Contributing Factors in Substance Use after Graduation from Rehabilitation Centers. Case of Rehabilitees Admitted in Iwawa Rehabilitation Center

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Abstract. Rwanda has three public rehabilitation centers and various private and public facilities supporting substance misuse recovery. Unfortunately, many individuals relapse after treatment. At the Iwawa Rehabilitation Center, which hosts over 5000 trainees from all provinces and districts, now about 24.92% of patients ae relapsed cases, requiring two to nine treatments on average. The reasons for these relapses are not well understood. This study aims to identify factors contributing to substance use relapses among trainees at Iwawa Rehabilitation Center. It is a cross-sectional study with a quantitative approach, involving 212 drug abusers who underwent multiple rehabilitation rounds. Data was collected using a structured questionnaire through face-to-face computer-based interviews and analyzed with SPSS version 28. This study demonstrates that substance use, social support, and post-rehabilitation circumstances significantly influence relapse risks. Alcohol and cannabis use, unemployment, and financial instability are major predictors of relapse, while strong family support and addressing perceived reputation loss can mitigate these risks. Enhancing family support and addressing perceived reputation loss are vital. Employment support post-rehabilitation is essential, along with strategies to manage anxiety without substance abuse and ensuring financial stability. Tailored programs for cohabitants and those who have experienced personal loss should also be considered.

Index Terms- Relapse, Rehabilitation, Substance use

I. Introduction

Substance abuse is in these days is a major public health issue worldwide, and as a result, substance users have a very high recurrence rate (Barati et al., 2021). The research contacted with the aim of knowing the efficacy of mindfulness in treating

and developing prevention to substance users found that relapse is very common after receiving treatment for substance misuse (Bowen et al., 2014).

According to Kabisa et al. (2021) said that relapse post-detoxification and rehabilitation after success can be seen in several different parts of the world, and it is more prevalent in low- and middle-income countries (LMICs) than developed countries. Evidence from a very recent, reliable epidemiological researches have demonstrated that drug use is a major issue that necessitates comprehensive prevention efforts, even after successful treatment and recovery (Kabisa et al., 2021). This said above research continues to define relapse as a breakdown in an individual's attempt to alter their substance-related behavior, going back to their previous level of use prior to receiving treatment, or continuing to use substances following a significant time of abstinence or failure in their attempts to alter or make any change to any target behavior.

After receiving treatment, more than 50% of people with records of being subjects of substance use disorders (SUD) relapsed (Hasin et al., 2013). Taking account to other research, relapse rates are common after therapy and can range from forty to seventy five percent in between three weeks to six months after they had stopped treatment process (Moradinazar et al., 2020 & Sapkota, 2019). Relapse to drug and alcohol usage is still a widespread issue in many nations, despite advancements in treatment. Most people seeking treatment do not sustain continuous sobriety, despite more attention being paid to relapse prevention and improving long-term results. Furthermore, findings from several studies carried out in various nations revealed a significant frequency of relapse following therapy completion and or rehabilitation for example, in 2018, in United States of America 22.35 million of adults were drug users, but only 164.8 million of them in this year have overcome addiction and live in solid sobriety (Jones et al., 2020 & Abuse, 2020).

In South Africa, the research found a number of relapse cases increased exponentially. They found that the most numbers of admitted persons in different provinces were relapse cases means it was not the first admission into treatment centers, for example from 9394 in 2020 to 10938 in 2021 (Ndou & Khosa, 2023).

Studies conducted in Iran on the variables influencing drug relapse have revealed that even after a protracted time of abstinence, former drug user relapse. According to this study, 80% of addicted users relapsed within six months after stopping their addictions, another study conducted in this nation revealed that 72% of addicts receiving treatment in treatment facilities fully resumed their drug use within a year of stopping. Relapse rates in this nation were 61% in outpatient settings six months following standard therapy, 59% in long-term hospital settings, and 77% in short-term hospital settings (Mousali et al., 2021).

Relapse is very common; for instance, it is 33% in Nepal, 55.8% in China, and 60% in Switzerland and common in different countries with high rates of drug users who terminated their treatment (Hasin et al., 2013).

In Rwanda recent research conducted by Kabisa et al. (2021), searching to know determinants of relapse after being treated using medication and psychotherapy approaches, showed that the relapse rate is similar to those of other countries, as they found that the range is between 40-60% globally.

II. Conceptual framework

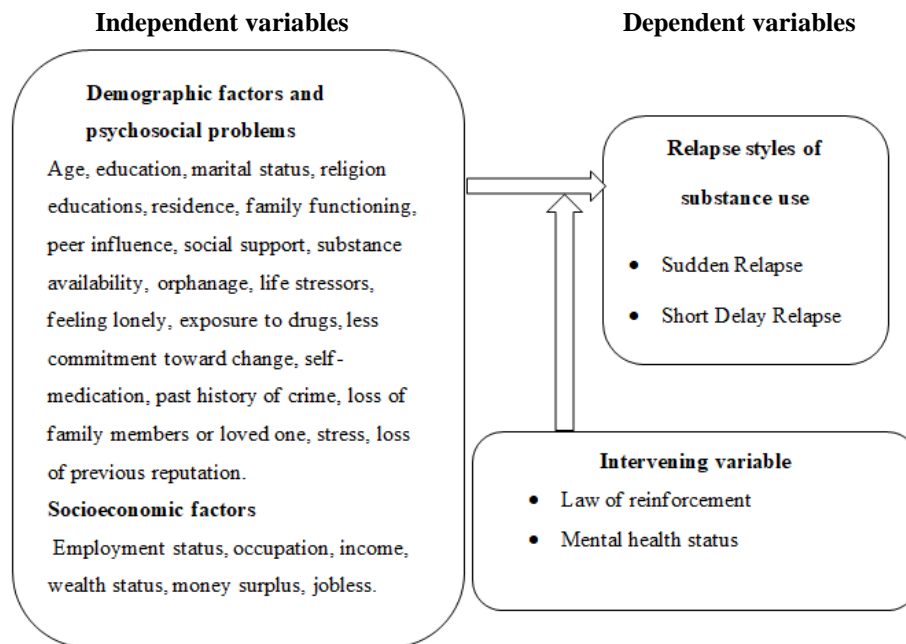**Independent variables**   **Dependent variables**

Figure 1: The conceptual framework shows the relationship between variables

Figure 1: Demonstrate the current study's conceptual foundation. The literature from earlier research projects was consulted in the design of the framework. The variables that are dependent, independent, and intervening are shown in the conceptual framework. Considering the results of the current study, this cohesive conceptual framework results in a cohesive, comprehensive knowledge of the relapse and its causes.

III. Methods

1. Study Design

This research employed a cross-sectional design and a quantitative methodology. Cross-sectional study designs prove valuable in addressing inquiries related to the prevalence of a condition and determining the typical state within a specific demographic at a given moment. These studies can also imply relationships or correlations, often serving as a foundation for further investigations (Bowling, 2014).

2. Study Setting

Choosing Iwawa Rehabilitation Center is fair, because it is the one renown Rehabilitation Center in Rwanda that receives a great number of substance users and others from all 30 Districts of Rwanda, now this center hosts 5030 now. This Center has also a vocational program by which admitted substance users choose themselves to study in in different trades as a way of empowering their socio-economic capacity after graduation from Rehabilitation Center.

This study will give an important clarification on the contributing factors of relapse to substance use after graduation from rehabilitation Centers here in Rwanda. Until now no research was been conducted in Rwanda about the contributing factors to relapse in substance use among graduates from rehabilitation Centers including Iwawa Rehabilitation Center, coupling psychotherapy and vocational training. This research had shed light on contributing factors to relapse in substance use, which will give an insight of what to do in different three parts which makes rehabilitation to be effective including prevention, rehabilitation and reintegration. This study will finally help decision makers to elaborate strategies to help graduates from rehabilitation centers, making prevention and help centers to prepare treatment and program from research-based result.

3. Participants and Sampling

The study is specifically targeting a group of 394 individuals who have rehabilitated in Iwawa Rehabilitation Center more than once due to substance abuse. Those said rehabilitees in the center are mainly substance users who came from all districts of Rwanda. It is therefore a good representative sample of delinquent population in Rwanda on the matter of using substance of abuse and relapse.

4. Sampling Technique

A formula by Yamane (1967), for simple random sampling has been used which is $(n=N)/(1+N×e^2)$, where "N" is total population, "e" is margin of error which is equal to 0.05, and "n" is the sample size.

$$ n = \frac{394}{1 + 394 * (0.05)^2} = 198.5 $$

The minimum sample calculated sample size is 199. With the 10% of non-response rate, the maximum sample size was 2012.

This study employed a systematic sampling technique to select our sample. This method is advantageous because it ensures a more evenly distributed representation across the population, thereby enhancing the study population's representativeness (Bowling, 2014).

5. Variables of the Study

The variables of this study were known using existing literatures on the issues of relapse from worldwide researches. Independent variables were

sociodemographic factors which include age, education, marital status, religion educations, residence. In addition, psychosocial problems where family functioning, peer influence, social support, social consideration, substance availability, orphanage, life stressors, feeling lonely, exposure to drugs, less commitment toward change, self-medication, past history of crime, loss of family member or loved one after rehabilitation program among others. Finally in independent variables related to socioeconomic factors were pointed out including employment status, occupation, income, wealth status, money surplus.

6. Data Collection

Permission to conduct this study was obtained from both Mount Kenya University and the National Rehabilitation Service (NRS). The data collection was carried out at the Iwawa Rehabilitation Center during the period of one month from 1st to 30th August 2024. Firstly, the researcher contacted the chosen rehabilitees and provided them with information regarding the research's purpose and procedures. The data collection process took place in a private and quiet setting, ensuring the confidentiality and privacy of the participants. To facilitate the interview, the researcher utilized Kobo Toolbox, a secure online data collection platform (Lakshminarasimhappa, 2021).

The face-to-face interview technique was employed to gather data. Prior to the interview, the researcher obtained consent from the respondents. During the interview, the researcher adhered to the exact wording and sequence outlined in the questionnaire. Finally, the collected data, stored in Excel format, was retrieved from the Kobo Toolbox database.

7. Data Analysis

All statistical analyses were performed by Statistical Package for Social Sciences (SPSS) version 28. The characteristics of the study respondents were presented as frequencies and percentages in a meaningful graphs and tables. Continuous variables were presented as mean and standard deviations (SD) in narratives. Chi-square test and Binary logistic regressions were performed to determine the presence, magnitude, direction, and statistical significance of the relationship between both sociodemographic and socioeconomic factors and styles of relapse on substance use. The level of statistical significance was set at < 0.05 for all statistical tests.

8. Ethical Consideration

Before commencing this research, ethical approval was sought from the research committee of Mount Kenya University. Additionally, permission was obtained from the managing authority of the National Rehabilitation Service. Prior to the interview, each respondent received detailed information about the research's purpose and procedures, as well as their rights. The consent for participation was requested from the respondent before the interview. Respondents' names were used solely on the sampling frame and destroyed after use.

The respondent study identification number served as the sole identifier on the questionnaire papers. On the issue of confidentiality, the research interviews took place in a private setting. Furthermore, the right of respondents to withdraw from the research at any time was respected. The collected data are securely stored, and only aggregated findings were reported.

IV. Results

1. Demographic and Psychosocial Problems Associated with Relapse Styles

Table 1: Sociodemographic factors associated with sudden relapse

Variables	Sudden relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Age					5.289	0.152
Less than 25	19	19.8	17	14.7		
25 - 29	21	21.9	40	34.5		
30 - 34	27	28.1	34	29.3		
35 and above	29	30.2	25	21.6		
Marital status					5.740	0.057
Single	70	72.9	98	84.5		
Cohabitant	11	11.5	11	9.5		
Married	15	15.6	7	6.0		
Education					0.247	0.884
Primary	40	41.7	51	44.0		
Secondary	46	47.9	55	47.4		
Tertiary	10	10.4	10	8.6		
Religion					0.089	0.956
Catholicism	47	49.0	55	47.4		
Other Christians	28	29.2	36	31.0		
Muslims	21	21.9	25	21.6		
Residence					0.004	0.948
Rural	6	6.3	7	6.0		
Urban	90	93.8	109	94.0		
Rehab admissions					0.198	0.656
Less than Three times	86	89.6	106	91.4		
Three and more times	10	10.4	10	8.6		
Biological Parents					0.290	0.962
Both deceased	21	21.9	27	23.3		
Only father is alive	12	12.5	12	10.3		
Only mother is alive	27	28.1	32	27.6		
Both parents are alive	36	37.5	45	38.8		

Sociodemographic factors associated with sudden relapse were presented int table 4.2. Significant association were not found between sudden relapse and age, marital status, education, religion, rehabilitation admissions times, and biological parents (p > 0.05).

Table 2: Psychological problems associated with sudden relapse

Variables	Sudden relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Alcohol usage					13.160	0.000
No	48	50.0	30	25.9		
Yes	48	50.0	86	74.1		
Cannabis usage					5.056	0.025
No	35	36.5	26	22.4		
Yes	61	63.5	90	77.6		
Heroin usage					0.364	0.546
No	79	82.3	99	85.3		
Yes	17	17.7	17	14.7		
Post rehabilitation counseling					2.756	0.097
No	93	96.9	106	91.4		
Yes	3	3.1	10	8.6		
Post Rehabilitation assistance					1.923	0.166
No	72	75.0	96	82.8		
Yes	24	25.0	20	17.2		
No Post-rehabilitation assistance					2.972	0.085
No	22	22.9	16	13.8		
Yes	74	77.1	100	86.2		
No post-rehab Obstacles					0.457	0.499
No	75	78.1	86	74.1		
Yes	21	21.9	30	25.9		
Family member who uses drug					1.056	0.302
No	54	56.3	57	49.1		
Yes	42	43.8	59	50.9		
Post-Rehab family conflict					6.501	0.011
No	93	96.9	101	87.1		
Yes	3	3.1	15	12.9		
Age at the onset of drug abuse					3.351	0.187
Less than 15	21	21.9	33	28.4		
15 - 19	46	47.9	60	51.7		
20 and above	29	30.2	23	19.8		
Abusing for anxiety alleviation					0.643	0.423
No	50	52.1	54	46.6		
Yes	46	47.9	62	53.4		
Having incurable disease					0.631	0.427
No	81	84.4	93	80.2		
Yes	15	15.6	23	19.8		

Psychological problems associated with sudden relapse were shown in table 4.3. Heroin usage, post rehabilitation counseling, post rehabilitation assistance, no post rehabilitation obstacles, having a family member who use drug, age at the onset of drug abuse, abusing for anxiety alleviation, and having incurable diseases were not significantly associated with sudden relapse (p>0.05).

On the other hand, Alcohol usage (χ^2 (1, $N = 212$) = 13.160, $p < 0.001$), cannabis usage (χ^2 (1, $N = 212$) = 5.056, $p = 0.025$), and post rehabilitation family conflict (χ^2 (1, $N = 212$) = 6.501, $p = 0.011$), were significantly associated with sudden relapse.

Table 3: Social problems associated with sudden relapse

Variables	Sudden relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Housemates after Previous Rehab					2.163	0.706
Alone	8	8.3	12	10.3		
Others	13	13.5	21	18.1		
Siblings	10	10.4	12	10.3		
Parents	54	56.3	63	54.3		
Spouse	11	11.5	8	6.9		
Post-Rehab loss of someone close					0.838	0.360
No	86	89.6	108	93.1		
Yes	10	10.4	8	6.9		
Ever Criminally convicted					0.416	0.519
No	77	80.2	97	83.6		
Yes	19	19.8	19	16.4		
Going back to where you lived before					0.155	0.693
No	8	8.3	8	6.9		
Yes	88	91.7	108	93.1		
Returning to drugs friendly place					5.761	0.016
No	13	13.5	5	4.3		
Yes	83	86.5	111	95.7		
Living alone following Rehab					2.921	0.087
No	56	58.3	54	46.6		
Yes	40	41.7	62	53.4		
Residing with peers who use drugs					9.422	0.002
No	30	31.3	16	13.8		
Yes	66	68.8	100	86.2		
Post rehab reputation loss					10.413	0.001
No	47	49.0	82	70.7		
Yes	49	51.0	34	29.3		

Post rehab family Rejection					4.204	0.040
No	94	97.9	106	91.4		
Yes	2	2.1	10	8.6		
Post rehab assistance by family					11.982	0.001
No	53	55.2	90	77.6		
Yes	43	44.8	26	22.4		
MSPSS family					0.579	0.447
Low	34	35.4	47	40.5		
High	62	64.6	69	59.5		
MSPSS friends					0.003	0.958
Low	50	52.1	60	51.7		
High	46	47.9	56	48.3		
MSPSS Significant others					0.469	0.493
Low	41	42.7	55	47.4		
High	55	57.3	61	52.6		

Social problems associated with sudden relapse were demonstrated in table 4.4. Post-rehabilitation housemates, post-rehabilitation loss of someone close, ever criminally convicted, returning to where you lived before rehabilitation, living alone after rehabilitation, MSPSS family, MSPSS friends, and MSPSS significant others were not significantly associated with sudden relapse ($p > 0.05$).

However, the association with sudden relapse were present with returning to where obtaining drugs is effortless (χ^2 (1, $N = 212$) = 5.761, $p = 0.016$), residing with peers who use drugs (χ^2 (1, $N = 212$) = 9.422, $p = 0.002$), post-rehabilitation reputation loss (χ^2 (1, $N = 212$) = 10.413, $p = 0.001$), post-rehabilitation assistance by family (χ^2 (1, $N = 212$) = 11.982, $p = 0.001$), and post-rehabilitation family rejection (χ^2 (1, $N = 212$) = 4.204, $p = 0.040$).

Sociodemographic, psychological and social factors that showed significant association with sudden relapse were included in multivariate analysis to determine the magnitude and directions of associations.

Table **Error! No text of specified style in document.**: Sociodemographic and psychosocial factors associated with sudden relapse

Variables	B	SE	AOR	95% CI	p
Alcohol usage					
No			Reference		
Yes	0.933	0.344	2.543	[1.295, 4.993]	0.007
Cannabis usage					
No			Reference		
Yes	0.733	0.368	2.081	[1.011, 4.284]	0.047
Post Rehab family conflict					
Yes	0.880	0.743	2.410	[0.561, 10.344]	0.237
No			Reference		

Returning to drugs friendly place					
No			Reference		
Yes	0.781	0.646	2.183	[0.615, 7.749]	0.227
Residing with peers who use drugs					
No			Reference		
Yes	0.673	0.399	1.960	[0.896, 4.286]	0.092
Post rehabilitation reputation loss					
No	0.827	0.341	2.287	[1.173, 4.461]	0.015
Yes			Reference		
Post rehabilitation family Rejection					
No			Reference		
Yes	1.020	0.904	2.774	[0.471, 16.321]	0.259
Post rehabilitation assistance by family					
No	0.538	0.346	1.712	[0.869, 3.372]	0.120
Yes			Reference		

Sociodemographic and psychosocial factors associated with sudden relapse were shown in table 4.5. Respondents who used alcohol had higher odds of experiencing sudden relapse than those who do not use alcohol (AOR = 2.543, p < 0.05, 95% CI = [1.295, 4.993]). Similarly, respondents who used cannabis were more likely to experience sudden relapse than those who did not use cannabis (AOR = 2.081, p < 0.05, 95% CI = [1.011, 4.284]). Again, respondents who did not had post-rehabilitation perceived reputation loss had higher odd of experiencing sudden relapse than those who think their reputation was lost after rehabilitation (AOR = 2.287, p < 0.05, 95% CI = [1.173, 4.461]).

Post-rehabilitation family conflict, returning to place, where obtaining drugs in effortless, residing with peers who use drugs, post rehabilitation family rejection, and post rehabilitation assistance by family were not found to be independent predictors of sudden relapse ($p > 0.05$).

Table 5: Socio demographic factors associated with short delay relapse

Variables	Short delay relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Age					1.133	0.796
Less than 25	13	14.1	23	19.2		
25 - 29	26	28.3	35	29.2		
30 - 34	28	30.4	33	27.5		
35 and above	25	27.2	29	24.2		
Marital status					6.141	0.046

Single	68	73.9	100	83.3		
Cohabitant	15	16.3	7	5.8		
Married	9	9.8	13	10.8		
Education					4.402	0.111
Primary	39	42.4	52	43.3		
Secondary	40	43.5	61	50.8		
Tertiary	13	14.1	7	5.8		
Religion					0.581	0.748
Other Christians	47	51.1	55	45.8		
Catholicism	26	28.3	38	31.7		
Muslims	19	20.7	27	22.5		
Residence					0.043	0.836
Rural	6	6.5	7	5.8		
Urban	86	93.5	113	94.2		
Rehab admissions					1.211	0.271
Less than Three times	81	88.0	111	92.5		
Three times and above	11	12.0	9	7.5		
Biological parents					4.512	0.211
Both deceased	25	27.2	23	19.2		
Only father alive	9	9.8	15	12.5		
Only mother alive	29	31.5	30	25.0		
Both alive	29	31.5	52	43.3		

Sociodemographic factors associated with short delay relapse were presented in table 4.6. Age, education, religion, residence, rehabilitation admissions times and biological parents were not significantly associated with short delay relapse ($p > 0.05$).

Contrastingly, marital status was found to be significantly associates with short delay relapse (χ^2 (2, $N = 212$) = 6141, $p = 0.046$).

Table 6: Psychological problems associated with short delay relapse

Variables	Short delay relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Alcohol usage					0.060	0.807
No	33	35.9	45	37.5		
Yes	59	64.1	75	62.5		
Cannabis usage					1.166	0.280
No	30	32.6	31	25.8		
Yes	62	67.4	89	74.2		
Heroin usage					0.009	0.926
No	77	83.7	101	84.2		
Yes	15	16.3	19	15.8		
Post rehabilitation counselling					0.137	0.711
No	87	94.6	112	93.3		

Yes	5	5.4	8	6.7		
No post-rehab assistance					2.654	0.103
No	21	22.8	17	14.2		
Yes	71	77.2	103	85.8		
No post-rehab obstacles					1.031	0.310
No	73	79.3	88	73.3		
Yes	19	20.7	32	26.7		
Family member who uses drugs					0.105	0.746
No	47	51.1	64	53.3		
Yes	45	48.9	56	46.7		
Age at the onset of drug abuse					5.257	0.072
Less than 15	29	31.5	25	20.8		
15 - 19	38	41.3	68	56.7		
20 and above	25	27.2	27	22.5		
Abusing drug to alleviate anxiety					0.632	0.427
No	48	52.2	56	46.7		
Yes	44	47.8	64	53.3		
No	25	27.2	21	17.5		
Yes	67	72.8	99	82.5		
Incurable disease					0.810	0.368
No	78	84.8	96	80.0		
Yes	14	15.2	24	20.0		
Post-rehabilitation family conflict					0.163	0.687
No	85	92.4	109	90.8		
Yes	7	7.6	11	9.2		

Psychological problems associated with short delay relapse were demonstrated in table 4.7. There was no significant association found between short delay relapse and alcohol usage, cannabis usage, heroin usage, post rehabilitation counselling, no post rehabilitation assistance, no post-rehabilitation obstacles, family member who uses drugs, age at the onset of drug abuse, abusing drugs to alleviate anxiety, having incurable diseases, and post rehabilitation family conflict ($p>0.05$).

Table 7: Social problems associated with short delay relapse

Variables	Short delay relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Housemates after previous rehab					5.905	0.206
Others	18	19.6	16	13.3		
Siblings	8	8.7	14	11.7		
Parents	45	48.9	72	60.0		
Spouse	12	13.0	7	5.8		
Post rehab Loss of					9.466	0.002

someone close						
No	78	84.8	116	96.7		
Yes	14	15.2	4	3.3		
Criminal conviction					0.297	0.586
No	74	80.4	100	83.3		
Yes	18	19.6	20	16.7		
Returning where you lived before rehab					0.001	0.976
No	7	7.6	9	7.5		
Yes	85	92.4	111	92.5		
Returning to drugs friendly place					1.184	0.277
No	10	10.9	8	6.7		
Yes	82	89.1	112	93.3		
Living alone post-rehab					0.394	0.530
No	50	54.3	60	50.0		
Yes	42	45.7	60	50.0		
Residing with peers who used drug					2.868	0.090
No	25	27.2	21	17.5		
Yes	67	72.8	99	82.5		
Post rehab loss of reputation					0.735	0.391
No	59	64.1	70	58.3		
Yes	33	35.9	50	41.7		
Post-rehabilitation family rejection					0.015	0.901
No	87	94.6	113	94.2		
Yes	5	5.4	7	5.8		
Post rehab assistance by family					0.098	0.755
No	61	66.3	82	68.3		
Yes	31	33.7	38	31.7		
MSPSS Family					2.783	0.095
Low	41	44.6	40	33.3		
High	51	55.4	80	66.7		
MSPSS Friends					2.132	0.144
Low	53	57.6	57	47.5		
High	39	42.4	63	52.5		
MSPSS Significant others					0.424	0.515
Low	44	47.8	52	43.3		
High	48	52.2	68	56.7		

Social problems associated with short-delay relapse were presented in table 4.8. Housemates after rehabilitation, criminal conviction, returning to where you lived

before rehab, returning to drugs friendly places, living alone after rehabilitation, residing with peers who use drugs, perceived post-rehabilitation loss of reputation, post-rehabilitation family rejection, post rehabilitation assistance by family, MSPSS family, MSPSS friends, and MSPSS significant others were not found to be significantly associated with short delay relapse ($p > 0.05$). Post rehabilitation loss of someone close was however found to be significantly associated with short delay relapse ($\chi^2(1, N = 212) = 9.466, \ p = 0.002$).

Sociodemographic, psychological and social factors that showed significant association with short delay relapse were included in multivariate analysis to determine the magnitude and directions of associations.

Table 8: Sociodemographic and psychosocial factors associated with short delay relapse

Variables	B	SE	AOR	95% CI	p
Marital status					
Single			Reference		
Cohabitant	-1.03	0.496	0.354	[0.134, 0.934]	0.036
Married	0.096	0.478	1.100	[0.431, 2.810]	0.842
Post rehab Loss of someone close					
No	1.578	0.595	4.844	[1.511, 15.33]	0.008
Yes			Reference		

Sociodemographic and psychosocial factors associated with short delay relapse were showed in table 4.9. Respondents in cohabitants relationship were less likely to experience short-delay relapse compared to single respondents (AOR = 0.354, p < 0.05, 95% CI = [0.134, 0.934]). Married and single respondents were not different regarding short-delay relapse ($p > 0.05$). Respondent who did not lost someone close after previous rehabilitation were more likely to experience short delay relapse compared to their counterpart (AOR = 4.844, p < 0.05, 95% CI = [1.511, 15.33]).

Table 9: Sociodemographic factors associated with long delay relapse

Variables	Long delay relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Age					0.238	0.971
Less than 25	14	17.9%	22	16.4		
25 - 29	21	26.9%	40	29.9		
30 - 34	23	29.5%	38	28.4		
35 and above	20	25.6%	34	25.4		
Marital status					5.298	0.071
Single	57	73.1%	111	82.8		
Cohabitant	13	16.7%	9	6.7		
Married	8	10.3%	14	10.4		
Education					0.222	0.895
Primary	32	41.0%	59	44.0		

Secondary	38	48.7%	63	47.0		
Tertiary	8	10.3%	12	9.0		
Religion					0.241	0.887
Other Christians	36	46.2%	66	49.3		
Catholicism	25	32.1%	39	29.1		
Muslims	17	21.8%	29	21.6		
Residence					0.216	0.642
Rural	4	5.1%	9	6.7		
Urban	74	94.9%	125	93.3		
Rehab admissions for drugs					1.321	0.250
Less than Three times	73	93.6%	119	88.8		
Three times and above	5	6.4%	15	11.2		
Biological parents					4.292	0.232
Both deceased	15	19.2%	33	24.6		
Only father alive	7	9.0%	17	12.7		
Only mother alive	28	35.9%	31	23.1		
Both alive	28	35.9%	53	39.6		

Sociodemographic factors associated with long delay relapse were demonstrated in table 4.10. Significant association were not found between long delay relapse and age, marital status, education, religion, rehabilitation admissions times, and biological parents ($p > 0.05$).

Table 10: Psychological problems associated with long delay relapse

Variables	Long delay relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Alcohol usage					8.203	0.004
No	19	24.4	59	44.0		
Yes	59	75.6	75	56.0		
Cannabis usage					2.055	0.152
No	27	34.6	34	25.4		
Yes	51	65.4	100	74.6		
Heroin usage					0.949	0.330
No	68	87.2	110	82.1		
Yes	10	12.8	24	17.9		
No post-rehab assistance					3.421	0.064
No	9	11.5	29	21.6		
Yes	69	88.5	105	78.4		
No post-rehab obstacles					0.170	0.680
No	58	74.4	103	76.9		
Yes	20	25.6	31	23.1		
Family member who uses drugs					1.905	0.168
No	36	46.2	75	56.0		
Yes	42	53.8	59	44.0		

Age at the onset of drug abuse					0.442	0.802
Less than 15	18	23.1	36	26.9		
15 - 19	41	52.6	65	48.5		
20 and above	19	24.4	33	24.6		
Abusing drug to alleviate anxiety					7.693	0.006
No	48	61.5	56	41.8		
Yes	30	38.5	78	58.2		
Incurable disease					1.225	0.268
No	67	85.9	107	79.9		
Yes	11	14.1	27	20.1		
Post-rehabilitation family conflict					0.101	0.750
No	72	92.3	122	91.0		
Yes	6	7.7	12	9.0		

Psychological problems associated with short delay relapse were demonstrated in table 4.12. There was no significant association found between short delay relapse and cannabis usage, heroin usage, post rehabilitation counselling, no post rehabilitation assistance, no post-rehabilitation obstacles, family member who uses drugs, age at the onset of drug abuse, having incurable diseases, and post rehabilitation family conflict ($p>0.05$). Alcohol usage (χ^2 (1, $N = 212$) = 8.203, $p = 0.004$) and using drugs to alleviate anxiety (χ^2 (1, $N = 212$) = 7.693, $p = 0.006$. was found to be significantly associated with long delay relapse.

Table 11: Social problems associated with long delay relapse

| Variables | Long delay relapse status | | | | χ^2 | p |
| | No | | Yes | | | |
	n	%	n	%		
Housemates after previous rehab					4.365	0.359
Others	17	21.8	17	12.7		
Siblings	7	9.0	15	11.2		
Parents	41	52.6	76	56.7		
Spouse	8	10.3	11	8.2		
Post rehab Loss of someone close					0.037	0.847
No	71	91.0	123	91.8		
Yes	7	9.0	11	8.2		
Criminal conviction					0.143	0.705
No	63	80.8	111	82.8		
Yes	15	19.2	23	17.2		
Returning where you lived before rehab					1.298	0.255
No	8	10.3	8	6.0		
Yes	70	89.7	126	94.0		

Returning to drugs friendly place					2.978	0.084
No	10	12.8	8	6.0		
Yes	68	87.2	126	94.0		
Living alone post-rehab					2.483	0.115
No	46	59.0	64	47.8		
Yes	32	41.0	70	52.2		
Residing with peers who used drug					0.138	0.710
No	18	23.1	28	20.9		
Yes	60	76.9	106	79.1		
Post rehab loss of reputation					1.066	0.302
No	51	65.4	78	58.2		
Yes	27	34.6	56	41.8		
Post rehab assistance by family					1.060	0.303
No	56	71.8	87	64.9		
Yes	22	28.2	47	35.1		
MSPSS Family					7.269	0.007
Low	39	50.0	42	31.3		
High	39	50.0	92	68.7		
MSPSS Friends					5.909	0.015
Low	49	62.8	61	45.5		
High	29	37.2	73	54.5		
MSPSS Significant others						
Low	41	52.6	55	41.0	2.640	0.104
High	37	47.4	79	59.0		

Social problems associated with short-delay relapse were presented in table 4.12.

Housemates after rehabilitation, criminal conviction, returning to where you lived before rehab, returning to drugs friendly places, living alone after rehabilitation, residing with peers who use drugs, perceived post-rehabilitation loss of reputation, post-rehabilitation family rejection, post rehabilitation loss of someone close, post rehabilitation assistance by family, and MSPSS significant others were not found to be significantly associated with short delay relapse ($p > 0.05$). MSPSS friends ($\chi^2 (1, N = 212) = 5.909$, $p = 0.015$) and MSPSS family ($\chi^2 (1, N = 212) = 7.269$, $p = 0.007$. was found to be significantly associated with long delay relapse.

Sociodemographic, psychological and social factors that showed significant association with long delay relapse were included in multivariate analysis to determine the magnitude and directions of associations.

Table 12: Sociodemographic and psychosocial factors associated with long delay relapse

Variables	B	SE	AOR	95% CI	p
Alcohol usage					
No	0.889	0.328	2.432	[1.278, 4.628]	0.007
Yes			Reference		
Abusing drug to alleviate anxiety					
No			Reference		
Yes	0.861	0.313	2.367	[1.280, 4.374]	0.006
MSPSS Family					
Low			Reference		
High	0.770	0.367	2.160	[1.053, 4.432]	0.036
MSPSS Friends					
Low			Reference		
High	0.224	0.361	1.252	[0.617, 2.541]	0.534

Sociodemographic and psychosocial factors associated with long delay relapse were presented in table 4.13. Respondents who do not use alcohol are more likely to experience long delay relapse compared to those who drinks (AOR = 2.432, p < 0.05, 95% CI = [1.278, 4.628]). Respondents who abuse drugs to alleviate anxiety had higher odd of having long delay relapse compared to others (AOR = 2.367, p < 0.05, 95% CI = [1.280, 4.374]). Additionally, respondents with high MSPSS Family are more likely to experience long delay relapse compared to those with low MSPSS family (AOR = 2.160, p < 0.05, 95% CI = [1.053, 4.432]). Respondents with low or high MSPSS friends were not statistically different regarding long delay relapse.

2. Socio-Economic Factors Associated with Relapse Styles

Table 13: Socioeconomic factors associated with sudden relapse

Variables	Sudden relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Father occupation					1.666	0.435
Day labor	9	18.8	16	28.1		
Nonfarm employment	21	43.8	25	43.9		
Farmer	18	37.5	16	28.1		
Mother occupation					3.196	0.202
Day labor	10	15.9	22	28.6		
Nonfarm employment	23	36.5	23	29.9		
Farmer	30	47.6	32	41.6		
Post rehab assistance with money					2.347	0.125

No	88	91.7	112	96.6		
Yes	8	8.3	4	3.4		
Post-rehab Job offer					5.195	0.023
No	81	84.4	109	94.0		
Yes	15	15.6	7	6.0		
Post rehab unemployment					16.643	0.000
No	72	75.0	55	47.4		
Yes	24	25.0	61	52.6		
Post-rehab employment by others					0.844	0.358
No	55	61.1	59	54.6		
Yes	35	38.9	49	45.4		
Post Rehab daily labor					3.206	0.073
No	56	62.2	80	74.1		
Yes	34	37.8	28	25.9		
Post rehab Self employed					0.362	0.547
No	66	73.3	75	69.4		
Yes	24	26.7	33	30.6		
Post rehab surplus money					21.421	0.000
No	45	46.9	90	77.6		
Yes	51	53.1	26	22.4		
Socioeconomic category					0.467	0.792
Rich	7	7.3	8	6.9		
Middle	51	53.1	67	57.8		
Poor	38	39.6	41	35.3		
Sources of money to buy drugs					1.690	0.194
Working	77	80.2	99	86.8		
Others	19	19.8	15	13.2		

Socioeconomic factors associated with sudden relapse are presented in table 4.14. Father occupation, mother occupation, post rehabilitation assistance with money, post rehabilitation employment by others, post rehabilitation daily labor, post rehabilitation self-employment, socioeconomic category and source of money to buy drugs were not significantly associated with sudden relapse ($p > 0.05$).

Post rehab job offer ($\chi^2 (1, N = 212) = 5.195$, $p = 0.023$), Post rehabilitation unemployment ($\chi^2 (1, N = 212) = 16.463$, $p < 0.001$), and post rehabilitation surplus money ($\chi^2 (1, N = 212) = 21.421$, $p < 0.001$) were found to be significantly associated with sudden relapse.

Socioeconomic factors that showed significant association with sudden relapse were included in multivariate analysis to determine the magnitude and directions of associations.

Table 14: Socioeconomic predictors of sudden relapse

Variables	B	SE	AOR	95% CI	p
Post-rehab Job offer					
No	0.360	0.519	1.433	[0.518, 3.966]	0.488
Yes			Reference		
Post rehab unemployment					
No			Reference		
Yes	0.837	0.322	2.310	[1.228, 4.345]	0.009
Post rehab surplus money					
No	1.044	0.327	2.840	[1.497, 5.389]	0.001
Yes			Reference		

Socioeconomic predictors of sudden relapse were shown in table 4.15. Respondent who experienced post rehabilitation unemployment were more likely to have sudden relapse compared to respondents who obtained post rehabilitation employment (AOR = 2.310, p < 0.05, 95% CI = [1.228, 4.345]). Additionally, respondents who did not obtain surplus money had higher odd of experiencing sudden relapse compared to those who obtained surplus money (AOR = 2.840, p < 0.05, 95% CI = [1.497, 5.389]). Obtaining or not obtaining post rehabilitation job offer were not different regarding sudden relapse ($p > 0.05$).

Table 15: Socioeconomic factors associated with short delay relapse

Variables	Short delay relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Father occupation					0,024	0.988
Day labor	9	23.7	16	23.9		
Nonfarm employment	17	44.7	29	43.3		
Farmer	12	31.6	22	32.8		
Mother occupation					0.290	0.865
Day labor	12	20.7	20	24.4		
Nonfarm employment	20	34.5	26	31.7		
Farmer	26	44.8	36	43.9		
Post rehab assistance by money					0.226	0.635
No	86	93.5	114	95.0		
Yes	6	6.5	6	5.0		
Post rehabilitation job offer					2.462	0.117
No	79	85.9	111	92.5		
Yes	13	14.1	9	7.5		
Post rehabilitation unemployment					0.775	0.379
No	52	56.5	75	62.5		
Yes	40	43.5	45	37.5		
Post rehab employment by others					0.520	0.471

No	52	60.5	62	55.4		
Yes	34	39.5	50	44.6		
Post rehab daily labor					0.410	0.522
No	57	66.3	79	70.5		
Yes	29	33.7	33	29.5		
Post rehab self-employment					0.058	0.810
No	62	72.1	79	70.5		
Yes	24	27.9	33	29.5		
Post rehab surplus money					2.435	0.119
No	64	69.6	71	59.2		
Yes	28	30.4	49	40.8		
Social economic categories					3.725	0.155
Rich	6	6.5	9	7.5		
Middle	45	48.9	73	60.8		
Poor	41	44.6	38	31.7		
Source of money to buy drugs					0.632	0.427
Working	75	81.5	101	85.6		
Others	17	18.5	17	14.4		

Socioeconomic factors associated with short delay relapse were presented in table 4.16. Father occupation, mother occupation, post rehabilitation assistance with money, post rehabilitation job offers, post rehabilitation unemployment, post rehabilitation surplus money, post rehabilitation employment by others, post rehabilitation daily labor, post rehabilitation self-employment, socioeconomic category and source of money to buy drugs were not significantly associated with short delay relapse (p > 0.05).

Table 16: Socioeconomic factors associated with long delay relapse

Variables	Long delay relapse status				χ^2	p
	No		Yes			
	n	%	n	%		
Father occupation					4.366	0.113
Day labor	5	14.3	20	28.6		
Nonfarm employment	20	57.1	26	37.1		
Farmer	10	28.6	24	34.3		
Mother occupation						
Day labor	10	17.9	22	26.2	1.349	0.509
Nonfarm employment	20	35.7	26	31.0		
Farmer	26	46.4	36	42.9		
Post rehab assistance by money					0.065	0.798
No	74	94.9	126	94.0		
Yes	4	5.1	8	6.0		
Post rehabilitation job offer					2.088	0.148
No	73	93.6	117	87.3		
Yes	5	6.4	17	12.7		

Post rehab unemployment						7.885	0.005
No	36	46.2	87	65.9			
Yes	42	53.8	45	34.1			
Post rehab employment by others						0.003	0.957
No	43	57.3	71	57.7			
Yes	32	42.7	52	42.3			
Post rehab daily labor						0.616	0.432
No	54	72.0	82	66.7			
Yes	21	28.0	41	33.3			
Post rehab self-employment						1.217	0.270
No	50	66.7	91	74.0			
Yes	25	33.3	32	26.0			
Post rehab surplus money						3.514	0.061
No	56	71.8	79	59.0			
Yes	22	28.2	55	41.0			
Surplus money usage						0.213	0.644
Buying drugs	14	63.6	38	69.1			
Others	8	36.4	17	30.9			
Social economic categories						2.294	0.318
Rich	3	3.8	12	9.0			
Middle	43	55.1	75	56.0			
Poor	32	41.0	47	35.1			
Source of money to buy drugs						0.043	0.836
Working	64	83.1	112	84.2			
Others	13	16.9	21	15.8			

Socioeconomic factors associated with long delay relapse were presented in table 1.17. Father occupation, mother occupation, post rehabilitation assistance with money, post rehabilitation job offers, post rehabilitation surplus money, post rehabilitation employment by others, post rehabilitation daily labor, post rehabilitation self-employment, socioeconomic category and source of money to buy drugs were not significantly associated with short delay relapse ($p > 0.05$).

Post rehabilitation unemployment (χ^2 (1, $N = 212$) = 7.885, $p < 0.005$), was found to be significantly associated with long delay relapse.

Socioeconomic factors that showed significant association with sudden relapse were included in multivariate analysis to determine the magnitude and directions of associations.

Table 17: Socioeconomic predictor of long delay relapse

Variables	B	SE	OR	95% CI	p
Post rehab unemployment					
No			Reference		
Yes	0.813	0.292	2.256	[1.272, 3998]	0.005

Socioeconomic predictor of long delay relapse was demonstrated in table 4.18. Respondent who experienced post rehabilitation unemployment were more likely to have long delay relapse compared to respondents who obtained post rehabilitation employment (AOR = 2.256, p < 0.05, 95% CI = [1.272, 3998]).

V. Discussion

Findings in this study, are consistent with results reported in previous studies. However, some variations were presented depending on local issues. Time to relapse may reveal underlying mechanisms of relapse to substance use and have important implications in concerned solutions and this was a dependent variable with its styles to relapse including sudden delay relapse, short delay relapse and long delay relapse (Adinoff et al., 2010).

Majority in this study (57.6%) of the whole participants was aged 18-34 years old and all were males. In this study 78.2% were single and different studies showed that relapse to substance use is mostly occur among young and adult people than older age people who can maintain abstinence and age of drug user is associated with relapse as it was seen in previous research (Bhandari et al., 2015).

In this study, 116 (54.7%) experienced sudden relapse. We have not seen a significant association between sudden relapse   with age, marital status, education, religion, rehabilitation admission times and biological and these may be associated with other style of relapse which are short delay relapse and long delay relapse. But on other hand, alcohol usage, cannabis usage and post rehabilitation family conflict were found significantly associated with sudden relapse. Social problems associated with sudden relapse were the following found in this study including returning to where obtaining drugs is not demanding effort, residing with peers who use drugs, post-rehabilitation reputation loss, and post-rehabilitation family rejection which corroborated with what were seen before by Afkar et al. (2016) in his findings.

In sociodemographic and psychosocial factors, we have found that those who use alcohol had higher odds of experiencing sudden relapse than those who do not use alcohol (Kvamme, et al.,2015), and those who used cannabis were more likely to experience sudden relapse and those who thought to be in a post-rehabilitation perceived reputation (Afkar et al., 2016). Sudden relapse is a style which does not demand to thing on what one is going to do, as alcohol and cannabis are shared in groups of peers this can be the cause of not having time to evaluate the consequences of what on is going to engage and cause to use in abruptly way.

In this research, we found that the only factor that was significantly associated with short delay relapse is marital status in sociodemographic factors where single ones are concerned and for this   (Mousali et al., 2021) in their findings, they said that marital status among demographic variables is a significant predictor of drug use recurrence. Single persons may not have a chance of having advices from

partners, no fear of anyone surrounding them and single ones have a way of passing a long time alone which can allow them to use substances anarchically.

Surprisingly, post rehabilitation loss of someone close was found only as the associated factor to short delay relapse, and this was also seen in the research in Ghana by Appiah et al. (2017), where they found that loss of loved one, family member is behind of relapse to substance use which can be associated with alleviation of consequences caused by emotions related to loss. Single persons are more likely to experience short delay relapse, and those who did not loss someone after previous rehabilitation were to be more likely to experience short delay relapse. On other hand, alcohol users and those who use drugs to alleviate anxiety were found associated with experiencing short delay relapse (Afkar et al., 2016).

For long delay relapse, found that lack of support from friends and family members are associated with long delay relapse. People who do not use alcohol are more to experience long delay relapse, people who abuse drugs to alleviate anxiety are also more likely to experience long delay relapse, with those who receive support from their family members (Ndou & Khosa, 2023).

Socioeconomic factors associated with sudden relapse, we found that post rehabilitation job offer, post rehabilitation unemployment and not obtaining post rehabilitation surplus money were found to be associated with sudden relapse, but only unemployment was found to be associated with long delay relapse (Amat et al., 2020).

Strengths and Limitations

This research had shed light on contributing factors to relapse in substance use, which will give an insight of what to do in different three parts which makes rehabilitation to be effective including prevention, rehabilitation and reintegration. This study will finally help decision makers to elaborate strategies to help graduates from rehabilitation centers, making prevention and help centers to prepare treatment and program from research-based result.

This study has limitations, the first one is that participants are now in rehabilitation center and cannot be generalized to all substance users in the country who were not treated in rehabilitation centers. Another limitation is that the methodology used in this study is simply regarding relapse cases to substance use which causes the lack of information which would come from families, neighbors and in other external environment.

VI. Conclusion

Factors influencing relapse in its three styles are common worldwide. In this study, respondents showed that one can cross in different styles of relapse according to time it takes, how one think on and take decision of reusing substance. Sudden relapse style was 116 (54,7% short delay relapse were 120% (56.6%) and long delay

relapse were 134 (63.2%), this shows that relapse to substance use demands time from relapsing abruptly to the level where users can think and take decision of relapsing into drug use or not relapsing depending on influencing factors.

In this study, what was found showed that relapse into substance use to graduates from rehabilitation center is based on different factors including the fact of being single, returning to where obtaining drugs in not demanding efforts, residing with peers who use drugs,   post rehabilitation rejection by family or friends, post rehabilitation perceived reputation, post rehabilitation loss (loved one, family members), using drug to alleviate anxiety, lack of support from family and friends, unemployment were found to be factors behind relapsing into substance use among rehabilitees admitted in Iwawa rehabilitation center more than 2 times because of substance use.

Abbreviations
- **SUD:** Substance use disorder
- **LMICs:** Low and middle-income countries
- **NRS:** National Rehabilitation Service
- **SPSS:** Statistical Package for the Social Sciences
- **SD:** Standard deviation

Availability of Data Materials
The datasets used and analyzed in this study are available from the author of this article. All data analyzed are compiled in this article and can be shared to anyone when requested.

Ethics Approval and Consent to Participate
Before commencing this research, ethical approval was sought from the research committee of Mount Kenya University. Additionally, permission was obtained from the managing authority of the National Rehabilitation Service. Prior to the interview, each respondent received detailed information about the research's purpose and procedures, as well as their rights. The consent for participation was requested from the respondent before the interview. Respondents' names were used solely on the sampling frame and destroyed after use.

The respondent study identification number served as the sole identifier on the questionnaire papers. On the issue of confidentiality, the research interviews took place in a private setting. Furthermore, the right of respondents to withdraw from the

research at any time was respected. The collected data are securely stored, and only aggregated findings were reported.

Consent for Publication
Competing Interests
No conflicts of interest.

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