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Application of the Analytical Hierarchy Process (AHP) Method in Supporting Decision-Making Regarding Drug Abuse Factors

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Abstract
Drugs, an abbreviation for narcotics and hazardous substances, include natural, synthetic, and semi-synthetic compounds that have detrimental effects on public health and social well-being. The increasing prevalence of drug abuse worldwide, including in Indonesia, has become a serious threat to social stability and the younger generation. This study aims to identify and prioritize the risk factors contributing to drug abuse in Bengkulu Province using the Analytic Hierarchy Process (AHP) method. The research data were obtained from experts of the National Narcotics Agency of Bengkulu Province through pairwise comparison–based expert judgment questionnaires. Each comparison matrix was tested for consistency using the Consistency Ratio (CR), and all matrices yielded values of CR < 0.1, indicating that they met the consistency criteria as proposed by Saaty. The results of the priority weighting suggest that the family factor has the most dominant influence on drug abuse, followed by peer group, personality, community environment, economic and psychosocial factors, drug availability, anxiety and depression, and the school environment. These findings highlight the importance of strengthening family functions and social environments in regional drug prevention strategies. This research provides empirical contributions to the development of criteria-based decision-making models in the field of drug abuse prevention in Indonesia.

Keywords: AHP, drug abuse, MCDM, risk factors, Consistency Ratio.

1. Introduction

The National Narcotics Agency (BNN) defines drugs as an abbreviation of narcotics and dangerous substances, encompassing natural, synthetic, and semi-synthetic compounds. These substances can induce altered states of consciousness such as impaired cognitive function, hallucinations, heightened stimulation, euphoria, or excessive physical activity, ultimately posing serious health risks to users (Badan Narkotika Nasional, 2019). The phenomenon of drug abuse not only affects individuals but also threatens social stability, economic productivity, and national security.

Drug abuse in Indonesia has reached an alarming level. Narcotics use is no longer limited by age; adults, adolescents, and even children are involved both as users and as distributors (Prawiradana *et al*., 2018). The illicit distribution of narcotics occurs not only in major cities but has also penetrated rural areas. Typically, drug use begins with curiosity, social pressure to gain group acceptance, or psychological distress, which can gradually develop into chronic addiction (Mustamu *et al*., 2023). This condition highlights that drug abuse is a multidimensional phenomenon intricately linked to social, economic, and psychological factors.

At the national level, the prevalence and distribution of drug abuse continue to increase, resulting in numerous victims across various regions (Harum & Syarifah, 2023). In response, the Indonesian government has implemented the Prevention and Eradication of Drug Abuse and Illicit Trafficking Program (P4GN) as part of the seventh national development priority agenda, which aims to strengthen political stability, law enforcement, national defense, and public service transformation. The key indicator of this program's success is the reduction in the national drug abuse prevalence rate, which is targeted to decrease to 1.70% by 2025 (BNN, 2024).

One province that faces significant challenges in combating drug abuse is Bengkulu. According to data from the Central Statistics Agency (BPS, 2022), there were approximately 148 drug abuse cases reported in Bengkulu Province in 2022, with Rejang Lebong Regency recording the highest number of incidents. Bengkulu, with a population of about two million people, has a relatively young demographic structure dominated by the productive age group (15–35 years). The province's open social dynamics, high interregional mobility, and exposure to modern peer environments contribute to the increased vulnerability of youth and young adults to drug abuse. Therefore, it is crucial to systematically analyze the most influential risk factors for drug abuse in this region to serve as a foundation for more effective prevention policies.

According to Hawari (2006), several factors influence drug abuse, including personality traits, anxiety and depression, family environment, peer group, economic and psychosocial conditions, drug availability, school environment, and community setting. Awwalya (2024) further emphasized that adolescent drug abuse behavior is influenced by identity crises, weak self-control, lack of affection, poor religious understanding, and environmental influences. However, most previous studies remain descriptive and qualitative in nature, failing to provide structured measurements of the priority level of each risk factor. An individual may become addicted due to multiple simultaneous factors. Thus, understanding these factors underscores the importance of Decision Support System (DSS) analysis in determining the relative weights of the most and least influential factors. A DSS assists in making informed decisions based on pre-established criteria (Turban *et al*., 2004).

This study employs an analytical approach, utilizing the Analytic Hierarchy Process (AHP) as a quantitative method to objectively assess and prioritize drug abuse risk factors based on expert evaluations. Unlike conventional descriptive approaches, AHP enables pairwise comparisons among factors to determine their relative importance systematically and consistently (Saaty, 1990; Parhusip, 2019). The application of this method is particularly relevant in complex decision-making contexts, especially those involving multiple criteria and regional variations in vulnerability to drug abuse (Jayadi *et al*., 2024). Beyond providing measurable priority weights, AHP functions as a decision-support model that decomposes multifactorial problems into a more rational and transparent hierarchical structure, making its analytical results empirically valuable for evidence-based drug prevention policy formulation (Saaty, 1990).

Specifically, this research aims to identify and determine the priority of the most influential risk factors contributing to drug abuse in Bengkulu Province using the AHP method. The AHP model in this study is intended to support decision-making processes related to intervention priorities and prevention strategies that should be emphasized by local government agencies, particularly the Bengkulu Provincial National Narcotics Agency. Consequently, the findings of this study are expected to provide a scientific basis for formulating more targeted, effective, and context-specific drug control policies that align with the social characteristics of Bengkulu society.

2. Methods

This study was designed to produce systematic, objective, and scientifically accountable analytical results. The research employs a quantitative approach complemented by qualitative expert assessments through the expert judgment technique. The analysis was conducted using the Analytic Hierarchy Process (AHP) method, which helps identify and determine the relative priority levels of risk factors contributing to drug abuse based on expert perceptions. The application of this method facilitates a structured decision-making process through the development of a problem hierarchy, pairwise comparisons, and consistent computation of priority weights. Accordingly, AHP not only provides measurable evaluations of each factor but also establishes an empirical foundation for strategic decision-making in the prevention of drug abuse in Bengkulu Province.

2.1 Data Collection and Research Variables

The data used in this study were obtained through procedures that received official approval from the National Narcotics Agency of Bengkulu Province. The data collection process was conducted in several stages, including direct observation, in-depth interviews with experts to validate and refine the research criteria, and the distribution of questionnaires based on the expert judgment technique. The questionnaire instrument was systematically designed according to the pairwise comparison principles of the AHP method, enabling a quantitative assessment of the relative importance among risk factors. The respondents involved were experts with substantive experience in the fields of prevention, rehabilitation, and eradication of drug abuse, ensuring that their assessments reflected both professional competence and a multidisciplinary perspective. Through this approach, the data obtained are expected to demonstrate high empirical validity and methodological consistency, thereby supporting the accuracy of the pairwise comparison matrix as the foundation for AHP analysis.

The study employed a set of variables representing the major risk factors influencing drug abuse. These variables served as the decision criteria within the AHP framework to determine the relative importance of each factor based on expert evaluations. Eight key risk factors were analyzed in this research: personality traits, anxiety and depression, family, peer groups, drug availability, school environment, community environment, and socioeconomic-psychosocial factors. The selection of these eight factors was grounded in empirical literature and prior studies that have demonstrated a significant relationship between these variables and the propensity for drug abuse behavior.

Table 1.
Criteria /Risk Factors Symbols

Symbol	Description
K1	Personality
K2	Anxiety and Depression
K3	Family
K4	Peer Group
K5	Drug Availability
K6	School Environment
K7	Community Environment
K8	Economic and Psychosocial

2.2 Analytic Hierarchy Process (AHP) Procedure

The AHP method, introduced by Saaty between 1971 and 1975, is one of the most widely applied multi-criteria decision-making approaches across various fields of research and public policy. This method integrates a robust mathematical framework with expert qualitative judgment, enabling the decomposition of complex problems into a systematic and rational hierarchical structure (Saaty, 1990; Leal, 2020). Within its framework, AHP organizes the decision-making process into several hierarchical levels, beginning with the definition of the overall goal, followed by the identification of criteria and sub-criteria, and culminating in the final stage of decision alternatives (Torre & Salamon, 2025). This hierarchical modeling allows researchers to assess and compare the relative importance of elements consistently, thus producing scientifically accountable priority weights. The procedural stages of AHP implementation in this study are as follows.

1. The initial stage of applying the AHP method begins with systematically defining the problem to be solved and the decision objectives to be achieved. Next, a hierarchical structure is formed by placing the main objective, namely determining the risk factors for drug abuse, followed by the decision risk factors or criteria at the lowest level. This hierarchical approach facilitates the analysis of complex problems into logical and measurable relationships (Saaty, 1990).
2. The next stage is the construction of the pairwise comparison matrix to assess the relative importance between criteria or risk factors. This matrix is developed based on data collected through field observations, in-depth interviews, and questionnaires completed by experts experienced in the prevention and control of drug abuse. The qualitative data obtained from

expert opinions are then translated into quantitative form using the fundamental scale developed by Saaty, which ranges from 1 to 9, where the value 1 indicates equal importance between two factors, while the value 9 indicates that one factor is absolutely more important than the other (Saaty, 1990). This conversion process is carried out using the principle of expert judgment consensus, namely, averaging or unifying the assessments of experts who share similar perceptions to ensure an objective and consistent representation of real conditions in the field.

3. The values resulting from the experts' assessments are then entered into a square pairwise comparison matrix of size $n \times n$, where the element a_{ij} indicates the relative importance of the criteria i and j. This matrix serves as the basis for calculating priority weights using the formula proposed by Bhushan & Rai (2004):

$$A = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ \frac{1}{a_{12}} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} & \cdots & 1 \end{bmatrix} \quad (1)$$

4. Constructing a normalization matrix, namely by dividing each element located in column i of matrix A by the total sum of all elements in column i, so that the sum of each column in the matrix equals 1 (Wang, 2025). The normalization matrix can be obtained using the following formula.

$$\mathrm{A}_{norm} = \begin{bmatrix} \frac{a_{11}}{\sum_{i=1}^{n} a_{i1}} & \frac{a_{12}}{\sum_{i=1}^{n} a_{i2}} & \cdots & \frac{a_{1n}}{\sum_{i=1}^{n} a_{in}} \\ \frac{a_{21}}{\sum_{i=1}^{n} a_{i1}} & \frac{a_{22}}{\sum_{i=1}^{n} a_{i2}} & \cdots & \frac{a_{2n}}{\sum_{i=1}^{n} a_{in}} \\ \vdots & \vdots & \vdots & \vdots \\ \frac{a_{n1}}{\sum_{i=1}^{n} a_{i1}} & \frac{a_{n2}}{\sum_{i=1}^{n} a_{i2}} & \cdots & \frac{a_{nn}}{\sum_{i=1}^{n} a_{in}} \end{bmatrix} \quad (2)$$

5. Conducting a consistency test on the criteria/risk factors of the study. This consistency testing is a very important step in the AHP method. The initial step that can be taken to calculate the value of the Weighted Sum Vector (WSV) is to use the following formula:

$$\boldsymbol{WSV = Ab}$$

$$\begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{\mathrm{nn}} \end{bmatrix} \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{bmatrix} \quad (3)$$

where $w_1 = \sum_{i=1}^{n} a_{il}\, b_l$

Thus, from the WSV, the value of λ_{maks} can be obtained using the following formula:

$$\lambda_{maks} = \frac{1}{n}\sum_{i=1}^{n}\frac{w_i}{b_i} \quad (4)$$

6. The next step in the consistency test is to calculate the Consistency Index (CI), followed by determining the Consistency Ratio (Wang, 2025). To obtain the Consistency Ratio (CR), the Random Index (RI) value is required. The RI value varies depending on the size of the pairwise comparison matrix, as established by Saaty in the development of the AHP method (Saaty & Vargas, 2012).

   a. *Consistency Index* (CI)
   The basic concept of the AHP process inevitably involves quantitative data as well as subjective opinions in decision-making, which creates the possibility of inconsistent judgments within the pairwise comparison procedure—especially under conditions of uncertainty. Therefore, the formula to calculate the CI value is as follows:

$$CI = \frac{\lambda_{maks} - n}{n-1} \quad (5)$$

   b. *Consistency Ratio* (CR)
   The Consistency Ratio is essential for assessing the consistency level, making it easier to determine how consistent the pairwise comparison matrix is in the decision-making process. The CR can be calculated using the following formula:

$$CR = \frac{CI}{RI} \quad (6)$$

   If the CR value is less than 0.10, it indicates that the consistency requirement has been met, meaning that the judgments made are sufficiently consistent and therefore acceptable. Conversely, if the CR value is greater than 0.10, inconsistency may have occurred.

3. Result and Discussion

This section presents the results and discussion focusing on the application of the AHP method in identifying and determining the most influential risk factors contributing to drug abuse in Bengkulu Province. The analysis was carried out through three main stages: determining local priorities based on pairwise comparison matrices among criteria, conducting a consistency test to ensure the logical validity of expert assessments, and interpreting the final results by comparing this study's findings with relevant previous research. This approach not only provides a quantitative understanding of the relative importance of each risk factor but also strengthens the scientific foundation for evidence-based decision-making in the field of drug abuse prevention and control.

3.1 Determining Local Priorities

The determination of local priorities in this study was conducted on the pairwise comparison matrix representing the relationships among the criteria, namely the risk factors of drug abuse in Bengkulu Province. The matrix was constructed based on the conversion of expert assessment data into relative importance values using Saaty's fundamental scale through **Equation (1)**. This approach allows each criterion to be compared pairwise in order to obtain priority weights that objectively and quantitatively reflect the relative importance of each risk factor.

$$
\begin{array}{c} \\ K1 \\ K2 \\ K3 \\ K4 \\ K5 \\ K6 \\ K7 \\ K8 \end{array}
\begin{array}{c}
\begin{array}{cccccccc} K1 & K2 & K3 & K4 & K5 & \text{K6} & \text{K7} & \text{K8} \end{array} \\
\begin{bmatrix}
1 & 2 & 1/4 & 1/2 & 2 & 3 & 2 & 2 \\
1/2 & 1 & 1/7 & 1/3 & 1/2 & 2 & 1/3 & 1/2 \\
4 & 7 & 1 & 6 & 5 & 8 & 5 & 6 \\
2 & 3 & 1/6 & 1 & 3 & 3 & 4 & 1/2 \\
1/2 & 2 & 1/5 & 1/3 & 1 & 3 & 1/2 & 1 \\
1/3 & 1/2 & 1/8 & 1/3 & 1/3 & 1 & 1/3 & 1/4 \\
1/2 & 3 & 1/5 & 1/4 & 2 & 3 & 1 & 2 \\
1/2 & 2 & 1/6 & 2 & 1 & 4 & 1/2 & 1
\end{bmatrix}
\end{array}
$$

The pairwise comparison matrix was then expressed in decimal form to facilitate the calculation and analysis process using the AHP method. This conversion allows each comparison value to be processed more systematically and accurately in determining the priority weight of each criterion.

$$
\begin{array}{c} \\ \text{K1} \\ \text{K2} \\ \text{K3} \\ \text{K4} \\ \text{K5} \\ \text{K6} \\ \text{K7} \\ \text{K8} \end{array}
\begin{array}{c}
\begin{array}{cccccccc} \text{K1} & \text{K2} & \text{K3} & \text{K4} & \text{K5} & \text{K6} & \text{K7} & \text{K8} \end{array} \\
\begin{bmatrix}
1.000 & 2.000 & 0.250 & 0.500 & 2.000 & 3.000 & 2.000 & 2.000 \\
0.500 & 1.000 & 0.143 & 0.333 & 0.500 & 2.000 & 0.333 & 0.500 \\
4.000 & 7.000 & 1.000 & 6.000 & 5.000 & 8.000 & 5.000 & 6.000 \\
2.000 & 3.000 & 0.167 & 1.000 & 3.000 & 3.000 & 4.000 & 0.500 \\
0.500 & 2.000 & 0.200 & 0.333 & 1.000 & 3.000 & 0.500 & 1.000 \\
0.333 & 0.500 & 0.125 & 0.333 & 0.333 & 1.000 & 0.333 & 0.250 \\
0.500 & 3.000 & 0.200 & 0.250 & 2.000 & 3.000 & 1.000 & 2.000 \\
0.500 & 2.000 & 0.167 & 2.000 & 1.000 & 4.000 & 0.500 & 1.000
\end{bmatrix}
\end{array}
$$

The next step is to perform normalization on the criteria matrix, also referred to as the normalized matrix A. This is achieved by dividing each entry in the column i of matrix A by the sum of all entries in column iii, as expressed in **Equation (2)**.

	K1	K2	K3	K4	K5	K6	K7	K8
K1	0.1071	0.0976	0.1111	0.0465	0.1348	0.1111	0.1463	0.1509
K2	0.0536	0.0488	0.0635	0.0310	0.0337	0.0741	0.0244	0.0377
K3	0.4286	0.3415	0.4442	0.5581	0.3371	0.2963	0.3659	0.4528
K4	0.2143	0.1463	0.0740	0.0930	0.2022	0.1111	0.2927	0.0377
K5	0.0536	0.0976	0.0888	0.0310	0.0674	0.1111	0.0366	0.0755
K6	0.0357	0.0244	0.0555	0.0310	0.0225	0.0370	0.0244	0.0189
K7	0.0536	0.1463	0.0888	0.0233	0.1348	0.1111	0.0732	0.1509
K8	0.0536	0.0976	0.0740	0.1860	0.0674	0.1481	0.0366	0.0755

The normalization process of the matrix A is carried out by calculating the average value of each row, which is then used as the priority vector value. This value is obtained by summing the elements in each row of the matrix representing the risk factors, thereby producing the relative weights for each criterion. The results of the priority vector calculations are presented as follows.

Table 2.
Results of Priority Vector Values for Criteria/Risk Factors

Criterion	Value
K1	0.9055
K2	0.3667
K3	3.2244
K4	1.1715
K5	0.5616
K6	0.2494
K7	0.7821
K8	0.7388

The next step is to calculate the weight of each criterion or risk factor by dividing the priority vector value obtained in the previous step by the matrix size, which is 8×8. This process aims to determine the relative weight of each criterion, representing its proportional level of importance within the decision-making hierarchy. The results of the relative weight calculations for each criterion are presented in Table 3 below.

Table 3.
Results of Relative Weights for Each Criterion

Criterion	Weight

K1	0.1132
K2	0.0458
K3	0.4031
K4	0.1464
K5	0.0702
K6	0.0312
K7	0.0978
K8	0.0924

The vector for the relative weight values of the criteria or risk factors was obtained as follows:

$$\boldsymbol{b} = [0.1132 \quad 0.0458 \quad 0.4031 \quad 0.1464 \quad 0.0702 \quad 0.0312 \quad 0.0978 \quad 0.0924].$$

3.2 Consistency Testing

In the expert evaluation process, differences in perception or subjective judgment may lead to inconsistencies in the results of the pairwise comparisons, either between criteria or between alternatives. Therefore, a consistency test was conducted to ensure that the judgments provided fall within an acceptable range of consistency. This step is essential to guarantee the validity and reliability of the results, ensuring that all data used in the AHP method are mathematically verified and provide an accurate and accountable basis for decision-making.

The first step in the consistency testing process is to calculate the Weighted Sum Vector (WSV), which serves to assess the level of consistency within the pairwise comparison matrix. The WSV value is obtained using **Equation (3)**, where the result provides the foundation for the subsequent consistency evaluation stage. The results of the Weighted Sum Vector calculations are presented in Table 4 below.

Table 4.
Results of Weighted Sum Vector Calculation

Criterion	WSV
K1	0.9930
K2	0.3850
K3	3.6986
K4	1.3188
K5	0.5827

Criterion	WSV
K6	0.2701
K7	0.8277
K8	0.8444

The next step is to calculate the value of λ_{maks}, using the WSV values obtained in the previous stage. By applying **Equation (4)**, the value of λ_{maks} can be calculated as follows:

$$\lambda_{maks} = \frac{1}{8}\left[\left(\frac{0,9930}{0,1132}\right) + \left(\frac{0,3850}{0,0458}\right) + \left(\frac{3,6986}{0,4031}\right) + \left(\frac{1,3188}{0,1464}\right) + \left(\frac{0,5827}{0,0702}\right) + \left(\frac{0,2701}{0,0312}\right) + \left(\frac{0,8277}{0,0978}\right) + \left(\frac{0,8444}{0,0924}\right)\right]$$

$$\lambda_{maks} = 8,7412.$$

The result of the λ_{maks} value is then substituted into **Equation (5)** to obtain the Consistency Index (CI). By following **Equation (5)**, the CI value is determined as follows:

$$CI = \frac{(8,7412 - 8)}{(8 - 1)}$$
$$CI = 0,1059.$$

After obtaining the CI value in the previous stage, the next and final step in the consistency testing process within the AHP method is to calculate the Consistency Ratio (CR) using **Equation (6)**. To calculate the CR value, the Random Index (RI) used for this criterion is 1.41, which corresponds to an 8×8 matrix. Therefore, the CR value is calculated as follows:

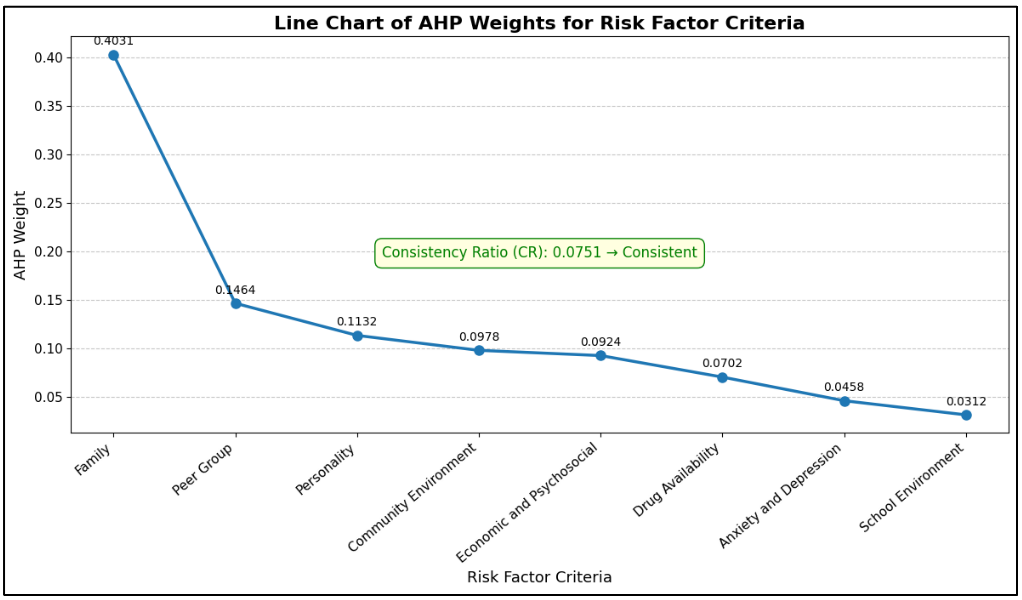
$$CR = \frac{0,1059}{1,41}$$
$$CR = 0,0751.$$

As a result, the obtained CR value for the criteria/risk factors is $0,0751 < 0,10$, indicating that the assessments of the risk factors used in this study are consistent and meet the AHP methodological standards.

3.3 Discussion

This section discusses the results of the weighting analysis of the eight risk factors for drug abuse in Bengkulu Province obtained through the application of the AHP method. The analysis focuses on determining the priority levels among the risk factors without involving the alternative level, aiming to identify the dominant factors that have the most significant influence on the potential for drug abuse in the region. This approach was chosen to gain an in-depth understanding of the structure of relative importance among the factors, which serves as the conceptual basis for strategic decision-making and policy formulation in drug abuse prevention. The resulting weight values reflect the experts' perceptions based on their empirical experience and are subsequently visualized to strengthen the interpretation of the results and compared with findings from previous studies to ensure the relevance and consistency of the research outcomes.

Figure 1.
Visualization of the Results of Drug Abuse Risk Factors



Based on the AHP weighting results presented in Figure 1, the **family factor** emerged as the most dominant determinant with a weight of **0.4031**. This finding emphasizes that the dynamics of parental relationships with children, including the quality of parenting, supervision, emotional closeness, and family communication, play a crucial role in mitigating the risk of substance abuse. This aligns with empirical evidence positioning the family as both a protective and risk determinant in the developmental pathway of addiction (Avcı *et al*., 2025). The position of the **peer group factor**, as the second strongest determinant with a weight of **0.1464**, confirms the literature highlighting the significant influence of peer interaction on the initiation and escalation of substance use among adolescents. Consequently, interventions that neglect peer group dynamics risk being less effective (Watts *et al*., 2024). The **personality factor**, with a weight of **0.1132**, underscores the contribution of individual characteristics such as impulsivity, emotional regulation, and sensation-seeking tendencies, which interact with social factors to heighten vulnerability to addictive behaviors (Alhammad *et al*., 2022).

The moderate weights obtained for the **community environment** weight of **0.0978** and the **economic and psychosocial factors** weight of **0.0924** indicate the importance of structural determinants. Socioeconomic instability and permissive community norms can facilitate access, normalization, and distribution of narcotics, thereby increasing collective risk (Avcı *et al*., 2025). Although the **availability of drugs** received a relatively lower weight of **0.0702**, it still functions as a structural factor enabling exposure, meaning that supply-reduction strategies remain relevant as complementary policies to demand-reduction prevention measures. The role of **anxiety and depression**, with a weight of **0.0458**, in this model reflects the dual nature of mental health disorders as both predisposing factors and consequences of substance abuse. This finding is consistent with psychopathological literature highlighting the comorbidity between mental health conditions and addiction (Stritzel *et al*., 2021). Meanwhile, the **school environment**, which obtained the lowest weight of **0.0312**, still plays a crucial role as a preventive and early detection setting. Although its contribution is relatively small in this context, schools remain an essential arena for implementing curricular programs and fostering a protective school climate (Avcı *et al*., 2025).

Methodologically, the consistency ratio result previously presented in **Figure 1** or during the consistency testing phase, which meets the required threshold ($CR = 0.0751 < 0.10$) — provides confidence that the established priority structure is stable and can be used as a solid basis for policy recommendations (Saaty, 1990). This result confirms that each expert's judgment regarding the criteria or risk factors in this study is both logical and mathematically consistent, ensuring that the derived priority weights genuinely represent the perceptions and empirical experiences of experts from the National Narcotics Agency of Bengkulu Province. Thus, the reliability of the AHP results lies not only in the obtained priority ranking but also in the validity of the decision-making process itself, which remains free from significant inconsistency. These findings further reinforce the argument that the AHP effectively simplifies the complexity of drug abuse risk factors without compromising the validity of its outcomes.

When compared to previous studies, the findings of this research demonstrate a distinctive novelty in its analytical focus, which specifically emphasizes the influence of internal and social risk factors on drug abuse rather than directly addressing intervention alternatives. For instance, the study by Alhammad *et al*. (2022) highlighted the social and economic dimensions but did not quantify the relative weights among factors with consistency validation as conducted in this study. Meanwhile, the research by Torre and Salomon (2025) concentrated on multi-criteria classification within the industrial sector, without incorporating the socio-behavioral and psychological contexts. Therefore, the novel contribution of this research lies in the application of the Analytic Hierarchy Process (AHP) to assess the hierarchical structure of drug abuse risk factors, supported by strong and rational empirical consistency testing. This approach paves the way for developing evidence-based, measurable, and replicable policy frameworks in the field of drug abuse prevention.

The policy implications derived from these findings highlight the necessity for multi-level strategies, including strengthening family capabilities (such as parenting programs and family counseling) as priority interventions, implementing peer-led programs and establishing healthy group norms to mitigate peer influence, integrating mental health services to address predisposing conditions like anxiety and depression, as well as developing community economic policies and supply reduction measures to minimize structural determinants. This research focuses on analyzing the determination of risk factor weights associated with drug abuse. For future research development, it is recommended to conduct external validation (cross-validation) using different samples and to integrate spatial or alternative analyses to map intervention priorities at the regional level, thereby enabling these findings to be translated into more contextual and actionable policy frameworks.

4. Conclusion

This study successfully applied the Analytic Hierarchy Process as an effective quantitative approach to evaluate and prioritize the risk factors of drug abuse in Bengkulu Province. The analysis revealed that the family factor holds the most dominant influence on the potential for drug abuse, followed by peer group, personality, community environment, and economic and psychosocial aspects. These findings emphasize the crucial role of the immediate social environment in shaping individual behavior toward addictive substances. Moreover, the consistency test results showed a Consistency Ratio (CR) < 0.1, indicating that all expert judgments demonstrate a high level of rationality and consistency in accordance with AHP standards. Overall, this research provides empirical contributions in supporting evidence-based decision-making for government agencies and policymakers in designing more targeted, systematic, and contextually relevant strategies for preventing drug abuse at the regional level.

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