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Characteristics and Effects of Suicide Prevention Programs: Comparison between Workplace and Other Settings

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Abstract: The present study reviews the literature on suicide prevention programs conducted in the workplace and other settings, namely school, the community, medical facilities, jail, and the army, by conducting an electronic literature search of all articles published between 1967 and November 2007. From a total of 256 articles identified, various contents of suicide prevention programs were determined, and in 34 studies, the effect of programs was evaluated. A review of the literature reveals that the common contents of suicide prevention programs in the workplace and other settings are education and training of individuals, development of a support network, cooperation from internal and external resources, as well as education and training of managers and staff. Although the characteristic contents of suicide prevention programs at the workplace aimed at improving personnel management and health care, screening and care for high-risk individuals, as well as improvement of building structures, were not described. Although a reduction in undesirable attitudes and an increase in mental health knowledge and coping skills in the workplace are in agreement with findings in other settings, suicide rate, suicide-associated behavior, and depression, which were assessed in other settings, were not evaluated in the three studies targeting the workplace.

Key words: Suicide prevention program, Effect, Workplace

Introduction

According to the World Health Organization (WHO), suicide is a significant public health issue, with worldwide suicide rates increasing by 60% in the last 45 yr[1)]. Globally, suicide is currently among the three leading causes of death among individuals aged 15–44 yr, with approximately one million people dying every year. WHO figures, however, do not include suicide attempts, which are up to 20 times more frequent than completed suicides.

Since 1998, the rate of suicide in Japan has substantially increased, with over 30,000 completed suicides annually[2)]. Cases of suicide have also increased in the working population, with the number of cases increasing from 6,212 in 1997 to 8,673 in 1998[2)]. Japan therefore approved legislation on suicide countermeasures in 2006, leading to the establishment of the Suicide Prevention Center, which collects and provides the public with suicide-related data.

Of the suggested countermeasure strategies, a number of suicide prevention measures and manuals are available for workers[3–8)]. Despite recommendations, however, no studies have investigated the effect of suicide prevention programs in the workplace[9)]. The effectiveness of these programs therefore requires the implementation and evaluation of suicide prevention measures in the workplace.

The present study reviews suicide prevention pro-

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grams currently proposed in the workplace and other settings, such as school, the community, medical facilities, jail, and the army, provides information on the content and context of suicide prevention programs, and details recommendations for future prevention programs.

Objectives

The present study compares the characteristics and effect of suicide prevention programs between the workplace and other settings.

Methods

An electronic literature search of all articles published between 1967 and November 2007 was conducted using MEDLINE, PsycINFO, and the Japan Medical Abstracts Society with "suicide prevention program(s)" and "suicide prevention measure(s)" as search keywords in English and Japanese. Selection criteria include publication between 1967 and 2007, evaluation and description of a suicide prevention program and measure, writing in English or Japanese, and being conducted at the workplace, school, community, medical facility, jail or army.

A total of 256 articles were identified, with 16 articles citing suicide prevention programs in the workplace, 71 in schools, 126 in the community, 22 in medical facilities, 29 in jail and 10 in the army. A total of 3 articles evaluated these programs in the workplace, 14 in schools, 10 in the community, 1 in a medical facility, 2 in jail and 4 in the army.

Results

The number of articles describing suicide prevention programs in the workplace was considerably lower than that in schools and the community. Table 1 shows the contents of suicide prevention programs recommended in each setting. Contents common to two or more settings were grouped to create seven contents groups, namely education and training of individuals, development of a support network, cooperation from internal and external resources, education and training of managers and staff, screening and care for high-risk individuals, improvement of building structures (e.g. setting up barriers to prevent jumping off the building), and reduced access to lethal means of committing suicide.

Of the total studies citing suicide prevention programs, 34 evaluated the effects of these program based on contents including education and training, counseling, and the creation of support networks, as well as by measuring suicide rate, suicide-associated behavior, depression, undesirable attitude (e.g. admitting suicidal tendencies and drug abuse), mental health knowledge, and coping skills. Table 2 shows the contents and effects measured in the reported suicide prevention programs. Study designs were classified based on the Canadian Task Force on the Periodic Health Examination[10] and consisted of at least one properly randomized control study (I), properly designed cohort or case-control analytic studies, preferably from more than one centre or research group (II-1), or comparisons between study period and location, with and without intervention (II-2).

The characteristics of the suicide prevention programs are summarized below based on setting.

Workplace

The common contents of suicide prevention programs at the workplace consist of:

- *Education and training of individuals*: providing mental health education for employees[11–14]
- *Development of a support network*: Development a support network among employees[14], encouraging cooperation between managers and industry health staff[14]
- *Cooperation from internal and external resources*: encouraging cooperation of an industrial physician

Table 1. Common contents of suicide prevention programs

Contents of program/measure	Setting*					
	Workplace	School	Community	Medical facilities	Jail	Army
Education and training of individuals	4	18	7	1	1	2
Development of a support network	1	3	2	0	3	2
Cooperation from internal and external resources	2	7	8	0	1	2
Education and training of managers or staff	4	17	0	1	6	0
Screening and care for high-risk individuals	0	8	5	7	11	2
Improvement of building structures	0	1	0	0	6	0
Reducing access to lethal means of committing suicide	0	0	3	1	0	0

*Numbers in the table represent the number of articles in which the content was recommended.

Table 2. Contents and evaluation of suicide prevention programs

Study Setting	Study	Design*1	Approach	Contents of program/measure*2			Targeted respondents and evaluation*3					
							Decrease				Increase	
				Education/ training	Counseling	Support network	Suicide rate	Suicide-associated behaviors	Depression	Undesirable attitude	Mental health knowledge	Coping skills
Workplace	Berlim *et al*. (2007)	II-2	Population	○						Yes		
	Botega *et al*. (2007)	II-2	Population	○								Yes
	Kojima & Nakamura (2007)	II-2	Population	○							Yes	
School	OrbachI & Joseph (1993)	I	Population	○				Yes				Yes
	Aseltine & DeMartino (2004)	I	Population	○			Yes			Yes	Yes	
	Aseltine *et al*. (2007)	I	Population	○			Yes			Yes	Yes	
	Herbert (1989)	II-2	Population	○			Yes					
	Shaffer *et al*. (2007)	II-1	Population	○		○				Yes		
	Silbert & Berry (1991)	II-1	Population	○		○		Yes			Yes	
	Shaffer *et al*. (1991)	II-1	Population	○		○					Yes	
	Vieland *et al*. (1991)	II-1	Population	○		○						No
	Ciffone (1993)	II-1	Population	○						Yes		
	Ciffone (2007)	I	Population	○						Yes		
	Randell *et al*. (2001)	I	High risk	○	○			Yes	Yes			No
	Eggert *et al*. (2002)	I	High risk	○	○			Yes	Yes			
	Eggert *et al*. (1995)	II-2	High risk	○				Yes	Yes			Yes
	Stuart *et al*. (2003)	II-2	High risk	○						Yes	Yes	Yes
Community	LaFromboise & Howard-Pitney (1995)	II-1	Population	○				Yes	No			Yes
	Rutz (2001)	II-2	Population	○			Yes		Yes			
	Szanto *et al*. (2007)	II-2	Population	○		○	Yes					
	Mishara *et al*. (2005)	I	High risk	○	○		Yes	Yes	Yes			
	Weiner (1969)	II-2	High risk		○		No					
	Lester (1971)	II-2	High risk		○		No					
	Cutter (1979)	II-2	High risk		○		No					
	Glatt (1986)	II-2	High risk		○		Yes					
	Mishara & Daigle (1992)	II-2	High risk		○		Yes		Yes			
	Morrow-Howell *et al*. (1998)	II-2	High risk		○				Yes			
Medical facilities	Martz (1974)	II-2	High risk				Yes					
Jail	Jackson (2003)	II-2	High risk	○				Yes				Yes
	Cox & Morschauser (1997)	II-2	High risk	○	○		Yes					
Army	Gaines & Skaer (1979)	II-2	Population			○	Yes					
	McDaniel *et al*. (1990)	II-2	Population	○				Yes				
	Knox *et al*. (2003)	II-2	Population	○			Yes	Yes				
	Dedic *et al*. (2007)	II-2	Population	○			Yes					

*1I = Evidence obtained from at least one properly randomized control study, II-1 = Evidence obtained from properly designed cohort or case-control analytic studies, preferably from more than one centre or research group, II-2 = Evidence obtained from comparisons between study period and location, with and without intervention.
*2○ = Used content. *3 Yes = Effective, No = Not effective.

and general practitioner[14, 15]

- *Education and training of managers and staff*: providing mental health education for managers or occupational health staff[11–14]

The characteristic contents of suicide prevention programs at the workplace aimed to improve personnel management and health care[16].

A total of three studies evaluated the effects of suicide prevention programs at the workplace. Before the start and immediately after a three-hour training session on suicide prevention, 40 non-clinical and 102 clinical professionals employed in a university hospital in Brazil (e.g. security staff and nursing attendants, respectively) were evaluated using the Suicide Behavior Attitude Questionnaire[13]. The training program consisted of a three-hour class session emphasizing different aspects of suicidal behavior, namely the etiology, epidemiology and health impact, risk factors, basic assessment and management, and referral principles of suicide. The training program was also mainly based on a document published in 2000 by the WHO entitled "Preventing Suicide: A Resource for Primary Health Care Workers"[17], which is part of a worldwide initiative for suicide prevention. Training was delivered by junior psychiatrists under the supervision of senior psychiatrists, and included oral presentations followed by discussion with the audience. Results show a significant improvement in attitude and belief towards suicide in subjects after training.

In a separate study, 317 nursing personnel working at a general hospital attended a six-hour training program on suicide prevention[12], which focused on the impact and stigma towards suicide behavior; common mental disorders associated with suicide at the hospital, including depression, alcohol dependence, and delirium; basic interview skills; and the assessment and management of suicidal patients. Before and after training, subjects anonymously completed the Suicide Behavior Attitude Questionnaire. Results indicate positive changes in attitude towards suicide, which were significantly maintained during follow-up evaluation six months after training. In particular, improvement was observed in the Feeling and Professional Capacity subscales. In Japan, a trial for mental health education intended for managers of large enterprises was performed[11]. At the beginning and six months after the educational trial, coping skills of 87 managers were compared to those of managers with depression. Results show a decrease from 28% to 10% in the number of managers giving strong encouragement and suggesting mindset changes to employees thought of possibly committing suicide.

School

The common contents of suicide prevention programs at school consist of:

- *Education and training of individuals*: providing education and training for students[18–34], increasing self efficacy among students[35]
- *Development of a support network*: Development a support network among students[23, 36, 37]
- *Cooperation from internal and external resources*: encouraging cooperation with service facilities and community resources[19, 20, 29, 33, 38–40]
- *Education and training of managers and staff*: providing education and training for teachers[18–34]
- *Screening and care for high-risk individuals*[18, 22, 28, 31, 32, 41–43]
- *Improvement of building structures*[26]

The characteristic contents of suicide prevention programs at school consisted of conducting suicide prevention programs while considering socio-cultural backgrounds[44–46]; conducting a school-wide curriculum-based program on suicide prevention[28, 47]; educating and informing parents[27, 38].

Among programs in which results were evaluated, one program, consisting of raising awareness of students, teachers, and parents, as well as training professionals and teachers, led to a decrease in the number of suicides[27]. Two studies reported the effectiveness of a different program in raising suicide and suicide-related awareness using an educational curriculum, as well as a brief screening tool for depression and risk factors associated with suicidal behavior[18, 48]. In these studies, high school students randomly assigned to an intervention group showed a significantly lower rate of suicide attempts, as well as increased knowledge and adaptive attitudes towards depression and suicide compared to those assigned to a control group. Three additional studies reported the effectiveness of promoting suicide awareness by depicting suicide as a problem, as well as by describing clinical features of suicidal adolescents, including the need to seek professional help with particular focus on the value of support networks in alleviating stress, as well as by promoting problem-solving techniques[49–51]. The program was conducted in the classroom by regular teachers, which had previously received training. Although the majority of students showed positive reactions and interest in the program, no effects on actual help-seeking behaviors and suicide morbidity was observed during the 18-month follow-up period.

Ciffone[52] investigated the effectiveness of a program which continuously promoted the concept of suicide as directly related to mental illness, namely major depression and an abnormal reaction to stress and emotional

upset. Results show a significant change in attitude in direction of the promoted concept. Orbach & Bar-Joseph[24] examined the effectiveness of a program focused on education and coping strategies against self-destructive feelings, in which subjects were randomly divided into experimental and control groups. Results showed higher suicidal tendencies, hopelessness, coping, and ego identity in the experimental than control group. Ciffone[25] reported the effectiveness of another program consisting of the showing of a 15-minute film depicting a girl and boy who attempted and completed suicide, respectively, followed by discussion. Results show a significantly improved attitude towards suicide after the program.

Silbert & Berry[53] conducted a study in high school students who demonstrated special needs, namely low social support and high stress, anxiety, and/or degrees of hopelessness. The program consisted of understanding teenage suicide and learning to cope with depression by recognizing suicide warning signs and help resources. Results indicated that compared to control groups, both experimental groups with and without special needs showed a significantly increased factual knowledge on suicide and decreased levels of stress and hopelessness.

An additional five programs involving students with high risk of suicide were evaluated. One program consisted of assessing and performing personal growth classes for youth with high risks of school failure[22]. Subjects having attended the personal growth class demonstrated decreased depression, hopelessness, stress, and anger, as well as increased perceived personal control, self-esteem, and social network support. Another program conducted a brief interview as well as coping and support training for students with risks of high school dropout and suicide[19, 20]. Students were randomly assigned to the interview and training, interview only, or regular intervention. Results show an increase in personal control, problem-solving skills, and perceived family support in the group having undergone training and the interview. Further, a decrease in depression and an increase in self-esteem to meet family goals was observed in groups having undergone the interview alone or in combination with training. A separate program consisting of gatekeeper training for peer helpers showed a significant increase in suicide knowledge and response skills towards suicidal peers immediately after and three months after training[36]. In addition, a significant improvement in positive attitudes towards suicide intervention was reported following training.

Community

The common contents of suicide prevention programs in the community consist of:

- *Education and training of individuals*: providing suicide prevention education by professionals[54–59], raising awareness about suicide prevention[58, 60]
- *Development of a support network*: developing a community network[54, 61]
- *Cooperation from internal and external resources*: establishing a network of various support facilities[62–69]
- *Screening and care for high-risk individuals*[54, 60, 62, 67, 70]
- *Reducing access to lethal means of committing suicide*[54, 71, 72]

The characteristic contents of suicide prevention programs in the community consisted in educating professionals who provide suicide prevention education[73–76], increasing the efficacy of consultation systems and medical facilities in the community[70, 71, 72, 77–84], educating the media[85, 86] and developing suicide prevention manuals[63].

Results from one program, which consisted of installing a telephone helpline at a bridge potentially used for suicide by jumping, showed that all people having used the telephone were sufficiently disturbed to require treatment and hospitalization. Further, hospitalization was required for an additional three people not having used the telephone and found loitering on the bridge[82].

Mishara, Houle & Lavoie[73] assessed callers to a suicide prevention center which targets high risk men and randomly invited subjects to participate in one of four programs: an information session, an information session with telephone follow-up, a rapid referral to mental health and abuse programs, or telephone support. Results show that suicidal males had significantly lower suicidal ideation, suicide attempts, and depressive symptoms after attending any of the programs. Family and friends also reported lower psychological distress, higher use of positive coping mechanisms, and improved communication with suicidal male subjects. One study investigated 617 calls to telephone crisis lines at suicide prevention centers[87], in which interventions were directive and non-directive, as well as occasionally included types of responses not usually found in traditional therapies. Results indicate that a great number of callers appear to benefit from calls, based on the observed decreased ratings for depression and suicidal urgency, as well as the promise at the end of the call not to commit suicide, which was confirmed at follow-up. Another program examined the effectiveness of suicide prevention hotlines for the elderly, provided as a social work service in the community[75]. After receiving standard crisis intervention, 31 participants were assigned to a four-month waiting list (control group), whereas 30 received immediate treatment. Intervention

was composed of a multidimensional assessment, a service arrangement in response to identified needs, and supportive therapy. An increase in social contact and a trend towards reduced depressive symptoms were observed four months later in patients having received immediate treatment. Further, a marginally significant difference between pre- and post-test scores on unmet needs was reported after an eight-month observation period, with clients having fewer unmet needs after receiving services. An additional two studies also reported decreased suicide rates among general medical practitioners after an educational and treatment program[57, 89]. In contrast, no benefit was reported in three programs conducted before 1977 in which telephone intervention at suicide prevention centers was performed[83, 84, 88].

LaFromboise & Howard-Pitney[79] studied a culturally tailored intervention program in collaboration with the Zuni people using a model of social cognitive development to correct for the behavioral and cognitive correlations with suicide. The Zuni, an American Indian population, were concerned about rising rates of youth suicide, an especially distressing phenomenon due to the forbidden nature of suicide in the traditional Zuni culture. Results from behavioral assessment show higher scores, as well as problem-solving and suicide intervention skills in the intervention than non-intervention group.

Medical facilities

The common contents of suicide prevention programs in medical facilities consist of:

- *Education and training of individuals*: educating patients[90]
- *Education and training of managers and staff*: educating hospital staff[90]
- *Screening and care for high-risk individuals*: assessing and providing care for patients following a suicide attempt[90–92], providing care for patients following a suicide attempt[93–95], observing patients daily following a suicide attempt[96]
- *Reducing access to lethal means of committing suicide*[90]

The characteristic contents of suicide prevention programs in medical facilities aimed to encourage spiritual connection such as religion[92].

After a five-week training program, volunteers remained between 7 a.m. and 11 p.m. in the presence of a patient who attempted suicide and were asked to report any mood swings and significant statements to the medical staff[96]. Although approximately 582 patients were hospitalized during the five years after the start of the program, no suicide cases were reported.

Jail

The common contents of suicide prevention programs in jail consist of:

- *Education and training of individuals*: training to increase coping skills[97]
- *Development of a support network*: encouraging support from staff[98–100]
- *Cooperation from internal and external resources*: cooperating with community resources[101]
- *Education and training of managers and staff*: training of staff[99–104]
- *Screening and care for high-risk individuals*[98–103, 105–109]
- *Improvement of building structures*[99, 100, 104–106, 109]

No particular characteristic contents of suicide prevention programs in jail were reported.

The Local Forensic Suicide Prevention Crisis Service Program consisted of 11 components: policy and procedure guidelines to clarify county jail roles; police department lockup and establishment of mental health agency personnel; screening of detainees by trained jail and police officers; supervision; establishment housing for mental health observation; scheduled mental health treatment; crisis intervention; external hospitalization; training for both jail and mental health staff; communication, investigation and monitoring of inmate deaths; and staff debriefing[110]. Despite a nearly 100% increase in jail population, reports show a more than 150% decrease in jail suicides after implementation of the suicide prevention program.

Jackson[97] reported the effectiveness of a suicide prevention program developed after two female inmates from the same facility committed suicide within a two-week period. The program used a psychoeducational approach and treatment was administered in groups to train inmates in coping skills used during stressful situations. Results show a significant increase in the Survival and Coping Beliefs and Fear of Social Disgrace subscales after the implementation of the program.

Army

The common contents of suicide prevention programs in the army consist of:

- *Education and training of individuals*: providing mental health education[111, 112]
- *Development of a support network*: Development a support network for service personnel[111, 113]
- *Cooperation from internal and external resources*: offering adequate facilities[114, 115]
- *Screening and care for high-risk individuals*[114, 115]

No particular characteristic contents of suicide prevention programs in the army were reported.

Two educational programs, aimed at supervisors and

both soldiers and professional staff, showed a decrease in suicidal behaviors and number of suicides, respectively[112, 116]. Gaines & Skaer[113] reported the effectiveness of a program designed to deal with social isolation. After program implementation, squadron commanders briefed each flight trainee on their first day on the purpose of basic training, the need for cooperation and teamwork, and the value of having another trainee partner[113]. Results following completion of the program show a significant decrease in the rate of suicidal attempts. Knox, Litts & Talcott[111] reported the effectiveness of a multilayered intervention to reduce suicidal risk factors and enhance protective factors, consisting of eliminating the stigma of seeking help for mental and psychosocial problems, improving the understanding of mental health, and changing policies and social norms. Results show a sustained decline in rates of suicide, homicide, and family violence after implementation of the program.

Discussion

A review of the literature reveals that the common contents of suicide prevention programs in the workplace and other settings are education and training of individuals, development of a support network, cooperation from internal and external resources, as well as education and training of managers and staff. Although the characteristic contents of suicide prevention programs at the workplace aimed at improving personnel management and health care, screening and care for high-risk individuals, as well as improvement of building structures, were not described. In addition, comparing the workplace with other settings was difficult due to the considerably low number of studies in the workplace. Although a reduction in undesirable attitudes and an increase in mental health knowledge and coping skills in the workplace are in agreement with findings in other settings, suicide rate, suicide-associated behavior, and depression, which were assessed in other settings, were not evaluated in the three studies targeting the workplace.

Although a number of contents were recommended for the workplace, only the effects of educating managers and staff were evaluated. Given these observations, evaluation of the effect of the other recommended contents remains necessary. Furthermore, significant effects of educating managers and staff were observed in only three studies, warranting further evaluation. In addition, although improvements in manager and hospital staff attitudes were observed, no effects were confirmed in individuals. In contrast, other settings implemented and evaluated the effects of programs for individuals, which suggests that effects directly related to suicide were measured, such as depression and suicide-associated behaviors. Given these observations, workplace environments should also implement and evaluate suicide prevention programs for individual in the workplace. In school settings, only programs implementing suicide education yielded significant effects on suicide prevention, suggesting that suicide education methods used in the school may also prove beneficial in workplace.

The evaluation of these programs, however, shows a number of limitations. Comparisons of measures shown to be effective in suicide prevention among studies, for example, may prove to be difficult to assess. The establishment of defined programs and procedure manuals, however, may facilitate the implementation of suicide prevention programs in a number of settings, including the workplace.

The effect of education was evaluated by measuring a number of factors, namely suicide rate, suicide-associated behaviors, undesirable attitudes, mental health knowledge and coping skills. Depression, however, was not used to evaluate the effects of suicide prevention program. Compared to suicide rate and associated behaviors, depression is not directly related to suicide, and therefore appears to be seldom used in the studies. Four studies evaluated suicide prevention programs in the army, with effects measured using suicide rate and suicide-associated behaviors. The effect of suicide prevention programs in the army is more easily assessed than in the workplace due to the higher rate of suicide. For the workplace, the evaluation of suicide-associated behaviors and undesirable attitudes may provide more insight on the effect of prevention programs. Further, mental health knowledge and coping skills, used to measure program effectiveness in the workplace, are considered positive features, which may improve subject turnout as suicide is often perceived as a negative subject.

Observations in the present study may not be conclusive due on the insufficient number of articles evaluating the effects of suicide prevention programs. Given the current literature, however, content shown as most suitable for a comprehensive strategy program in the workplace includes education, training and screening of individuals, development of support networks, as well as education and training of managers and staff. Further, evaluation of the effects of suicide prevention programs in individuals may require measuring suicide-associated behaviors, undesirable attitudes, mental health knowledge, and coping skills.

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