Review Article

Effective Programs on Suicide Prevention: Combination of Review of Systematic Reviews with Expert Opinions

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Abstract

Background: Health managers often do not have adequate information for decision making on what strategy makes an effective impact on suicide prevention. Despite the availability of global Suicide Prevention Programs (SPP), no previous investigation has developed combinations of a review study with expert opinions. This study was aimed to identify effective programs for suicide prevention. **Methods:** We used two methods for selecting the effective SPP. (1) review of systematic reviews: we systematically searched to find relevant review studies through Medline, Cochrane Library, PsycINFO, and gray literatures. (2) Expert panel opinions: effective programs identified from the previous step were combined with expert views via the Hanlon method. **Results:** A total of 27 since some of them were reports met the inclusion criteria. After full-text screening 9 records included. We found the following 12 SPP for prioritizing and rating the most effective interventions by an expert panel: (1) case management of Suicide Attempters (SAs), (2) identification and treatment of depression, (3) registry for suicide, (4) identifying local determinants of Suicidal behavior (SB), (5) public awareness campaigns, (6) gatekeepers' training, (7) conducting research, (8) school-based training, (9) improving knowledge and attitudes, (10) restricting access to means, (11) at-risk people screening, (12) mass media. **Conclusions:** Seven effective SPP identified after combined 12 included interventions with expert panel opinion: (1) Case management of SAs, (2) Identification and treatment of depression, (3) Improving a registry for suicide, (4) Identifying local determinants of SB, (5) Public awareness campaigns, (6) Training gatekeepers, and (7) Conducting research.

Keywords: *Expert testimony, Iran, suicide, review, systematic reviews*

Introduction

Suicide is responsible for almost one million death every year. On average, 132 suicides occur per day. In other words, more than one person every 40 seconds.[1] Currently, suicide is a high-burden phenomenon throughout the lifespan. It is a global concern which imposes huge costs on health care systems. The age-adjusted suicide rate is 10.5 per 100 000 persons globally. In both sexes of young people aged 15-29, suicide is the second leading cause of death, after road traffic accidents. The majority of suicides occur in low- and middle-income countries.[2,3]

Suicide is a complex and multifactorial phenomenon that is affected by culture and social stigma. This makes the research on suicide prevention a highly challenging work. A comprehensive and high-quality Suicide Prevention Program (SPP) and registry for suicide for providing valid data and the best-match suicide prevention programs are urgently needed in all settings and societies. According to the WHO, developing and improving SPP is important in order to inform programs and evaluation in health care systems, and for valid assessment of the progress towards global suicide mortality objectives. Evidence-based and effective programs can be implemented at the community, at-risk population, individuals and local levels to prevent suicide and Suicidal Behaviors (SB).[4,5]

Some countries have developed comprehensive SPP to address the burden of suicide as a collective political commitment and effort. Lack of evidence on the effectiveness of SPP is one of the most challenging concerns.[6] A few SPPs have been rigorously investigated and assessed for their effectiveness to reduce rates of suicide and SB. A wide variety of

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interventions have been implemented to prevent suicide but are not systematically assessed.[7]

Despite the problem of a lack of valid and reliable outcome measures, most SPPs also suffer from a low-base suicide rate. For instance, mortality and morbidity are often used to measure the effect size of the health problems and to set priorities for health resource allocation. As a result, the SPP often ranks as a relatively low priority in resource allocation.[2,8] There is no confident document regarding the most effective SPP until now.[9] Up-to-date and high-quality evidence along with effective programs are required for developing and implementing a well-design health programs.[10] Health managers often do not have adequate information for decision making on what strategy makes an effective impact on suicide prevention.[11]

Moreover, a single strategy clearly cannot guarantee the achievement to a successful outcome measure of SPP. Combinations of best evidence-based interventions from systematic review studies with investigators and field experts' opinions at the local level can lead to desirable outcomes and success in SPP. A health community assessment found suicide is a public health priority in Malekan County, East Azerbaijan Province, Iran in 2014 (incidence rate of 12 per 100 000 persons). Then a regional community-based SPP was developed in Primary Health Care (PHC) of Malekan County during 2014-2017.

This study was aimed to identify effective programs for suicide prevention in Malekan County during 2014-2017.

Methods

Study design

We used two methods for selecting effective programs and interventions for suicide prevention: (1) A review of systematic reviews and (2) Field expert opinions and priority through the Hanlon technique. The identified programs from electronic search (research evidence) were combined with expert comments to select and prioritize the best and effective interventions for community-based suicide prevention in Malekan society.

Review of systematic reviews

Search strategy

This study was performed in 2014-2015 to determine effective SPPs for developing and implementing a suicide prevention strategy in Malekan County in the future (during 2014-2017). A review of systematic reviews has been performed by Christina *et al*.[12] in 2011 related to the best practice and interventions or programs for suicide prevention. Accordingly, we systematically searched for all English language published systematic review studies through Medline, Cochrane Library, PsycINFO, and gray literature from January 1, 2011, and December 30, 2014.

Our search focused on effective community-based interventions and programs that were used for suicide prevention overall, and in particular among the general population and young people. Grey literature and relevant sites, such as WHO and CDC, were explicitly explored. The initial search used the relevant MeSH terms (i.e., Medical Subject Headings) in conjunction with "suicide" "prevention" and "review" in the title and/or abstract. Then the primary search was combined with "programs, strategies, methods, control, intervention, depression, suicidal behavior/behavior, suicide attempted, primary health care, family physicians, mass media, schools, adolescents, and health promotion". Boolean operators including AND, OR, NOT was used to combine the terms.

We selected community-based programs or interventions in the review of systematic reviews that were effective in reduction of suicide and SB. The target group was also the general population, especially with an emphasis on adolescents and young people.

All primary researches, narrative and scoping reviews, critical and literature reviews, pharmacological interventions, reviews which assessed single intervention or special groups of people or patients, records with poor information, and reviews that not identified an effective SPP reduce suicide rates were excluded.

Two experts independently reviewed the included papers and extracted and summarized the required data (authors, year, name and type of SPP, summary of results, and target group) in MS Excel 2010 software. For discrepancies, a third expert made the final decision. At the end of this stage first draft of list of interventions or programs was prepared by the two experts.

Expert panel opinion

The effective programs identified from the review of systematic reviews (evidence-based) were assessed and prioritized by an expert panel in Tabriz University of Medical Sciences including academics from the Department of Psychiatry and executives from the Department of Mental Health (the provincial Deputy of Health), and the County Health Network experts. The panel used the Hanlon method to prioritize the best programs for developing an SPP for Malekan County. Interventions from published evidence (review studies) were discussed in accordance with the local level by experts including health managers, psychiatrists, psychologists, mental health experts, adolescent health experts, epidemiologists, health system researchers, family physicians, community health workers, and nurses of the hospital emergency ward.

In the Hanlon method, a list of SPP and interventions has been identified from the review of systematic reviews, then the programs were ranked by the panel members using a five-point scale. Then, programs have been rated by expert

panel members based on following 5 criteria (each criteria had 1-5 scores): *feasibility*: the degree of being simply or conveniently done), *effect/importance*: is the program suitable for the health problem?, *cost-effectiveness*: compares the relative costs and outcomes of different courses of programs and actions based on field expert views in the present study, *timeliness*: the time/speed of the steps, from obtaining information up to the action in a surveillance system, and *acceptability*: will the community accept the program? Is it wanted? Based on the five criteria rankings assigned to each strategy or program from the previous step, and then the priority scores were calculated for each particular program.

Results

We initially identified 489 relevant records focused on community-based SPP and interventions, which targeted all age groups or the general population. After removing duplicates, titles and abstracts of the records were screened. Then the remaining records were assessed for eligibility according to inclusion and exclusion criteria. A total of 9 records (7 systematic reviews and 2 reports by international organizations) were included in the synthesis for selecting the best practice and effective interventions on suicide prevention [Figure 1].

Table 1 summarizes the identified community-based programs and interventions for suicide prevention. To prioritize and select the best programs and well-organized interventions, identified interventions from electronic search were combined with expert panel of field and academic experts by using the Hanlon Technique.

A total of 12 suicide prevention programs were found and discussed in the expert sessions by the Hanlon method. Of these, 7 programs had the highest score for implementing

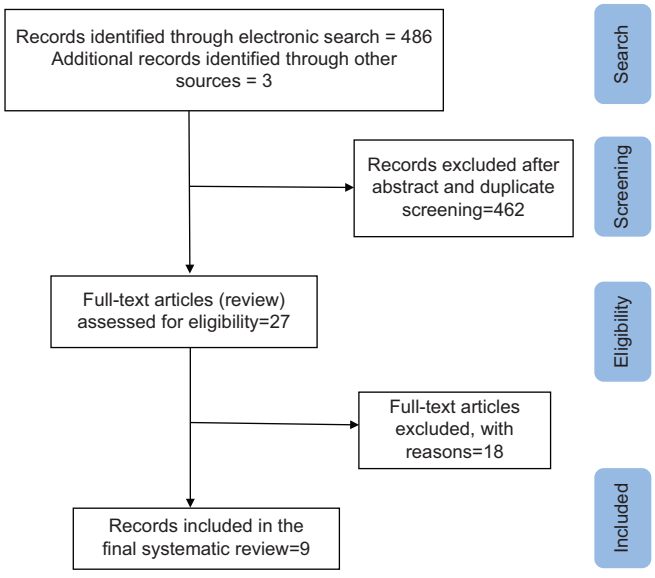

Figure 1: PRISMA flow diagram for review of systematic reviews on programs for prevention of suicide

according to the field and academic experts' views. Case management of persons who attempted suicide to prevent future attempts (re-attempt) was identified as the most effective strategy. According to the Hanlon method, the following interventions and programs had the highest score for implementation in Malekan County: (1) follow-up monitoring of attempters, (2) identification and treatment of depression, (3) improving registry for suicide and suicidal behavior, (4) identification and investigation of risk factors of suicidal behaviors, (5) public education campaigns in hotspots, (6) training health service providers (gatekeeper), and (7) conducting research [Table 2].

Discussion

Suicide is a complex and misunderstood term of death that strongly affects mental health and the quality of life of individuals and communities.[13] Policy-makers and health managers often do not have adequate information for decision making on what strategy makes an effective role, let alone which strategy meets these criteria.[11] Adequate research-based evidence is required for decision making and evaluating the existing SPP, as well as intervention strategies, to guarantee that target populations are being supported effectively. Policy-makers and funding bodies should be informed of the necessity of an evidence-based SPP, and also should include the evaluation in their policies and funding criteria.[4,8,11]

To resolve this problem and developing a regional SPP in PHC system of Malekan County, this study with a novel approach, evaluated how community-based suicide prevention programs affected suicide and suicide attempt rates based on combinations of the highest level of evidence (review of systematic reviews) with field and academic expert opinions. Suicide is an intricate and multifaceted problem, which often implicates numerous interdisciplinary efforts to prevent it. This paper provides a framework and approach for selecting effective and feasible programs that help suicide prevention in the community. The method used in this study to select the most effective SPP can be used in the Iranian context. Because suicide is an influential issue of culture and custom, combining the highest level of evidence with field experience can be very helpful. The findings of this study can provide valuable evidence for the Malekan County and provincial health care system and decision-makers can adopt appropriate programs to reduce suicide. These findings could also be a robust pattern for other distinct and health systems.

Based on evidence-based programs which were identified from the review of systematic reviews and their combination with comments of experts of healthcare field, 12 programs were extracted, three of which had the highest score and effectiveness in suicide prevention: (1) case management and following up the attempters to prevent future attempts, (2) identification and treatment of depression, (3) improving registry for suicide and

Table 1: The best suicide and suicidal behaviors prevention programs identified in the review of systematic reviews

Author-year	N of included study	Summary of results (Effective and recommended interventions)	Target group
Christina M- 2011, (review of systematic review)[12]	6	Training general practitioners (medical doctors) to identify and treat depression and suicidality, providing and improving health care services for at-risk people, and restricting access to means of suicide. Moreover, indirect support was found for possible synergies in particular combinations of interventions within multilevel strategies.	General population
WHO - 2012[5]	Report	A national suicide prevention strategy should be developed through a stepwise approach. The following five effective interventions were recommended by WHO: Prevention strategies at the general population level Restrict access to means of self-harm/suicide Develop policies to reduce harmful use of alcohol as a component of suicide prevention Assist and encourage the media to follow responsible reporting practices of suicide Prevention strategies for vulnerable sub-populations at risk Gatekeeper training (especially various types of health care providers) Mobilizing communities Survivors (who have lost someone to suicide) Prevention strategies at the individual level Identification and treatment of mental disorders Management of persons who attempted suicide or who are at risk Improving case registration and conducting research Monitoring and evaluation	General population, at risk people, individual level
National Action Alliance for Suicide Prevention Executive Committee-2011[29]	Report- suicide care in system framework	This report presents the results and recommendations of the Clinical Care and Intervention Task Force to the National Action Alliance for Suicide Prevention. The Task Force focused its deliberations and recommendations on care in four environments: (1) Emergency Departments and Medical-Surgical Units; (2) Primary Care and General Medical Settings; (3) Behavioral Health Entities; and (4) Crisis Services. The Task Force has identified the following four components of care. (1) Screening and Suicide Risk Assessment, (2) Intervening to increase coping to ensure safety, (3) Treating and caring for persons at-risk of suicide, (4) Follow up and case management of attempters	General population
Szumilas M- 2011[30]	16	This review study was performed to determine the effectiveness of suicide post intervention programs on suicide and suicide attempts. School-based programs and gatekeeper training for proactive postvention was effective in increasing knowledge pertaining to crisis intervention among school personnel.	school-based, family-focused, and community-based
Georgina R Cox - 2013[31]	14	In this review study following effective interventions were identified in hotspots: (1) restricting access to means, (2) encouraging help-seeking (by placement of signs and telephones); (3) increasing the probability of intervention by a third party (through surveillance and staff training); and (4) encouraging responsible media reporting of suicide	Hotspots area
Anton C - 2013[32]	9	This study nine evaluations of suicide prevention interventions were identified: five targeting Native Americans; three targeting Aboriginal Australians; and one First Nation Canadians. The main intervention strategies employed included: Community Prevention, Gatekeeper Training, and Education.	Indigenous people

Contd...

Table 1: Contd...

Author-year	N of included study	Summary of results (Effective and recommended interventions)	Target group
MD Cusimano - 2014[33]	36	This study assessed the effectiveness of middle and high school-based suicide prevention curriculum among 36 randomized controlled studies. School-based programs to prevent suicide among adolescents by improving knowledge, attitudes, and help-seeking behaviors,	Adolescents
Lapierre S - 2011[15]	19	A review study (19 studies) conducted to investigate successful strategies in elderly people and areas needing further exploration. Findings showed the reduction of risk factors including depression screening and treatment, and decreasing isolation are efficient especially among women.	Elderly
Robinson J - 2013[34]	43	This review study aimed to review effective suicide prevention and early interventions in school-based setting among 43 included relevant studies. The most effective interventions for schools have been gatekeeper training, awareness programs, and screening programs.	School-based

Table 2: Hanlon method for prioritizing and combination of programs through evidence-based with field and academic expert views

Programs		Expert panel*					Total score	Rank
		feasibility	effect/ importance	cost-effectiveness	Timeliness	social acceptability		
1	Identification and treatment of depressive disorders	5	5	4	4	5	23	2a
2	Follow-up monitoring of attempters	5	5	5	5	5	25	1
3	Improving suicidal behavior registration	5	4	5	5	4	23	2b
4	School-based training	4	3	4	5	4	20	4a
5	public education campaigns in hotspots	4	4	5	5	5	23	2d
6	Training health service providers (gatekeeper)	5	3	5	5	4	22	3a
7	Identification local determinants of suicidal behaviors' and risk factors	5	4	5	5	4	23	2c
8	Restricting access to means of suicide	4	3	4	4	4	19	5
9	Suicide ideation and at-risk people screening	4	4	3	4	3	18	6
10	Improving knowledge and attitudes	5	4	4	3	4	20	4b
11	Conducting research	5	4	5	4	4	22	3b
12	Mass media (reporting, training and preventing)	4	3	3	3	2	15	7

* Health manager, Psychiatrist, Family Physician, Epidemiologist, Health care providers, mental health expert, and Psychologist

suicidal behavior. All of these programs are consistent with systematic review and meta-analysis studies that are effective to reduce suicide in most societies.[1,9,14-17]

Management of suicide attempters can have a notable impact on re-attempt prevention. The previous suicide attempt history is the robust predictor for future (re-attempt) suicidal behaviors.[18] A 5-years follow-up study of 302 suicide attempters, 37% of them made at least one re-attempt and 6.7% died by suicide.[19] A systematic review with a sample size of 21,385 (14 cohort studies) reported that people with a history of suicidal behaviors are at-risk for suicide 25 times than the general population.[20]

Case management of suicide attempter is a major strategy to be integrated into WHO reports for suicide prevention.[5] Based on the results of the present study and the opinions of the panel of experts, recommended programs and programs of the WHO for the countries were much more comprehensive and effective on suicide prevention. However, most systematic reviews have focused on specific programs or special age and sub-population groups.[16,21]

Effective management of suicide and suicidal behaviors requires up-to-date information at the local level where plans are implemented. Information at this level allows health managers to know which health care system is meeting specific goals. Based on the published evidence and the findings of the present study, to help obtaining this information, developing and launching a comprehensive electronic system for registering the suicidal behaviors at the beginning of suicide prevention programs is a basic necessity to reduce undetected cases. However, merely 18% of countries have a registry system for suicide.[22,23]

Treatment of people with depressive disorder was another effective strategy selected in the present study to prevent suicide. Globally, depressive disorders have been

identified as a noticeable cause of disability and burden of diseases. Among people who die by suicide, depressive disorders are the most prevalent psychological disorder. Depression is a major predictor of suicide.[24] Awareness of predictors for suicide in depression is imperative for health care systems.[25] Previous evidence indicated that antidepressants have a positive effect on suicide prevention.[26,27] A systematic review study by Lapierre and *et al*. found that depression screening and treatment and depression awareness programs are the most efficient program for suicide prevention in elderly and also student of university.[15,28]

Most of the studies included in this research focused mostly on suicide prevention programs for youths and young adults. The emphasis of prevention programs on youths and young adults may reflect public responsiveness to the strategy of young suicide. Therefore, the need for prevention in other age groups such as middle-aged and elderly seems to be ignored. Yet, it does not mean the absence of strong evaluation in most of the programs targeted at these population.[2]

Strengths and limitations of the study

This study had some limitations. We were unable to generate (the measure of association) effect sizes of OR and RR due to the lack of meta-analyses in included systematic reviews. Therefore, we could only describe the review studies. This concern is minimized by a combination of evidence-based programs and expert panel views via Hanlon method for selecting effective SPP.

This research was conducted to identify effective programs on suicide prevention for implementing a community-based SPP in Malekan County Health care system during 2014-2017. It concerns data from a while ago. We believed that these numbers are still representative (in 2020) because we used a novel method to select and identify effective SPP. Moreover, suicide is a multifaceted phenomenon that is strongly affected by local beliefs. The combination of published evidence with expert opinions is a good approach. Field experts in health care may have well-imperative of unpublished opinions and comments which applicable in all societies.

Conclusions

In this study, we used a novel and strength approach as a combination of a review of systematic reviews (highest evidence) with field and academic expert panel opinions for selecting the effective programs on suicide prevention. A total of 12 community-based programs were identified on suicide prevention in this study. Out of these following seven most effective and efficient interventions rated (high scores) by an expert panel after combined with the findings of the review of the systematic review. (1) Case management of SB to prevent future re-attempts, (2) Identification and treatment of depressive disorders, (3) Developing and improving a registry for suicide, (4) Identifying local determinants of SB and risk factors, (5) Public awareness campaigns in hotspots, (6) Training health service providers (gatekeeper), and (7) Conducting research.

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Conflicts of interest

There are no conflicts of interest.

Author's contributions

HA and AF Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND Drafting the work or revising it critically for important intellectual content; MF and EDE Data collection AND Final approval of the version to be published; AND Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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