Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Effectiveness of Emotion Self-Regulation Training in Reducing Risk-Taking Behaviors Among Adolescent Girls Dependent on Social Media

Neda Rahmani
Qazvin University of Medical Sciences
Mahmoud Bahramkhani
Qazvin University of Medical Sciences
Ahad Alizadeh
Qazvin University of Medical Sciences
solmaz heidarifard
heydari_s88@yahoo.com

Qazvin University of Medical Sciences

Research Article

Keywords: Social media, Emotion self-regulation, Adolescents, Risk-taking, Educational intervention

Posted Date: June 16th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9854238/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background:

Social media dependency and risk-taking behaviors are common among adolescents, especially girls. Excessive social media use can lead to negative consequences, including increased risky behaviors. This study evaluated the effectiveness of emotion self-regulation training in reducing risk-taking behaviors among adolescent girls dependent on social media.

Methods:

In this randomized controlled trial, 188 female students aged 16–19 with social media dependency in Takestan city were randomly assigned to intervention (n = 94) and control (n = 94) groups. The intervention group received eight weekly 60-minute sessions based on Gross's emotion regulation model. Data were collected using demographic questionnaires, Internet Addiction Test, and Iranian Adolescent Risk-Taking Scale before, immediately after, and two months post-intervention. Multivariate analysis of Repeated measures analysis of variance (RM-ANOVA) was conducted using SPSS-26 ($\alpha = 0.05$).

Results:

No significant effect of the intervention was found on total risk-taking scores or subscales related to substance use, smoking, alcohol, sexual behaviors, and opposite-sex relationships ($p > 0.05$). However, significant group-by-time interactions were observed for aggression ($p = 0.018$, partial $\eta^2 = 0.021$) and risky driving behaviors (group effect: $p < 0.001$, partial $\eta^2 = 0.091$; interaction: $p = 0.028$, partial $\eta^2 = 0.018$).

Conclusions:

Emotion self-regulation training effectively reduced aggression and risky driving tendencies. Incorporating such programs in school-based interventions may promote adolescent mental health and reduce social harms. The findings highlight the need for multidimensional interventions targeting specific risk behaviors.

Clinical trial registration

IRCT20240514061786N1, registered on 05/08/2024

Introduction

Adolescence, defined by the World Health Organization as the period between 10 and 19 years of age, is a critical developmental stage characterized by rapid physical, cognitive, emotional, social, religious, and occupational changes that prepare individuals for adulthood (1).

These developments influence adolescents' feelings, thoughts, decision-making, and social relationships, laying the foundation for future personality and mental health (1, 2).

Globally, there are over 1.2 billion adolescents, with approximately 11 million residing in Iran, and the ratio of girls to boys being nearly equal (1, 2). Adolescents, particularly girls, play a pivotal role in individual health, fertility, and the health of future generations due to their unique developmental characteristics during puberty and physical and psychological conditions (3). Experiences and behaviors during this period shape the infrastructure of adult life and impact future health. Therefore, attention to adolescent girls' wellbeing is essential, given their role in reproduction, nurturing the next generation, and social participation (3).

Contemporary social and cultural changes, along with the expansion of technology, have exposed adolescents to new risks, among which social media dependency is prominent (4, 5). Terms such as social media addiction, internet addiction, and technology addiction have been used to describe this phenomenon (6). Although definitions vary, most studies consider social media dependency as a phenomenological process characterized by addictive behavioral and psychological features (7). This dependency refers to excessive, uncontrolled use of virtual space that impairs adolescents' individual and social functioning (6). While excessive social media use is not formally classified as a behavioral disorder in medical taxonomies, it is associated with serious psychological consequences such as anxiety, depression, sleep disorders, reduced concentration, academic decline, and social isolation (8).

In Iran, the prevalence of social media dependency among adolescents has increased sharply from 20% in 2017 (9) to 58% in 2021 (10). This alarming rise signals a serious threat to the mental and social health of Iranian adolescents, potentially leading to abandonment of beneficial activities, decline in social relationships, and emergence of risky behaviors (13). Virtual environments, intended as tools for growth, education, and communication, have become significant threats to adolescent mental health (5). For instance, behaviors such as smoking and opposite-sex relationships are more frequent among adolescents dependent on social media. These risky behaviors increase the likelihood of adverse physical, psychological, and social outcomes (11). Such consequences not only jeopardize adolescents' health but may also endanger those around them (12). These outcomes include irreversible physical harm, sexually transmitted infections, unintended pregnanc, legal problems, and long-term psychological disorders (5).

Extensive studies indicate a high prevalence of risky behaviors and vulnerability among Iranian adolescents, especially girls. A meta-analysis reported the prevalence of smoking and alcohol use at 9% each, substance abuse at 4%, hookah consumption in girls at 20%, and extramarital sexual relations at approximately 20% (13). These concerning statistics underscore the urgent need for designing and implementing preventive and therapeutic interventions (13).

Risky behaviors are influenced by multiple factors, including individual traits, social environment, and cultural-technological contexts. Among these, poor emotion self-regulation— the ability to manage one's emotions effectively—is a strong predictor of such behaviors (14, 15).

Evidence shows that individuals who fail to regulate their emotions often turn to social media or behavioral addictions to escape unpleasant feelings. Such individuals tend to adopt maladaptive strategies like emotional suppression or avoidance, exacerbating harms (16). Adolescents lacking these skills, whether due to personality traits (e.g., impulsivity) or insufficient education, are more susceptible to experiencing negative emotions, extreme reactions, and engaging in risky behaviors (17). Given the higher intensity and frequency of emotional reactions in adolescent girls, teaching and applying effective emotion regulation skills is essential to reduce risk-taking and its negative outcomes. Emotion regulation training can thus play a crucial role in mitigating risky behaviors. For example, one study reported that emotion regulation interventions significantly decreased risky behaviors such as violence, smoking, and unsafe sexual activities among adolescents (18). Another study found that teaching emotion regulation skills reduced addictive and risky behaviors including aggression and substance use (19). Moreover, multiple studies have documented the positive effects of emotion self-regulation training on reducing stress, depression, academic procrastination, while enhancing self-control and mental health (18, 19). Such training helps adolescents recognize their emotions, understand their causes, and acquire effective emotion management strategies (20).

Gross's (1998) emotion regulation model has been widely used in training programs and has shown proven effectiveness in reducing academic procrastination (21), risky behaviors such as hookah use (18), sexual behaviors (18), alcohol consumption (19), and violence (19) among adolescents.

However, no studies were found in database searches examining the effect of emotion self-regulation training specifically in adolescent girls dependent on social media. Given the significant role of social media dependency in the emergence of risky behaviors, particularly among adolescent girls who constitute a substantial population in Iran and whose health is vital for families, communities, and future motherhood, this study was conducted to evaluate the effectiveness of emotion self-regulation training in reducing risk-taking behaviors among social media-dependent adolescent girls.

Methods

Study Design, Participants, and Sampling

This study was a randomized controlled trial (RCT) with a control group, conducted among female high school students aged 16 to 19 years in Takestan city during the 2024–2025 academic year. Eligible participants were students scoring between 80 and 100 on Young's Internet Addiction Test (IAT), indicating social network dependency. A cluster random sampling method was employed: first, three all-girls high schools were randomly selected from Takestan. Then, the 20-item Young's IAT questionnaire

was distributed among students at these schools to identify those with internet addiction scores in the specified range.

Inclusion criteria comprised Iranian nationality, enrollment in the second high school level, scoring 80 to 100 on the IAT, providing informed consent (by both the students and their parents), and ability to actively participate in group sessions. Students with a history of acute or chronic psychiatric disorders were excluded. After initial selection, classes were considered as clusters and randomized into intervention and control groups using block randomization with block size two. Participants were assigned to either the intervention group (receiving emotional self-regulation training) or the control group (22). *To ensure allocation concealment, sequentially numbered, opaque, sealed envelopes were used. The outcome assessor and the statistician were blinded to group allocation throughout the study.*

Sample Size

The sample size was calculated based on the study by Noei et al., with a type I error of 0.05, power of 80%, and estimated effect size from mean differences. A sample size of 84 participants per group was determined, which, accounting for 10% attrition, resulted in 94 participants per group and a total of 188 students. All participants completed the study protocols (23).

Measures

Demographic data were collected using a researcher-made questionnaire containing 10 items related to age, educational level, parental education and occupation, socioeconomic status, number of siblings, birth order, and last semester GPA.

Young’s Internet Addiction Test (IAT), consisting of 20 items scored on a 5-point Likert scale (from "rarely" to "always"), was used to assess internet addiction severity, with scores ranging from 20 to 100. Participants scoring 20–49 were classified as non-addicted, 50–79 as at risk, and 80–100 as addicted. The validity and reliability of the Persian version have been previously confirmed, with Cronbach’s alpha ranging from 0.81 to 0.88 (24, 25).

Risk-taking behaviors were assessed using the Iranian Adolescent Risk-Taking Scale (IARS), a 38-item questionnaire developed by Zadeh Mohammadi et al. (2011), measuring domains such as substance use, alcohol consumption, smoking, violence, sexual behavior, opposite-sex relationships, and risky driving. Responses were recorded on a 5-point Likert scale from “strongly disagree” to “strongly agree.” Total scores ranged from 0 to 152, with scores above 64 indicating multiple risk-taking behaviors. Cronbach’s alpha for the total scale and subscales ranged from 0.74 to 0.94 (12).

Procedure

This applied experimental study employed a pre-test, post-test, and control group design. After baseline assessment using the IAT and IARS questionnaires, the intervention group received an emotional self-regulation training program based on Gross's model, while the control group received no intervention during the study period. Post-test assessments were conducted immediately after and two months following the intervention to evaluate short- and medium-term effects.

To minimize contamination between groups, confidentiality and the importance of not sharing questionnaires or training content were emphasized to students and school staff. The intervention was delivered by a trained researcher under continuous supervision of an academic advisor. Informed consent was obtained from participants and their parents, and data were recorded anonymously to maintain confidentiality.

Intervention

The intervention consisted of eight weekly group sessions, each lasting 60 minutes, based on Gross's emotional regulation model (2007). The control group did not receive any training during the study but were provided with educational materials after completion. The curriculum was developed based on the book "Techniques of Emotion Regulation in Psychotherapy" and "Simple Strategies for Emotion Regulation by Gross," and was content-validated by six experts in psychology and midwifery faculty members. A summary of the session content is presented in Table 1.

Table 1
Summary of Emotion Self-Regulation Training Sessions

Session	Objectives and Activities	Method
Session 1: Introduction and Group Bonding	**Objectives**: - Familiarize members with each other - Explain study goals and process **Activities**: - Introductions - Set and prioritize group goals **Homework**: - Record any emotional experiences triggered by specific events or thoughts during the week and share in next session	Individual and group discussion
Session 2: Emotion Education and Situation Selection	**Objectives**: - Provide education on emotions **Activities**: - Review previous homework - Classify emotion triggers, bodily changes, facial expressions, and action tendencies - Discuss definition and types of emotions (fear, anger, happiness, worry, etc.) - Members experience several primary emotions - Differentiate physical, cognitive, and emotional components **Homework**: - Log emotions experienced next week with multiple components (trigger, body changes, facial expression, urges)	Lecture and group discussion
Session 3: Emotional Vulnerability Assessment and Self-Evaluation	**Objectives**: - Evaluate emotional experiences, vulnerability, and regulation strategies **Activities**: - Review homework and acknowledge successes	Lecture and group discussion

Session	Objectives and Activities	Method
	- Discuss role of emotions in human adaptation and social interaction - Induce emotional state and measure intensity - Complete emotional vulnerability rating forms - Identify self-regulation strategies **Homework**: - Daily emotion reports focusing on personal skills used to regulate emotions and their effectiveness	
Session 4: Situation Modification	**Objectives**: - Modify emotion-triggering situations **Activities**: - Review homework - Teach avoidance of social isolation and withdrawal - Set individual and social goals - Assess relationships and identify situations needing change - Teach problem-solving and interpersonal skills (communication, assertiveness, conflict resolution) **Homework**: - Daily activities aligned with goals - Practice resolving interpersonal problems	Brainstorming and group discussion
Session 5: Attention Deployment	**Objectives**: - Teach attention-shifting skills **Activities**: - Review homework and discuss emotional experiences and barriers - Introduce Gross's emotion regulation process model - Teach attention deployment strategies: 1. Stopping rumination and worry	Lecture and group discussion

Session	Objectives and Activities	Method
	2. Shifting attention **Homework**: - Practice attention control skills during emotional episodes (sadness, anger, fear, etc.) and rate effectiveness (0–10)	
Session 6: Cognitive Reappraisal	**Objectives**: - Change cognitive appraisals of emotions **Activities**: - Review homework and feedback - Discuss mental processes in emotion generation and regulation - Identify maladaptive appraisals - Teach cognitive reappraisal strategies **Homework**: - Identify faulty appraisals and practice reappraisal techniques	Lecture and group discussion
Session 7: Response Modulation	**Objectives**: - Modify behavioral and physiological responses to emotions **Activities**: - Review homework - Explain emotional expression and regulation strategies: 1. Emotional expression 2. Behavior modification through environmental reinforcers 3. Emotional discharge 4. Opposite action 5. Physical relaxation (Jacobson's progressive muscle relaxation) **Homework**: - Apply response modulation skills during emotional experiences	Lecture and group discussion

Session	Objectives and Activities	Method
Session 8: Evaluation and Application	**Objectives**: - Reassess skills and plan for real-life application - Acknowledge progress - Conduct post-test **Activities**: - Share homework results and discuss barriers - Evaluate individual and group goal achievement - Plan practical application of skills **Homework**: - Develop personal action plan to implement skills in daily life	Lecture and brainstorming

Data Analysis

After data collection, the demographic characteristics of the study participants were described using frequency tables, charts, means, and standard deviations. To assess homogeneity and compare baseline variables such as age, birth order, number of siblings, parents' education and occupation, economic status, and academic grade between the intervention and control groups, Chi-square tests were used for categorical variables and independent samples t-tests for continuous variables.

The normality assumption for the main study variables was evaluated using the Kolmogorov–Smirnov test, and Levene's test was applied to examine the homogeneity of variances. To assess the effect of the intervention on the study variables and to analyze changes across three time points (pre-test, post-test, and follow-up), repeated measures analysis of variance (Repeated Measures ANOVA) was conducted.

All statistical analyses were performed using SPSS version 26, and a significance level of $p < 0.05$ was considered statistically significant. All methods performed in this study were carried out in accordance with the relevant guidelines and regulations, including the Declaration of Helsinki (2013 revision), the CONSORT 2010 guidelines for reporting randomized controlled trials, and the ethical standards of the Qazvin University of Medical Sciences Ethics Committee (IR.QUMS.REC.1403.18). A flowchart illustrating the participant selection and analysis process is presented in Fig. 1.

Results

A total of 188 adolescent girls participated in the study and were randomly allocated to the intervention group (n = 94) and the control group (n = 94). There were no missing data, as all 188 participants completed the pre-test, post-test, and follow-up assessments. The two groups were statistically comparable in terms of age, number of children in the family, previous semester grade point average (GPA), social media dependency scores, birth order, parental education and employment, and socioeconomic status ($p > .05$). However, there was a significant difference between the groups regarding school grade level ($p < .001$), as all participants in the intervention group were in the 11th grade, while the control group included 10th and 12th grade students. Demographic characteristics of the participants are presented in Table 2.

Table 2
Demographic Characteristics of Participants by Group

Variable	Control Group (n = 94)	Intervention Group (n = 94)	*p*-value
Age (years), M ± SD	16.41 ± 1.10	16.39 ± 0.49	.864
Number of children in family	2.64 ± 0.84	2.64 ± 0.84	1.000
Previous semester GPA	16.11 ± 1.92	16.11 ± 1.92	1.000
Social media dependency	84.08 ± 6.34	83.91 ± 6.38	.855
Birth order, n (%)			1.000
Firstborn	41 (43.62%)	41 (43.62%)	
Second child	30 (31.91%)	30 (31.91%)	
Third child	20 (21.28%)	20 (21.28%)	
More than three	3 (3.19%)	3 (3.19%)	
Grade level, n (%)			< .001
Tenth grade	44 (46.81%)	0 (0%)	
Eleventh grade	0 (0%)	94 (100%)	
Twelfth grade	50 (53.19%)	0 (0%)	
Economic status, n (%)			1.000
Poor	0 (0%)	0 (0%)	
Average	75 (79.79%)	75 (79.79%)	
Good	19 (20.21%)	19 (20.21%)	
Father's employment, n (%)			1.000
Employed	76 (80.85%)	76 (80.85%)	
Retired	11 (11.70%)	11 (11.70%)	
Unemployed	7 (7.45%)	7 (7.45%)	
Mother's employment, n (%)			1.000
Employed	14 (14.89%)	14 (14.89%)	
Retired	1 (1.06%)	1 (1.06%)	
Housewife	79 (84.04%)	79 (84.04%)	
Father's education, n (%)			1.000
Below high school	48 (51.06%)	48 (51.06%)	

Variable	Control Group (n = 94)	Intervention Group (n = 94)	*p*-value
High school diploma	44 (46.81%)	44 (46.81%)	
University degree	2 (2.13%)	2 (2.13%)	
Mother's education, n (%)			1.000
Below high school	52 (55.32%)	52 (55.32%)	
High school diploma	35 (37.23%)	35 (37.23%)	
University degree	7 (7.45%)	7 (7.45%)	

The effects of emotion self-regulation training on risk-taking tendencies among adolescent girls dependent on social networks were examined using repeated measures ANOVA. As shown in Table 3, the results indicated:

- **Overall risk-taking scores** did not differ significantly between the intervention and control groups across the three time points (pretest, follow-up 1, and follow-up 2). Although a significant main effect of time was observed *($\chi^2(2) = 6.26$, $p = 0.044$, partial $\eta^2 = 0.016$)*, neither the main effect of group nor the group-by-time interaction reached significance, suggesting that the observed reductions over time occurred similarly in both groups.
- A significant **group-by-time interaction** was found for **violence propensity** *($\chi^2(2) = 8.05$, $p = 0.018$, partial $\eta^2 = 0.021$)*, while main effects of time and group were nonsignificant. This indicates that changes in violence-related risk-taking differed over time between the intervention and control groups, implying a specific effect of the self-regulation training on this dimension.
- For **risky driving behavior**, both the main effect of group *($\chi^2 = 17.82$, $p < 0.001$, partial $\eta^2 = 0.091$)* and the group-by-time interaction *($\chi^2(2) = 7.16$, $p = 0.028$, partial $\eta^2 = 0.018$)* were significant. These findings demonstrate a substantial reduction in risky driving tendencies in the intervention group compared to controls, attributable to the training.
- Other subscales, including propensity for substance use (drugs, smoking, alcohol), sexual behavior, and relationships with the opposite sex, did not show significant group-by-time interactions (all $p > 0.05$). Some exhibited trends toward significance for main effects but lacked consistent interaction effects.

No adverse events or unintended effects were observed during the intervention sessions or follow-up period.

Table 3
Results of Repeated Measures ANOVA for Risk-Taking Dimensions Between Intervention and Control Groups (N = 188)

Variable	Time Point	Control (M ± SD)	Intervention (M ± SD)	t (p)	Effect	χ^2 (df)	p-value	Partial η^2
Overall Risk-Taking	Pre-test	74.02 ± 21.37	74.43 ± 17.70	-0.140 (0.888)	Time	6.26	0.044	0.016
	Post-test 1	74.01 ± 21.20	73.53 ± 16.91	0.173 (0.862)	Group	0.01	0.932	0.000
	Post-test 2	73.97 ± 20.87	73.35 ± 16.84	0.222 (0.824)	Time × Group	5.39	0.068	0.014
Substance Use	Pre-test	13.03 ± 7.34	11.56 ± 4.90	1.692 (0.092)	Time	10.42	0.005	0.027
	Post-test 1	13.04 ± 7.26	11.52 ± 4.82	1.753 (0.081)	Group	2.90	0.088	0.016
	Post-test 2	12.71 ± 6.59	11.31 ± 4.65	1.619 (0.107)	Time × Group	0.34	0.842	0.000
Violence	Pre-test	9.53 ± 4.73	9.43 ± 4.77	0.155 (0.876)	Time	3.75	0.154	0.010
	Post-test 1	9.56 ± 4.71	9.20 ± 4.39	0.538 (0.590)	Group	0.17	0.680	0.001
	Post-test 2	9.64 ± 4.62	9.28 ± 4.36	0.538 (0.590)	Time × Group	8.05	0.018	0.021
Smoking	Pre-test	8.43 ± 3.87	7.78 ± 3.15	1.330 (0.185)	Time	0.97	0.614	0.002
	Post-test 1	8.44 ± 3.86	7.71 ± 3.08	1.481 (0.140)	Group	1.82	0.177	0.010
	Post-test 2	8.36 ± 3.69	7.77 ± 3.01	1.222 (0.223)	Time × Group	2.72	0.256	0.007
Alcohol Use	Pre-test	11.19 ± 5.71	9.91 ± 4.00	1.843 (0.066)	Time	4.98	0.083	0.013
	Post-test 1	11.18 ± 5.68	9.85 ± 3.91	1.920 (0.056)	Group	3.51	0.061	0.019
	Post-test 2	11.05 ± 5.38	9.79 ± 3.92	1.828 (0.069)	Time × Group	0.31	0.857	0.000

Variable	Time Point	Control (M ± SD)	Intervention (M ± SD)	t (p)	Effect	χ^2 (df)	p-value	Partial η^2
Risky Sexual Behaviors	Pre-test	7.94 ± 4.14	7.82 ± 4.13	0.201 (0.840)	Time	5.63	0.060	0.015
	Post-test 1	7.94 ± 4.14	7.76 ± 4.06	0.309 (0.757)	Group	0.11	0.738	0.000
	Post-test 2	8.09 ± 4.11	7.80 ± 3.91	0.488 (0.625)	Time × Group	4.38	0.112	0.011
Opposite-Sex Relationship Risk	Pre-test	10.41 ± 4.32	10.94 ± 4.08	-0.88 (0.379)	Time	1.16	0.559	0.003
	Post-test 1	10.35 ± 4.31	10.90 ± 4.04	-0.93 (0.351)	Group	0.67	0.413	0.003
	Post-test 2	10.45 ± 4.27	10.82 ± 3.99	-0.63 (0.528)	Time × Group	3.93	0.140	0.010
Risky Driving	Pre-test	13.49 ± 5.92	16.99 ± 4.71	-4.593 (0.000)	Time	3.16	0.206	0.008
	Post-test 1	13.50 ± 5.80	16.59 ± 4.40	-4.041 (0.000)	Group	17.82	< 0.001	0.091
	Post-test 2	13.67 ± 5.75	16.60 ± 4.50	-3.840 (0.000)	Time × Group	7.16	0.028	0.018

Discussion

This study examined the effect of emotion self-regulation training on overall risk-taking scores and specific risk behaviors among adolescent girls dependent on social networks. The intervention did not produce a statistically significant reduction in the overall risk-taking score at any time point when compared to the control group ($p > 0.05$). This finding contrasts with previous study such as Amirian (26). which reported the effectiveness of emotion regulation interventions in reducing risky behaviors. Potential explanations for these discrepancies include differences in targeted behaviors (prevention versus reduction), intervention duration, and demographic and cultural characteristics of participants. Additionally, methodological factors such as assessment tools and population heterogeneity likely influence intervention efficacy.

Regarding drug use propensity, no significant group differences were observed, diverging from finding by Najafı et al. (27). who demonstrated that emotion regulation and peer-education programs could effectively prevent or reduce substance use. This disparity may be attributed to the present intervention's exclusive focus on the emotional dimension without involving family or peer support, as well as gender

and sociocultural differences. Successful prior studies incorporated multidimensional approaches with social support components.

In contrast, the current intervention significantly decreased violence propensity, with effects sustained up to two months post-intervention. This aligns with studies by Amirian (26), Nozari et al (28), and Hatami (29), which underscore the effectiveness of emotional, communication, and stress management trainings. Emotion self-regulation likely facilitated healthier expression of negative emotions and reduced impulsive reactions. However, some interventions, such as Reyhani et al(30) using emotional schema therapy, did not achieve significant violence reduction, possibly due to differences in intervention type, target outcomes, or sample characteristics.

No significant effects were found for smoking propensity, differing from Kashan (31) and Mohammadhanlou et al. (32), who reported success with self-regulation and multifaceted behavioral interventions. Such interventions often include cognitive-behavioral techniques and life skills training, targeting social and coping skills in addition to emotion regulation, which may account for their superior effectiveness.

Similarly, the intervention did not significantly reduce alcohol use propensity, contrasting with findings by Heydarpour et al. (33), Abolfathi et al (34). The divergence likely reflects the multidimensional nature of those interventions, which integrate cognitive, behavioral, and social factors, while the current study focused solely on emotional regulation. Demographic and cultural factors also potentially moderated intervention effectiveness.

No significant effects emerged on risky sexual behavior or relationships with the opposite sex, consistent with literature emphasizing the need for multidimensional programs that combine sexual education, social skills, and parental involvement (e.g., Gomezlugo (35); Markham (36)). Exclusive focus on emotional aspects without addressing social or cognitive dimensions may limit impact in these domains.

Conversely, the intervention yielded a significant and sustained reduction in risky driving behavior, consistent with finding by Laning (37) and Alizadeh et al. (38), highlighting the role of emotion self-regulation in impulse control and emotional management to reduce risky driving among adolescents.

A notable strength of this study is the durability of effects on violence and risky driving up to two months post-intervention. The randomized controlled design and use of a theory-driven training model further support the study’s rigor. However, generalizability is limited to adolescent girls dependent on social networks in Takestan, warranting cautious extrapolation to other populations.

Limitations include: (1) exclusive focus on emotion self-regulation without concurrent training in problem-solving or self-control skills; (2) absence of direct targeting of social network dependency; (3) a geographically and demographically restricted sample; (4) reliance on self-report measures susceptible to bias; (5) lack of active family and peer involvement; and (6) baseline risk-taking scores being higher

than comparable studies in some subscales. Moreover, the intervention addressed only select risk behaviors, omitting important psychological, social, and biological factors. Another significant limitation was the baseline difference in grade level between groups ($p < 0.001$), as all intervention participants were in 11th grade while controls were in 10th and 12th grades. This imbalance may have introduced selection bias and potentially influenced the results, as developmental and academic differences across grade levels could affect risk-taking behaviors. Therefore, findings should be interpreted with caution.

Future interventions should adopt comprehensive, multidimensional approaches incorporating cognitive, behavioral, and social skills, engage families and peers actively, utilize objective and observational assessment methods, and expand demographic and geographic scope. Long-term follow-up is critical to assess sustained impact on multiple mental and physical health dimensions. Moreover, investigating the mediating role of reduced social network dependency on risk behaviors is recommended.

Overall, the findings underscore the importance of integrated and participatory prevention strategies for risky behaviors in adolescent girls, emphasizing the role of school-based mental health education programs.

Conclusion

This study provides evidence that emotion self-regulation training significantly reduces violence propensity and risky driving behaviors among adolescent girls dependent on social networks, with sustained effects observed up to two months post-intervention. However, the intervention did not produce significant changes in other risk behaviors, including tobacco, alcohol, drug use, risky sexual behaviors, or relationships with the opposite sex. These findings suggest that while emotion regulation is a valuable component, comprehensive prevention programs targeting multiple cognitive, behavioral, and social domains—alongside family and peer involvement—are essential to effectively reduce the broader spectrum of adolescent risk behaviors. Future research should prioritize multidimensional, culturally tailored interventions with long-term follow-up to optimize outcomes in this vulnerable population.

Declarations

Conflicts of Interest

The authors declare no conflicts of interest related to this study.

Ethical Considerations

This study was approved by the Ethics Committee of Qazvin University of Medical Sciences (Approval No. IR.QUMS.REC.1403.18) and registered in the Iranian Registry of Clinical Trials (IRCT No. [

IRCT20240514061786N1 **]** registered on 05/08/2024**). Prior to participation, the study objectives were explained to all participants and their guardians, and written informed consent was obtained. Participant data were kept confidential and used solely for research purposes. The full trial protocol is available from the corresponding author upon reasonable request.**

Funding

The authors received no external funding for this study; all expenses were covered by the authors themselves.

Author Contribution

N.R. (Neda Rahmani) wrote the main manuscript text, conducted the intervention sessions, and performed data collection. M.B. (Mahmoud Bahramkhani) provided psychological consultation and contributed to the study design and interpretation of results. A.A. (Ahad Alizadeh) performed the statistical analyses and verified the underlying data. S.H. (Solmaz Heidarifard) supervised the study, revised the manuscript critically for important intellectual content, and acted as the corresponding author. All authors reviewed and approved the final manuscript.

Acknowledgments

We sincerely thank all the adolescent participants for their patience and cooperation throughout the intervention sessions. We also appreciate the support of the school administrators and staff in Takestan County who facilitated the implementation of this study.

Data Availability

"The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request."

References

1. World Health Organization (WHO)Kanthi E, Johnson MA. Adolescence: An overview of health problems. Indian J Continuing Nurs Educ. 2024;22(2):148–63.
2. Lindberg LD, Boggess S, Williams S. Multiple Threats: The Co-Occurrence of Teen Health Risk Behaviors. 2000.
3. Jaskiewicz MG. An integrative review of the health care needs of female adolescents. J Nurse Practitioners. 2009;5(4):274–83.

4. Maryam SH. The prevalence of high-risk behaviors in adolescents and youth. 2023.
5. Toozandehjani A, Mahmoodi Z, Rahimzadeh M, Motlagh AJ, Kamrani MA, Saeieh SE. The predictor role of Internet addiction in high-risk behaviors and general health status among Alborz students: A structural equation model. Heliyon. 2021;7(5).
6. Wang YC, Yu JC, Chen JY, Wang ZZ. [Factors associated with illicit drug use intention in secondary vocational school students based on theory of triadic influence]. Zhonghua liu xing bing xue za zhi = Zhonghua liuxingbingxue zazhi. 2018;39(7):925–30. PubMed PMID: 30060306. Epub 2018/08/01. chi.
7. Thadani DR, Cheung CM, editors. Online social network dependency: Theoretical development and testing of competing models. 2011 44th Hawaii International Conference on System Sciences; 2011: IEEE.
8. Wegmann E, Müller SM, Turel O, Brand M. Interactions of impulsivity, general executive functions, and specific inhibitory control explain symptoms of social-networks-use disorder: An experimental study. Sci Rep. 2020;10(1):3866.
9. Modara F, Rezaee-Nour J, Sayehmiri N, Maleki F, Aghakhani N, Sayehmiri K et al. Prevalence of Internet Addiction in Iran: A Systematic Review and Meta-analysis. Addict health 2017 Fall;9(4):243–52. PubMed PMID: 30574288. Pubmed Central PMCID: PMC6294487. Epub 2017/10/01. eng.
10. Yarahmadi S, Zarei F, Sadooghiasl A, Jeong S. The prevalence of internet addiction and its associated factors among Iranian adults. Iran Rehabilitation J. 2020;18(2):163–70.
11. Vente T, Daley M, Killmeyer E, Grubb LK. Association of social media use and high-risk behaviors in adolescents: cross-sectional study. JMIR Pediatr Parent. 2020;3(1):e18043.
12. Zadeh Mohammadi A, Ahmadabadi Z, Heidari M. Construction and Assessment of Psychometric Features of Iranian Adolescents Risk-Taking Scale. Iran J Psychiatry Clin Psychol. 2011;17(3):218–25. eng.
13. Bahadivand S, Doosti-Irani A, Karami M, Qorbani M, Mohammadi Y. Prevalence of high-risk behaviors among Iranian adolescents: A comprehensive systematic review and meta-analysis. J Educ Community Health. 2021;8(2):135–42.
14. Affouneh S, Mahamid FA, Berte DZ, Shaqour AZ, Shayeb M. The efficacy of a training program for social skills in reducing addictive Internet behaviors among Palestinian university students. Psicologia: Reflexão e Crítica. 2021;34:19.
15. Houck CD, Hadley W, Barker D, Brown LK, Hancock E, Almy B. An emotion regulation intervention to reduce risk behaviors among at-risk early adolescents. Prev Sci. 2016;17:71–82.
16. Zoghi L. Internet addiction model based on cultural intelligence, big five personality factors, high-risk behaviors, mediated by cognitive emotion regulation in students. Cult Psychol. 2023;6(2):184–207.
17. Ding R, Wen X, He P, Guo C, Luo Y, Song X, et al. Association between childhood and adolescent sexual abuse experiences and high-risk sexual behaviors among Chinese youth. Sex Med. 2018;6(4):273–81.
18. Gross JJ. Emotion regulation strategies: in plain language1998. 128 p.

19. Jafarri AM, Omidi Shamami M, Fahimi S. The comparative study of mindfulness and emotion regulation in substance abuser resistant to treatment. Med Sci J Islamic Azad Univ. 2017;27(1):62–70. eng.
20. Barzegarie E, Khaleghipour S, Vahabi Hamabadi J. Mediating Role of Emotion Regulation in relation to Spirituality and High-risk Behavior in Adolescents with Addicted Parent(s). Res Addict. 2019;12(50):233–52. eng.
21. Amani A, Isanezhad O, Pashabadi S. The effectiveness of emotional self-regulating group training on motivational strategies, academic procrastination and mental health in students. Res Teach. 2019;7(3):208–181.
22. Hurley JC. How the cluster-randomized trial works. Clin Infect Dis. 2020;70(2):341–6.
23. Noei Z, Moatamedy A, Eskandari H, Farokhi N, Poshtmashhadi M. Evaluating efficacy of a social responsibility- based educational program on at risk youth's tendency toward high- risk behaviors. Res Clin Psychol Couns. 2020;9(2):71–86.
24. Nasser NZ. Investigating the relationship between public health and Internet addiction. Zahedan Med Sci Res J (Taib Sharq) 2009:57–63.
25. Ghasemzadeh LSM, Moradi AR. The study of degree of prevalence to internet addiction and its relation with loneliness and self esteem in high schools students of Tehran. J Educ. 2007;23(1):41–68. (Persian).
26. Amirian G, Ghodampour E, Abbasi A. The effect of cognitive emotion regulation strategies training on risky behaviors and civil-academic behaviors in adolescent girls with high-risk behaviors. Q Sci J Psychol Methods Models. 2024;14(54):29–42.
27. Najafı Chalashtari M, Askari P, Heydaree A, Dasht Bozorgi Z, Hafezi F. The Effectiveness of Emotion Regulation Training on Addiction Readiness and Sensation Seeking in Adolescents with Substance-Dependent Parent. Res Addict. 2021;15(61):181–98. eng.
28. Nozari E, Sabet M, Bashardoost S. The effectiveness of stress management training on risky behaviors in female students. J Appl Psychol Res. 2021;12(2):303–19.
29. Hatami R, Rad S, Hassani H. The effectiveness of communication skills training in the impulsivity of adolescent girls with conduct disorder symptoms. Educ Syst Res. 2016;9(31):227–54.
30. Reyhani S, Ahovan M. The Effectiveness of Emotional Schema Therapy on Regulating Emotions and Reducing High-Risk Behaviors in Female Adolescents. J Res Behav Sci. 2024;22(1):137–49. eng.
31. Cousson-Gélie F, Lareyre O, Margueritte M, Paillart J, Huteau ME, Djoufelkit K, et al. Preventing tobacco in vocational high schools: study protocol for a randomized controlled trial of P2P, a peer to peer and theory planned behavior-based program. BMC Public Health. 2018;18(1):494. PubMed PMID: 29653527. Pubmed Central PMCID: PMC5899383. Epub 2018/04/15. eng.
32. Kha M. The effectiveness of cognitive-behavioral training on emotion regulation and high-risk behaviors in students. Iran J Dev Educ Psychol. 2022;4(2):14.
33. Heidarpour R, Rouhani F. The effect of life skills training on changing attitudes toward drug and alcohol abuse in high school students. Sadra Med Sci J. 2023;11(3):225–38.

34. Solhi M, Abolfathi M. The effect of education about prevention of addiction through health belief model (HBM) on knowledge and perceptions of high school students in Saveh. Iran J Health Educ Health Promotion. 2013;1(2):31–40. eng.
35. Gómez-Lugo M, Morales A, Saavedra-Roa A, Niebles-Charris J, Abello-Luque D, Marchal-Bertrand L, et al. Effects of a sexual risk-reduction intervention for teenagers: A cluster-randomized control trial. AIDS Behav. 2022;26(7):2446–58.
36. Markham CM, Tortolero SR, Peskin MF, Shegog R, Thiel M, Baumler ER, et al. Sexual risk avoidance and sexual risk reduction interventions for middle school youth: A randomized controlled trial. J Adolesc Health. 2012;50(3):279–88.
37. Lanning BA, Melton K, Abel N. The impact of a supplemental drivers' education program on teenage risk perception and driving behaviors. Transp Res part F: traffic Psychol Behav. 2018;58:442–51.
38. Alizadeh S, Raheb G, Mirzaee Z, Hosseinzadeh S. Effect of social competence training on tendency towards high-risk behaviors in male adolescents living in welfare boarding centers. Archives Rehabilitation. 2020;21(1):54–73.

Figures

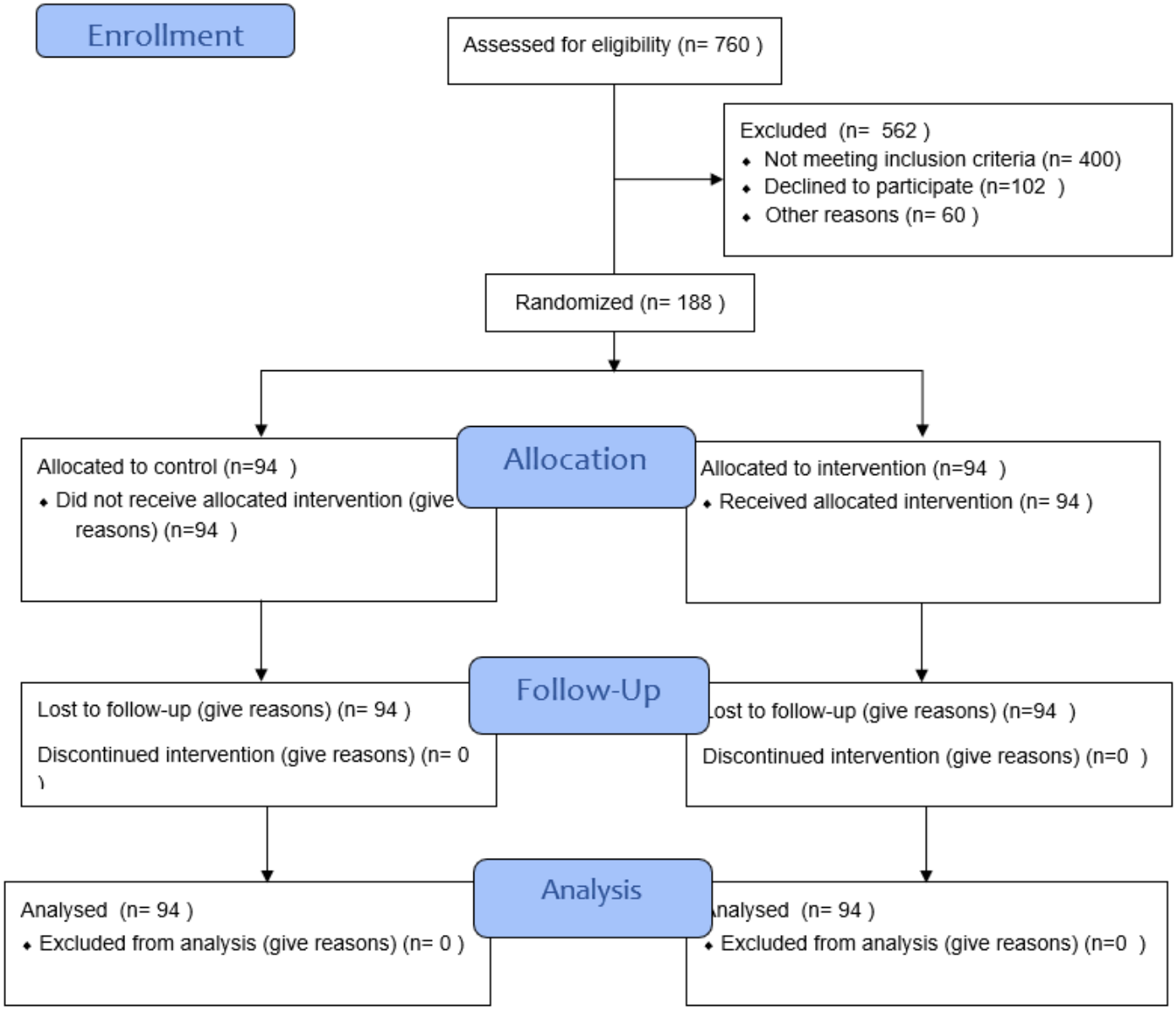


Figure 1

CONSORT 2010 Flow Diagram

Flow of participants through each stage of the randomized controlled trial.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Trials1.pdf
- CONSORT2025Checklist.docx