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## Special Feature Article

### Review of a Decade of Counseling and a Support Project for Suicide Attempters in Osaka City

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#### Abstract

In the framework of Japanese suicide prevention, demand for stronger efforts in local government seems to be increasing year by year. Large-scale disasters, effects of the coronavirus pandemic, and conflicts have made people feel uneasy and the nationwide suicide mortality rate in Japan has begun to increase once again. In females, the suicide rate, which was previously thought to be lower than that in males, has been increasing rapidly. Moreover, there have been increased suicides in young people.

Considering such circumstances, we aimed to assess a municipal project: a counseling and support project for suicide attempters in Osaka City (Inochi-no-soudan Support Project), which approaches its 10-year milestone, and to optimize interventions and support based on the evidence from quantitative evaluation for suicide risk. Furthermore, we would like to develop our support to be more tailored to local characteristics and educational activities for raising public awareness as a populational approach.

To evaluate the risks of suicide ideation associated with various factors, we aimed to analyze a dataset of all registered cases between 2009 and 2020 by multivariate analysis; however, we couldn't get an eligible dataset because all the paper-based

registrations were not linked to individual suicide attempters throughout Osaka City's 24 ward areas. We compared the age distribution of all registered cases with publicly available findings and administrative reports based on datasets of emergency activity records in Osaka City. We also examined the impact of the coronavirus pandemic.

The number of suicide attempters in Osaka City was estimated to be about 3,000 per year, of which about 500 (17%) were registered to the Inochi-no-soudan Support Project, based on the information provided by the police. Most suicide attempters were aged in their 20s or less. Moreover, female attempters were two to three times more than male attempters. Almost 40% of suicides were by overdose, followed by knives (30%), and both jumping to their death and hanging were 10% or less. Among those who reported having an alcohol-related disorder, self-harm under the influence of alcohol accounted for 60% of suicides. Total cases were 3,837 between 2009 and 2020 and of those 10 died by suicide and 4 died from other causes in the follow-up period.

There are few municipal projects for suicide prevention that target the suicide attempter and collaborate with the police in Japan; however, our findings suggest that the municipality has not yet caught up to the infrastructure for safe and accurate data-sharing, because of the difficulties of handling personal data of subjected persons, administrative burdens, and barriers to obtain individuals' consent. In order to conduct appropriate assessments for suicide risks and evaluate the validity of the project itself, it is necessary to convert the current paper-based registries into electronic data, which will enable us to perform quantitative and appropriate analyses of the obtained data from the project, and address evidence-based approaches to improve local programs for suicide prevention.

**Keywords:** suicide attempter, suicide ideation, sex difference, suicide prevention, local government

## Introduction

The oldest data on suicide statistics are the Vital Statistics (Ministry of Health, Labour and Welfare), which are core government statistics. Data have been available since 1899, except for a period around the end of World War II. In addition, the National Police Agency

has been compiling suicide statistics since 1978, which include cases of death by suicide determined based on circumstances at the time of discovery (such as suicide notes) and unidentified suicide deaths. Furthermore, some death cases are classified by the police according to "motives for suicide,"

making them a valuable source of information for national suicide prevention efforts. However, although not part of death statistics, the Fire and Disaster Management Agency's emergency response records include a "self-inflicted injury" flag. This is an important check item indicating that the cause of injury requiring emergency transport was self-inflicted. Using this "intentional self-harm" flag, it is possible to obtain information on suicide attempts and suicides that necessitated emergency transportation. In addition, death by suicide is a rare cause of mortality compared with general natural and external causes. Therefore, it is important to understand that large-scale data, including basic statistics, are necessary for appropriate assessment of the risk of suicide.

Figure 1 shows the annual trends in age-adjusted mortality rates for deaths confirmed as suicide, based on demographic statistics from 1978 to 2020. The two solid lines represent males (blue) and females (black), and the vertical axis shows the values converted to per 100,000 population. Age-adjusted mortality refers to the mortality rate weighted and adjusted using a base population (1985 model population) to eliminate the influence of age-specific population structures that vary from year to year.

The significant sex-related difference in suicide mortality rates is immediately apparent, and it is considered that there is no other cause of death with such a marked gap between males and females. The causes of such differences will be discussed later, but before that, a general overview of the trends in age-adjusted mortality rates by calendar year shows that the suicide mortality rate among men tends to correlate well with events that have had an impact on society and the economy. It is widely known that suicide mortality rates fluctuate markedly in response to social environmental influences, but such social environmental factors can be considered avoidable exposure factors in some cases. They can be viewed as preventable risk factors because it is possible to reduce the risk by shielding people from risk factors, even if only slightly, through appropriate intervention and support.

Looking at events that coincided with peaks in the suicide mortality rate by calendar year, around 1983 there were frequent large-scale disasters such as hotel fires and volcanic eruptions. Around 1985, a domestic plane crash claimed many lives (520 deaths). Subsequently, with the change of the era to Heisei, the economy deteriorated, consumption tax was introduced, and major securities companies and banks

went bankrupt one after another, eventually raising the unemployment rate to 5.4%. Around 2008, the global financial crisis, triggered by the collapse of major US investment banks, spread throughout the world. When examining trends by sex, men appear to be more affected by fluctuations in domestic socio-economic conditions (e.g., unemployment rates), whereas women tend to be more influenced by emotional events and mental anxiety or instability reflecting the social climate.

Figure 2 illustrates the annual trends in the suicide rate (proportion of suicide deaths relative to the estimated population) by age group (10-year intervals), estimated based on suicide statistics from the National Police Agency as published in the “White Paper on Suicide Prevention.”

Although suicide statistics for individuals aged 19 or younger are only available from 2007 onwards, it is noteworthy that the rate remained flat for a long time after statistics began to be collected, but has been gradually increasing over the past five years. In addition, suicide rates rose sharply across all age groups under 49 between the end of 2019 and end of 2020, strongly suggesting the impact of COVID-19. Furthermore, family and school-related problems have long been regarded as major factors contributing to youth suicide; however, during the

COVID-19 pandemic, nationwide restrictions on going out and avoiding crowded settings may have weakened social relationships. These changes are considered to have had a more serious impact than expected, undermining people's mental and physical health and increasing mental distress.

### **I. Framework for Suicide Countermeasures in Japan**

The Basic Act on Suicide Countermeasures (enacted in 2006 and revised in 2016) aims to comprehensively promote suicide countermeasures by establishing basic principles for such countermeasures, clarifying the responsibilities of the national government, local governments, business owners, and the public, and stipulating fundamental matters for suicide countermeasures, with the goal of realizing a society in which no one is driven to suicide. This also aims to strengthen suicide prevention and provide support for the families of suicide attempters and victims, thereby contributing to a society in which citizens can live healthy, meaningful, and fulfilling lives. Local governments are also required to develop specific suicide prevention plans in accordance with comprehensive suicide prevention guidelines and local conditions.

The Comprehensive Suicide Prevention Policy Outline (approved by the cabinet in 2017) was established the year after enforcement of the Basic Act on Suicide Countermeasures, and the current version represents the Third Outline. In 2012, the Second Outline was revised, setting a numerical target of reducing the suicide mortality rate per 100,000 population by 20% by 2016. However, the actual rate was 16.8 per 100,000 in 2016, a 30.6% reduction from 24.2 in 2005, significantly exceeding the target. Furthermore, the Third Outline establishes a new target of reducing the suicide mortality rate by more than 30% from the 2015 level of 18.5 per 100,000 to 13.0 or lower by 2026, aiming to reach a level comparable to that of other advanced countries. In late 2016, a “Study Group on the Future Direction of the Comprehensive Suicide Prevention Policy” was established based on a decision by the Minister of Health, Labour and Welfare.

The report included proposals, such as: “further promotion of suicide prevention measures for young people” and “further promotion of suicide prevention measures addressing issues such as excessive working hours,” as well as policy directions for institutional reforms, including “promotion of planned suicide prevention measures at the local level.” The key policies were expanded to 12 items.

The 15th edition of the “White Paper on Suicide Prevention,” published in 2021, concisely summarizes the importance and implementation status of various suicide prevention initiatives. When I first viewed the initial edition, published in 2007 following the enactment of the Basic Act on Suicide Countermeasures, I was struck by the foreword authored by Fumio Kishida, now Prime Minister of Japan (at that time, he served as Minister of State for the Cabinet Office). Japan’s suicide prevention efforts, rooted in a collection of writings by suicide-bereaved families, entitled: “Suicide: I Can’t Say It,” have now reached a critical juncture. Further strengthening of measures is required moving forward.

## II. The Role of Local Governments and Osaka's Initiatives

Osaka, at the center of the Kansai region, comprises two designated cities, Osaka and Sakai Cities, and 41 municipalities, with approximately 30% of the total population concentrated in Osaka City. Osaka City has a population of approximately 2.7 million, making it the second most densely populated area in Japan after the special wards of Tokyo (excluding Chiyoda Ward). Although urban areas are known for their convenience and generally low mortality rates, excessive population density also entails certain

drawbacks. In bustling downtown areas, where crime and illegal drug trafficking are prevalent, the likelihood of encountering life-threatening situations is increasing. Furthermore, behind the charming, traditional neighborhoods, there are areas where many foreign workers endure poverty and discrimination, as well as zones where day laborers from across the country continue to gather for food despite being exposed to substandard sanitary conditions. The reality in Osaka City is that numerous underground societies, separated by a single street, exist where psychological stress has reached its limits.

As part of suicide prevention efforts, in 1996, the Department of Psychiatry and Emergency Medical Center of Kinki University Hospital, located in southern Osaka, launched a suicide prevention network conference in collaboration with local public health centers and other organizations to exchange information and provide training to follow-up on suicide attempters. These activities subsequently evolved into the Ministry of Health, Labour and Welfare's Mental Health Research Project (2003-2006) and later into a strategic study on suicide prevention, the Multicenter Intervention Study to Prevent Suicide Reattempts (ACTION-J), conducted under the ministry's Research Project on Emerging and

Reemerging Infectious Diseases and Other Diseases (2006-2010). The evidence for the effectiveness of interventions in preventing suicide reattempts obtained from these studies was incorporated into the 2012 revision of the Second Outline of Suicide Prevention Measures. Since 2012, the Prefectural Health and Medical Department and Mental Health Center (Mental Health and Welfare Center) have requested cooperation from emergency medical centers in the prefecture as part of the Osaka Prefecture Suicide Attempters Collaboration Support Project, and have played a leading role in preventing reattempts. The Osaka Prefecture Survey on the Actual Conditions of Suicide Attempts, published in March 2012, highlighted numerous issues and emphasized the importance of establishing an emergency medical system at the level of secondary medical care areas to prevent reattempts. Furthermore, from 2010 to 2014, the eastern region of Osaka, spanning from the Higashi-Osaka area to central Osaka, played a central role in advancing emergency medical services and supporting psychiatric emergency care through the Osaka Psychiatric Emergency Information Center. In 2016, IRIS, an Osaka prefectural support center for suicide attempters, was established within this center.

It is unclear whether this was in response to the promotion of suicide prevention measures in Osaka, but in 2014, the Osaka Prefectural Police established the “Guidelines for Providing Information on Persons Eligible for Support for Suicide Attempts.” These guidelines stipulate that the police shall confirm with the person subject to protection (as defined in Article 3 of the Police Duties Act) or their family whether or not they consent to the provision of information regarding suicide attempts that occurred within the jurisdiction of Osaka Prefecture, and if consent is obtained, the local government of the location where the suicide attempt occurred shall be notified. This decision is believed to have led to a marked step forward in suicide attempt consultation and support services throughout Osaka Prefecture, including Osaka City.

### **III. Overview of the “Life Consultation Support Project” for People Who Have Attempted Suicide (Osaka City Version)**

The consultation support project for people who have attempted suicide in Osaka was first launched in Sakai City in 2009, followed by Osaka City in 2010, and Osaka Prefecture in 2011. The target area has been gradually expanded, and since 2013, the project has been implemented throughout Osaka Prefecture.<sup>3)</sup> The program

structure in Osaka City is shown in Figure 3. Police stations notify the health and welfare center in their jurisdiction of cases of suicide attempts that they deem to require protection, based on the consent of the person concerned or their family. A working group consisting of public health nurses and mental health counselors in charge of the area is formed, and a risk assessment meeting is held.

The key to such risk assessment is the initial report, or first contact. The psychological state of the individual and their family is naturally unstable, and in many cases their perspectives differ, making it difficult to obtain information as expected. If the first contact is unsuccessful, recovery requires considerable skill and may hinder prompt assessment. Risk assessment is conducted by public health nurses trained at the Osaka City Mental Health Center (hereinafter referred to as “the center”). Preparation before contact is essential, with consideration of support priorities based not only on limited information from the police but also, in the case of welfare recipients, from case workers. Through repeated and careful communication with the person and their family, confusion and anxiety can be gradually eased, allowing the development of a support plan aimed at preventing reattempts. The content of the interviews includes

health issues and alcohol-related problems, as well as lifestyle habits, economic circumstances, family environment, employment status, and the urgency of the situation as inferred from the means of self-harm and preparations made up to that point. The process of developing a support plan while discussing risk mitigation, such as the possibility of cooperation from family or others, is also considered valuable for providers.

The center, which serves as the core agency for the entire city, receives consultations and reports from the 24 wards and provides guidance and support as necessary. Unless specifically requested, the center waits for a follow-up report one year later to determine whether continued support is necessary.

It is believed that only a handful of municipalities nationwide conduct such effective information-sharing with police agencies. The number of consultation support cases has increased to over 500 per year in the city alone since around 2017, but the infrastructure for safely and accurately sharing the personal information of those involved has not been sufficiently developed. As a result, not only has the administrative burden on police stations increased, but the difficulty of obtaining consent has also become a barrier, and a consultation support

system based on smooth information-sharing has yet to be established.

Therefore, to provide effective intervention support to a larger number of individuals, it is necessary to conduct appropriate program evaluations and iteratively explore approaches to individualized intervention according to risk characteristics. To clarify risk characteristics, it is not sufficient to simply use the incidence of suicide attempts and completions in the entire city as an outcome. Epidemiological analyses have the potential to be valuable. For example, the incidence of reattempts and completions in each ward (with the number of support providers as the denominator) can be used as outcome indicators, and the strength of association for each risk factor can be assessed. To obtain such evidence, it is essential to digitize the current paper-based information and steadily accumulate and organize (clean) the data to enhance their accuracy.

Figure 4 presents the cumulative number of counseling support cases by age group over the 10-year period from 2009 to 2020. The total number of cases was 3,836, with the largest number (996) in the 20s, followed by 756 in their 30s, and 706 in their 40s.

To verify the validity of these results, the age distribution of suicide attempters, calculated using the

aforementioned “intentional self-harm” flag based on emergency response records, is shown in the graph cited in Figure 5. In recent years, suicide attempts identified at medical institutions have been reported to the police, and the graph in Figure 5 can be considered to represent the group of people recognized by the police as suicide attempters who are subject to protection. Furthermore, the similar distribution patterns in Figures 4 and 5 suggest that the analysis sample adequately represents the population.

#### **IV. Utilization of Emergency Response Data and Impact of the COVID-19 Pandemic**

We briefly describe the utilization of emergency response data in Osaka Prefecture. The Osaka Prefecture Emergency Transport Support, Information Collection, and Tabulation Analysis System (Osaka Emergency Information Research Intelligent Operation Network system: ORION) is an information-sharing system that uses emergency response activity records managed by the Fire and Disaster Management Agency as its foundation. It designates emergency care facilities that meet certain implementation standards, enters into cooperation agreements with these facilities, and requests the input of post-hospital information. This enables the

creation of a database that links emergency response activity records (so-called pre-hospital information) with post-hospital information (such as treatment details and outcomes) using multiple identifiers, making it available for research purposes. The system collaborates not only with local governments and emergency medical institutions, but also with national, public, and private university-affiliated hospitals and research institutions, and has a backup system in place with epidemiological experts. It is operated under a framework that allows for consultation from ethical review to research design, enabling analytical research. Recently, it became expected that smartphone functions will be used to share safe and timely medical information for life-saving activities, and provide mapping and routing guidance for emergency response destinations.

As mentioned earlier, analysis based on the ORION database shows that between 2010 and 2012, there were a total of 8,671 patients transported by emergency services in Osaka City due to intentional self-harm, with the age distribution presented in Figure 5. In all age groups under 50, the incidence rate of intentional self-harm (including actual suicides) was higher among women than men.<sup>4)</sup> Furthermore, the cumulative number of minors aged 10 to

19 was 365, and the incidence rate of intentional self-harm (including suicide attempts) based on the 2010 Ministry of Internal Affairs and Communications population estimates showed a marked sex-related difference, as presented in Figure 6. Among males, the incidence rate was 6.3 to 81.0 per 100,000 population, while among females, it was 6.3 to 228.3 per 100,000 population, showing a significantly higher rate among females. Additionally, the proportion of fatal cases among those exhibiting intentional self-harm was 14.8% (13/88) among males and 2.4% (8/337) among females, with a significantly higher rate among males ( $P < 0.001$ ). These results are consistent with trends observed in regional profiles and demographic statistics for Osaka City.

To examine the impact of the COVID-19 pandemic, ORION data were used to analyze the response rate of the emergency medical system and transport rate within the area for the three years from 2018 to 2020. For details, please refer to the Osaka Prefecture website.<sup>7)8)</sup>

There were 8,882 patients showing “intentional self-harm” (total: 1,436,224), and the incidence rates of “intentional self-harm” per 100,000 population were: 31.8 in 2018, 33.7 in 2019, and 35.2 in 2020, showing a significant increasing trend (trend test,

$P < 0.001$ ). The median age was under 40 in all years, indicating that the trend toward a higher incidence among younger age groups remained unchanged. In both analyses of all age groups and those limited to the 20s, the incidence rate of “intentional self-harm” increased significantly from 2019 to 2020, but no significant impact on mortality was observed.

In Osaka Prefecture, further expansion of ORION is required, and the development of a registration system utilizing smartphones and establishment of a rapid and secure information-gathering system are being promoted. Amidst the need to respond to large-scale natural and complex disasters, it is expected that the integration of such secure information-gathering systems and real-time operation technology utilizing artificial intelligence will lead to a marked improvement in the utilization and maintenance of effective and reliable databases.

## **V. Review of the Osaka City Suicide Attempt Consultation Support Project “Life Consultation Support Project”**

Figure 7 shows the basic attributes of the subjects analyzed and a breakdown by consultation support item. The breakdown of the number of people who sought counseling, sex, household status, whether they had a regular

doctor (and if so, the department they visited), alcohol-related issues, type of counseling, counseling content related to motives, and outcome (one year later) is shown in a pie chart, and the breakdown of self-harm methods (a) is shown in a bar graph. Fifty-four percent of those who sought counseling were family members, and 68% were female. In terms of the household status, 39% were living alone, and regarding the medical history, 57% had a history of psychiatric treatment. Among the 554 individuals who reported alcohol-related issues, 58% showed self-harm while under the influence of alcohol. In terms of the consultation type, 74% were telephone consultations, 9% were in-person consultations, and 6% were home visits. The content of consultations related to motives included family issues (19%), health issues (32%), issues related to the opposite sex (11%), economic issues (10%), and employment issues (8%). Regarding outcomes, 58% of support recipients completed support (resolution of suicidal intent), while 27% required continued support. There were 10 cases (0.3%) of suicide completion despite ongoing support, which was higher than the 4 cases (0.1%) of death due to causes other than suicide. The most common means of self-harm were: 1st “overdose (36.9%)”, 2nd “knife (28.6%)”, 3rd “other (19.0%)”, 4th

“jumping” (8.6%), and 5th “hanging” (5.9%). This distribution clearly differed from the methods most commonly used by suicide completers in Osaka City in the 2020 Regional Suicide Profile, where “hanging” (54%) and “jumping” (26.4%) were the most common methods. This gap in the frequency of methods chosen for attempted and completed suicides is considered to be useful in risk assessment and intervention planning for attempted suicides. The principle of risk avoidance is to distance the target from risk factors. For example, it is possible to make specific assessments of the number of risks within the target's home, their situation at work or school, and the likelihood of obtaining cooperation from those around them through monitoring and communication. This can lead to lifestyle support and appropriate treatment and care, while also contributing to the alleviation of anxiety and building of trust through individualized advice and listening aimed at risk avoidance. As a reference, the crude suicide mortality rate in Osaka City, based on registered address data from the regional suicide profile, was 29.0 per 100,000 population in 2009 and 30.4 in 2010 at the start of the project, but declined after 2011, falling to 16.7 per 100,000 in 2019. While this achievement can be attributed to the strengthening of suicide

countermeasures not only by this project but also by the national and local governments, it is also urgent to address the stagnation noted in recent years.

## VI. Discussion and Future Prospects

Regarding the relationship between suicide risk and population density, it has been reported that suicide risk gradually increases as population density decreases.<sup>9,11)</sup> Conversely, age-adjusted and sex-specific analyses have revealed that psychological stress increases as population density rises, leading to a higher suicide risk.<sup>9)</sup> Regarding the higher suicide mortality rate among men, some theories suggest that vulnerability to rapid socioeconomic changes may be a contributing factor.<sup>9)</sup> In addition, sex differences in summary statistics related to suicide have already been confirmed, with the frequency of attempts and completions reversed, and age differences are also observed in addition to sex differences. In general, attempts are overwhelmingly more common among young people, while the percentage of completions is higher among older people, and the survival rate is low. Such differences in frequency between attempts and completions are considered to be influenced by factors such as preparation status and tendencies in

the selection of self-harm methods. However, the reasons for the significant sex differences observed in Figures 5 and 6 remain unclear, particularly whether they stem from cultural backgrounds or regional characteristics, or whether they are due to genetically inherent sex differences. Furthermore, the nationwide trend of increasing suicide mortality rates among minors and women can be interpreted as reflecting increased psychological stress and mental health disorders within these groups. However, it is also necessary to consider the possibility that changes in their surrounding environment may be making it easier for them to choose more lethal means.

Additionally, there is abundant evidence linking suicide to alcohol-related disorders,<sup>16)</sup> and in Osaka City, where the prevalence of alcohol- and substance-related disorders is among the highest nationwide, it is considered necessary to implement targeted measures. Furthermore, several studies in Japan and abroad have reported an association with cancer,<sup>2,10)</sup> and the period within one year after a cancer diagnosis is considered to be the highest risk period.

## Conclusion

The basic approach to suicide prevention is to reduce the psychological stress that arises from the

deterioration of living conditions. This requires the expansion of public support tailored to diverse lifestyles and ways of working, as well as the utilization of all social resources, including outreach, and community-based responses. The primary focus of awareness-raising efforts for residents, promoted alongside the expansion of individual support, should be to encourage those living with difficulties and foster a spirit of mutual support and compassion.

#### Editor's Note

This special feature article is based on the symposium held at the 117th Annual Meeting of the Japanese Society of Psychiatry and Neurology, with Osamu Tanaka (Aomori Prefectural Mental Health and Welfare Center) as the representative.

There are no conflicts of interest to disclose in relation to this paper.

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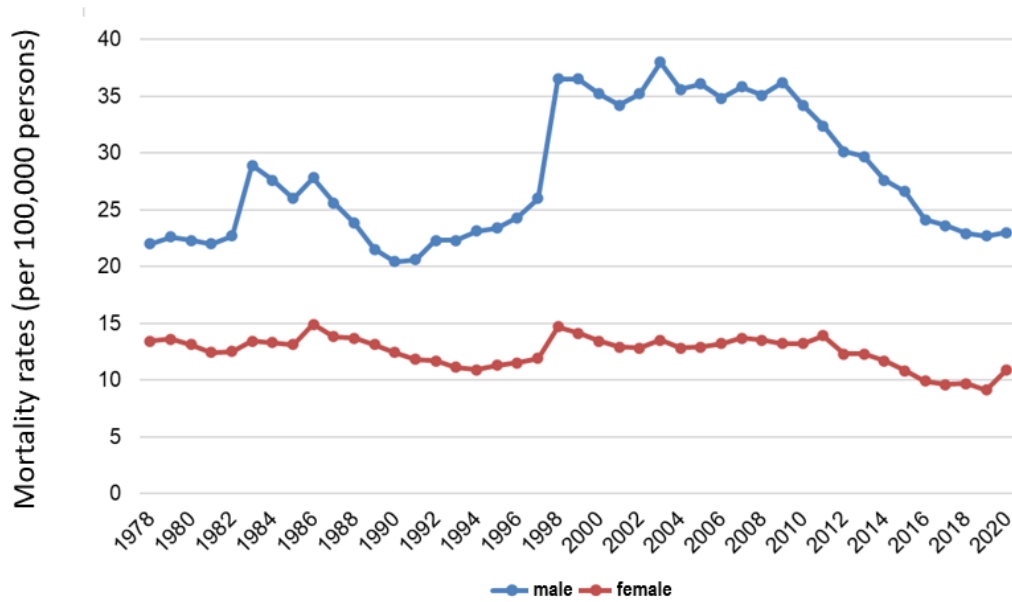


Figure 1: Trends in suicide mortality rates by sex (1978-2020)  
Source: Vital Statistics Age-adjusted mortality rates for suicide

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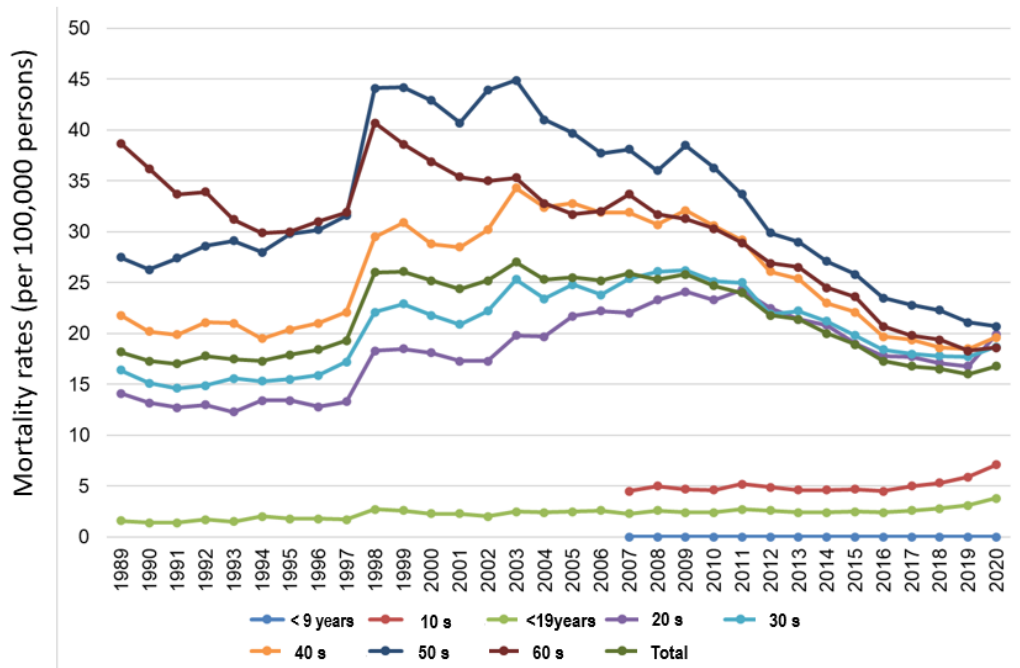


Figure 2 : Annual trends in suicide mortality rates by age group (1989-2020)  
 Source: Suicide statistics from the National Police Agency and National Census prepared by the Ministry of Health, Labour and Welfare

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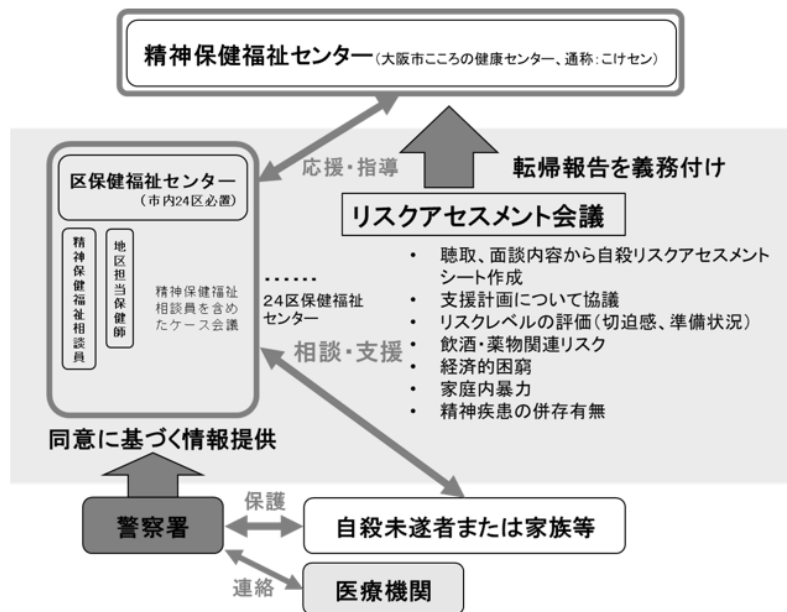


Figure 3: Overview of the Consultation Support Project with suicide attempters in Osaka City,, “Life Consultation Support Project”

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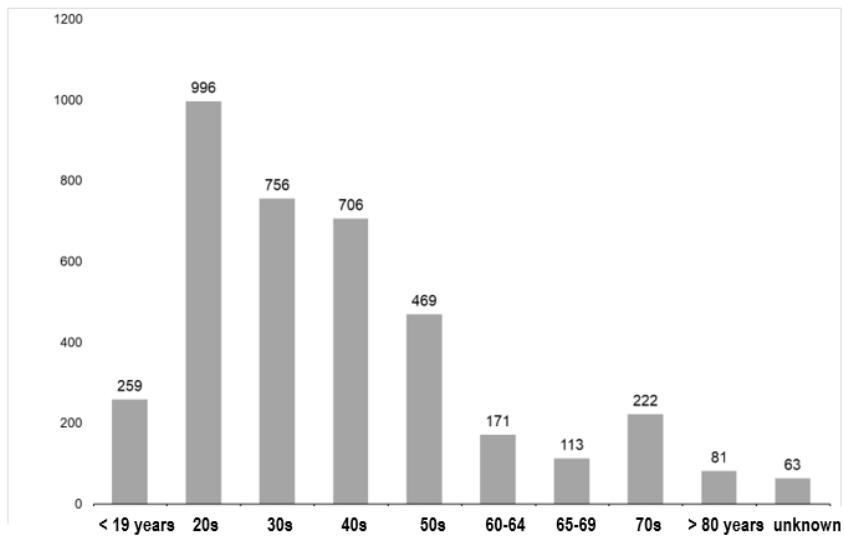


Figure 4: Age distribution of the number of registries for the consultation support project with suicide attempters, “Life Consultation Support Project” in Osaka City from 2009 to 2020 (N=3,836)

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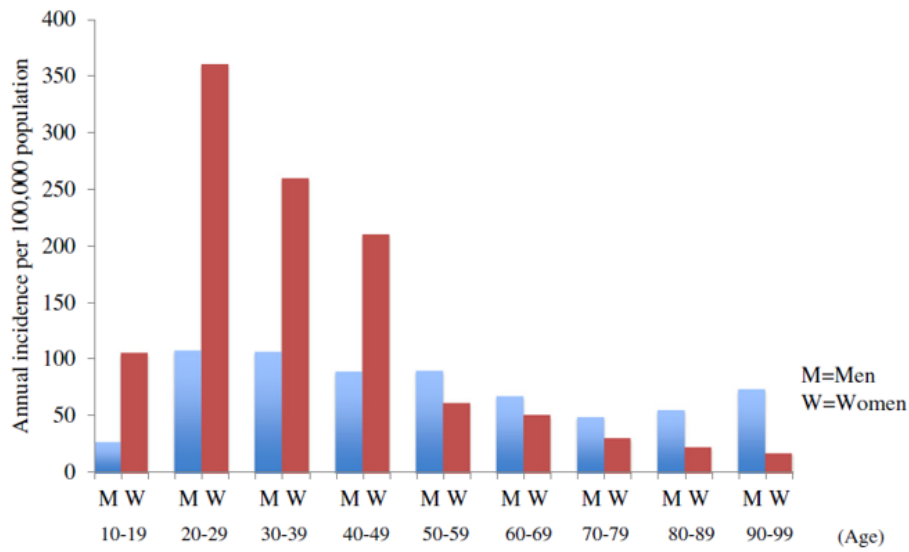


Figure 5 : Incidence rates of intended self-harm by age and sex per 100,000 population in Osaka City

Source: Matsuyama T, et al *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* (2016) 24:68

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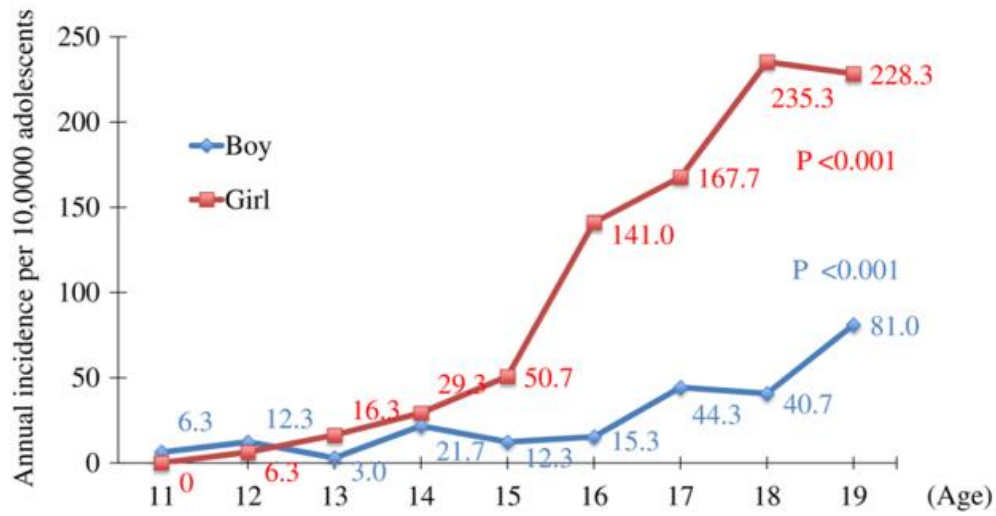


Figure 6 : Incidence rates of intended self-harm among those under 20 years per 100,000 population in Osaka City

Source: Matsuyama T, et al. *BMJ Open* 2016; 6:e011419

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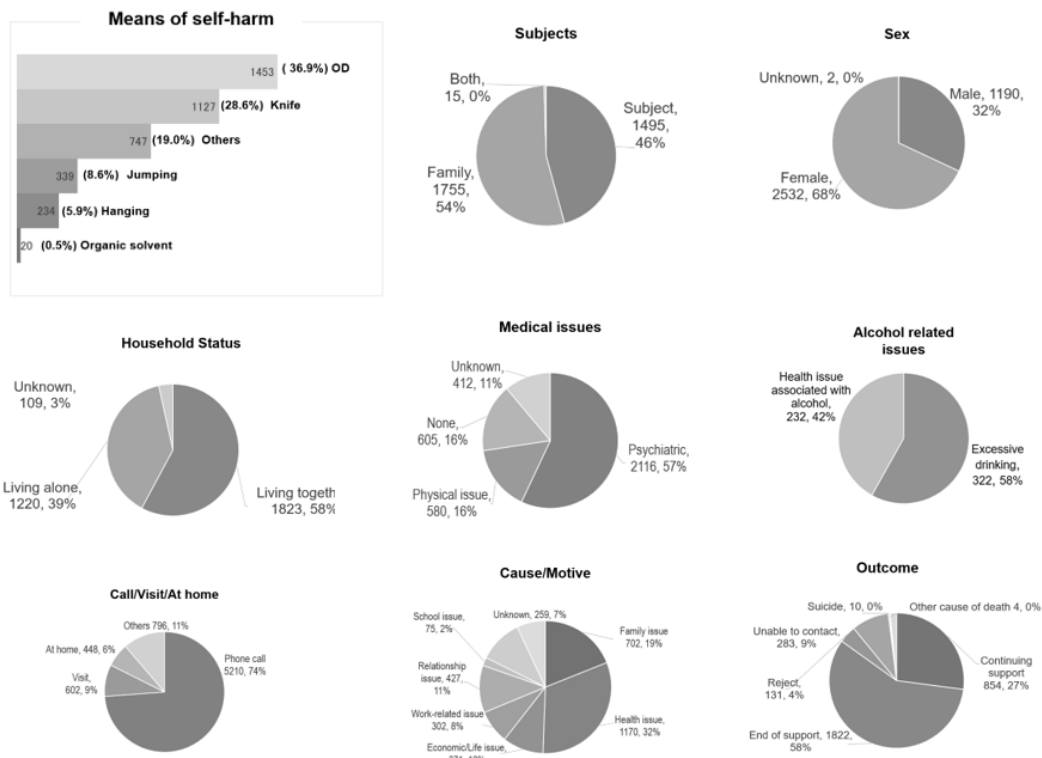


Figure 7: Breakdown of consultation content in the Osaka City Suicide Attempt Consultation Support Project (cumulative total from fiscal 2009 to the end of fiscal 2020)

a: Means of self-harm (number of people, percentage) (duplicates included), b: Consultants (number of people, percentage), c: Sex (number of people, percentage), d: Household status (number, percentage), e: Primary care department visited (number, percentage), f: Self-injury status among those with alcohol-related issues (number, percentage), g: Type of consultation (number, percentage), h: Consultation content (number, percentage), i: Outcome (number, percentage)