

## Regression model for a drug-related crime reduction



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### ABSTRACT

Globally, drug-related offenses present a significant challenge, necessitating the development of effective prevention strategies. This abstract describes a regression model designed to address the complex dynamics of drug-related crimes. Using data from parents, faculty, and youth at a university, including demographic profiles and other drug-related information, the model identifies key factors contributing to the potential prevention of drug-related crimes. Through regression analysis, the model quantifies the relationships between these variables and provides insights into the causes of drug-related criminal behavior based on respondents' observations. The model identifies the most influential predictors of reducing drug-related crimes through careful preprocessing and feature selection, enabling a targeted approach to crime prevention and intervention strategies. The results show that each approach within the drug prevention model is significant. Notably, the findings indicate that parental involvement has the greatest impact on reducing drug criminality. Teachers contribute by focusing on the effects of drugs through seminars and integrating this information into their subjects. The community can also promote sports-related activities to divert youth interest. It is anticipated that these efforts will be effective because parents are already actively advising and educating their children.

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### 1. Introduction

Adults, including both parents and non-parents, share concerns that youth have increasing access to drugs. There is widespread anxiety about drugs reaching children, with many worrying that their children and grandchildren may experiment with drugs (Rapee et al., 2023). Drug abuse and addiction among people in society have become serious problems. These drugs negatively affect individuals' behavior, psychology, emotions, physical health, and spirituality. Drugs are linked to crime in various ways. It is illegal to use, possess, manufacture, or distribute drugs classified as having abuse potential, such as cocaine, heroin, marijuana, and amphetamines (Tsai et al., 2019). The most effective strategy for preventing drug-related crimes used by different agencies involves direct action against these crimes (D'Souza et al., 2024).

Communities around the world have a long history of achievements in crime prevention through

active participation and cooperation among local residents and organizations. Governments are increasingly partnering with communities and civil society organizations to prevent crime and violence, leveraging their knowledge of local issues and ability to reach vulnerable and at-risk populations. Community involvement has become a crucial component of crime prevention, involving partnerships with municipalities, police, schools, health and social services, and the private sector.

The term "drug" originates from the Dutch word "droog." A drug is generally understood as a solid, liquid, or gaseous chemical that can become addictive. It directly affects the brain and nervous system, altering feelings, mood, thinking, perception, and consciousness and changing one's view of their surroundings and reality. Opium is believed to be the oldest known drug, with derivatives including morphine, heroin, and codeine. Other well-known drugs include cocaine, cannabis (with hashish and marijuana derivatives), and synthetic drugs like amphetamine, methamphetamine, and methadone.

The issue of drug addiction is not new; it dates back to ancient times when humans first recognized the properties of certain plants and minerals. Over 6,000 years ago, drugs were used for therapeutic purposes. In Mesopotamia and Egypt, drugs were also used in ceremonies and rituals. Today, many

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people worldwide use drugs despite the risks, eventually becoming burdens on society and, ultimately, succumbing to addiction (Biggs et al., 2024). Criminal behavior is often associated with illegal drug use. While there is a notable correlation between drug use and crime, it is not possible to definitively conclude a cause-and-effect relationship. The assertion that drugs lead to crime overlooks the influence of living conditions on individuals (Brutti and Montolio, 2021).

The relationship between drugs and crime is complex, with three main explanations: drug use leads to crime, crime leads to drug use, and both are influenced by broader factors. These factors include the international drug trade's impact on local communities and the adverse effects of globalization on local employment opportunities (Gutiérrez-Romero, 2024). Parents are considered responsible not only for educating their children about drugs but also for intervening if drug use begins (Al-Qaaneh et al., 2023).

Fortunately, treatments exist that help individuals counteract addiction's powerful effects and regain control. Research shows that combining addiction treatment medications with behavioral therapy is the most effective approach. Tailoring treatment to each patient's specific drug abuse patterns and any concurrent medical, psychiatric, and social issues can lead to sustained recovery and a drug-free life (Al-Qaaneh et al., 2023).

There is a strong association between illicit drug use and criminal activity, as shown in much of the experimental literature. However, the relationship is complex and dynamic, often linked to deep-seated social and health problems such as unemployment, socioeconomic inequality, and poor mental health. This relationship is neither simple nor linear, nor is it universal across all types of offenses (Bates et al., 2022).

The United States has experienced a significant increase in incarceration due to the drug trade and extensive use of imprisonment. In 2009, there were 13.7 million arrests, 10% of which were for drug offenses, with nearly half of these related to marijuana. In comparison, only 590,000 people were arrested for violent crimes. Overall, 80% of drug arrests were for possession. More than half of federal prisoners are serving time for drug offenses, and about 20% of state prisoners are incarcerated for drug crimes. Although the US leads in this regard, increased enforcement efforts have also raised prison populations in other countries. Currently, about 10 million people worldwide are in jail for drug offenses (Kabra and Gori, 2023).

According to Harada et al. (2023), the drug prevention campaign in the Philippines aims to reduce the use of illegal drugs by raising public awareness and encouraging participation across all sectors of society. The campaign educates the public about different types of illegal drugs and related issues through advertising, public relations, promotions, resource development, and online communication.

Law enforcement authorities have made numerous arrests related to illegal drug activities, with cases filed against 170 individuals. Attorney Caparoso, regional information officer of the Philippine Drug Enforcement Agency (PDEA) Bicol, stated that PDEA, in collaboration with the Philippine National Police (PNP) and the National Bureau of Investigation (NBI), has been apprehending drug pushers and users almost daily (Atun et al., 2019).

Schools can play a significant role in reducing drug demand and supply and mitigating the health and social consequences of drug use. However, education authorities should not bear sole responsibility for changing student health behaviors, including drug use reduction. Schools can influence drug use behavior through educational programs, policies, procedures, and experiences aimed at preventing drug abuse. Teachers can detect early warning signs of drug problems, such as poor attendance or declining performance, giving them a powerful role in prevention. Effective school programs can develop personal and social skills, such as decision-making, stress management, communication, social interaction, conflict resolution, and assertiveness, helping students resist drug use (Farrugia, 2023).

Prevention programs should enhance protective factors, such as parental support, and reduce risk factors, such as deviant attitudes and behaviors. The risk of drug abuse is influenced by the relationship between the number and type of risk and protective factors. The impact of these factors changes with age; for example, peer influence is a significant risk factor for adolescents, while family factors are more impactful for younger children. Positive or negative early family interactions are crucial in a child's development. Families play an essential role in protecting children involved in outside activities by providing financial, transportation, healthcare, and homework support, which can increase emotional, social, cognitive, and material support (Davis et al., 2024).

Prevention programs at the community level involve civic, religious, law enforcement, and other government organizations to promote anti-drug norms and pro-social behaviors. Strategies may include instituting new policies, such as drug-free schools, or strengthening community practices, like requiring proof of age for purchasing cigarettes (Tran et al., 2023).

Combining multiple effective programs, such as family-based and school-based initiatives, can be more effective than single programs in creating a comprehensive anti-drug community prevention program (Wenger et al., 2024).

Exploring perceptions of drug abuse and individuals who abuse drugs is crucial for understanding the reasons behind drug abuse and contributing to prevention efforts among youth (Nnam et al., 2021). The input section of Fig. 1 includes the profile of the respondents, which may cover their age, sex, and other characteristics. It also

includes the level of citizens' participation in combating drug-related crime, focusing on the roles of parents, school faculty, and youth. The process section of Fig. 1 involves analyzing the respondents'

answers using appropriate statistical methods and interpreting the data. The output section of Fig. 1 presents the proposed model for reducing drug-related crime, developed using regression analysis.

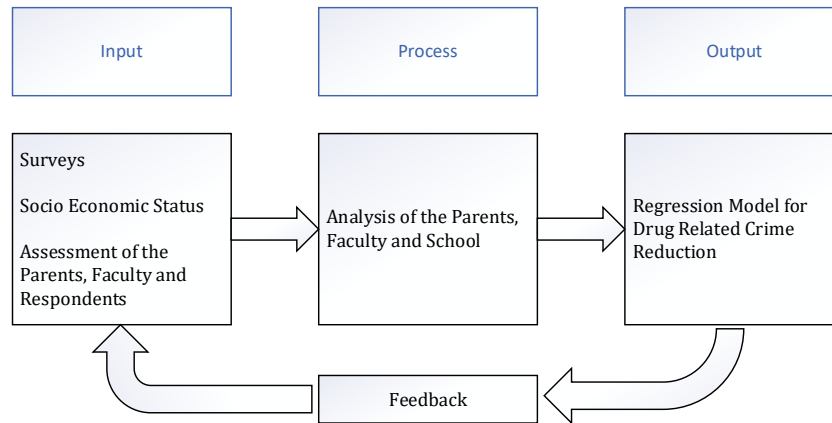


Fig. 1: Paradigm of the study

2. Methods

This study used a descriptive research approach to examine the roles that ordinary people play in combating drug-related criminal activity. One hundred residents from nine different barangays in the city of Cabanatuan participated by responding to a standardized questionnaire. The questionnaire checklist was the primary tool for gathering data, designed to capture the respondents' perspectives. A Likert scale was used to assign numeric values to qualitative data for statistical analysis. Before starting the study and distributing the questionnaires, the researcher obtained permission from their professor, the barangay heads, and the Dean. The collected data were then tallied and analyzed using frequency counts, weighted mean, percentage, and regression analysis. Regression analysis was used to develop the study's model and to predict the most effective approaches to reducing drug-related crime. The presentation, analysis, and interpretation of the data were based on the weighted mean and percentage. Regression analysis, which best fits the study (Hernandez, 2023), shows trends in drug-related crime patterns based on the respondents' views and opinions. The study provides a clear analysis of the groups most commonly associated with drug-related crimes.

3. Results and discussions

The demographic profile of the respondents, including their age, sex, civil status, educational attainment, and socio-economic status, is presented in Tables 1-5. The largest age group of respondents is 15-25 years, making up 39% or 39 respondents. The second largest group is 26-35 years, comprising 23% or 23 respondents. The next group is those aged 46 and above, representing 21% or 21 respondents. The smallest group is 36-45 years, making up 17% or 17 respondents. The number of male and female respondents is equal, with each

group representing 50% or 50 respondents. The largest group of respondents in terms of civil status is single, making up 53% or 53 respondents. This is followed by married respondents, who make up 47% or 47 respondents. The majority of respondents are high school graduates, making up 47%. The second largest group is college graduates, at 35%. Next, 11% are elementary school graduates, and the remaining 7% are unspecified.

Table 1: Demographic profile in terms of age

Age	Frequency	Percentage
15-25	39	39%
26-35	23	23%
36-45	17	17%
46 and above	21	21%
Total	100	100%

Table 2: Demographic profile in terms of sex

Sex	Frequency	Percentage
Male	50	50%
Female	50	50%
Total	100	100%

The majority of respondents are high school graduates, accounting for 47%. The second largest group is college graduates, making up 35%. Next, 11% are elementary school graduates and the remaining 7% fall into other categories. As shown in Table 6, items 5 and 7 have the highest mean, both at 4.62 and are verbally interpreted as "always." In contrast, item 3 has the lowest mean at 4.20, interpreted as "often."

Table 3: Demographic profile in terms of civil status

Civil status	Frequency	Percentage
Single	53	53%
Married	47	47%
Total	100	100%

Table 4: Demographic profile in terms of educational attainment

Educational attainment	Frequency	Percentage
Elementary graduate	11	11%
High school graduate	47	47%
College graduate	35	35%
Others	7	7%
Total	100	100%

**Table 5:** Demographic profile in terms of socio-economic status

Socio-economic status	Frequency	Percentage
10,000 – 15,000	72	72%
15,500 – 20,000	14	14%
20,500 – 30,000	7	7%
30,500 and above	7	7%
Total	100	100%

The overall weighted mean for the Roles of the Parents is 4.39, also interpreted as "often." This indicates that the respondents perceive that parents often perform their roles in combating drug-related crimes. As shown in Table 7, item 5 has the highest mean at 4.50, interpreted as "always." Conversely, item 2 has the lowest mean at 4.00, interpreted as "often." The overall weighted mean for the Roles of the Faculty at Schools is 4.29, also interpreted as "often." This indicates that respondents perceive that

the faculty at schools often fulfill their roles in combating drug-related crimes.

As shown in Table 8, item 3 has the highest mean at 4.61, interpreted as "always." Conversely, item 4 has the lowest mean at 3.93, interpreted as "often." The overall weighted mean for the Roles of the Youth is 4.41, also interpreted as "often." This indicates that respondents perceive that the youth often fulfill their roles in combating drug-related crimes.

The findings in Table 8 reveal that the Roles of the Youth have the highest mean among all citizen roles, at 4.41, interpreted as "often." In contrast, the roles of the faculty at schools have the lowest mean at 4.29, which is also interpreted as "often." This suggests that the youth contribute more significantly than other groups in combating drug-related crimes (Nnam et al., 2021).

**Table 6:** Perception of the parents

Roles of parents	Weighted mean	Interpretation
1. Discussing with your child the relationship between illegal drugs and crime in society in a calm manner	4.24	Often
2. Sharing information you have learned about illegal drugs	4.25	Often
3. Talking about the dangers of using and abusing illegal drugs	4.2	Often
4. Making an effort to know your child's friends	4.42	Often
5. Setting a good example for your child and other family members	4.62	Always
6. Setting boundaries and limits on their leisure activities	4.5	Often
7. Knowing where your child is	4.62	Always
8. Spending time each day doing activities your child enjoys	4.26	Often
9. Letting your child know you are ready to help solve their problems	4.42	Often
10. Making it clear to your child that you do not want them to use illegal drugs and that you will be disappointed if they do	4.4	Often
General weighted mean	4.39	Often

**Table 7:** Perception of the faculty

Roles of the faculty at schools	Weighted mean	Interpretation
1. Educating students about illegal drugs	4.38	Often
2. Conducting seminars and symposiums on drug abuse and its effects	4	Often
3. Enforcing drug abuse prevention programs and policies	4.23	Often
4. Increasing students' knowledge and awareness of the dangers of illegal drug use	4.46	Often
5. Teaching positive attitudes and good values	4.5	Often
6. Being aware of your students' interests within the school	4.31	Often
7. Advising students on the right actions to take if they encounter drug-related crimes	4.27	Often
8. Clearly stating that the illicit use, possession, and sale of drugs in the school are unacceptable and will have serious consequences	4.41	Often
9. Identifying students involved in drug-related crimes and encouraging them to seek help	4.07	Often
10. Encouraging parental involvement in enforcing anti-drug prevention from home to school	4.3	Often
General weighted mean	4.29	Often

**Table 8:** Perception of the youth

Roles of youth	Weighted mean	Interpretation
1. Being aware of the current situation in your community	4.51	Always
2. Informing others about drug-related issues	4.12	Often
3. Abstaining from using illegal drugs	4.61	Often
4. Participating in drug-related seminars and symposiums	3.93	Often
5. Supporting governmental efforts to combat drug-related issues	4.35	Often
6. Setting a good example for others in the community	4.58	Always
7. Avoiding known drug users and pushers	4.57	Always
8. Resisting peer pressure to use illegal drugs	4.51	Always
9. Reporting drug problems in the community to the appropriate authorities immediately	4.33	Often
10. Encouraging others to have strong moral and spiritual faith	4.56	Always
General weighted mean	4.41	Often

**3.1. The regression model for drug-related crime reduction**

The derived model for reducing drug-related crime is presented in the form of equations. Regression analysis was used to determine the model. The predictors in the model are the approaches of parents, faculty, and youth. The equation for the regression model is as follows:

$$DrugCrimeReduction = \beta_0 + \beta_1ParentsApproach + \beta_2FacultyApproach + \beta_3 \times YouthApproach + \epsilon$$

where, *DrugCrimeReduction* represents the predicted reduction in drug-related crimes.  $\beta_0$  is the intercept (constant term).  $\beta_0$ ,  $\beta_1$ , and  $\beta_2$  are regression coefficients for the parents' approach, faculty approach, and youth approach, respectively.  $\epsilon$

represents the error term, accounting for the unexplained variation  $n$  in the model. *ParentsApproach*, *FacultyApproach*, and *YouthApproach* are the predictor variables representing the respective approaches.

The regression coefficients  $\beta_0$ ,  $\beta_1$ , and  $\beta_2$  indicate the intensity and direction of the relationships between each predictor and the reduction in drug-related crime. A positive coefficient implies a positive relationship, whereas a negative coefficient indicates a negative relationship. The magnitude of the coefficient reflects the influence of each predictor on the variable of interest. Based on the available data, the regression analysis estimates the values of the regression coefficients. The coefficients can be interpreted to determine the relative significance and impact of the parents' approach, the faculty approach, and the youth approach on the reduction of drug-related crime. The model can be evaluated using statistical metrics such as R-squared, adjusted R-squared, and coefficient significance levels. These metrics provide insights into the model's overall fit and the importance of the predictors in explaining the variation in drug-related crime reduction.

**Table 10:** Summary of the regression statistics of the of the drug-related crimes reduction approach

Approaches	Coefficients	Relationship	P-value	Interpretation
Intercept	3.38			
Parent	12.39	Positive	0.001	Significant
Faculty	5.058	Positive	0.006	Significant
Youth	3.01	Positive	0.031	Significant

Table 10 displays the constant and coefficients of the regression model, indicating that the reduction in drug-related crimes is influenced by the Parent Approach, Faculty Approach, and Youth Approach. The regression equation is as follows:

$$DrugCrimeReduction = 3.38 + 12.39\beta_1 + 5.05\beta_2 + 3.01\beta_3$$

Moreover, all approaches are significant in the drug prevention model regarding the reduction of drug-related crimes. Interestingly, the results show that the Parent Approach has the highest effect on drug crime reduction. This is expected because parents are already making efforts through advice and awareness to their children.

#### 4. Conclusion

Based on the study results, it can be concluded that the general public has a positive attitude toward the roles of parents, teachers, and young people in combating drug-related crimes. Most respondents were aged 15 to 25, with an even distribution of males and females. Single respondents were the largest civil status group, and most had a high school education or higher. The majority had annual household incomes between \$10,000 and \$15,000, indicating the predominant socioeconomic status of the sample.

The survey findings reveal that parents are often perceived as actively fulfilling their roles in fighting drug-related crimes. Items related to parental

The derived regression model can be used to make predictions and inform drug prevention strategies. It highlights the effectiveness of different approaches, allowing policymakers and practitioners to prioritize interventions and allocate resources effectively. Additionally, the model can guide future research and inform the development of drug prevention programs based on empirical evidence.

Table 9 presents the R and R-squared values for the indicators of drug-related crime reduction, indicating a very high positive correlation (R=0.706, R-squared=0.498). This means that 49% of the reduction in drug-related crimes can be explained by the linear relationship of the approaches by parents, faculty, and youth, while approximately 51% is attributed to other factors not included in the study. Table 10 provides the detailed information about the model.

**Table 9:** Regression statistics of the of the drug-related crimes reduction

Regression statistics	Values
Multiple R	0.706224394
R-squared	0.498752894

engagement received high mean scores, indicating their constant involvement.

Similarly, faculty members at educational institutions are frequently seen as playing their roles in combating drug-related crimes. While all items had relatively high mean scores, item number 5 stood out as a task regularly performed by teachers.

Young people are also perceived as frequently fulfilling their roles in fighting drug-related crimes, with item number 3 receiving the highest mean score. Overall, young people's roles were regarded as the most significant among all citizen roles evaluated in the study.

The proposed regression analysis model resulted in the following equation:

$$DrugCrimeReduction = 3.38 + 12.39\beta_1 + 5.05\beta_2 + 3.01\beta_3$$

Each approach in the drug prevention model is significant in reducing drug-related offenses. Notably, parental involvement has the greatest impact, likely due to parents' ongoing efforts to advise and educate their children.

These findings highlight the importance of parental involvement, active participation of teachers, and meaningful engagement of young people in addressing drug-related offenses. Community organizations, educational institutions, and policymakers can use these insights to develop targeted interventions and strategies to enhance collaborative efforts in combating drug-related

crimes. Schools can promote awareness programs for youth through counseling, seminars, and integrating drug education into certain subjects. Communities can also provide activities such as livelihood projects and sports to divert attention from drugs.

## Compliance with ethical standards

### Ethical considerations

This study complied with all relevant ethical guidelines. Prior to data collection, necessary permissions were obtained, and informed consent was secured from participants. The confidentiality and anonymity of respondents were strictly maintained, with data securely stored and accessible only to the research team. The study adhered to the Declaration of Helsinki principles and followed Institutional Review Board (IRB) guidelines.

### Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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