavy		f	%	
	f	%	f	%			
Family support							
Good Support	31	53,4	38	55,9	69	100	0,784
Poor support	27	46,6	30	44,1	57	100	

Source: Primary data processing results, 2024

Table 5 explains the relationship between family support and drug abusers who experience relapse. In this table, there are 69 respondents who have good support with 38 respondents (55.9%) having severe relapse events. Meanwhile, 57 respondents had poor family support, totaling 30 respondents (44.1%) had severe relapse. Based on the results of the statistical test, a value of $p = 0.784$ was obtained, meaning that there was no significant relationship between family support and the incidence of relapse in drug abusers.

The relationship between the risk of relapse and drug abusers who experience relapse

Table 6. Cross table of the risk of relapse and relapse in drug abusers (n=126)

Characteristic	Relapse				Sum		p value
	Light		Heavy		f	%	
	f	%	f	%			
Risk of relapse							
Light	26	44,8	38	55,9	64	100	0,216
Heavy	32	55,2	30	44,1	62	100	

Source: Primary data processing results, 2024

Table 6 explains the relationship between relapse risk and drug abusers who experience relapse. In this table, there are 64 respondents who have a mild risk with 38 respondents (55.9%) having severe relapse events. Meanwhile, 62 respondents had a severe risk of relapse, while 32 respondents (55.2%) had mild relapse. Based on the results of the statistical test, a value of $p = 0.216$ was obtained, which means that there was no significant relationship between the support of relapse risk and the incidence of relapse in drug abusers.

The relationship between knowledge and drug abusers who experience relapse

Table 7. Cross table of family support relationship with relapse (n=126)

Characteristic	Relapse				Sum		p value
	Light		Heavy		f	%	
	f	%	f	%			
Knowledge							
Good	28	48,3	49	72,1	77	100	0,006
Bad	30	51,7	19	27,9	49	100	

Source: Primary data processing results, 2024

Table 7 illustrates the relationship between knowledge and drug abusers who experience relapse. In this table, there are 77 respondents who have good knowledge with 49 respondents (72.1%) having severe relapse events. Meanwhile, 49 respondents had poor knowledge with 30 respondents (51.7%) having mild relapse. Targeting the results of the statistical test, a value of $p = 0.006$ was obtained, meaning that there was a significant relationship between knowledge and the incidence of relapse in drug abusers.

Analysis of the most dominant factors between age, education level, employment status, efficacy, peer support, risk of relapse and knowledge

Table 8. Simple logistic regression results (n=126)

Variable	p value	OR	CI (95%)
Relapse knowledge	0,009	2,940	1,313 - 6,582
Risk of relapse	0,017	2,791	1,204 - 6,468
Self efficacy	0,026	2,594	1,124 - 5,989
Employment status	0,039	2,617	1,052 - 6,511
Education level	0,044	0,357	0,131 - 0,973

Source: Primary data processing results, 2024

Based on the results of the logistic regression test in table 12, there are 5 dominant variables related to the incidence of relapse in drug abusers. There is a significant relationship between knowledge and the occurrence of relapse with a value of $p = 0.009$. The OR (Odds ratio) value of 2.940 means that drug abusers who have poor knowledge have a chance of 2.940 times relapse.

Relationship of respondent characteristics with drug abusers who experience relapse

Based on the results of this study, the results of the statistical test obtained were obtained that the variables of age, gender, education level and marital status had a $p >$ value of 0.05, meaning that there was no relationship between the variables of age, gender, education level and marital status with the incidence of relapse in drug abusers (Okunade & Osmani, 2020). Meanwhile, the work status variable has a $p <$ value of 0.05, meaning that there is a relationship between work status and the incidence of relapse in drug abusers. In the next stage, the variables of age, education level and employment status met the assumption test with the condition of $p < 0.25$.

This research is in line with the research of Haris, Z., Kamaluddin, M. T., & Sitorus, R. J. (2019). The effect of substance type and peer on relapse incidence on narcotics abuse in IPWL Rehabilitation Hospital, Bahar Hospital, South Sumatra Province. The results of the study showed that there was no relationship between respondent characteristics and the incidence of relapse in drug abuse had a $p > 0.05$, which was 0.808 (Motsumi et al., 2020).

It can be concluded that there is no consistent relationship between demographic factors such as age, gender, education level, and employment status of respondents and recurrence of drug abuse. Research by (Solihat et al., 2022) found that in the population of individuals attending recovery programs from alcohol abuse, these demographic factors did not significantly predict relapse.⁷ A similar thing was found in a study by (Dolev-Cohen et al., 2020), which showed that demographic factors did not consistently influence relapse outcomes in overcoming drug abuse, in adolescents of drug abusers found that age and sex had no significant relationship with relapse. Overall, these findings suggest that in the context of drug abuse, those demographic factors may not be the primary predictors of determining the outcome of relapse, and that other factors such as social support, motivation for recovery, and psychological well-being may have a more significant impact.

The relationship between self-efficacy and drug abusers who experience relapse

Based on the results of the research on the relationship between self-efficacy and drug abusers who experience relapse, it can be concluded that there are 67 respondents who have high self-efficacy with 43 respondents (63.2%) having severe relapse events. Meanwhile, 59 respondents had low self-efficacy with 34 respondents (58.6%) having mild relapse. Based on the results of the statistical test, a value of $p = 0.014$ was obtained, which means that there was a significant relationship between self-efficacy and the incidence of relapse in drug abusers.

This research is in line with research by (Sufredini et al., 2022) about an analysis of resident perception in undergoing rehabilitation by using health belief model in BNN East Kalimantan Province. In his research, it can be concluded that self efficacy has been added to the HBM variable where self efficacy is a belief in a person's ability to perform an action. Based on the results of the

Spearman Rank correlation test, the results were obtained that there was a relationship between the variable of self-efficacy perception towards rehabilitation undertaken by residents with a significance value of 0.006 which means a significance value of < 0.05 .⁹ reviews

Some respondents have demonstrated high self-efficacy and confidence in their own ability to recover from drug dependence through the rehabilitation process. They believe that by participating in a rehabilitation program, they can improve their physical, mental, and social health. However, there are also some respondents who still feel doubtful about their abilities, which leads to a lack of confidence in the recovery process (Gupta, 2018). To address this, it is important to maintain contact with people who are considered influential to respondents. Constant emotional support, appreciation, and information from those closest to them can increase respondents' enthusiasm, motivation, and confidence in facing rehabilitation challenges and achieving optimal physical, psychological, and social recovery (Millner, 2021).

The relationship of peer support with drug abusers who experience relapse

Based on the results of the study, it explains the relationship between peer support and drug abusers who experience relapse. In this table, there are 64 respondents who have good support with 38 respondents (55.9%) having severe relapse events. Meanwhile, 62 respondents had poor peer support, 32 respondents (55.2%) had mild relapse. Based on the results of the statistical test, a value of $p = 0.216$ was obtained, meaning that there was no significant relationship between peer support and the incidence of relapse in drug abusers.

This research is not in line with the research by Haris, Z., Kamaluddin, M. T., & Sitorus, R. J. (2019). The effect of substance type and peer on relapse incidence on narcotics abuse in IPWL Rehabilitation Hospital, Bahar Hospital, South Sumatra Province. Based on the results of statistical tests, it is proven that there is a relationship between peer influence and the incidence of narcotics relapse (P value = 0.010). Exp, B of 3,879 (95% C.I 1,388 - 10,839). Narcotics abusers who interact with friends who are also narcotics abusers will have a 3.8 times risk of relapse compared to narcotics abusers who interact with friends who are not narcotics abusers.

The results of this study confirmed that there was no peer relationship with the incidence of relapse, while other studies confirmed that there was a significant relationship between friend or group factors and recurrence (Relapse), in accordance with the findings of previous studies. The Chi-Square statistical test showed a significant value ($p = 0.009 < \alpha = 0.05$).⁶ Other studies also show a meaningful relationship between peers or groups with drug abuse, with significant p-values, such as in the study at the Narcotics Polyclinic of RSJ Prof. HB. Sa'anin Padang City by Rahmadona and Agustin (2014), and on the study of prisoners of the Makassar City Police by Akifah, Noor, and Jumriani (2014). Other findings also highlight the great influence of peers on drug abuse behavior, such as in research by Husna (2016) in Kendari City and Sinaga (2007). The main reason for drug abuse is often peer influence, whether in invitation, influence, or pressure. Relapses in drug abuse often occur due to re-interaction with friends who are still actively using drugs. From this, it can be seen how important the role of peers is in handling rehabilitation and preventing recurrence (Suzabar et al., 2020).

The relationship between family support and drug abusers who experience relapse

The results of the study explain the relationship between family support and drug abusers who experience relapse. In this table, there are 69 respondents who have good support with 38 respondents (55.9%) having severe relapse events. Meanwhile, 57 respondents had poor family support, totaling 30 respondents (44.1%) had severe relapse. Based on the results of the statistical test, a value of $p = 0.784$ was obtained, meaning that there was no significant relationship between family support and the incidence of relapse in drug abusers.

This research is not in line with the research of Rindiani, R., & Nurmaguphita, D. (2017). The relationship between family support and the level of motivation to recover in drug abusers in the Class II A Narcotics Prison Yogyakarta (Doctoral Dissertation, Universitas Aisyiyah

Yogyakarta). The study showed that 71.5% of family support in the high category and 90.8% of the motivation level to recover from drug abuse were in the high category (Harding et al., 2015). The significance value is $p=0.000$ so $p<0.05$.

It can be concluded that there is no significant relationship between family support and the incidence of relapse in drug abusers with 69 respondents having good support with 38 respondents (55.9%) having severe relapse events. Meanwhile, 57 respondents had poor family support, totaling 30 respondents (44.1%) had severe relapse. Meanwhile, several similar researchers stated that there is a relationship between family support and drug abusers who experience relapse, such as research by (Mildawati et al., 2023) which emphasizes the important role of family support in improving resilience. Irianto, Purwadi & Yuzarion (2019) also support these findings by showing that family support plays a significant role in resilience. The contribution of family support to resilience reached 15.5%, with esteem support making the largest contribution of 5.1494%. This is in line with research by (Çop, 2021) which shows that esteem support can increase individual abilities and resilience. Family support, especially in the form of esteem support, helps drug rehabilitation participants overcome difficulties and improve their psychosocial status, so that they become more resilient in facing challenges during the rehabilitation process.

Relationship of knowledge with drug abusers who experience relapse

The results of the study describe the relationship between knowledge and drug abusers who experience relapse. In this table, there are 77 respondents who have good knowledge with 49 respondents (72.1%) having severe relapse events. Meanwhile, 49 respondents had poor knowledge with 30 respondents (51.7%) having mild relapse. Targeting the results of the statistical test, a value of $p = 0.006$ was obtained, meaning that there was a significant relationship between knowledge and the incidence of relapse in drug abusers (Sethi et al., 2019).

This research is in line with the research of Jumaidah, J., & Rindu, R. (2017). Drug Abuse Prevention Behavior in Adolescents in the Sukmajaya District Area, Depok. The results of this study show that knowledge factors, attitude factors and environmental factors are related to preventive behavior (Ibna, 2018).

Based on the above, it can be concluded that knowledge is a very important factor in influencing a person to experience relapse in drug abuse. With high knowledge, a person can more easily anticipate things that are not desirable to him. The better the knowledge of adolescents, the better their preventive behavior against drug abuse, because they will be more aware of the dangers (Zhu, Z., Deng, Z., Wang, Q., Wang, Y., Zhang, D., Xu, R., ... & Wen, 2022). According to YB Mantra quoted by Notoadmodjo, education plays an important role in shaping a person's lifestyle and attitude, as well as influencing their perception, thus making it easier for them to make decisions and act. Although the youth of the PIK-R community have shown a positive attitude, their preventive behavior still needs to be improved because their knowledge about drugs is still lacking. Many teenagers are still confused about the dangers of several types of drugs around them. Therefore, to increase adolescents' knowledge about drug abuse prevention behaviors, efforts such as holding seminars, counseling, and education about the dangers of drugs both at school and at home, both for adolescents and parents.

CONCLUSION

The results of this study can be concluded that there is no relationship between respondent characteristics and the incidence of relapse in drug abuse has a $p > 0.05$ which is 0.808, there is a significant relationship between self efficacy and the incidence of relapse in drug abusers, based on the results of statistical tests obtained a value of $p = 0.216$ means that there is no significant relationship between peer support and the incidence of relapse in drug abusers, there is no significant relationship between family support and the incidence of relapse in drug abusers, Based

on the results of statistical tests, a value of $p = 0.006$ means that there is a significant relationship between knowledge and the incidence of relapse on drug abusers.

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