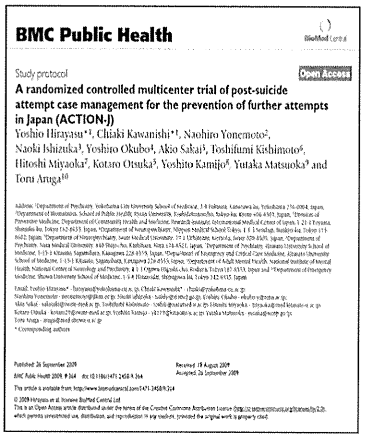
ACTION-Jの研究成果（1）

1．米国および日本で臨床試験登録を実施し，研究プロトコルを BMC Public Health 誌に学術論文として公開した。自殺ハイリスク者を対象とするアウトカム研究の普及・啓発が促進された。現在，ACTION-Jは，世界に類例をみない大規模研究として国際学会などでも高い注目を浴びている。


BMC Public Health

Study protocol

Open Access

A randomized controlled multicenter trial of post-suicide attempt case management for the prevention of further attempts in Japan (ACTION-J)

Yoshio Hirayasu*[1], Chiaki Kawanishi*[1], Naohiro Yonemoto[2], Naoki Ishizuka[3], Yoshiro Okubo[4], Akio Sakai[5], Toshifumi Kishimoto[6], Hitoshi Miyaoka[7], Kotaro Otsuka[5], Yoshito Kamijo[8], Yutaka Matsuoka[9] and Toru Aruga[10]

* Corresponding authors

Published: 26 September 2009

Received: 19 August 2009

Accepted: 26 September 2009

2．研究計画書に従い，平成23年6月末で介入と追跡を終了した。イベント発生率は推定通りだった。現在，ベースラインデータに加え，解析用データセットの固定に向け最終プロセスにある。データ固定に必須の住民基本台帳資料等を用いた生存確認調査をほぼ終了し、死亡関連情報を収集中である。

3．加えて，本研究に参加した多職種の人材を対象とした学術集会及び研究会議を定期的に開催することにより，研究者ネットワークが強化され，その質が向上した。

精神保健研究所

National Institute of Mental Health, NCNP

ACTION-Jの研究成果（2）

5．ACTION-Jは，複数の生物統計家等との協働により高いレベルの検証を目指しており，国主導による政策目標を達成するための研究体制のモデルとなった。

6．ACTION-Jの実施により，精神・神経科学振興財団や国立精神・神経医療研究センターによる専門的支援や，国立国際医療研究センターJCRAC/DMCによるデータマネジメント，厳格な研究倫理審査体制の整備など，大型研究費の投入を可能にするアウトカム研究の基盤整備が実現された。

7．厚生労働省は，2008年4月の診療報酬改定で自殺未遂者に対する救急・精神科医療の評価を盛り込む等の施策を既に実施した。今後も，ACTION-Jの研究成果を迅速に利用可能とする，エビデンス/実践ギャップの改善へ向けた様々な施策を実現していく必要がある。

8．長期にわたる多施設共同研究のため，研究期間中の人事異動等への対応に苦慮した。一方，平成21年度より実施された自殺対策緊急強化基金（内閣府）を背景に，エビデンス―実践ギャップの改善に不可欠な人材が多数育成され，ACTION-Jスタッフにとって貴重なキャリアパスを構築することができた。

第26回国際自殺予防学会：特別セッション

タイトル： Fighting against suicide with evidence! The experience of the practical intervention trials in Asia.

座　　長: Dr. Paul Yip (University of Hong Kong)
Dr. Mitsuhiko Yamada (NIMH, NCNP,Japan)

指定発言： Dr. Nav Kapur (University of Manchester)

1. Paul Yip, University of Hong Kong
Restricting the means of suicide by charcoal burning.
2. Mitsuhiko Yamada, National Center of Neurology and Psychiatry, Japan
Japanese Multimodal Intervention Trials for Suicide Prevention, **J-MISP**.
3. Yutaka Ono, National Center of Neurology and Psychiatry, Japan
NOCOMIT-J: A community intervention trial of multi-modal suicide prevention program in Japan.
4. Chiaki Kawanishi, Yokohama City University, Japan
ACTION-J: A randomized, controlled, multicenter trial of post-suicide attempt case management for the prevention of further attempts in Japan.

Integrating cultural perspectives in the understanding and prevention of suicide

XXVI IASP World Congress
13-17 September, 2011
Beijing, China

精神保健研究所

まとめ

本研究は，独創性および学術的意義が高いものであった。特に，複数の生物統計家等と協働する等，政策目標を達成するための研究実施体制を確立できた。さらに，臨床研究推進のための問題点を整理し，貴重なノウハウを蓄積することができた。

本研究により形成された研究者ネットワークを利用することで，NOCOMIT-J及びACTION-Jの成果として創出されるエビデンスと，本研究で開発された介入資材やノウハウ等を，国の自殺対策に利用すること（Evidence-Based Policymaking）が可能であり，アウトカム研究の普及・啓発の促進に大きく寄与するものと考えられた。

精神保健研究所

BMC Public Health

BioMed Central

Study protocol

Open Access

A community intervention trial of multimodal suicide prevention program in Japan: A Novel multimodal Community Intervention program to prevent suicide and suicide attempt in Japan, NOCOMIT-J

Yutaka Ono*[1], Shuichi Awata[2], Hideharu Iida[3], Yasushi Ishida[4], Naoki Ishizuka[5], Hiroto Iwasa[6], Yuichi Kamei[7], Yutaka Motohashi[8], Atsuo Nakagawa[9], Jun Nakamura[10], Nobuyuki Nishi[11], Kotaro Otsuka[12], Hirofumi Oyama[13], Akio Sakai[12], Hironori Sakai[14], Yuriko Suzuki[15], Miyuki Tajima[16], Eriko Tanaka[16], Hidenori Uda[17], Naohiro Yonemoto[18], Toshihiko Yotsumoto[19] and Naoki Watanabe[20]

Address: [1]Health Center, Keio University,.35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan, [2]Division of Neuropsychiatry and Center for Dementia, Sendai City Hospital, 3-1 Shimizukouji, Wakabayashi-ku, Sendai 984-8501, Japan, [3]Department of Occupational Therapy, Faculty of Nursing and Rehabilitation, Aino University, 4-5-4 Higashiooda, Ibaraki-shi, Osaka 567-0012, Japan, [4]Department of Psychiatry, Faculty of Medicine, University of Miyazaki, 5200 Kihara, Kiyotake-cho, Miyazaki-gun, Miyazaki 889-1692, Japan, [5]Division of Preventive Medicine, Department of Community Health and Medicine, esearch Institute, International Medical Center of Japan, 1-21-1 Toyama, Shinjuku-ku, Tokyo 162-8655, Japan, [6]Aomori Prefectural Center for Mental Health and Welfare, 353-92 Sawabe Sannai, Aomori-shi, Aomori 038-0031, Japan, [7]Department of Psychiatry, Kohnodai Hospital, National Center of Neurology and Psychiatry, 1-7-1 Kohnodai, Ichikawa-shi, Chiba 272-8516, Japan, [8]Department of Public Health, Akita University School of Medicine, 1-1-1 Hondo, Akita-shi, Akita 010-8543, Japan, [9]Department of Psychiatry, Graduate School of Medicine, Keio University, 35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan, [10]Department of Psychiatry, University of Occupational and Environmental Health, 1-1 Iseigaoka, Yahatanishi-ku, Kitakyusyu-shi, Fukuoka 807-8555, Japan, [11]Health Promotion Division of Health and Social Welfare Department, Kagoshima Prefecture, 10-1 Kamoike-shinmachi, Kagoshima-shi, Kagoshima 890-8577, Japan, [12]Department of Neuropsychiatry, Iwate Medical University, 19-1 Uchimaru, Morioka-shi, Iwate 020-8505, Japan, [13]Department of Social Welfare, Faculty of Health Sciences, Aomori University of Health and Welfare, 58-1 Mase Hamadate, Aomori-shi, Aomori 030-8505, Japan, [14]Graduate School of Medicine, Gunma University, 39-22 Showa-machi 3-chome, Maebashi-shi, Gunma 371-8511, Japan, [15]Department of Adult Mental Health, National Institute of Mental Health, National Center of Neurology and Psychiatry, 4-1-1 Ogawahigashi-cho, Kodaira-shi, Tokyo 187-8553, Japan, [16]Stress Management Office, Keio University, 35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan, [17]Kanoya Public Health Center, 2-16-6 Utsuma, Kanoya-shi, Kagoshima 893-0011, Japan, [18]Department of Biostatistics, School of Public Health, Kyoto University, Yoshidakonoecho, Sakyo-ku, Kyoto-shi, Kyoto 606-8501, Japan, [19]Sensatsu Public Health Center, 228-1 Kumanojocho, Satsumasendai-shi, Kagoshima 895-0041, Japan and [20]Department of Psychology, Faculty of Human Sciences, Kansai University of International Studies, 1-18 Aoyama, Shizimi-cho, Miki-shi, Hyogo 673-0521, Japan

Email: Yutaka Ono* - yutakaon@sc.itc.keio.ac.jp; Shuichi Awata - awata-thk@umin.ac.jp; Hideharu Iida - h-iida@ot-u.aino.ac.jp; Yasushi Ishida - ishiday@med.miyazaki-u.ac.jp; Naoki Ishizuka - naishi@ri.imcj.go.jp; Hiroto Iwasa - hiroto_iwasa@pref.aomori.lg.jp; Yuichi Kamei - kame@cj8.so-net.ne.jp; Yutaka Motohashi - motohasi@med.akita-u.ac.jp; Atsuo Nakagawa - nakagawa@keio-psychiatry.com; Jun Nakamura - jun@med.uoeh-u.ac.jp; Nobuyuki Nishi - nobwest@pref.kagoshima.lg.jp; Kotaro Otsuka - kotaro29@iwate-med.ac.jp; Hirofumi Oyama - h_oyama@auhw.ac.jp; Akio Sakai - sakaiaki@iwate-med.ac.jp; Hironori Sakai - Sakai.Hironori@mb.mt-pharma.co.jp; Yuriko Suzuki - yrsuzuki@ncnp.go.jp; Miyuki Tajima - ta-ji88@cf7.so-net.ne.jp; Eriko Tanaka - eriko.tanaka@nifty.com; Hidenori Uda - udah@pref.kagoshima.lg.jp; Naohiro Yonemoto - nyonemoto@jfnm.or.jp; Toshihiko Yotsumoto - yotsumoto-tosihiko@pref.kagoshima.lg.jp; Naoki Watanabe - n-watanabe@kuins.ac.jp

* Corresponding author

Published: 15 September 2008

BMC Public Health 2008, **8**:315 doi:10.1186/1471-2458-8-315

Received: 29 July 2008
Accepted: 15 September 2008

This article is available from: http://www.biomedcentral.com/1471-2458/8/315

Abstract

Background: To respond to the rapid surge in the incidence of suicide in Japan, which appears to be an ongoing trend, the Japanese Multimodal Intervention Trials for Suicide Prevention (J-MISP) have launched a multimodal community-based suicide prevention program, NOCOMIT-J. The primary aim of this study is to examine whether NOCOMIT-J is effective in reducing suicidal behavior in the community.

Methods/DesignThis study is a community intervention trial involving seven intervention regions with accompanying control regions, all with populations of statistically sufficient size. The program focuses on building social support networks in the public health system for suicide prevention and mental health promotion, intending to reinforce human relationships in the community. The intervention program components includes a primary prevention measures of awareness campaign for the public and key personnel, secondary prevention measures for screening of, and assisting, high-risk individuals, after-care for individuals bereaved by suicide, and other measures. The intervention started in July 2006, and will continue for 3.5 years. Participants are Japanese and foreign residents living in the intervention and control regions (a total of population of 2,120,000 individuals).

Discussion: The present study is designed to evaluate the effectiveness of the community-based suicide prevention program in the seven participating areas.

Trial registration: UMIN Clinical Trials Registry (UMIN-CTR) UMIN000000460.

Background

Recent rapid increase of suicide in Japan

(1) Changes in suicide incidence

According to vital statistics collected by the Japan Ministry of Health, Labour, and Welfare in 1997, there were 23,494 suicides (15,901 men and 7,593 women), with the number rising to 31,755 (22,349 men and 9,406 women) in 1998, which represented a 35% increase. This was the highest rate of increase recorded since the Ministry began tracking mortality statistics. The number of suicides remained high in subsequent years, reaching 29,949 in 2002 and 32,109 in 2003.

In 2002, the World Health Organization (WHO) reported that the suicide rate in Japan (25.3 per 100,000) was higher than in any other developed nation (for comparison: France: 17.5, Germany: 13.5, Canada: 11.7, United States of America: 10.4, United Kingdom: 7.5, Italy: 7.1).

In terms of the number of suicides, three peaks have emerged since World War II. However, the most recent rise that started in 1998 has shown no signs of abating, and represents the worst in Japan's history. Therefore, it is clear that suicide prevention measures are urgently needed in Japan.

(2) Regional tendencies

It has been pointed out that the suicide rate has traditionally been high in the three prefectures of the northern Tohoku area (Akita, Iwate, and Aomori), Niigata, Shimane, and the Kyushu area (Miyazaki, Kagoshima, and Okinawa) [1].

The increase in the number of suicides that began in 1998, however, was not necessarily attributable to suicides in these rural areas. Fujita (2003) [2] conducted a comparative study of suicide rates by prefecture by comparing a time period with a low number of suicides (1989–1995) to time periods before and after, during which the number of suicides was on the rise (1983–1987 and 1998–2000, respectively). The findings indicated that the recent increase in the number of suicides has been significantly more prominent in urban areas such as Tokyo, Osaka, and their surrounding areas, than in rural areas. During the two periods 1989–1995 and 1998–2000, the mean number of suicides among people 15 years of age or older rose from 894 to 1,658 in Osaka, from 713 to 1,309 in Kanagawa, and from 1,129 to 1,938 in Tokyo.

With regard to recent trends in suicide rate by age, the middle-aged population was found to have higher suicide rates. In 2004, 42.1% of those who committed suicide were 45 to 64 years old. This tendency was particularly evident among men, in whom the suicide rate peaked at 55 to 59 years of age, whereas a similar trend was not found in women, in whom the suicide rate generally increased with age.

(3) Causes and motives for suicide

According to the statistics of the National Police Agency, health and financial/lifestyle problems were the top two reasons for suicide. Although this tendency remained the same during the increase in suicides that began in 1998, the number of suicides due to financial/lifestyle problems has increased more rapidly compared to suicides commit-

ted due to health problems. Among those who committed suicide with or without suicide notes in 1997, 13,659 individuals (56.0%) did so due to health problems and 3,556 individuals (14.6%) due to financial/lifestyle problems. These numbers rose to 16,769 (51.0%, a 22.8% increase over the previous year) and 6,058 (18.4%, a 70.4% increase over the previous year), respectively, in 1998. In terms of those with health problems, the number of suicides subsequently decreased in 2004 to 14,786 (45.7%), whereas the number of suicides due to financial/lifestyle problems increased to 7,947 (24.6%). This indicates that the percentage of suicides due to financial/lifestyle problems has been increasing.

Recent suicide prevention programs in Japan

Many suicide prevention measures have been implemented internationally [3-5]. In Japan, evidence has also emerged recently to support the effectiveness of community-based programs for suicide prevention. Seven community-based intervention trials implemented for five years or more have been conducted between 1985 and 2005 in Japan. All the trials used a quasi-experimental design and included suicide rate as the primary outcome. These suicide prevention programs included the development of social support networks in the community and/or depression screening for residents with follow-up by physicians. All the intervention programs were also administered by local governments. Six of the seven trials targeted individuals aged 65 years and older.

The first trial was conducted in Matsunoyama, Niigata prefecture. During the 10-year implementation period, the suicide rate of over 150 per 100,000 decreased by 75% for both men and women aged 65 years and older [6]. In the trials conducted in Joboji (Iwate pref.), Nagawa (Aomori pref.), Matsudai and Yasuzuka (Niigata pref.), and Yuri (Akita pref.), the suicide prevention program significantly reduced the suicide risk for individuals aged 65 years and older [7-10].

Recently, a relatively large, multimodal intervention trial targeting all age groups was conducted in four municipalities of Akita. During the four-year implementation period, the suicide rate of 68 per 100,000 for all residents was reduced by 27% [11].

The results of these seven trials suggest that community-based intervention would be effective for preventing suicide and that the increase of suicide deaths in Japan may be related to more pervasive social isolation than in the past, and to an absence of personal psycho-social development compared with financial success.

However, the sample sizes in these trials were relatively small and the monitoring of the implementation process was insufficient. Furthermore, since the trials were conducted in rural areas with high suicide rates, it is still unclear whether similar community-based programs would be effective in urban areas where the suicide rates have increased rapidly. Therefore large, community-based intervention trials with adequate controls should be conducted to develop an effective, evidence-based suicide prevention program to reduce the future suicide rate in Japan.

Objectives of this study

(1) The primary goal is to examine the effectiveness of a community-based multimodal intervention program for suicide prevention in regions where the suicide rate was relatively high compared to control regions. These target areas were designated "Group 1".

(2) The secondary goal was to explore the effectiveness of a community-based multimodal intervention program for suicide prevention in highly populated regions. These target areas were designated "Group 2".

Methods/Design

A community intervention trial will be conducted to evaluate the effectiveness of a novel suicide intervention program. In this study, the incidence of suicidal behavior in an intervention group and a control group will be compared.

Organization

The Japan Ministry of Health, Labour, and Welfare selected the Japan Foundation for Neuroscience and Mental Health (JFNMH) as the primary institution responsible for the strategic research program for suicide prevention. The JFNMH conducts the program "Japanese Multimodal Intervention Trials for Suicide Prevention, J-MISP" in close collaboration with the National Center of Neurology and Psychiatry. NOCOMIT-J is one of two research projects being conducted by J-MISP. The other is a randomized, controlled, multicenter trial of post-suicide attempt case management for prevention of further attempts in Japan (ACTION-J).

The principal investigator of NOCOMIT-J and the subleader will supervise the study group in order to conduct and complete the study effectively.

The study group management office will engage in overall administrative procedures regarding the operation of the study group. It will also set up and operate the study group steering committee and the intervention program committees, hold the research conference, and respond to questions from institutions in the participating regions.

The J-MISP director, the principal investigator of the NOCOMIT-J, and the regional leaders share the informa-

tion and collaborate to resolve problems and safety issues with the help of the steering committee and the Central and Local Research Ethics Committee.

The study group steering committee will be composed of regional leaders and other key members of the study group. Research meetings will be held upon the principal investigator's request. At the meetings, the intervention program committee will present the agenda, after which important issues, such as revision of the protocol or stopping of the study, will be discussed.

Participants and Participating Areas

Participants

The participants will include Japanese and foreign residents living in the intervention and control regions.

Eligibility Criteria

Target areas will be selected and divided into two groups: "Group 1" and "Group 2" as mentioned above. The areas meeting the following criteria will be eligible for the study:

a) Areas with strong support from local government and other organizations to conduct this multimodal suicide prevention program.

b) Areas capable of selecting intervention and control regions.

c) Areas capable of following the data collection procedure.

d) Areas with comparable baseline data on suicide attempts in intervention and control regions.

e) Areas with comparable baseline demographic data in intervention and control regions.

Participating regions and sample size estimation

(1) Group 1: Regions in Aomori, Akita, Iwate, and the Minamikyushu area, with a total population of 670,000 individuals.

(2) Group 2: Regions in Sendai, Chiba, and the Kitakyushu area, with a total population of 1,450,000 individuals.

After a preliminary survey to record the rate of suicidal behavior and other information in the target regions in these areas, intervention and control regions will be selected based on the similarity in community characteristics and the incidence of suicidal behavior (Figure 1).

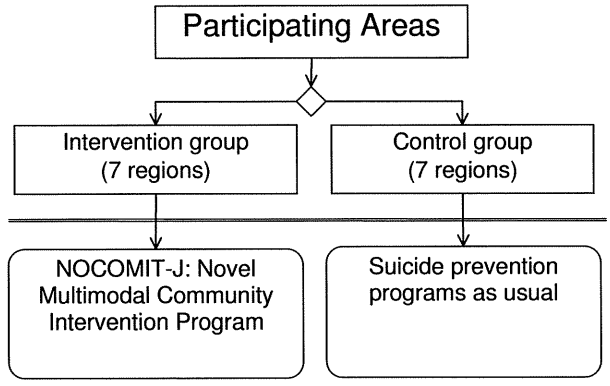


Figure 1
Flow diagram of the study.

Each region has a designated regional leader. The personnel associated with each region include psychiatrists, researchers supporting community intervention, and personnel in charge of regional health administration.

Rationale for estimation of sample sizes

Sample sizes to be used in the study were calculated based on the assumptions of the outcome and suicide rates from 2002 to 2004 in Groups 1 and 2 presented in Table 1.

Although the estimated sample sizes are not adjusted for 5-year age group, sex, and regional characteristics, if all assumptions are met, the statistical power will be over 80% for each group, regarding person-year incidences in the intervention and control regions.

Using the O'Brien-Fleming method [12] in the interim analysis, the significance level in the final analysis is estimated to be 4.9% for a two-sided test. In addition, the statistical power will be over 80% in each group.

Intervention

The intervention program will be implemented by local authorities.

Suicide prevention program in control regions

The interventions in the control regions include the usual suicide prevention programs.

Suicide prevention programs in intervention regions

The local health authorities will implement the suicide prevention measures in accordance with the intervention manual developed by the program committee of the study group. To better enhance the quality of the essential intervention activities, the local health authority is also requested to share with the other study group members the information on the program tools.

Table 1: Assumptions of the outcome and suicide rates in Group 1 and Group 2

	Group 1	Group 2
Suicide rate in control regions (per 100,000 individuals)	30	20
Proportion of expected numbers of ambulance transports due to "self-harm" (severe and mild cases) relative to completed suicides	50%	50%
Expected suicide rate reduction over observed 3 years by intervention	20%	15%
Significance level (two-sided)	5%	5%

Notes. These assumptions of the outcome and suicide rates (2002–2004) are used to calculate the sample sizes in this study.
Group1: regions with a relatively high suicide rate compared to control regions, examined to gauge the effectiveness of the community-based multimodal intervention program for suicide prevention.
Group 2: highly-populated regions, examined in order to explore the effectiveness of the community-based multimodal intervention program for suicide prevention.

The program components

The program stresses that bonds between human beings, social support, and social capital within communities are key factors for reducing suicide. Its essential components are listed below.

(1) The program focuses on building social support networks in the public health system for suicide prevention and mental health promotion, which will reinforce human relationships in the community.

- Network meetings of related departments and organizations will be held.

- Coordinating committees for the program will be formed in the intervention regions.

(2) Primary prevention measures for suicide and suicide-related behavior

- An public awareness campaign will be set up.

- Community programs will be set up to allow residents to gather and communicate.

(3) Secondary prevention measures for suicide and suicide-related behavior

- High-risk individuals will be screened.

- Counseling and outreach services will be provided.

(4) After-care for individuals bereaved by suicide

(5) Suicide prevention measures targeting individuals with substance/alcohol-related disorders, schizophrenia, and other mental health disorders

(6) Suicide prevention measures targeting individuals with work-related problems.

Study period

Study period: August 2005 to March 2010.

Intervention period: July 2006 to December 2009.

Approval of the study protocol

This study protocol was reviewed and approved by the Central Research Ethics Committee of the J-MISP. Additionally, the regional leaders will ask the local governors for cooperation, and obtain written authorization to conduct the study. Regional leaders will obtain approval from the ethics committees of affiliated universities or hospitals.

Data collection

Baseline Information

Data will be collected for the items below:

(1) Statistics on suicide

The number of suicides in the 3 years prior to the study (2003–2005) in the study regions was recorded by sex and 5-year age group the Japan Ministry of Health, Labour, and Welfare.

(2) Information from the emergency report

Information on "self-harmed" individuals transported by ambulance in the 3 years prior to the study was collected from the emergency reports of ambulance service.

(3) Demographic information

A total population count in the regions in the 3 years prior to the study was recorded by sex and 5-year age group by each local governments.

(4) Regional characteristics

The following information was collected from published statistical data sources: geographic information, proportion of unmarried individuals, widowed spouses, divorcees, nuclear families, the unemployed, individuals in the labor force, and the annual population turnover in the regions.

(5) Suicide prevention programs in existence prior to the study
Baseline information concerning suicide prevention programs implemented in each region 3 years prior to the study will be recorded by each regions.

Intervention program process monitoring
Every 6 months, each regional leader will collect information regarding the implemented projects described in the intervention program manual.

Data collection during the study
(1) Information on suicides
After consent is obtained for the use of designated statistics for other purposes, information regarding the number of suicides in the participating regions will be collected. Death certificates from the Vital Statistics records from 2006, 2007, 2008, and 2009 for the intervention and control regions will be used to collect the following data items: International Classification of Diseases 10th Revision (ICD-10) code for intentional self-harm (ICD-10 codes X60–X84), residence of individuals who committed suicide (municipality codes), cause of death, external cause of death (ICD-10 code), measure of suicide (ICD-10), sex, age, reported place (municipality codes), and identification number.

(2) Information regarding suicidal behavior
Information regarding "self-harmed" individuals transported by ambulance will be collected from emergency reports.

The following information will be collected regarding "self-harmed" individuals every 6 months: type of transportation, date of notification, residence address, destination address, incidence location, severity (death, severe, moderate, mild, other), sex, age, and means of self-harm infliction.

(3) Demographic information
Total population numbers in the regions will be collected every year between 2006 and 2009.

(4) Information regarding ongoing suicide prevention programs
Information regarding the existence and implementation of suicide prevention programs in each participating region will be collected every 6 months.

Responsibility for data collection
Regional leaders are responsible for collecting data from each municipality and sending the data set to the data management center in a timely manner.

Data management
Collected data will be exclusively managed by the data management center. The data set will comply with the data management procedures and the Personal Information Protection Law. The data set will be periodically duplicated and saved as a backup file.

Outcomes
Primary outcome
The incidence of suicidal behavior (completed suicides and suicide attempts excluding mild cases reported on emergency reports).

Secondary outcomes
(1) Incidence of completed suicides.

(2) Incidence of suicide attempts.

Statistical analysis
Primary analysis
In the primary analysis, the incidence of suicidal behavior will be calculated based on the number of suicidal behavior per person-year for the annual population. Data obtained will include the incidence of suicidal behavior and its 95% confidence intervals adjusted by sex, 5-year age group, and regional characteristics. This data will be compared between the intervention and control regions in "Group 1".

The significance level will be set at 0.05 for the two-sided test, and will be adjusted in the final analysis based on the methods of O'Brien and Fleming [12] for interim analysis.

Additionally, regression analysis will also be performed to examine the interactions among sex, 5-year age group, and regional characteristics. A statistician in the study group will determine the analysis plan, whereas a different independent statistician will perform the interim analysis. The independent statistician will not contribute to the revision of the statistical analysis plan after interim analysis.

Interim analysis and rules for stopping or revising the study protocol
The interim analysis in "Group 1" will be performed 2 years after the study's implementation to evaluate the achievement of the primary objectives. Multiplicity will be adjusted using the methods of O'Brien and Fleming, in order to maintain Type-1 error at 0.05 for the two-sided test. The results will be reported to the Central Research Ethics Committee, which is expected to make recommendations to the J-MISP director to either stop the study or revise the study protocol if the primary objective of the study has already been achieved or is unlikely to be achieved.

Secondary analysis
In addition to the primary analysis, it will also be evaluated whether the primary outcome (the incidence of sui-

cidal behavior) is also significantly reduced in intervention regions of "Group 2" areas, as a consequence of implementation of the program, when compared to control regions. The incidence of suicidal behavior will be investigated in Groups 1 and 2 combined. The analysis will be performed using the primary analysis plan described above.

Secondary outcomes will also be examined in order to determine whether the rate of completed suicides and suicide attempts – including individuals with severe, moderate, and mild self-harm transported to a hospital – is significantly reduced in the intervention regions, when compared to the control regions in "Group 1" and "Group 2". The same will be examined for both groups combined.

Subgroup analysis of the primary and secondary outcomes will be performed by sex, 5-year age group, and regional characteristics in "Group 1", "Group 2", and both groups combined. In addition, the incidence of suicidal behavior adjusted by sex and 5-year age group in the intervention and control regions will be calculated using the model population in 1985 as a reference population. Because of the exploratory nature of the secondary analysis, no adjustment for multiplicity will be made.

Ethical considerations

The rights and welfare of the participating residents will be protected according to the World Medical Association Declaration of Helsinki Ethical Principles for Medical Research Involving Human Subjects. The study will comply with the ethical guidelines of the Ministry of Education, Culture, Sports, Science and Technology, as well as the Ministry of Health, Labour, and Welfare. Ethical validity, including safety, scientific legitimacy, and the reliability of results are to be ensured. This study will also comply with the ethical guidelines for epidemiologic studies and the Personal Information Protection law. The NOCOMIT-J principal investigator and the J-MISP director will be responsible for the protection of personal information during the study.

The data collected in this study will not include personal identification that would enable individuals to be identified. The data management center will collect only anonymous data.

Stopping of the study

The J-MISP director is to inform the principal investigator of the NOCOMIT-J of the decisions of the Central Research Ethics Committee in the cases described below to discuss whether the study in each region or all of them should be discontinued.

a) The results of the interim analysis do not satisfy the standards set by the committee.

b) Safety issues that might affect the conduct of future studies arise from the results of interim analysis or the results of periodic monitoring.

c) The Local Research Ethics Committee of a region retracts consent to participate.

Revision of the study protocol and due process

The J-MISP director is to inform the NOCOMIT-J principal investigator of the decisions of the Central Research Ethics Committee as soon as possible, when the Central Research Ethics Committee recommends that the study be redesigned due to the emergence of safety issues based on the interim analysis, periodic monitoring, and/or emergence of serious issues that might affect the conduct of future studies. The J-MISP director is to call a meeting of the study group and discuss the revision of the study protocol. If a recommendation to revise the study protocol is made, the principal investigator of the NOCOMIT-J will propose the revised study protocol as soon as possible and submit the proposal to the J-MISP director.

The J-MISP director will deliberate and approve the proposal at the Central Research Ethics Committee meeting and adopt the revision of the study protocol after deliberation in the steering committee. The study group management office will inform all of the participating researchers, and regional leaders will submit the proposed revision to the Local Research Ethics Committee and local government in each of the participating regions. The revision of the study protocol is to be implemented when approved.

Study monitoring

Periodic monitoring

The regional leaders will periodically (once every 6 months) submit reports evaluating the progress of the study to the intervention program committee. The intervention program committee will submit a process evaluation monitoring report to the study group management office and J-MISP administration office once every 6 months. The J-MISP administration office will consider the progress of the research and submit the process evaluation monitoring report to the progress control committee and the Central Research Ethics Committee of the J-MISP.

The data management center will submit an event monitoring report to the J-MISP administration office. The office will submit event monitoring reports to the progress control committee, Central Research Ethics Committee, and the study group management office. The event monitoring report, which will contain the results of the analysis

separated by intervention and control groups, will be submitted to the progress control committee and Central Research Ethics Committee. The results of the data analyzed from both groups combined will be submitted to the study group management office.

The progress control committee will examine the monitoring reports and submit the evaluation to the J-MISP director. The Central Research Ethics Committee will examine the monitoring reports as a third party, and make recommendations to revise the study protocol or discontinue the study to the J-MISP director when and if ethical problems, such as safety and efficacy issues, arise.

Monitoring reports

The process evaluation monitoring report will contain the following:

(1) An evaluation of the implementation progress of the study.

(2) A program process evaluation.

(3) Reports of individual cases and events requiring intervention and other information.

The event monitoring report will contain the following:

(1) Data on the incidence of suicidal behavior (total number of both suicide completions and attempts) in the intervention and control groups, etc.

(2) Other relevant information.

Discussion

The study presented here is designed to evaluate the effectiveness of the community-based suicide prevention program in seven participating areas. Because treatment and prevention of suicide are complex and encompass many factors, success

will need multi-sector collaboration. We hope that the results of NOCOMIT-J will help to develop effective strategies to reduce future suicide rate in Japan.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

All authors participated in the design of the study. All authors contributed to the writing of the manuscript and have approved the final manuscript.

Acknowledgements

This study was funded by Health Labour Sciences Research Grant from the Ministry of Health, Labour, and Welfare of Japan, and was sponsored by the Japan Foundation for Neuroscience and Mental Health.

References

1. Ishihara A: **Suicide in Japan – the analysis of vital statistics.** *J Ment Health* 2003, **49(Suppl):**13-26.
2. Fujita T: **Rapid increases of suicide deaths in metropolitan areas.** *J Natl Inst Public Health* 2003, **52:**295-301.
3. Taylor SJ, Kingdom D, Jenkins R: **How are nations trying to prevent suicide? An analysis of national suicide prevention strategies.** *Acta Psychiatr Scand* 1997, **95:**457-463.
4. Mann JJ, Apter A, Bertolote J, Beautrais A, Currier D, Haas A, Hegerl U, Lonnqvist J, Malone K, Marusic A, Mehlum L, Patton G, Phillips M, Rutz W, Rihmer Z, Schmidtke A, Shaffer D, Silverman M, Takahashi Y, Varnik A, Wasserman D, Yip P, Hendin H: **Suicide prevention strategies: A systematic review.** *JAMA* 2005, **294:**2064-2074.
5. Goldney RD: **Suicide prevention: A pragmatic review of recent studies.** *Crisis* 2005, **26:**128-140.
6. Takahashi K, Naito H, Morita M, Suga R, Oguma T, Koizumi T: **Suicide prevention work for the elderly in Matsunoyama Town, Higashikubiki County, Niigata Prefecture; Psychiatric care for elderly in the community.** *Seishinshinkeigakuzasshi* 1998, **100:**469-485. (In Japanese).
7. Oyama H, Goto M, Fujita M, Shibuya H, Sakashita T: **Preventing elderly suicide through primary care by community-based screening for depression in rural Japan.** *Crisis* 2006, **27:**58-65.
8. Oyama H, Koida J, Sakashita T, Sakamoto S, Kudo K: **Community-based prevention for suicide in elderly by depression screening and follow-up.** *Community Ment Health J* 2004, **40:**249-263.
9. Oyama H, Ono Y, Watanabe N, Tanaka E, Kudoh S, Sakashita T, Sakamoto S, Neichi K, Satoh K, Nakamura K, Yoshimura K: **Local community intervention through depression screening and group activity for elderly suicide prevention.** *Psychiatr Clin Neurosci* 2006, **60:**110-114.
10. Oyama H, Watanabe N, Ono Y, Sakashita T, Takenoshita Y, Taguchi M, Takizawa T, Miura R, Kumagai K: **Community-based prevention through group activity for elderly successfully reduced the high suicide rate for females.** *Psychiatr Clin Neurosci* 2005, **59:**337-344.
11. Motohashi Y, Kaneko Y, Sasaki H: **Lowering suicide rates in rural Japan.** *Akita J Public Health* 2005, **2:**105-106.
12. O'Brien PC, Fleming TR: **A multiple testing procedure for clinical trials.** *Biometrics* 1979, **35:**549-556.

Pre-publication history

The pre-publication history for this paper can be accessed here:

http://www.biomedcentral.com/1471-2458/8/315/prepub

BMC Public Health

BioMed Central

Study protocol

Open Access

A randomized controlled multicenter trial of post-suicide attempt case management for the prevention of further attempts in Japan (ACTION-J)

Yoshio Hirayasu*[1], Chiaki Kawanishi*[1], Naohiro Yonemoto[2], Naoki Ishizuka[3], Yoshiro Okubo[4], Akio Sakai[5], Toshifumi Kishimoto[6], Hitoshi Miyaoka[7], Kotaro Otsuka[5], Yoshito Kamijo[8], Yutaka Matsuoka[9] and Toru Aruga[10]

Address: [1]Department of Psychiatry, Yokohama City University School of Medicine, 3-9 Fukuura, Kanazawa-ku, Yokohama 236-0004, Japan, [2]Department of Biostatistics, School of Public Health, Kyoto University, Yoshidakonoecho, Sakyo-ku, Kyoto 606-8501, Japan, [3]Division of Preventive Medicine, Department of Community Health and Medicine, Research Institute, International Medical Center of Japan, 1-21-1 Toyama, Shinjuku-ku, Tokyo 162-8655, Japan, [4]Department of Neuropsychiatry, Nippon Medical School Tokyo, 1-1-5 Sendagi, Bunkyo-ku, Tokyo 113-8602, Japan, [5]Department of Neuropsychiatry, Iwate Medical University, 19-1 Uchimaru, Morioka, Iwate 020-8505, Japan, [6]Department of Psychiatry, Nara Medical University, 840 Shijo-cho, Kashihara, Nara 634-8521, Japan, [7]Department of Psychiatry, Kitasato University School of Medicine, 1-15-1 Kitasato, Sagamihara, Kanagawa 228-8555, Japan, [8]Department of Emergency and Critical Care Medicine, Kitasato University School of Medicine, 1-15-1 Kitasato, Sagamihara, Kanagawa 228-8555, Japan, [9]Department of Adult Mental Health, National Institute of Mental Health, National Center of Neurology and Psychiatry, 4-1-1 Ogawa-Higashi-cho, Kodaira, Tokyo 187-8553, Japan and [10]Department of Emergency Medicine, Showa University School of Medicine, 1-5-8 Hatanodai, Shinagawa-ku, Tokyo 142-8555, Japan

Email: Yoshio Hirayasu* - hirayasu@yokohama-cu.ac.jp; Chiaki Kawanishi* - chiaki@yokohma-cu.ac.jp; Naohiro Yonemoto - nyonemoto@jfnm.or.jp; Naoki Ishizuka - naishi@ri.imcj.go.jp; Yoshiro Okubo - okubo-y@nms.ac.jp; Akio Sakai - sakaiaki@iwate-med.ac.jp; Toshifumi Kishimoto - toshik@naramed-u.ac.jp; Hitoshi Miyaoka - miyaoka@med.kitasato-u.ac.jp; Kotaro Otsuka - kotaro29@iwate-med.ac.jp; Yoshito Kamijo - yk119@kitasato-u.ac.jp; Yutaka Matsuoka - yutaka@ncnp.go.jp; Toru Aruga - aruga@med.showa-u.ac.jp

* Corresponding authors

Published: 26 September 2009

BMC Public Health 2009, **9**:364 doi:10.1186/1471-2458-9-364

Received: 19 August 2009
Accepted: 26 September 2009

This article is available from: http://www.biomedcentral.com/1471-2458/9/364

Abstract

Background: A previous suicide attempt is a potent risk factor for suicide later on. Crisis intervention, psychiatric and psychosocial evaluation at emergency medical facilities, and follow-up care for suicide attempters are considered important components for suicide prevention. The Japanese Multimodal Intervention Trials for Suicide Prevention (J-MISP) includes a randomized, controlled, multicenter trial of post-suicide attempt case management for the prevention of further attempts (ACTION-J) to address the continuing increase in suicides in Japan. The primary aim of ACTION-J is to examine the effectiveness of an extensive intervention for suicide attempters in prevention of recurrent suicidal behavior, as compared with standard intervention. This paper describes the rationale and protocol of the ACTION-J trial.

Methods/Design: In this clinical trial, case management intervention will be provided at 19 emergency medical facilities in Japan. After crisis intervention including psychiatric evaluation, psychosocial assessment, and psychological education, subjects will be randomly assigned to either a group receiving continuous case management or a control group receiving standard care. Suicidal ideation, depressive symptoms, and general health condition will be evaluated as secondary

measures. The intervention was initiated in July 2006. By December, 2009, 842 subjects will be randomized. Subject follow-up will continue for 1.5 to 5 years.

Discussion: Suicide is a complex phenomenon that encompasses multiple factors. Case management by multi-sector collaboration is needed. ACTION-J may provide valuable information on suicide attempters and may develop effective case management to reduce future risk for suicide attempters.

Trial registration: UMIN Clinical Trials Registry number, UMIN000000444. ClinicalTrials.gov number, NCT00736918.

Background

A history of suicide attempt as a risk factor for suicide

Based on studies in Europe, North America, and Australasia, a previous suicide attempt is a key risk factor for completed suicide [1-3]. After a follow-up period of 1 year, 12% to 15% of repetitions of cases of self-harm or suicide attempt are non-fatal, whereas 0.8% to 2.6% are fatal. After a follow-up period of 9 years, 3% to 12% ended in completed suicide [4]. Given these statistics, intervention for suicide attempters is an important element to prevent suicide.

Recent increase in suicides in Japan

For approximately two decades (from 1978 to 1997), the suicide rate in Japan has been between 17.0 and 21.0 per 100,000 people. In 1997, 24,931 suicides were reported in Japan. In 1998, a dramatic 1.35-fold increase in the number of suicides in Japan occurred, as 32,863 suicides were reported. Since 1998, suicide rates in Japan have been between 25.2 and 27.0 per 100,000 people. For 11 years, the annual number of suicides in Japan has remained over 30,000 [5]. According to statistics from the World Health Organization (WHO) compiled in 2007 concerning worldwide suicide rates, the suicide rate in Japan was the eighth highest in the world [6].

Recent preventive measures against suicide in Japan

"The Declaration of Suicide Prevention" was issued in 2002 in Japan by the Advisory Panel on Strategy for Suicide Prevention. Since 2002, various measures associated with suicide prevention have been implemented, such as publication of suicide prevention manuals for the work place and medical practitioners. However, the number of suicides has not yet declined significantly. Therefore, in 2005, an intensive deliberation on suicide prevention was held by the Health, Labour, and Welfare Committee in the House of Councillors, and "The Resolution on Urgent and Effective Promotion of Comprehensive Strategies for Suicide" was passed in July 2005.

Also in 2005, two research projects (Japanese Multimodal Intervention Trials for Suicide Prevention: J-MISP [7]) funded by The Japanese Ministry of Health, Labor and Welfare (JMHLW), were launched to develop effective strategies to prevent suicide. J-MISP consists of a community intervention trial of a multimodal suicide prevention program (NOCOMIT) [8] and a randomized controlled multicenter trial of post-suicide attempt case management to prevent further attempts (ACTION-J).

Review of strategies of intervention for suicide attempters

Various studies on intervention for suicide attempters as well as systematic reviews of these studies have been reported [9-14]. Few randomized controlled trials that focused on intervention methods showed a significant decrease in the repetition rate for attempted suicide. Van Herringen and colleagues investigated the effects of various strategies to increase compliance with referrals for outpatient aftercare [9]. Twenty-one of 196 patients (10.7%) in the experimental group and 34 of 195 patients (17.4%) in the control group repeated their suicidal behavior. The odds ratio was 0.57 (95% CI: 0.32 to 1.02).

A summary of 5 studies comparing cognitive behavioral therapy with standard aftercare demonstrated an odds ratio of 0.70 (confidence interval, 0.45 to 1.11), indicating the effects on suicide prevention. A summary of 6 studies involving intensive outreach, brief inpatient treatment, and nursing care, as compared with standard care, produced the odds ratio of 0.83 (CI: 0.61 to 1.14) [12].

Small sample sizes in the primary studies selected for the systematic review resulted in a wide range of confidence intervals for the odds ratios. Fewer than 600 subjects in both the experimental and control groups participated in the 5 studies to evaluate cognitive behavioral therapy and the 6 studies to investigate the effects of outreach programs. Thus, the total number of subjects in these studies was under 1,200. In addition, the follow-up period after enrollment was only 6 to 12 months. Hawton and colleagues [11] and Gaynes and colleagues [13], noting the limitations of studies with too few subjects and too short a study period, emphasized the need for large trials at

multiple sites in order to determine the benefits of interventions.

Overall scheme of ACTION-J

The act of suicide is complex. Findings from previous psychological autopsy studies in other countries indicate that more than 80% of patients who completed suicide could be diagnosed with a psychiatric disorder [15,16]. Over 80% of highly lethal (incomplete) suicide attempters taken to emergency medical centers in Japan were diagnosed with axis I psychiatric disorders, according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [17]. Proper psychiatric assessment and treatment of suicide attempters may be critical to suicide prevention.

Based on these findings, we chose to utilize emergency medical facilities as trial sites and designed an intervention trial involving close collaboration between emergency medicine and psychiatric medicine for management of suicide attempters with psychiatric disorders. We planned a large-scale, multisite study in Japan.

In this trial, case management is employed as an intervention method. Case management provides multi-dimensional and comprehensive care that has not been studied in previous research, and includes psychological education, follow-ups to increase compliance with referrals for outpatient treatment, individualized casework including coordination of use of social resources, and information technology-based services. Prevention of further suicide attempts will be compared between subjects in the experimental group who receive the specialized, case management care and subjects in the control group who receive standard care.

Objective of this study

The objective of this study is to examine the effectiveness of a trial intervention to prevent recurrent suicidal behavior by suicide attempters in Japan, as compared with a control intervention. It is expected that the case management administered in this study will be effective to prevent recurrence of suicide attempts.

Methods/Design

ACTION-J is an open, randomized, controlled, multicenter study which examines the effectiveness of a trial intervention for suicide attempters in Japan. The trial intervention involves the implementation of case management for suicide attempters transported and admitted to emergency medical facilities. The task schedule is presented in Table 1.

Organization

JMHLW selected the Japan Foundation for Neuroscience and Mental Health (JFNMH) as the primary institution responsible for J-MISP, in close collaboration with the National Center of Neurology and Psychiatry. The J-MISP administration office in JFNMH will organize overall administrative procedures regarding the operations of the ACTION-J study group. The office will also establish and operate the steering committee, central research ethics

Table 1: Task schedule

	during admission	at discharge	1 w after discharge	4 w	8 w	12 w	6 m	12 m	18 m	24 m	30 m	36 m	42 m	Interim/ Final analysis
Psychiatric diagnosis	◎													
Psychoeducation 1*	◎													
Informed consent	◎													
Enrollment/ randomization	◎													
Input data at time of discharge		◎												
Case management (Psychodeucation 2**, others)	○		○	○	○	○	○	○	○	○	○	○	○	
Psychiatric evaluation	◎						◎		◎		◎		◎	
Event	Input content of the event (ie, recurrent suicidal behavior, adverse event) into the web system as occasions require													
Participant survival (or cause of death of the participant)														◎
Actions to critical situations	In both groups during the study as occasions require													
Reports of a serious adverse event	Prompt report to the director of the hospital and the study group management office in both groups as occasions require													

◎ : implemented in both groups; ○ : implemented only in experimental intervention group
*: Psychoeducation Program I to all participants in both groups
**: Psychoeducation Program II to their family members during hospitalization in the experimental group
w: week, m: month

committee, study evaluation committee, and study progress control committee.

The ACTION-J study group will include 19 participating hospitals in Japan. The study group will comprise the following: the study group management office, each participating hospital, the steering committee, the principal statistician, the independent statistician, the intervention program committee, the event review committee, and the data management center for technical support.

Each participating hospital will have psychiatrists, emergency department physicians, case managers, and other personnel. In addition, one coordinator, either a psychiatrist or an emergency physician, will be assigned to each participating hospital. Other participating researchers in this study include experts in suicide prevention, nurses, clinical psychologists, psychiatric social workers, biostatisticians, epidemiologists, and coordinators of the data management center.

Subjects

Subjects will include individuals who are admitted to emergency medical facilities in Japan, are evaluated by an emergency physician or a psychiatrist in the emergency department, and are diagnosed as having made a suicide attempt. Subjects must also meet the following inclusion criteria:

Inclusion criteria

1) Subject is over 20 years old.

2) Subject has been diagnosed with a psychiatric disorder classified into DSM-IV axis I.

3) Subject has had suicidal intentions confirmed at least twice using the Suicide Intent Scale [18].

4) Subject is able to understand the description of the study and provide informed consent.

5) During hospitalization, subject is able to attend an interview and the *Psychoeducation Program I* (see *Intervention* section), which will be required before enrollment in the study.

6) Subject is able to visit the participating hospital regularly for evaluations and case management and be contacted directly from the hospital on a regular basis.

Exclusion criterion

1) Individual has a primary diagnosis that is not classified into DSM-IV axis I.

Estimation of sample size

The total sample size is 842 participants, including 421 participants in each of the two treatment groups. Calculation of the desired sample size was based on the following rationale. According to a study of suicidal individuals transported to psychiatric emergency facilities in Japan, the annual incidence rate of events (including death) was set at 15% in the control group [19]. The target reduction in recurrent suicidal behavior in the trial intervention group was set at approximately 30%; the annual incidence rate of events (including death) in the intervention group was estimated to be 10.5% [20].

Based on this estimation, we calculated the sample size using the method of Shoenfeld and Richter, in order to confirm that the intervention group is superior, with a significance level of 2.5% for the one-sided test and a power of 90%, dependent on a 3.5-year-enrollment period and a 1.5-year follow-up period after enrollment. Given these assumptions, the desired number of participants per group was calculated to be 518, and number of events was expected to be 296. Sample size was set to increase the likelihood that the expected number of events ($\geq$ 90% if no participant is lost to follow-up) would be observed during the study period.

Informed consent

Participants will be patients admitted to the participating hospitals on an emergency basis, those who meet the inclusion criteria, and who provide informed consent to participate in this study.

Enrollment

Participant enrollment will be based on the following procedural outline (Figure 1). Any physician in an emergency facility will contact a psychiatrist when suspecting that a patient has made a suicide attempt. The psychiatrist will collect information and make a psychiatric diagnosis when examining the patient. At this point, the patient's suicidal intention will be confirmed (first check for suicidal intention). The investigator will confirm that the patient has not yet participated in this trial (i.e., that this event is not a repetition of suicidal behavior of a participant already enrolled in this trial) and will determine whether the patient is eligible to participate in this study by reviewing the inclusion and exclusion criteria. The investigator will explain this study, as well as the *Psychoeducation Program I* (see the description in the *Intervention section*), to a patient who is confirmed to have suicidal intentions and obtain patient consent. Next, a practitioner in charge of the psychoeducation program will provide the *Psychoeducation Program I* to the patient.

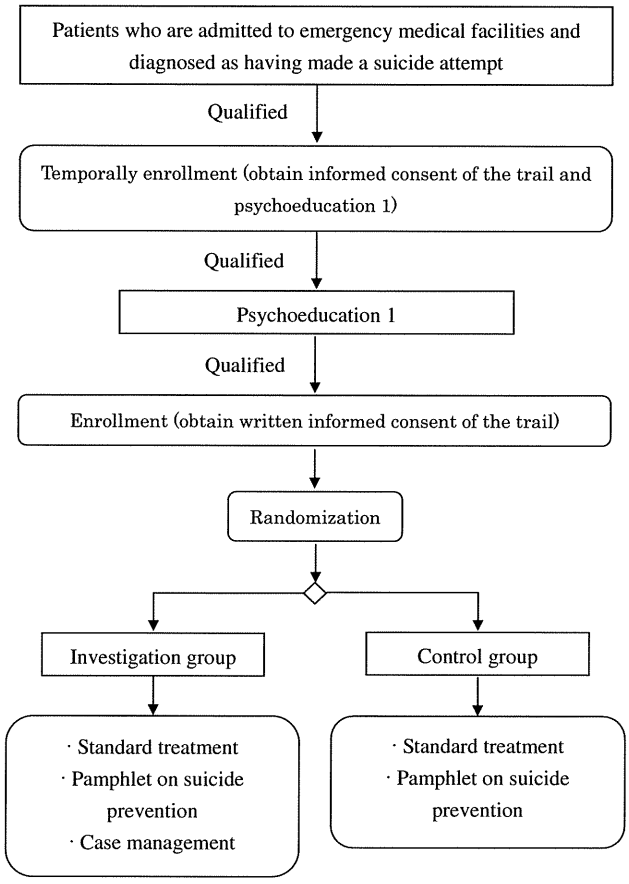


Figure 1
Flow diagram of the study.

The investigator will again confirm the suicidal intentions of a patient who is deemed eligible to participate in the study. After the patient completes the *Psychoeducation Program I*, the investigator will reconfirm the suicidal intentions of a patient who is deemed eligible to participate in the study (second check for suicidal intention). The investigator will obtain written consent from the patient to participate in this study. On-site research staff at the participating hospital will collect data from the participant at the time of enrollment and enter the information via a web input system to receive a random assignment. The participant will be informed about his/her assigned group and the subsequent schedule within 1 week (by the time of the first interventional treatment).

Randomization

Using the minimization method, participants will be randomly assigned to either the intervention group or control group. Central assignment involving an Internet-based assignment system will be performed.

Participants will be randomly assigned to one of the two groups according to the following factors:

1) Hospital

2) Gender

3) Age (< 40 or ≥ 40 years)

4) History of suicide attempts

Intervention

All participants will attend the semi-structured *Psychoeducation Program I*, which will involve a discussion of psychological changes leading to suicide, risk factors for suicide and the relationship to psychiatric disorders; introduce stress management; demonstrate the usefulness of psychological and social support; and make patients aware of social resources. After randomization, the following interventions will be carried out in the respective groups (Table 1).

Case management intervention in the experimental group

Case managers will periodically contact participants assigned to the experimental intervention group (on the 1st, 4th, 8th, and 12th week and the 6th month after the day of written consent, and every 6 months thereafter until the end of the study). Case managers will inform participants about the date of their scheduled interviews in advance, via e-mail or regular mail. E-mail messages for participants will be prepared with the e-mail form on the input system and sent via the dedicated e-mail address for this study; the dedicated e-mail address does not permit any replies. Regular mail will be sent by participating hospitals, and words such as suicide will not be printed on the envelopes.

In principle, case management should be accomplished through direct dialogue (face-to-face interviews), where a telephone conversation is the next best option. Interviews should be conducted at participating hospitals. If case managers cannot reach participants, case managers will approach participant family members who have given their consent to be contacted in advance.

The interview scheduled for the first week should be conducted within two days before or after the scheduled date. Interviews for the 4th, 8th, and 12th weeks should be conducted within a week, for the 6th month within 2 weeks, and thereafter within 1 month before or after the scheduled date.

Case management will include the following activities:

1) Periodic interviews (either face-to-face or via telephone) with participants

2) Collection of information about each participant's background and treatment status

3) Encouragement of psychiatric treatment to the participants

4) Coordination of appointments with psychiatrists and primary care physicians

5) Encouragement of psychiatric treatment to the participants who have stopped receiving the treatment

6) Referrals to social resources and private support organizations and coordination for utilization of these resources

7) Providing information to participants and the *Psychoeducation Program II* to their family members during hospitalization

8) Providing Internet-based information (website only for the experimental intervention group)

Case managers will conduct periodic case conferences with psychiatrists. The study group management office and the intervention program committee will periodically hold case conference meetings with the study group, visit the participating hospitals, and meet with case managers, as necessary.

Regarding Internet-based information, participants in the experimental intervention group who access the website will receive information about the psychoeducation program, support organizations, and a self-diagnosis program. The dedicated intervention website will contain pages providing an introduction to social resources and serial articles, applied intervention (including psychoeducation and self-evaluation tools), and crisis intervention. The Intervention Program Committee will periodically update the content and articles on the website.

Standard treatment will be provided to subjects in the experimental group at each participating hospital. In addition, each participant in the experimental group will receive a pamphlet on suicide prevention following the psychoeducation program and at hospital visits after enrollment.

Control intervention

Participants in the control group will receive standard treatment with casework at the participating hospitals. Also, participants in the control group will receive a pamphlet on suicide prevention following the psychoeducation program and during their visits for periodic evaluations 6 months after enrollment and every year thereafter.

Evaluations

Psychiatric Evaluations

Evaluators including psychiatrists, clinical psychologists, psychiatric social workers, and/or other mental health professionals, will conduct the psychiatric evaluations. In order to conduct blinded evaluations, evaluators will not know the participants' assigned groups, status of implementation of the intervention, or information on events obtained by other on-site research staff. Moreover, to achieve blinded evaluations, evaluators will not serve as case managers or practitioners in charge of the *Psychoeducation Program II*.

These evaluators will conduct psychiatric evaluations of all participants enrolled at the hospitals and will use a case sheet at 6 months from the date written consent was obtained and every year thereafter until the completion of the study. Evaluations can be carried out up to 1 month before or after the scheduled date.

Evaluations generally will take place as face-to-face interviews at the participating hospitals. The evaluators will notify the participants of the interview schedules 7 days before the scheduled dates via e-mail or regular mail. E-mail messages will be prepared with the e-mail form on the input system and sent via the dedicated e-mail address for this study; the dedicated email address does not permit any replies. Regular mail will be sent by the participating hospitals, and words such as suicide will not be printed on the envelopes. The evaluators will schedule the next evaluation date and inform participants at the end of each interview.

Evaluations will include the following:

1) Participant survival (or cause of death noted in the case of death of the participant)

2) Whether or not suicidal behavior has been repeated

3) Any events other than (1) or (2)

4) Stress factors

5) Persons and/or organizations to consult

6) Treatment status (outpatient or inpatient)

7) Physical function

8) Drinking habits

9) Evaluations using scales

a) Beck Hopelessness Scale [21]

b) Beck Depression Inventory-II (BDI-II) [22]

c) SF-36 [23]

Events

Events will be classified as follows:

1) Recurrent suicidal behavior

2) Total deaths (from any cause)

3) Self-harm

4) Adverse events other than (1), (2), or (3): Any unfavorable and unintended occurrence in a participant, whether or not there is a causal relationship with the intervention, will be recorded.

When identifying an event, the on-site research staff at the participating hospital will record the information according to the event review sheet and will confirm the information with the investigator. If there are no complications, the on-site research staff will enter the content of the event into the web input system. If necessary, on-site research staff will consult with the on-site research coordinator and the study group management office regarding any aspects of the event that are unclear. The on-site research coordinator will notify the hospital director about any serious adverse event and will fax the event review sheet directly to the study group management office.

The data center will consolidate the input data and periodically provide data to the study group management office and the chairperson of the event review committee, according to data management procedures. The study group management office and the chairperson of the event review committee should hold monthly event review meetings to evaluate and assess details of events based on the material provided.

Specific aspects of events will be described in the event definitions and event review procedures.

Time periods during the study

Study period: August 2005 through March 2011

Enrollment period: July 2006 through December 2009

Follow-up period: July 2006 through June 2011

Preconditions for hospital participation in the study

A hospital satisfying the following preconditions may participate in the study: The hospital should have both emergency medicine and psychiatry departments and an established collaborative agreement between those departments, so that the hospital can provide patients with psychiatric interventions to the emergency department.

Within the enrollment period, the hospital can recruit and obtain consent from at least 20 patients who are eligible to participate in the context of inclusion and exclusion criteria. The hospital will perform follow-up on the patients until study completion.

All participating researchers should take a seminar on suicide prevention (epidemiology, risk factors, psychology, prevention, intervention, and postvention). According to their respective roles, each participating researcher may take other seminars on psychiatric diagnosis (Mini International Neuropsychiatric Interview [M.I.N.I.; [24]]), the psychoeducation program, psychiatric evaluation, and assessment by scales (Suicide Intent Scale [18], Beck Hopelessness Scale [21], BDI-II [22], and SF-36 [23]).

Approval of the study protocol

The study protocol will be reviewed and approved by the Central Research Ethics Committee. In principle, the study protocol also will have to be reviewed and approved by the On-site Research Ethics Committee at each participating hospital.

Data collection

Data collection listed will be conducted according to the appropriate timing and each aspect of the relevant information.

Data collected at time of enrollment

1) Basic information on the participant

Initials, ID number, age, gender, other people living with the participant, marital status, education, employment, and other information

2) Information about suicidal behavior

Date and time, means, motivation, Beck Suicide Ideation Scale, and other details of past suicidal behavior

3) Demographic status (items marked with an asterisk on the forms are allocation adjustment factors): Age, gender, history of suicide attempts, DSM-IV diagnosis with M.I.N.I. [24], history of psychiatric treatment, history of

hospital visits for physical problems, drinking habits, family history, and individuals to consult

4) Condition (psychiatric and physical diagnoses) at the time of enrollment

a) Suicide Intent Scale (only at the time of enrollment) [18]

b) Beck Hopelessness Scale [21]

c) BDI-II [22]

d) SF-36 [23]

Data collected at time of discharge

1) Date of hospital discharge

2) Discharge plans

Data collected during case management

1) Psychological and social conditions

2) Status of treatment for psychiatric and/or physical problems

3) Utilization of social resources

4) Utilization of dedicated intervention website

5) Degree of participant satisfaction with case management

Data collected during psychiatric evaluations

1) Participant survival (or cause of death of the participant)

2) Whether or not a suicidal behavior has been repeated

3) Any events other than (1) or (2)

4) Stress factors

5) Individuals and/or organizations to consult

6) Other medical services received (during clinical visits and/or hospital admission)

7) Physical function

8) Drinking habits

9) Evaluations using scales

a) Beck Hopelessness Scale [21]

b) BDI-II [22]

c) SF-36 [23]

Outcomes

Primary outcome

The incidence of first recurrent suicidal behavior (expressed as attempted or completed suicides/person-year) will be used as the primary outcome, because an individual who reattempts suicide is at high risk for completion of suicide. Therefore, in order to develop effective suicide prevention strategies, it is essential to measure the time to the next suicidal behavior.

Secondary outcomes

Secondary outcomes will include the following:

1) Mortality rate (for any cause of death/person-year) during the study period2) The number and incidence rate of recurrent suicidal behavior, expressed as repeated suicidal attempts/person-year

3) The number of self-harm behaviors

4) Types and numbers of individuals and/or organizations to consult

5) Other medical services received (during clinical visits and/or hospital admission)

6) Physical function

7) Beck Hopelessness Scale score

8) BDI-II score

9) SF-36 score

Evaluation of events

The event review committee will assess events related to the primary and secondary outcomes, while the assignment of the participants remains blinded. The event review committee will specify the evaluation criterion in the event definitions and event review procedures.

Safety management

The on-site research staff at the participating hospitals will take necessary and appropriate actions to ensure the safety of participants when a serious adverse event occurs or a participant is at impending risk of suicide during the study. The on-site research staff will contact the on-site research coordinator at the hospital, and the coordinator

will submit a report promptly to the director of the hospital and the study group management office.

Statistical analyses

Primary analysis

The primary objective of this study is to examine whether or not the period of time until recurrent suicidal behavior (either attempt or completion of suicide) of participants in the experimental intervention group is significantly different from that of the control group. The stratified log-rank test based on allocation factors will be performed for all eligible participants in the intent-to-treat analysis, in order to examine the null hypothesis that the two groups are equal in the period of time until the incidence of the event.

A one-sided test will be conducted, because there would be no interest in the case that the experimental intervention is found to be significantly inferior to standard treatment. In this case, the level of significance will be set at 2.5% for the one-sided test, and the power will be set at 90%.

Sensitivity analyses will be performed as necessary, and a regression analysis will be performed with risk factors of potential influence.

Interim analyses

Interim analyses will be performed to evaluate achievement of the primary objective of the study. The analyses will be conducted twice during the study. Participant recruitment will be continued during the interim analyses.

For the interim analysis, the Lan-DeMets spending function will be used to adjust for multiplicity and to maintain the alpha error of the overall study at 2.5% for the one-sided test. The difference between the two groups in the period up to the event occurrence, using the O'Brien-Fleming alpha-spending function, will be examined for statistical significance.

The study will be terminated if the period up to the event occurrence in the trial intervention group exceeds that of the control group and the p-value of the log-rank sum test is less than the significance level defined by the method described above.

Secondary analysis

Secondary outcomes will be examined in order to reinforce the findings of the primary analysis. For analysis of secondary outcomes, the period up to event occurrence will be analyzed with the stratified log-rank test. Subgroup analysis of the primary and secondary outcomes will be performed by hospital, gender, age (< 40 or ≥ 40 years), and occurrence of suicide attempt before enrollment in this study. Because of the exploratory nature of the secondary analysis, no adjustment for multiplicity will be made.

Ethical considerations

In this study, the rights and welfare of the participants will be protected according to the World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. The study will comply with the ethical guidelines of the Ministry of Health, Labour, and Welfare in Japan. Ethical validity, including safety, scientific legitimacy, and reliability of results are ensured. Personal information collected by the participating hospitals in this study will include no identifiers that could be used to determine the identity of an individual and, therefore, will be made anonymous.

Study monitoring

Periodic monitoring

The data management center will submit a monitoring report, including the information listed below, to the J-MISP administration office once every 3 months. The J-MISP administration office will send the monitoring reports to the study progress control committee, the Central Research Ethics Committee, and the study group management office.

The study progress control committee will examine the periodic monitoring reports and submit the evaluation to the J-MISP director. As a third party, the central research ethics committee will evaluate the periodic monitoring reports and make recommendations to the J-MISP director to revise the study protocol or stop the study, if ethical problems, such as safety and efficacy issues, should arise.

Contents of monitoring reports

1) Progress of the study, including enrollment

2) Status of the implementation of psychiatric evaluations

3) Data on the occurrence of events (according to the blinded group allocations)

4) Data on the occurrence of adverse events (according to the blinded group allocations)

5) Other relevant information, such as presence of undesirable issues and/or events

Revision of the study protocol and due process

The J-MISP director will immediately inform the ACTION-J principal investigator of the decisions of the central research ethics committee if the committee has recommended that the study protocol be revised due to the emergence of safety issues based on the interim analysis,

periodic monitoring, serious adverse events, and/or other issues that might affect the conduct of the study. The ACTION-J principal investigator will call a meeting of the study group and discuss protocol revision based on the decisions of the central research ethics committee. If necessary, the principal investigator will propose the revised study protocol and submit it to the J-MISP director.

If the study evaluation committee and the central research ethics committee approve the revised protocol, the J-MISP director will adopt the revised protocol after deliberation in the steering committee. The study group management office will immediately distribute the revised protocol to all the on-site research staff through the on-site research coordinator. The on-site research coordinator will submit the revised study protocol to the on-site research ethics committee at each participating hospital.

The study is to be resumed after the revised protocol has been approved by each committee.

Study termination

Based on the findings of the interim analyses, the Central Research Ethics Committee can make a recommendation to the J-MISP director to terminate the study. The committee can decide to terminate the study because of safety issues. This decision will be based on the findings of the interim analyses, the periodic monitoring, the occurrence of a serious adverse event, or other issues that possibly could affect continuation of the study. The principal investigator will promptly convene a meeting of the steering committee to consider whether this study should be terminated, according to the conclusion of the central research ethics committee. Then, if study termination is confirmed to be appropriate, the final decision will be made.

Discussion

Suicide is a complex phenomenon that encompasses multiple factors. Ratios between 10 and 18 suicide attempts to 1 completed suicide have been estimated in other countries [25,26]. Although the ratio of suicide attempts to completed suicide is not known in Japan, many patients with self-injury from suicide attempts are transported to emergency departments in Japan [5].

In the absence of effective measures against suicide attempters, it has been difficult to reverse an increasing suicide trend in Japan. Case management by multi-sector collaboration is required.

The ACTION-J study is designed to evaluate the effectiveness of emergency facility-based case management for suicide prevention in 19 participating hospitals in Japan. ACTION-J is intended to provide valuable information on suicide attempters and to develop effective case management to reduce future risk for suicide attempters.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

All authors participated in the design of the study. All authors contributed to the writing of the manuscript and have approved the final manuscript.

Acknowledgements

This study, which was funded by a Health and Labour Science Research Grant from the Ministry of Health, Labour, and Welfare of Japan, was sponsored by the Japan Foundation for Neuroscience and Mental Health.

References

1. Robins E, Gassner S, Kayes , Wilkinson RH Jr, Murphy GE: **The communication of suicide intent: a study of 134 consecutive cases of successful (completed) suicide.** *Am J Psychiatry* 1959, **115**:724-733.
2. Rosenberg ML, Davidson LE, Smith JC, Berman AL, Buzbee H, Gantner G, Gay GA, Moore-Lewis B, Mills DH, Murray D: **Operational criteria for the determination of suicide.** *J Forensic Sci* 1988, **33**:1445-1456.
3. Mościcki EK: **Identification of suicide risk factors using epidemiologic studies.** *Psychiatr Clin North Am* 1997, **20**:499-517.
4. Owens D, Horrocks J, House A: **Fatal and non-fatal repetition of self-harm: systematic review.** *Br J Psychiatry* 2002, **181**:193-199.
5. Japan Cabinet Office: **Annual report on suicide prevention measure in 2008.** [http://www8.cao.go.jp/jisatsutaisaku/whitepaper/w-2008/pdf/index.html]. Accessed 1, June, 2009
6. World Health Organization: **SUPRE.** [http://www.who.int/mental_health/prevention/suicide/supresuicideprevent/en/]. Accessed 1, June, 2009
7. Japan Foundation for Neuroscience and Mental Health: **Japanese Multimodal Intervention Trials for Suicide Prevention.** [http://www.jfnm.or.jp/itaku/J-MISP/index.html]. Accessed 1, June, 2009
8. Ono Y, Awata S, Iida H, Ishida Y, Ishizuka N, Iwasa H, Kamei Y, Motohashi Y, Nakagawa A, Nakamura J, Nishi N, Otsuka K, Oyama H, Sakai A, Sakai H, Suzuki Y, Tajima M, Tanaka E, Uda H, Yonemoto N, Yotsumoto T, Watanabe N: **A community intervention trial of multimodal suicide prevention program in Japan: a novel multimodal community intervention program to prevent suicide and suicide attempt in Japan, NOCOMIT-J.** *BMC Public Health* 2008, **8**:315.
9. van Heeringen C, Jannes S, Buylaert W, Henderick H, De Bacquer D, Van Remoortel J: **The management of non-compliance with referral to out-patient after-care among attempted suicide patients: a controlled intervention study.** *Psychol Med* 1995, **25**:963-970.
10. Sande R van der, Buskens E, Allart E, Graaf Y van der, van Engeland H: **Psychosocial intervention following suicide attempt: a systematic review of treatment interventions.** *Acta Psychiatr Scand* 1997, **96**:43-50.
11. Hawton K, Arensman E, Townsend E, Bremner S, Feldman E, Goldney R, Gunnell D, Hazell P, van Heeringen K, House A, Owens D, Sakinofsky I, Träskman-Bendz L: **Deliberate self harm: systematic review of efficacy of psychosocial and pharmacological treatments in preventing repetition.** *BMJ* 1998, **317**:441-447.
12. Hawton K, Townsend E, Arensman E, Gunnell D, Hazell P, House A, van Heeringen K: **Psychosocial versus pharmacological treatments for deliberate self harm.** *Cochrane Database Syst Rev* 2000:CD001764.
13. Gaynes BN, West SL, Ford CA, Frame P, Klein J, Lohr KN, U.S. Preventive Services Task Force: **Screening for suicide risk in adults: a summary of the evidence for the U.S. Preventive Services Task Force.** *Ann Intern Med* 2004, **140**:822-835.