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ORIGINAL RESEARCH

The factors affecting rehabilitation to society of emergency department based post-suicidal care program recipients

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Abstract

The aim of this study is to investigate the factors affecting rehabilitation to society of Emergency Department (ED) based post-suicidal care program recipients. This prospective observational study was conducted at the ED of a general hospital in Seoul between March 2018 and October 2020. Patients who agreed to ED based post-suicidal care were followed up after 2 and 4 months and classified into a rehabilitated group and a non-rehabilitated group respectively. We analyzed the patients' demographic data and suicide-related data. We used the Chi-square test or the Fisher's exact test, the student's *t*-test and multivariate logistic regression analysis. A total of 86 patients were included in this study. Factors that disturb rehabilitation of suicidal attempters were the presence of a housemate, a history of psychiatric admission, an acute disease or disability on 1st follow-up and the presence of a housemate, educational level and 1st non-rehabilitation on 2nd follow-up on univariate analysis. Multivariate logistic regression analysis showed that the absence of a housemate and 1st rehabilitation were associated with rehabilitation. This study shows that fast rehabilitation is important for rehabilitation of suicidal attempters and the presence of housemate can be a risk factor for non-rehabilitation.

Keywords

Suicide; Emergency department; Affecting factor

1. Introduction

In 2019, South Korea maintained its position from 2018 as the country with the highest suicide rate (24.6 per 100,000 population) among the Organization for Economic Cooperation and Development (OECD) countries. Despite the declining suicide rates among OECD countries with high suicide rates, the suicide rate in Korea has been consistently on the rise [1].

People who have attempted suicide belong to a high-risk group with more than 10-fold higher risk of suicide than the general population [2]. The experts unanimously agree that high-risk individuals require aggressive management in emergency medical facilities. Nevertheless, only 8% of the estimated 40,000 people brought to the emergency department (ED) after a suicide attempt receive counselling and treatment, whereas the remaining 92% are discharged without any measures. Aggressive suicide prevention programmes are essential to effectively address the issue of suicide among individuals with high suicidal ideation as well as appropriate post-attempt management for suicide attempters to prevent another suicide attempt.

Finland and Japan—two countries that outranked South Korea in terms of suicide rates until the early 2000s—have managed to reduce their suicide rates and have achieved a lower suicide rate than Korea since implementing national suicide countermeasures [3]. Moreover, Denmark managed to reduce its suicide reattempt rate from 34% in 2002 to 14% in 2004 after implementing a post-attempt management programme for suicide attempters. In Korea, a post-attempt management project for suicide attempters launched in Dongdaemun-gu has reduced the number of suicide attempters from 106 in 2010 to 82 in 2011. In addition to these results, many studies have shown that post-attempt management of suicide attempters is effective in preventing another suicide attempt [4–10].

In South Korea, the ED-based Post-Attempt Care Programme was launched in 2013, and by 2021, 76 hospitals have adopted this initiative. This project aims to establish a support system for emotional recovery, rehabilitation and prevention of reattempts for individuals presented to the ED following suicide attempts. However, the ultimate goal of this programme extends beyond preventing suicide reattempts and deaths. It strives to facilitate reintegration into society by providing mental and psychological therapies and social welfare services. Despite the importance of post-attempt management, existing research has primarily focused on the characteristics of suicide attempters, with no studies

investigating social reintegration and its predictors among individuals subject to ED-based post-attempt care programmes [11–13].

This study seeks to address this gap by examining the factors influencing the successful social reintegration of suicide attempters who have participated in ED-based post-attempt care programmes. Social reintegration was determined through face-to-face interviews or phone consultations with programme administrators to assess suicide attempters' current employment status, utilisation of social welfare facilities (rehabilitation services, such as social adaptation and vocational training), and continuation of education.

2. Materials and methods

2.1 Study participants

This is a prospective study of patients in the ED of a university hospital in Seoul after a suicide attempt between 01 March 2018 and 31 October 2020. Our hospital runs an ED-based case management project, and two social workers are assigned to this programme. Individuals who have attempted suicide were first examined and treated for physical injuries in the ED, and then referred to psychiatry and the Loving Life Team. Patients who consented to the Loving Life Team case-management programme and the present study were enrolled (Fig. 1) (IRB No.: 2018-04-007-001).

2.2 Methodology

The patient's sex, age, level of consciousness, and vital signs (blood pressure, pulse and respiration) were assessed during the initial examination and assessment. Subsequently, information regarding their cohabiting family members, education level, marital status, religion, occupation, physical medical history, monthly income, medical insurance, place, method of suicide, intentionality of suicide attempt, suicide motivation, suicide history, family history of suicide, drinking status at the time of suicide, pre-existing psychiatric history, mental health hospitalisation history, suspected diagnosis and admission or discharge status were surveyed during consultations and initial assessments at the psychiatry and the Loving Life Team. Education level was categorised into middle or lower and high school or higher based on the mandatory education level in Korea. Monthly income was divided into $<$2.5 million KRW and $\geq$2.5 million KRW based on the median income for two-person households in 2018. Physical medical history was classified into having an acute physical medical history or a chronic disease affecting daily living, and having no physical disease or having a chronic disease that does not affect daily

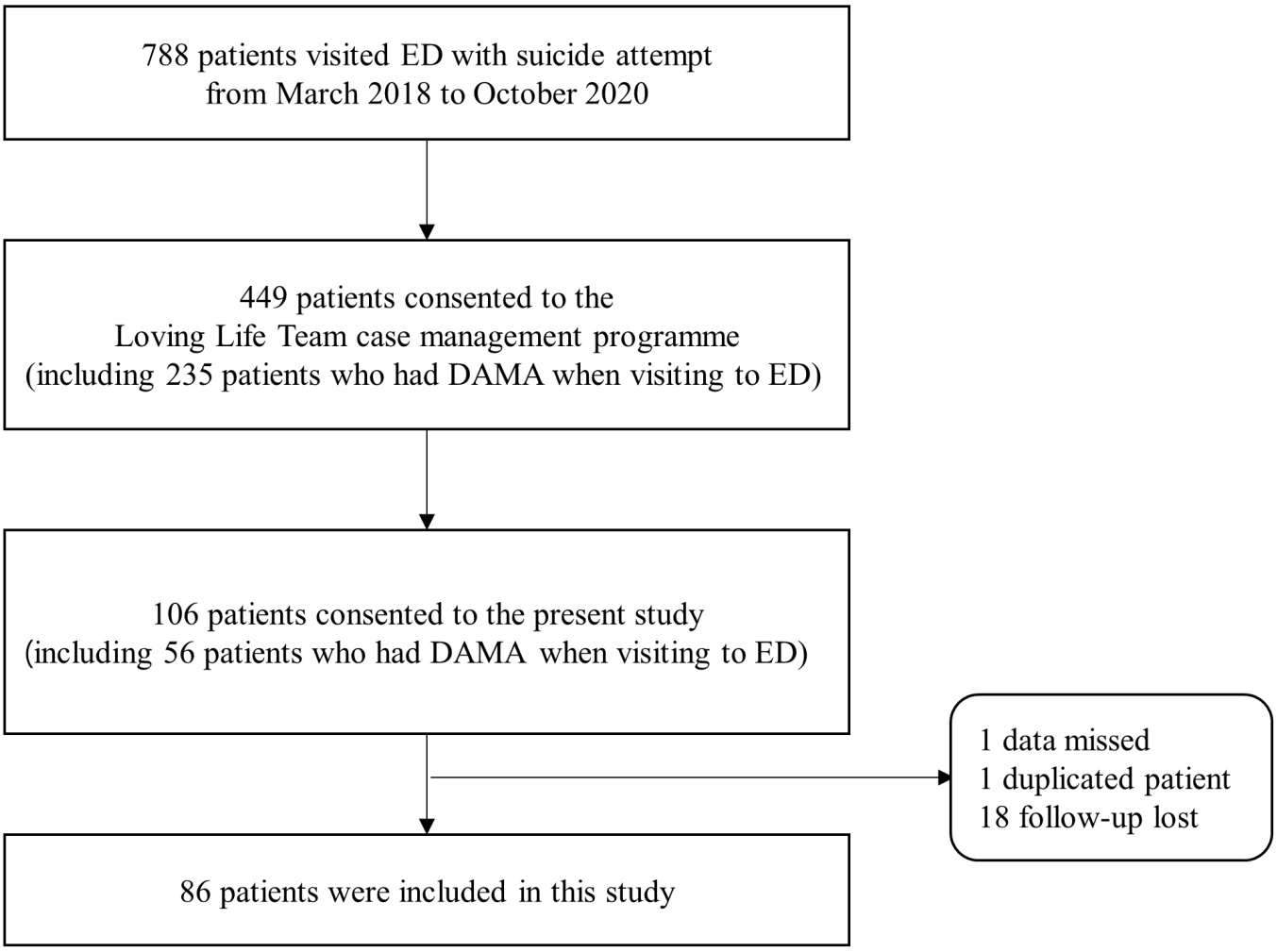

FIGURE 1. Flowchart of patient selection. DAMA: Discharge Against Medical Advice; ED: emergency department.

living.

Social activity status (employment and academic status) and utilisation of social welfare facilities (rehabilitation services such as social adaptation training and vocational training) at the time of the initial ED presentation were surveyed. Then, patients who consented to the case management service completed a post-attempt assessment and management report form. Patients' social activity status and utilisation of social welfare facilities were again surveyed after the conclusion of the case management service (approximately two months later). Social reintegration was initially determined on the basis of these data. After completion of the case management service, patients were referred to a community mental health centre upon consent. After the completion of the counselling provided by the community mental health centre (approximately four months after referral), the patients' social activity status and utilisation of social welfare facilities were again surveyed. Social reintegration was assessed again using these data.

The patients were divided into successful and failed social integration groups based on the results of the initial and second social integration assessments to analyse the factors affecting their social reintegration. Suicide fatalities were analysed by calculating the Risk-Rescue Ratio Scale (RRRS) score based on the collected data. The RRRS was used to measure the lethality of suicide attempts using the following formula: (risk score/risk score + rescue score) × 100 [14, 15]. The Risk score was calculated based on the method of suicide attempt, the level of consciousness at admission, the extent of injury, the degree of recovery, and the level of treatment received. The rescue score was calculated based on the location of the attempt, the identity of the first caller, the likelihood of discovery, accessibility for rescue, and time taken until discovery. RRRS scores were compared between the social and failed reintegration groups to determine the association between the fatality of a suicide attempt and social reintegration.

2.3 Statistical analysis

Categorical variables were analysed using the chi-square test and Fisher's exact test, and continuous variables were analysed using the Student's *t*-test to determine the associations of various factors with the social reintegration of suicide attempters. The independent predictors of social reintegration among suicide attempters were analysed using multivariate logistic regression with variables that were significant in the univariate analysis. Statistical significance was set at $p < 0.05$. Continuous variables were presented as the mean and 95% confidence interval, while categorical variables were presented as frequency and percentage. The collected data were encoded and reviewed for errors using Excel 2016 (Microsoft, Washington, USA) and statistically analysed using SPSS (version 22.0; IBM Corp., Armonk, NY, USA).

3. Results

Among patients in the ED for a suicide attempt during the study period, 106 consented to the post-attempt care programme. After excluding one patient with missing data, one duplicate patient, and 18 patients lost to follow-up, 86 patients were enrolled in the study (Fig. 1). The mean age of the study population was 38.3 years, with 15 aged ≤19 years (17.4%), 36 aged 20–39 years (41.9%), 17 aged 40–59 years (19.8%), and 18 aged ≥60 years (20.9%), showing that young adults aged 20–39 years accounted for the highest percentage of suicide attempters. There were more women (n = 51; 59.3%) than men (n = 35; 40.7%). At the initial social reintegration assessment, 63 were identified to have been reintegrated (73.3%), and 23 (26.7%) failed to reintegrate. In the second social reintegration assessment, 69 (80.2%) reintegrated, and 17 (19.8%) failed to reintegrate (Table 1).

Initial social reintegration was significantly associated with living alone ($p = 0.002$), referral to a mental health welfare centre ($p = 0.042$), psychiatric hospitalisation history ($p = 0.018$), and physical medical history ($p = 0.042$), while it was not significantly associated with sex, education level, marital status, employment status, monthly income, medical insurance, past suicide attempt history, the authenticity of suicide attempt, psychiatric treatment, family histories and the RRRS score. Second, social reintegration was associated with living alone ($p < 0.001$), initial social reintegration status ($p < 0.001$), and educational level ($p = 0.01$). There were no significant differences in referral to a mental health welfare centre ($p = 0.543$), psychiatric hospitalisation history ($p = 0.177$), and physical medical history ($p = 0.05$) (Table 2).

Factors that differed significantly in the univariate analysis were entered into the multivariate logistic regression analysis. Living alone was a significant predictor of initial social reintegration ($p = 0.023$) (Table 3), whereas initial social reintegration status ($p < 0.001$) and living alone ($p = 0.033$) were significant predictors of second social reintegration ($p < 0.001$) (Table 4).

4. Discussion

This study analysed the predictors of social reintegration among patients in the ED after a suicide attempt. Previous studies on suicide have primarily focused on the characteristics of suicide attempters. However, these studies have only provided evidence for identifying individuals at high risk of suicide, with little practical data for preventing suicide. Furthermore, few studies have examined the recovery and social reintegration of patients brought to the ED after suicide attempts.

Our multivariate logistic regression analysis showed that initial social reintegration status was a significant predictor of the second social reintegration of suicide attempters. In other words, the initial social reintegration status can determine whether an individual can achieve social reintegration at a later time point, suggesting that the quick social reintegration of suicide attempters can be long-term and definitive. Therefore, in the early stages, it is essential to aggressively address suicide attempters to facilitate their quick social return and ensure favourable long-term outcomes.

Additionally, living alone increased the odds of both initial and secondary social reintegration. This finding contradicts the general expectation that living with someone who can provide social and emotional support lowers the odds of suicide attempts or increases the odds of social reintegration.

TABLE 1. Demographic and social characteristics of rehabilitated and non-rehabilitated patients.

Variable	Total (n = 86)	1st follow-up			2nd follow-up		
		Rehabilitated (n = 63)	Non-rehabilitated (n = 23)	*p*-value	Rehabilitated (n = 69)	Non-rehabilitated (n = 17)	*p*-value
Sex							
Male	35 (40.7)	22 (34.9)	13 (56.5)	0.071	27 (39.1)	8 (47.1)	0.551
Female	51 (59.3)	41 (65.1)	10 (43.5)		42 (60.9)	9 (52.9)	
Age (yr)							
<20	16 (18.6)	14 (22.2)	2 (8.7)	0.062	13 (18.8)	3 (17.6)	0.120
20–29	25 (29.1)	22 (34.9)	3 (13.0)		23 (33.3)	2 (11.8)	
30–39	10 (11.6)	6 (9.5)	4 (17.4)		7 (10.1)	3 (17.6)	
40–49	8 (9.3)	4 (6.3)	4 (17.4)		5 (7.2)	3 (17.6)	
50–59	9 (10.5)	7 (11.1)	2 (8.7)		9 (13.0)	0	
≥60	18 (20.9)	10 (15.9)	8 (34.8)		12 (17.4)	6 (35.3)	
Educational level							
≤Middle school	20 (23.3)	18 (28.6)	2 (8.7)	0.050	20 (29.0)	0	0.010
≥High school	52 (60.5)	35 (40.7)	17 (73.9)		38 (55.1)	14 (82.4)	
No response	14 (16.3)	10 (11.6)	4 (17.4)		11 (16.0)	3 (17.6)	
Marital status							
Unmarried	51 (59.3)	36 (57.1)	15 (65.2)	0.862	40 (58.0)	11 (64.7)	0.926
Married	29 (33.7)	21 (33.3)	8 (34.8)		23 (33.3)	6 (35.3)	
No response	6 (7.0)	6 (9.5)	0		6 (8.7)	0	
Housemate							
None	41 (47.7)	36 (57.1)	5 (21.7)	0.002	40 (58.0)	1 (5.9)	<0.001
Exist	43 (0.5)	25 (39.7)	18 (78.3)		27 (39.1)	16 (94.1)	
No response	2 (2.3)	2 (3.2)	0		2 (2.9)	0	
Religion							
None	55 (64.0)	38 (60.3)	17 (73.9)	0.118	45 (65.2)	10 (58.8)	1.000
Exist	22 (25.6)	19 (30.2)	3 (13.0)		18 (26.1)	4 (23.5)	
No response	9 (10.5)	6 (9.5)	3 (13.0)		6 (8.7)	3 (17.6)	
Occupation							
None	48 (55.8)	31 (49.2)	17 (73.9)	0.057	36 (52.2)	12 (70.6)	0.210
Exist	36 (41.9)	30 (47.6)	6 (26.1)		31 (45.0)	5 (29.4)	
No response	2 (2.3)	2 (3.2)	0		2 (2.9)	0	
Income per month							
<2.5 million KRW	32 (37.2)	20 (31.7)	12 (52.2)	0.393	25 (36.2)	7 (41.2)	0.913
≥2.5 million KRW	26 (30.2)	19 (30.2)	7 (30.4)		20 (29.0)	6 (35.3)	
No response	28 (32.6)	24 (38.1)	4 (17.4)		24 (34.8)	4 (23.5)	
Physical status							
Healthy or chronic	76 (90.5)	58 (92.1)	18 (78.3)	0.042	64 (92.8)	12 (70.6)	0.050
Acute or disabled	9 (10.5)	4 (6.3)	5 (21.7)		4 (5.8)	5 (29.4)	
No response	1 (0.1)	1 (1.6)	0		1 (1.4)	0	
Insurance							
National health care	72 (83.7)	55 (87.3)	17 (73.9)	0.137	58 (84.1)	14 (82.4)	0.865
Medicaid beneficiary	14 (16.3)	8 (12.7)	6 (26.1)		11 (15.9)	3 (17.6)	

TABLE 2. Clinical and suicide related data of rehabilitated and non-rehabilitated patients.

Variable	Total (n = 86)	1st follow-up			2nd follow-up		
		Rehabilitated (n = 63)	Non-rehabilitated (n = 23)	*p*-value	Rehabilitated (n = 69)	Non-rehabilitated (n = 17)	*p*-value
Psychiatric disease history							
No	21 (24.4)	16 (25.4)	5 (21.7)		18 (26.1)	3 (17.6)	
Yes	63 (73.3)	47 (74.6)	16 (69.6)	0.884	51 (73.9)	12 (70.6)	0.622
No response	2 (2.3)	0	2 (8.7)		0	2 (11.8)	
Psychiatric admission history							
No	67 (77.9)	53 (84.1)	14 (60.9)		56 (81.2)	11 (64.7)	
Yes	16 (18.6)	8 (12.7)	8 (34.8)	0.018	11 (15.9)	5 (29.4)	0.177
No response	3 (3.5)	2 (3.2)	1 (4.3)		2 (2.9)	1 (5.9)	
Suicidal history							
No	38 (44.2)	26 (41.3)	12 (52.2)	0.367	30 (43.5)	8 (47.1)	0.790
Yes	48 (55.8)	37 (58.7)	11 (47.8)		39 (56.5)	9 (52.9)	
Authenticity of suicide attempt							
No	35 (40.7)	29 (46.0)	6 (26.1)		29 (42.0)	6 (35.3)	
Yes	44 (51.2)	30 (47.6)	14 (60.9)	0.136	34 (49.3)	10 (58.8)	0.540
No response	7 (8.1)	4 (6.3)	3 (13.0)		6 (8.7)	1 (5.9)	
Medical outcome							
Discharge or DAMA	59 (68.6)	45 (71.4)	14 (60.9)	0.350	50 (72.5)	9 (52.9)	0.120
Admission or transfer	27 (31.4)	18 (28.6)	9 (39.1)		19 (27.5)	8 (47.1)	
Referred to psychiatrist							
No	35 (40.7)	24 (38.1)	11 (47.8)	0.416	27 (39.1)	8 (47.1)	0.551
Yes	51 (59.3)	39 (61.9)	12 (52.2)		42 (60.9)	9 (52.9)	
The number of consultation							
<4 times	27 (31.4)	22 (34.9)	5 (21.7)	0.244	24 (34.8)	3 (17.6)	0.173
≥4 times	59 (68.6)	41 (65.1)	18 (78.3)		45 (65.2)	14 (82.4)	
Connected to MHC							
No	30 (34.9)	18 (28.6)	12 (52.2)	0.042	23 (33.3)	7 (41.2)	0.543
Yes	56 (65.1)	45 (71.4)	11 (47.8)		46 (66.7)	10 (58.8)	
Drinking							
No	56 (65.1)	42 (66.7)	14 (60.9)		44 (63.8)	12 (70.6)	
Yes	29 (33.7)	20 (31.7)	9 (39.1)	0.553	24 (34.8)	5 (29.4)	0.647
No response	1 (1.2)	1 (1.6)	0		1 (1.4)	0	
RRRS		34.6 ± 6.27	36.3 ± 4.66	0.240	34.7 ± 6.14	36.3 ± 4.76	0.330
Rehabilitated on 1st f/u							
Rehabilitated					61 (88.4)	2 (11.8)	<0.001
Non-Rehabilitated					8 (11.6)	15 (88.2)	

DAMA: discharge against medical advice; MHC: mental health center; RRRS: Risk-Rescue Ratio Scale; f/u: follow-up.

Previous studies have reported that suicide attempts among adolescents and young adults are influenced by impaired or severed family relationships, such as conflicts with parents [16, 17]. Furthermore, in terms of marital status, the number of married male suicide attempters has significantly increased over the past decades, with concerns about an increase in the number of male high school graduates, unemployed and married individuals [18]. Most interpersonal conflicts that trigger suicide involve family members, with marital conflict being the most common cause [19]. Thus, living with someone and experiencing conflict with that person can lead to a suicide attempt, and returning home to this person without resolving the conflict may hinder the social reintegration of the person who has attempted suicide. However, it is well known that

TABLE 3. Multiple regression analysis of factors affecting rehabilitation on 1st follow-up.

	OR (95% CI)	*p*-value
Housemate	3.866 (1.201–12.448)	0.023
Physical status	4.622 (0.873–24.485)	0.072
Psychiatric admission history	3.084 (0.887–10.726)	0.077
Connected to MHC	0.622 (0.189–2.045)	0.434

OR: odds ratio; CI: confidential interval; MHC: mental health center.

TABLE 4. Multiple regression analysis of factors affecting rehabilitation on 2nd follow-up.

	OR (95% CI)	*p*-value
Housemate	10.588 (1.215–92.253)	0.033
Educational level		0.998
Rehabilitated on 1st follow-up	33.583 (5.110–220.709)	<0.001

OR: odds ratio; CI: confidential interval.

older adults who live alone have a significantly higher suicide attempt rate [20–22]. Given these findings, our results may be attributed to the demographic characteristics of our sample, where young adults aged 10–39 years account for nearly 60% of the entire study sample. Therefore, additional research is required to conduct a more accurate assessment of the reasons for suicide attempts.

In our univariate analysis, a history of physical medical issues and educational level were significantly correlated with social reintegration. Previous studies have reported that the severity of physical illness and medical conditions affect suicide attempts, suicidal ideation and referrals to psychiatric treatment [23, 24]. Similarly, our results indicated that experiencing interruptions in daily life due to a physical illness hindered social reintegration. Hence, it is important to assess, treat and facilitate recovery from pre-existing conditions in addition to providing psychiatric assessment and treatment for those who have attempted suicide brought to the ED to promote their social reintegration. Furthermore, the rates of suicidal ideation and suicide attempts were higher among less educated individuals [18]. In our study, the odds of social reintegration decreased with increasing educational level in the univariate analysis, although the association was not significant in the multivariate analysis. These results contradict the previous findings. According to Agerbo [25], high income, high education and married status can increase suicide rates among individuals with a psychiatric history. Furthermore, the incidence rates of suicide attempts and suicidal ideation may be higher among less-educated individuals, but a lower number of suicide attempts among highly educated individuals may indicate more severe medical and social states and fatal suicide attempts. Further research on this topic is required.

This study has several limitations. First, this is a single-centre study conducted at a university hospital in Seoul, Korea. Consequently, the regional characteristics and population composition of the sample do not represent the region or country; thus, the findings cannot be generalised. Second, the sample size is small owing to the single-centre design. Third, we relied on self-report to collect data because of the nature of this topic. Some patients refused to answer some questions, and they might have provided false responses intentionally or otherwise. To address this issue, case managers need to develop good rapport with patients during the initial assessment to increase the reliability of responses and lower the rate of missing responses. Fourth, the follow-up periods of two months and four months are inadequate. Therefore, long-term studies with larger and more diverse populations are needed.

5. Conclusions

This study has several implications, including highlighting the benefits of rapid social reintegration in promoting long-term social reintegration among suicide attempters who consent to ED-based post-attempt care programs. The need for aggressive interventions to promote social reintegration among suicide attempters who live with someone, and the importance of assessing and treating pre-existing medical conditions and their severity, in addition to psychiatric assessment. Therefore, case managers of the Loving Life Team as well as ED and psychiatric providers, should be educated and trained to promote quick social reintegration of patients brought to the ED after a suicide attempt. Furthermore, for suicide attempters who live with someone else, it may be more effective to include cohabiting individuals in counselling and therapy sessions. Based on our findings and subsequent research, it is essential to explore measures to help those who have attempted suicide successfully reintegrate into society beyond simply lowering the suicide rate.

AVAILABILITY OF DATA AND MATERIALS

There are ethical restrictions on sharing a dataset because the data contain potentially identifying information. Loving Life team can be contacted for data access *via* e-mail (s8250@paik.ac.kr) or by calling 82-10-8497-7119.

AUTHOR CONTRIBUTIONS

HJK—performed the authored, analyzed the data, prepared tables, authored and reviewed drafts of the paper. JWC—

reviewed drafts of the paper, designed and wrote the first manuscript. All authors approved the final draft.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the institutional review board (IRB) of Inje University Sanggye Paik hospital (IRB No.: 2018-04-007-001). We acquired the informed consent for the patients or their guardians for data collection.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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