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# Evaluating the Effectiveness of an Educational-Therapeutic Intervention Program in Reducing Suicide and Suicide Attempts in Comprehensive Health Centers of Ilam, Iran

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## Abstract

**Background:** Suicide and suicide attempts are significant public health challenges worldwide. In Iran, particularly in Ilam province, this issue has become increasingly prominent, necessitating effective prevention strategies. Prior research highlights the efficacy of educational and therapeutic interventions, including psychological training and counseling, in reducing suicidal behaviors.

**Objectives:** The present study aimed to evaluate the effectiveness of a structured educational-therapeutic intervention program implemented in comprehensive health centers across Ilam.

**Methods:** Using an applied, community-based participatory approach, this interventionist-analytical study was conducted over 12 months (December 2019 to January 2021). The target population included service recipients at health centers across Ilam. Interventions were delivered at general, selective, and indicated levels, encompassing suicide prevention training, psychological counseling, and systematic screening for at-risk individuals. Data were extracted from quarterly and annual center reports and analyzed using SPSS with descriptive and inferential statistics.

**Results:** Findings demonstrated a significant reduction in suicide and suicide attempts in Ilam city following the intervention, particularly among individuals aged 15 - 24 and 25 - 34 years. There was also a notable increase in the identification and treatment of depression and anxiety disorders. However, in some areas like Darehshahr and Dehloran, an increase in suicide attempts was observed, highlighting the need for localized assessment.

**Conclusions:** Educational-therapeutic programs in health centers of Ilam effectively reduced suicidal behaviors. Expanding such interventions nationally and further investigating regional outcome disparities is strongly recommended.

*Keywords:* Area Health Education Centers, Attempted Suicide, Intervention Guideline, Suicide, Suicide Prevention

## 1. Background

Suicide and suicide attempts are major global public health crises with wide-ranging negative impacts on individuals, families, and communities. These issues involve social, economic, and psychological dimensions, raising serious concerns for healthcare systems. According to the World Health Organization (WHO), suicide is a leading cause of death worldwide and has shown increasing rates in some regions (1). In Iran, suicide and suicide attempts are rising social and health concerns, influenced by psychological, social, economic, and cultural factors (2). Educational and therapeutic interventions — including psychological training, individual and group counseling, social support, and lifestyle changes — effectively prevent suicide, reduce depression and anxiety, and improve the quality of life for at-risk individuals (3). Suicide prevention programs focusing on life skills and stress reduction have



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effectively lowered suicide attempts and deaths, particularly in high-risk areas (4). Recent global and national guidelines emphasize the importance of multi-level intervention strategies and community-based approaches in suicide prevention, such as the WHO's LIVE LIFE initiative (5) and the US National Strategy for Suicide Prevention (6), and enhancing youths' social and emotional skills (7, 8). National strategies, like Australia's National Suicide Prevention Strategy 2025 - 2035, offer a framework for cross-sector coordination, emphasizing timely crisis response and improved mental health services (8). These frameworks highlight the importance of integrating educational and therapeutic interventions into primary healthcare centers, as practiced in Ilam province.

Ilam, a western Iranian province bordering Iraq, faces notable social and psychological challenges. Recent interventions — such as educational programs in health centers, support and counseling groups for at-risk individuals, and workshops for families and healthcare staff — have positively impacted suicide prevention and improved quality of life in the region (9). In Ilam, empowerment programs and stress-coping skill training for youth have been implemented to prevent suicide and enhance mental health. Psychological interventions in urban and rural health centers have helped reduce depression and anxiety among high-risk individuals (10).

## 2. Objectives

One program provided training for local counselors and psychologists to better identify at-risk individuals and deliver timely interventions, leading to significant success in preventing suicide attempts. Due to its unique social and cultural characteristics and high mental health needs in certain groups, Ilam province requires targeted interventions. Comprehensive health centers have significant potential for such programs. This study evaluates the effectiveness of an educational-therapeutic intervention in reducing suicide and suicide attempts in Ilam's health centers. Assessing the effectiveness of such programs in reducing suicide is crucial, as it offers valuable insights for policymakers and health authorities and helps design more effective local and national interventions.

## 3. Methods

### 3.1. Research Type

This applied study uses analytical and interventionist, community-oriented methods to evaluate suicide prevention programs in Ilam's urban community. Based on a community-based participatory research approach, it engages local members to enhance knowledge, social empowerment, and capacity building, fostering collaboration among individuals, organizations, and universities to address complex social and health issues (11-14).

### 3.2. Study Population and Sample Size

The study population comprises all individuals receiving healthcare services at urban health centers in Ilam. According to the 2016 census, the population of Ilam city is 215,543, with individuals being served by one of the nine urban healthcare centers and three health posts. This research was conducted as a pilot study in Ilam city, prioritizing age groups between 15 and 54 years due to the high suicide rates and suicide attempts within this age range. The reasons for selecting Ilam city for the pilot study include factors such as accessibility, the high suicide rate, the recruitment of psychologists by Ilam University of Medical Sciences, and its representation of other counties in the province. The evaluation of the intervention's strengths and weaknesses was conducted one year after the program's initiation in Ilam. If the program demonstrated success, plans were made to extend it to other counties in the province.

### 3.3. Research Methodology

This study used an interventionist approach, delivering suicide prevention programs at three levels — universal, selective, and indicated — targeting the general population, at-risk groups, and high-risk individuals. Universal prevention targets the entire community, providing information and skills on suicide prevention through screening, public education, improving conditions in schools, universities, and healthcare centers, and using media to raise awareness of suicide warning signs. Selective prevention focuses on at-risk groups identified by age, gender, location, and family history, offering life skills and coping skills training as effective interventions. Indicated prevention targets at-risk individuals identified through screening,

providing tailored healthcare and counseling, including cognitive-behavioral therapy (CBT) and referrals to specialized centers.

### 3.4. Definition of At-risk Groups

At-risk groups were identified using standardized screening tools — PHQ-9 for depression and GAD-7 for anxiety — with scores ≥ 10, alongside demographic factors such as age, gender, location, and family history of mental illness or suicide.

### 3.5. Implementation Stages of the Intervention

The intervention involved proposal design and approval by Ilam's Social Affairs Department, coordination with Ilam University of Medical Sciences and other relevant institutions, and development of educational content by a multidisciplinary scientific team.

### 3.6. Development of Educational Content

A practical guidebook on anxiety, depression, and suicide prevention was created for physicians and psychologists. Training workshops, totaling six 24-hour sessions, taught CBT techniques, stress management, coping skills, and mental disorder identification and treatment through exercises, role-playing, and group discussions. Educational brochures and banners were also prepared to raise awareness in healthcare centers.

### 3.7. Conducting Training Workshops

Six 24-hour training workshops were held for psychologists, alongside sessions for healthcare experts and officials. Intervention quality was ensured through session checklists, periodic supervision by senior psychologists, and participant feedback.

### 3.8. Data Collection Tools

Two main tools were used for data collection in this study:

- Quarterly reporting forms: These forms were completed by healthcare centers and included information about the educational and therapeutic actions taken for the target groups.

- Quarterly and annual reports: Quarterly reports were sent by healthcare centers to the district center, and the annual report was prepared to evaluate interventions and make subsequent decisions. To ensure the accuracy of the data collected through quarterly reports, periodic audits, and supervisory checks were conducted by the provincial health monitoring team. These included random verification of reported cases and comparison with individual patient records and health center logs.

### 3.9. Data Analysis Method

The collected data, including quarterly reports and intervention records, were analyzed using descriptive and inferential statistical methods through SPSS software. Descriptive statistics — such as mean, standard deviation, frequency, and percentage — were used to summarize demographic characteristics and key variables. Subsequently, appropriate statistical tests were employed to examine the research hypotheses and explore relationships between variables, with all analyses conducted at a significance level of 0.05.

### 3.10. Ethical Considerations

The study strictly followed ethical guidelines, with approvals from relevant authorities. Participants provided written informed consent, confidentiality was maintained, and those needing support were referred to services. Interventions were monitored to address ethical concerns, ensuring protection of participants' rights, dignity, and well-being.

## 4. Results

Table 1 presents a comparative analysis of the prevalence and frequency of anxiety and depression disorders before and after the intervention across different age groups in Ilam, including 95% confidence intervals (CIs).

For anxiety disorders, the under-15 group increased from 0.44% (95% CI: 0.00 - 1.30) to 2.82% (95% CI: 1.71 - 3.94; P = 0.01). The 30 - 59 age group decreased from 51.54% (95% CI: 45.04 - 58.04) to 43.23% (95% CI: 39.90 - 46.56; P = 0.01), while the 60+ group rose from 8.37% (95% CI: 4.77 - 11.97) to 15.19% (95% CI: 12.78 - 17.61). No significant changes were observed in the 15 - 18 and 19 - 29 age groups. For depression disorders, the under-15 group increased from 0% (95% CI: 0.00 - 0.00) to 4.76% (95% CI: 3.20 - 6.32; P = 0.01). The 30 - 59 age group decreased from 63.95% (95% CI: 58.68 - 69.22) to 43.84% (95% CI: 40.20 -

**Table 1.** Comparison of the Frequency and Percentage of Identified Cases of Depression and Anxiety Disorders Before and After Intervention in Ilam City

| Age Group (y) | Pre-intervention Anxiety Disorder | | Pre-intervention Depression Disorder | | Post-intervention Anxiety Disorder | | Post-intervention Depression Disorder | |
|---|---|---|---|---|---|---|---|---|
| | No. (%) | 95% CI | No. (%) | 95% CI | No. (%) | 95% CI | No. (%) | 95% CI |
| **Under 15** | 1 (0.44) | 0.00 - 1.30 | 0 | 0 | 24 (2.82) | 1.71 - 3.94 | 34 (4.76) | 3.20 - 6.32 |
| **15 to 18** | 33 (14.54) | 9.95 - 19.12 | 13 (4.07) | 1.91 - 6.24 | 116 (13.66) | 11.35 - 15.97 | 70 (9.80) | 7.62 - 11.99 |
| **19 to 29** | 57 (25.11) | 19.47 - 30.75 | 86 (26.96) | 22.09 - 31.83 | 213 (25.10) | 22.17 - 28.00 | 200 (28.02) | 24.72 - 31.31 |
| **30 to 59** | 117 (51.54) | 45.04 - 58.04 | 204 (63.95) | 58.68 - 69.22 | 367 (43.23) | 39.90 - 46.56 | 313 (43.84) | 40.20 - 47.48 |
| **60 and older** | 19 (8.37) | 4.77 - 11.97 | 16 (5.02) | 2.62 - 7.41 | 129 (15.19) | 12.78 - 17.61 | 97 (13.58) | 11.07 - 16.10 |

Abbreviation: CI, confidence interval.

47.48; P = 0.01), and the 60+ group increased from 5.02% (95% CI: 2.62 - 7.41) to 13.58% (95% CI: 11.07 - 16.10). No significant changes were observed in the 15 - 18 and 19 - 29 age groups.

Overall, the interventions were effective in modifying the prevalence of anxiety and depression in certain age groups, although some groups showed no significant change. These variations may reflect differences in intervention exposure, duration, and age-specific characteristics.

Table 2 outlines the changes in types of care and referrals for individuals with depression and anxiety disorders before and after the intervention in Ilam city. The data reveal significant shifts in treatment approaches, particularly in medication use and referrals to specialist centers. For depression, pharmacotherapy increased from 10.59% (95% CI: 7.23 - 13.96) to 18.10% (95% CI: 16.18 - 20.03), while psychotherapy use significantly decreased from 57.63% to 35.63%, and referrals to specialist centers dropped substantially from 22.42% (95% CI: 17.87 - 26.99) to 7.60% (95% CI: 6.18 - 9.03). Similarly, for anxiety disorders, pharmacotherapy use rose from 11.80% (95% CI: 6.82 - 16.78) to 15.61% (95% CI: 13.97 - 17.25), psychotherapy decreased from 42.23% to 33.30%, and referrals to specialist centers showed a marked reduction from 19.88% (95% CI: 13.71 - 26.04) to 5.17% (95% CI: 3.75 - 6.58).

Additionally, screening services increased for both disorders. These shifts highlight the positive impact of the educational and therapeutic interventions on enhancing healthcare delivery, with a notable focus on increased access to medication and reduced reliance on specialist referrals. These positive outcomes may partly be attributed to the structured training workshops provided to healthcare staff, focusing on CBT, stress management, and coping skills. Furthermore, the identification of at-risk individuals using standardized screening tools such as PHQ-9 and GAD-7 enabled targeted interventions. Improved access to counseling services and increased medication prescriptions for anxiety and depression disorders, prescribed by licensed physicians within the health centers, reflect the enhanced diagnostic and referral capacities developed through these trainings.

Table 3 shows a significant reduction in suicide rates in Ilam county after the intervention across genders and age groups. Male suicides decreased from 429 (49.20%) to 271 (53.66%), and female suicides from 443 (50.80%) to 234 (46.34%), both statistically significant. The largest reductions occurred in the 15 - 24 and 25 - 34 age groups, while some groups showed minimal changes. Overall, the intervention positively impacted suicide rates. Effect sizes (Cohen's d) for significant reductions ranged from moderate to large, indicating meaningful clinical improvements in suicide rates and mental health disorder prevalence.

Table 4 shows a significant reduction in suicides after the intervention across all periods and both genders. Total suicides decreased from 1,443 in the "Before Intervention" period to 1,039 in the "After Intervention" period, representing a 28% reduction. Reductions were observed in all quarters, including 22.8% in Q4 2019, 37.9% in Q1 2020, 27.6% in Q2 2020, and 22% in Q3 2020. Male suicides dropped from 700 to 512 (26.8%), and female suicides from 743 to 527 (29.1%). The consistent decline across genders and quarters highlights the positive impact of the interventions and related social or psychological changes, supporting the effectiveness of preventive measures and suicide prevention programs.

**Table 2.** Comparison of the Frequency and Percentage of Care Types and Referrals for Individuals with Depression and Anxiety Disorders Before and After Intervention in Ilam City

| Types of Care | Depression Disorder Before Intervention | | Depression Disorder After Intervention | | P-Value | Anxiety Disorder Before Intervention | | Anxiety Disorder After Intervention | | P-Value |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. (%) | 95% CI | No. (%) | 95% CI | | No. (%) | 95% CI | No. (%) | 95% CI | |
| **Medication** | 34 (10.59) | 7.23 - 13.96 | 279 (18.10) | 16.18 - 20.03 | 0.01 | 19 (11.80) | 6.82 - 16.78 | 294 (15.61) | 13.97 - 17.25 | 0.01 |
| **Psychiatrist** | 11 (3.43) | - | 206 (13.37) | - | - | 10 (6.22) | - | 188 (9.98) | - | - |
| **Psychotherapy** | 185 (57.63) | - | 549 (35.63) | - | - | 68 (42.23) | - | 627 (33.30) | - | - |
| **Screening** | 91 (28.35) | - | 507 (32.90) | - | - | 64 (39.75) | - | 774 (41.11) | - | - |
| **Total** | 321 (100) | - | 1541 (100) | - | - | 161 (100) | - | 1883 (100) | - | - |
| **Improvement** | 35 (10.90) | - | 164 (10.88) | - | - | 17 (10.56) | - | 275 (14.70) | - | - |
| **Referral to specialist centers** | 72 (22.42) | 17.87 - 26.99 | 139 (7.60) | 6.18 - 9.03 | 0.01 | 32 (19.88) | 13.71 - 26.04 | 132 (5.17) | 3.75 - 6.58 | 0.01 |
| **Hospitalization** | 1 (0.31) | - | 3 (0.32) | - | - | 1 (0.62) | - | 2 (0.16) | - | - |

Abbreviation: CI, confidence interval.

**Table 3.** Comparison of the Frequency and Percentage of Suicide Attempts in Ilam County Before and After Intervention, by Gender and Age Group (December 2018 to December 2020) [a]

| Period, Gender, and Age Group | No. (%) Before Intervention | No. (%) After Intervention | P-Value |
|---|---|---|---|
| **Q4 2018 vs. Q4 2019** | | | 0.01 |
| Male | 71 (8.14) | 69 (13.66) | |
| Female | 97 (11.12) | 79 (15.64) | |
| **Q1 2019 vs. Q1 2020** | | | 0.01 |
| Male | 134 (15.37) | 75 (14.85) | |
| Female | 113 (12.96) | 37 (7.33) | |
| **Q2 2019 vs. Q2 2020** | | | 0.01 |
| Male | 103 (11.81) | 61 (12.08) | |
| Female | 120 (13.76) | 55 (10.89) | |
| **Q3 2019 vs. Q3 2020** | | | 0.01 |
| Male | 121 (13.88) | 66 (13.08) | |
| Female | 113 (12.96) | 63 (12.47) | |
| **Total** | | | 0.01 |
| Male | 429 (49.20) | 271 (53.66) | |
| Female | 443 (50.80) | 234 (46.34) | |
| **Overall period (before and after intervention; y)** | | | 0.01 |
| 14 - 5 | 16 (1.8) | 19 (3.8) | |
| 15 - 24 | 349 (40) | 220 (43.6) | |
| 25 - 34 | 330 (37.9) | 166 (33) | |
| 35 - 44 | 117 (13.4) | 64 (12.7) | |
| 45 - 54 | 26 (3) | 19 (3.8) | |
| 55 - 64 | 16 (1.8) | 9 (1.8) | |
| 64 and above | 18 (2) | 8 (1.6) | |
| Total | 872 (100) | 505 (100) | |

[a] No. refers to the number of recorded suicide attempts.

Table 5 compares suicide attempts before and after the intervention across counties in Ilam province. Most counties experienced a decrease, with Ilam county showing the most significant reduction of 367 cases (from 872 to 505). Other counties, including Abdanan, Chardaval, and Malekshahi, also showed declines, while Darehshahr and Dehloran experienced increases. Total suicide attempts in the province decreased from 1,443 to

**Table 4.** A Comparative Analysis of Overall Suicide Statistics in Ilam Province Between Two Distinct Periods [a]

| Year | Gender | | Total |
|---|---|---|---|
| | Male | Female | |
| **Before intervention** | | | |
| December 2018 - February 2019 | 147 | 182 | 329 |
| March 2019 - May 2019 | 227 | 164 | 391 |
| June 2019 - August 2019 | 167 | 223 | 390 |
| September 2019 - November 2019 | 159 | 174 | 333 |
| Total | 700 | 743 | 1443 |
| **After intervention** | | | |
| December 2019 - February 2020 | 112 | 142 | 254 |
| March 2020 - May 2020 | 129 | 114 | 243 |
| June 2020 - August 2020 | 137 | 145 | 282 |
| September 2020 -November 2020 | 134 | 126 | 260 |
| Total | 512 | 527 | 1039 |

[a] From the last quarter of 2018 through the third quarter of 2019, and the corresponding period from the last quarter of 2019 through the third quarter of 2020 in Ilam province.

**Table 5.** Comparison of Suicide Attempts Before and After Intervention Based on Monthly Statistics in the Counties of Ilam Province

| Counties | Fourth Quarter of 2018 | First Quarter of 2019 | Second Quarter of 2019 | Third Quarter of 2019 | Total Before Intervention | Fourth Quarter of 2019 | First Quarter of 2020 | Second Quarter of 2020 | Third Quarter of 2020 | Total After Intervention |
|---|---|---|---|---|---|---|---|---|---|---|
| **Abdanan** | 31 | 21 | 33 | 21 | 106 | 21 | 20 | 29 | 25 | 95 |
| **Ilam** | 168 | 247 | 223 | 234 | 872 | 148 | 112 | 116 | 129 | 505 |
| **Ivan** | 30 | 32 | 32 | 22 | 116 | 19 | 24 | 33 | 23 | 99 |
| **Darehshahr** | 27 | 31 | 25 | 30 | 113 | 32 | 28 | 48 | 37 | 145 |
| **Dehloran** | 13 | 20 | 18 | 11 | 62 | 13 | 17 | 22 | 18 | 70 |
| **Chardaval** | 32 | 25 | 42 | 11 | 110 | 18 | 30 | 19 | 15 | 82 |
| **Mamasani** | 12 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 |
| **Mehran** | 9 | 12 | 14 | 3 | 29 | 0 | 7 | 13 | 13 | 33 |
| **Badreh** | 7 | 2 | 3 | 1 | 13 | 3 | 5 | 2 | 0 | 12 |
| **Total** | 329 | 391 | 390 | 333 | 1443 | 254 | 243 | 282 | 260 | 1039 |

1,039, a reduction of 404 cases. Although the intervention was effective overall, increases in some counties warrant further investigation, indicating the need for additional regional analysis.

Table 6 shows a significant reduction in suicide attempts in Ilam county following the intervention. Male attempts decreased from 429 to 271, with their share of total attempts changing from 49.20% to 53.66% (P = 0.01). Female attempts decreased from 443 to 234, reducing their share from 50.80% to 46.34%, which is also statistically significant. The most considerable reductions occurred in the 15 - 24 and 25 - 34 age groups, previously accounting for most suicides: 15 - 24 decreased from 394 to 220 cases, and 25 - 34 from 330 to 166 cases. Other age groups (35 - 44, 45 - 54, and 55+) also saw reductions. These results highlight the positive impact of the intervention, particularly among younger populations and across genders, with a significant overall decrease in suicide attempts post-intervention.

Table 7 shows a significant reduction in suicide cases in Ilam province following the intervention, comparing data across suicide actions (attempts, deaths, and referrals). Total cases decreased by 42%, from 872 before the intervention to 505 after. Suicide attempts dropped by 41% (from 836 to 490), suicide deaths decreased by 55% (from 33 to 15), and referrals to medical centers were eliminated (from 3 to 0). The suicide rate per 100,000 population fell by 41%, from 345.6 to 202.5. These findings highlight the effectiveness of the intervention in reducing both the frequency and severity of suicides,

**Table 6.** Comparison of Suicide Statistics Before and After Intervention by Gender and Age Group in Ilam County (From December 2018 to December 2020) [a]

| Period, Gender, and Age Group | Before Intervention | After Intervention | P-Value |
|---|---|---|---|
| **Before intervention (fourth quarter of 2018 to third quarter of 2019)** | | | |
| Male (y) | | | 0.01 |
| 14 - 5 | 3 (1.7) | 8 (5.4) | |
| 24 - 15 | 61 (36.3) | 64 (43.2) | |
| 34 - 25 | 68 (40.5) | 46 (31.1) | |
| 44 - 35 | 22 (13.1) | 19 (12.8) | |
| 54 - 45 | 9 (5.4) | 6 (4.1) | |
| 64 - 55 | 3 (1.8) | 3 (2.0) | |
| 64 and older | 2 (1.2) | 2 (1.4) | |
| Female (y) | | | 0.01 |
| 14 - 5 | 3 (1.7) | 8 (5.4) | |
| 24 - 15 | 61 (36.3) | 64 (43.2) | |
| 34 - 25 | 87 (52.1) | 41 (27.9) | |
| 44 - 35 | 48 (28.6) | 8 (5.4) | |
| 54 - 45 | 5 (2.9) | 3 (2.0) | |
| 64 - 55 | 3 (1.8) | 0 (0) | |
| 64 and older | 4 (2.3) | 3 (2.0) | |
| **Total** | 872 (100) | 505 (100) | - |

[a] Values are expressed as No. (%).

**Table 7.** Comparison of Frequency and Suicide Rate (Per Thousand Population) Before and After Intervention by Action Type (Attempt, Death, and Referral)

| Periods | Total Cases | Suicide Attempts | Deaths | Referrals |
|---|---|---|---|---|
| **Fourth quarter 2018** | 168 | 163 | 4 | 1 |
| **First quarter 2019** | 247 | 235 | 12 | 0 |
| **Second quarter 2019** | 223 | 208 | 13 | 2 |
| **Third quarter 2019** | 234 | 230 | 4 | 0 |
| **Total (2018, 2019)** | 872 | 836 | 33 | 3 |
| **Suicide rate (per thousand population; 2018, 2019)** | 345.6 | 13.5 | - | - |
| **Fourth quarter 2019** | 148 | 145 | 3 | 0 |
| **First quarter 2020** | 112 | 111 | 1 | 0 |
| **Second quarter 2020** | 116 | 110 | 6 | 0 |
| **Third quarter 2020** | 129 | 124 | 5 | 0 |
| **Total (2019, 2020)** | 505 | 490 | 15 | 0 |
| **Suicide rate (per thousand population; 2018, 2019)** | 202.5 | 6.2 | - | - |

demonstrating the success of preventive and therapeutic efforts in the region.

## 5. Discussion

This study evaluated the effectiveness of an educational-therapeutic intervention program in reducing suicides and suicide attempts at comprehensive health centers in Ilam. The results indicate a positive impact of these interventions in lowering the frequency of suicides and attempts across Ilam province, consistent with previous research demonstrating the effectiveness of psychological and educational interventions in suicide prevention. This study provides statistical evidence of a significant reduction in suicide and suicide attempt rates following the intervention. It can be concluded that preventive

programs, particularly at the public, selective, and individual levels, positively impact this crisis.

A key finding was the reduction in suicide cases in Ilam county, especially among individuals aged 25 - 34, with a significant decrease in both suicides and suicide attempts compared to the pre-intervention period. These findings are consistent with numerous studies on suicide prevention, indicating that preventive programs can significantly reduce suicides by teaching life skills, building support networks, and providing psychological counseling. The study demonstrated the positive effects of life skills training, coping strategies, and psychological interventions in reducing symptoms of depression and anxiety, key contributors to suicidal thoughts. These findings align with global and regional research, indicating that psychological and educational interventions, especially in early stages and for at-risk groups, can significantly prevent suicidal behaviors. For example, previous studies have shown that psychological interventions, such as CBT and coping skills training, can reduce symptoms of depression and anxiety in individuals at risk of suicide (3, 4).

Furthermore, these results are consistent with the most recent global and national suicide prevention frameworks, such as the WHO LIVE LIFE initiative (7) and the US National Strategy for Suicide Prevention (6), which emphasize multi-level interventions including restriction of access to lethal means, responsible media engagement, and strengthening social and emotional skills — strategies aligned with the interventions conducted in this study (5). The Australian National Suicide Prevention Strategy (2025 - 2035) also highlights the importance of community engagement and culturally sensitive approaches, which supports the need for tailored interventions noted in our regional findings (8).

Based on the findings of this study, a significant reduction in the frequency of suicide and suicide attempts in Ilam county indicates the effectiveness of the educational and therapeutic interventions. However, the study also found an increase in suicide attempts in certain areas, such as Dareh-Shahr and Dehloran, despite program implementation. The actual number of attempts may be higher due to underreporting caused by social stigma, non-fatal or less severe attempts, and failure to seek medical care. These regional differences highlight the potential influence of cultural, social, and healthcare access factors on intervention effectiveness, suggesting the need for tailored, region-specific strategies. Specifically, the data show that in Ilam county, the suicide rate per thousand population decreased from 13.5 to 6.2 percent. This change is particularly significant for high-risk populations.

These findings are consistent with similar studies conducted in other parts of the world; for example, a systematic study in the United States demonstrated that life skills-based interventions can significantly reduce suicide risk (3). Furthermore, pre- and post-intervention evaluations across different age groups also indicate the positive impact of these programs in reducing suicides within specific age groups. Due to the positive effects of educational-therapeutic interventions on suicide prevention, it is recommended to implement similar programs nationwide and monitor their long-term impact, while future research should focus on improving risk identification and referral, especially in areas with limited healthcare access.

The largest reduction in suicide cases occurred in the 25 - 34 age group, likely due to their greater receptivity to psychological and social interventions. Additionally, a significant decrease in suicide attempts was observed in the 15 - 24 age group, which is generally at higher risk, underscoring the importance of preventive interventions for this population. The program's success largely stems from empowering at-risk groups and teaching coping skills, including stress management, problem-solving, and resilience enhancement (4). Raising public awareness of suicide signs and empowering healthcare staff to identify and promptly refer at-risk individuals have been key factors in the program's success.

In Dareh Shahr, Dehloran, and Mehran, suicide attempts increased after the intervention, likely due to cultural, social, or healthcare access challenges. The increase in suicide attempts in Dareh Shahr and Dehloran may result from cultural resistance, implementation barriers, or limited mental health access, highlighting the need for culturally sensitive strategies and improved healthcare. Gender differences were also noted, with a larger reduction among females (29.1%) than males (26.8%), suggesting the importance of exploring gender-specific responses in future studies.

The findings of this study are consistent with national and international research highlighting the significant effectiveness of educational, therapeutic, and psychological interventions in suicide prevention. This study highlights the need for comprehensive, multi-level suicide prevention strategies, including public education, empowerment of at-risk individuals, and stronger social support systems. A study in western Iran found that life skills training and psychological counseling programs effectively reduced suicide rates in both rural and urban areas (9). Similarly, the present study also confirms the significant impact of psychological interventions in reducing suicides in the Ilam province. However, contrasting our findings with those of Mann et al. (4), community engagement emerges as a prevention program. The absence of a control group may have introduced confounding factors, such as health policy changes or social influences, affecting the results.

Additionally, in some counties, such as Mamassani, where zero suicides were reported, it remains unclear whether this outcome reflects effective intervention or possible data limitations. Further research is needed to clarify these points and optimize future programs.

### 5.1. Conclusions

This study demonstrates that educational-therapeutic interventions in comprehensive health centers of Ilam have effectively contributed to reducing suicide and suicide attempts, especially in high-risk age groups. These findings highlight the importance of implementing and expanding such preventive programs. Continuous monitoring and tailored strategies are recommended to address regional variations and enhance program effectiveness.

### 5.2. Suggestions for Future Research

Based on the results of this study, it is recommended that similar programs be implemented in other counties within Ilam province and even in other regions of the country. Furthermore, it is essential for future research to thoroughly examine the factors that may influence differences in outcomes across various countries, including local culture, access to healthcare and social services, and demographic characteristics. Furthermore, future studies should include long-term follow-up evaluations to assess the sustainability of intervention effects over time and identify factors influencing lasting outcomes. Additionally, future studies should focus on the continuous evaluation of the long-term effects of these programs and assess potential interventions aimed at improving their effectiveness and reducing psychological and social issues among individuals at risk.

## Footnotes

**Authors' Contribution:** F. M. conceptualized and designed the study, supervised the project, and contributed to the critical revision of the manuscript. M. R. participated in data interpretation and contributed to the manuscript's intellectual content and revision. Y. V. performed the statistical analysis and helped interpret the clinical data. S. A. collected the clinical data, drafted the initial manuscript, and coordinated the study. All authors read and approved the final version of the manuscript.

**Conflict of Interests Statement:** The authors declare no conflict of interests.

**Data Availability:** The datasets used in this study are available from the corresponding author upon request, either at the time of submission or after publication.

**Ethical Approval:** The present study was approved by the Medical Ethics Committee of Ilam University of Medical Sciences, Ilam, Iran (IR.MEDILAM.REC.1398.103 ).

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