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Evid Based Ment Health

Search strategy

We searched PubMed, Web of Science, PsycINFO, Embase, the Cochrane library and EBSCO for all relevant studies limited to English language and published up to March 4, 2020, with the following terms: ("social support" OR "social integration" OR "social network" OR "social networking" OR "social connectedness" OR "social connect*" OR "contact*" OR "social isolation" OR "community integration" OR "psychosocial support" OR "emotional support" OR "instrumental support" OR "peer support" OR "volunteer" OR "social interaction") AND ("suicide prevention" OR "suicid* prevention" OR "suicide intervention" OR "suicid* intervention" OR "suicide prevent*" OR "suicide/prevention and control").

Embase

('social support' OR (social AND integration) OR 'social network' OR 'social networks' OR 'social connectedness' OR (social AND connection) OR contact OR 'social isolation' OR 'community integration' OR (psychosocial AND support) OR 'emotional support' OR 'instrumental support' OR (peer AND support) OR volunteer OR 'social interaction') AND ('suicide prevention' OR (suicide AND intervention) OR 'suicide prevention and control') AND [english]/lim

Pubmed

(((((((((((((((((((((social support) OR social support[MeSH Terms]) OR social integration) OR social network) OR social networking) OR social network*) OR social connectedness) OR social connect*) OR contact*) OR Social Isolation) OR Social Isolation[MeSH Terms]) OR Community Integration) OR Community Integration[MeSH Terms]) OR Psychosocial Support Systems[MeSH Terms]) OR Psychosocial Support) OR emotional support) OR instrumental support) OR peer support) OR volunteer) OR social Interaction)) AND ((((((suicide prevention) OR suicid* prevention) OR suicide intervention) OR suicid* intervention) OR suicide prevent*) OR ((suicide/prevention and control[MeSH Terms]))) Filters: English

Web of science

1 TS='social support' OR TS='social integration' OR TS='social network' OR TS='social connectedness' OR TS='social connection' OR TS='contact' OR TS='community integration' OR TS='social isolation' OR TS='psychosocial support' OR TS='emotional support' OR TS='instrumental support' OR TS='social Interaction' OR TS='peer support' OR TS='volunteer'

2 TS='suicide prevention' OR TS='suicide intervention'

3 #2 AND #1

Cochrane

#1   social support

#2   social integration

#3   social network

#4   social networking

#5   social connectedness

#6   social connection

#7   contact

#8   social isolation

#9   community Integration

#10   Psychosocial Support

#11   emotional support

#12   instrumental support

#13   peer support

#14   volunteer

#15   social Interaction

#16   MeSH descriptor: [Social Support] explode all trees

#17   MeSH descriptor: [Psychosocial Support Systems] explode all trees

#18   MeSH descriptor: [Online Social Networking] explode all trees

#19   #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16

or #17 or #18

#20   suicide prevention

#21   suicide intervention

#22   #20 or #21

#23   #19 and #22

Psycinfo (Ovid)

2

#1 suicide prevention.mp. or exp Suicide Prevention/

#2 suicide intervention.mp.

#3 social support.mp. or exp Social Support/

#4 social integration.mp. or exp Social Integration/

#5 social network.mp. or exp Social Networks/ or social networking.mp. or social networks.mp.

#6 exp Social Interaction/ or social interaction.mp.

#7 (social connectedness or social connection).mp.

#8 contact.mp.

#9 psychosocial support.mp.

#10 community integration.mp.

#11 social isolation.mp. or exp Social Isolation/

#12 emotional support.mp.

#13 instrumental support.mp.

#14 volunteer.mp. or exp VOLUNTEERS/

#15 peer support.mp.

#16 1 or 2

#17 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15

#18 16 and 17

#19 limit 18 to english language

Ebsco

S1 social support

S2 social integration

S3 social networks

S4 social networking

S5 social connectedness

S6 social connection

S7 contact

S8 social isolation

S9 community integration

S10 psychosocial support

S11 emotional support

S12 instrumental support

S13 peer support

S14 volunteer

S15 social interaction

S16 suicide prevention

S17 suicide intervention

S18 S1 OR S2 OR S3OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR

S15

S19 S16 OR S17

S20 (S16 OR S17) AND (S18 AND S19)

S21 (S16 OR S17) AND (S18 AND S19); Language: - english

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Evid Based Ment Health

Quality assessments of the studies included in the meta-analyses

The risk of bias was rated as low, high, or unclear for each item according to the Cochrane Collaboration's tool. If one study had an unclear or high risk of randomization and allocation procedures, masking, incomplete reporting, selective reporting, and/or other bias, it was rated as having a high risk of bias.

A total of 10 RCTs were included in the analyses of suicide deaths. Five were classified as high risk, the main reasons being incomplete outcome data or blinding of outcome assessment. The risk of bias of the studies was shown in eFigure 1.

Of the 14 RCTs for the analysis of suicide attempts, five studies had a high risk of bias in blinding of outcome assessment, seven were classified as high risk of incomplete outcome data. Overall, 11 RCTs studies were rated as having a high risk of bias. The risk of bias of the studies was shown in eFigure 2.

Subgroup and sensitivity analyses

Deaths by suicide in the intervention group compared with the control group

Subgroup-analysis by intervention method suggested face to face interventions significantly reduce risk of suicide, the pooled risk ratio was 0.16 (95% CI 0.05. 0.53). Suicides in other subgroups were not reduced. The heterogeneity among groups was moderate (I^2=66%, P=0.05).

Subgroup-analysis by participant suggested interventions targeting suicide attempters significantly reduce their risk of suicide, the pooled risk ratio was 0.24 (95% CI 0.10. 0.58). However, interventions targeting other participants did not reduce suicide. The heterogeneity between groups was high (I^2=77%, P=0.04). Participants in the study included people who had attempted suicide and others. All participants in the "suicide attempter" subgroup survived at least one suicide attempt at baseline. "Others" varied across studies, mainly individuals at risk of suicide (participants of each included study were shown in eTable 2). The target of some studies were people at risk of suicide, including those who attempted suicide, but since they covered a much broader range of people, we placed them in the latter group.

The subgroup analysis by gender ratio suggested social support interventions reduce suicide in population with gender ratio (females/males) ≥1 (RR=0.41, 95%CI: 0.20, 0.86), but not in population with gender ratio (females/males) <1 (RR=0.67, 95%CI: 0.18, 2.54). However, the subgroup heterogeneity was not significant.

After removing the studies with a high risk of bias, the pooled risk ratio (RR) was 0.50 (95% CI 0.18. 1.33, P = 0.16). After removing the study specifically targeting adolescents or older adults, the pooled RR was 0.48 (95% CI 0.25. 0.91, P = 0.02). For two studies with a long follow-up period (5 years and 11.2-14.1 years, respectively), the pooled risk ratio was 0.78 (95% CI: 0.41. 1.46, p = 0.43), I^2 = 0%, p = 0.45. After removing them, the pooled risk ratio was 0.34 (95% CI: 0.17, 0.69, p < 0.01), I^2 = 0%, p = 0.44.

Suicide attempt in the intervention group compared with the control group

According to subgroup analyses by intervention method, relative risk of suicide attempts was lower in the intervention group compared with the control group in each subgroup, the result was not significant. Subgroup heterogeneity was moderate (I^2=45%, P=0.16).

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Subgroup-analysis by participant suggested suicide attempters were not significantly reduced in each group. The heterogeneity between groups was moderate (I^2=53%, P=0.15).

Subgroup-analysis by age and gender ratio showed low to moderate heterogeneity among subgroups (I^2=29%, 0%, respectively), showing that these two factors are not the main sources of heterogeneity. The pooled result in population with gender ratio<1 showed a high heterogeneity (I^2=79%, p=0.01). Because there were only two studies in this subgroup, we failed to exclude any one of them to reduce heterogeneity.

The pooled risk ratio for suicide attempts was 0.83 (95% CI 0.60, 1.16, p = 0.28) after removing studies with a high risk of bias, although this was a pooled estimate of three studies.

Publication bias

Possible publication bias and small study effects were assessed through Egger's test in the meta-analysis. The results indicated that no small-study effects existed, giving *p*-value of 0.459 for suicide, 0.502 for suicide attempts, and 0.917 for thwarted belongingness.

eTable 1 Detailed characteristics of each trial included in systematic review

Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
One-to-one						
mail	Motto 1976[1]; Motto & Bostrom, 2001[2]	RCT	Psychiatric in-patient facilities	Patients received regular communications, in the form of a short letter. Each contact letter was simply an expression of concern that the person was getting along all right. The schedule for these contacts was monthly for 4 months, then every 2 months for 8 months, and finally every 3 months for 4 years—a total of 5 years and 24 contacts.	Research staff	Patient discharged from psychiatric inpatient wards
	Bennewith et al., 2014[3]	Single group design	Psychiatric inpatient units	A steering group comprising psychiatrists, researchers, and service users devised 8 letters to be mailed to people discharged from psychiatric hospital within 1 week of discharge and at 2 weeks, 4 weeks, and 2, 4, 6, 9, and 12 months following discharge. A support and advice leaflet, with contact details for telephone helplines, local support groups, and mental health crisis services, was included with each mailing.	Research staff	Patient discharged from psychiatric inpatient wards
	Beautrais, Gibb, Faulkner, Fergusson, & Mulder, 2010[4]	RCT	Emergency departments	The intervention consisted of a series of six 'postcards' sent by mail during the 12 months following the participant's index presentation for suicide attempt or self-harm. Postcards were posted at the following times after the	Research staff	Patient survived suicide attempt or self-harm

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
				index presentation: 2 and 6 weeks; 3, 6, 9 and 12 months.		
	Hassanian-Moghaddam, Sarjami, Kolahi, & Carter, 2011[5]; Hassanian-Moghaddam, Sarjami, Kolahi, Lewin, & Carter, 2015[6]	RCT	A poison hospital	Eight postcards were mailed at 1, 2, 3, 4, 6, 8, 10, and 12 months after discharge. A 9th was sent on each participant's birthday where the cards were on a two-monthly interval (5 to 12 month).	Research staff	Patient survived suicide attempt or self-harm
	Robinson et al., 2012[7]	RCT	Specialist youth mental health service	A postcard was sent one per month over 12 months, following the baseline assessment. Each postcard expressed an interest in the person's well-being, reminded them about one of the sources of help identified at interview and promoted one of six evidence-based self-help strategies.	Research staff	Young people with a history of SA, SI, and/or DSH
	Hatcher, Coupe, Wikiriwhi, Durie, & Pillai, 2016[8]	RCT	Emergency departments	Patient support for up to two weeks and postcard contact for one year. Eight postcards were sent in sealed envelopes in months 1, 2, 3, 4, 6, 8, 10 and 12 after the index episode. Problem solving therapy, improved access to primary care, a risk management strategy, and	Research staff	Patient survived suicide attempt or self-harm

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
				cultural assessment also included in the program.		
	Ehret2021[9]	Single group design	Psychosocial rehabilitation and recovery center	A weekly outpatient group where Veterans create cards, and sending cards to recently discharged Veterans. Veteran peers with lived mental health experience as card makers (generators of both artistic and written content).	Veteran peer	Veteran discharged from psychiatric inpatient unit
Text message	Chen, Mishara, & Liu, 2010[10]	Single group design	General hospitals	Mobile telephone messages began to be sent to patients in the first week after discharge and once a week during the first month, for a total of four contacts. The messages were standard supportive messages-simple expressions of concern about whether the person was getting along well.	Research staff	Patient survived suicide attempt or self-harm
	Berrouiguet et al., 2018[11]	Case report	Crisis support services	Participants in the intervention group received SIAM text messages 48 hours after discharge, then at day 8 and day 15, and months 1, 2, 3, 4, 5, and 6. The messages referred to validation of the suffering, recall of the discharge agreement, and ongoing outreach care.	Research staff	Patient survived suicide attempt or self-harm

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Comtois et al., 2019[12]	RCT	Military installations	Participants received caring texts at 1 day; 1week; and 1, 2, 3, 4, 6, 8, 10, and 12 months and on their birthdays. Text messages were nondemanding, asking nothing of the recipient and only expressing care and concern. The participants may reply to a scheduled text. If a response was requested, the CCs responded.	Professional	Active-duty military service member with suicidal ideation or a suicide attempt
Face to face	De Man & Labrèche-Gauthier, 1991[13]	Single group design	A community-based suicide-prevention center	Program 1: people received assistance that consisted of social support by trained community volunteers; Program 2: in addition to social support, volunteers provided help in improving self-esteem and stress management skills.	Trained volunteer	Individual with history of suicide ideation
	Thompson, Eggert, Randell, & Pike, 2001[14]	RCT	School	The social connections intervention was to link each youth with the school-based case manager, a favorite teacher, or both, and to contact a parent or guardian of the youth's choice to enhance immediate support, access to help, and communication between the youth, school personnel, and parents.	School staff and parents	Youth identified as at risk for suicide
	Randell, Eggert, & Pike, 2001[15]; Eggert, Thompson, Randell, & Pike, 2002[16]	RCT	School	Facilitation of social support from school personnel and a parent.	School staff and parents	Youth identified as at risk for suicide

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Hall & Gabor, 2004[17]	Single group design	Prison	They provided 24-h available listening and befriending service.	Trained volunteer	Vulnerable prisoner
	King et al., 2006[18]	RCT	Hospitals	Project staff assisted adolescents with their nomination of potential support persons. Adolescents were encouraged to consider caring others. Support persons were asked to maintain weekly supportive contact with the adolescents.	Adolescent nominated person	Adolescent patient with suicide attempt or significant suicidal ideation
	Vijayakumar & Kumar, 2008[19]	Nonrandomized control study	Community	Six experienced volunteers with extensive experience of providing mental health supported individuals expressing suicidal ideas, provided emotional support to the bereaved family members.	Trained volunteer	Bereaved family member of disaster victims
	King et al., 2009[20]; King et al., 2019[21]	RCT	Hospitals	YST-II provided tailored psychoeducation to youth-nominated adults and weekly check-ins for three months following hospitalization. Adults had regular supportive contact with adolescents.	Youth-nominated adult	Adolescent patient with suicide attempt and/or significant suicidal ideation
	Greden et al., 2010[22]	Single group design	Community	Trained peers regularly contacted their assigned panel of soldiers to "check in," helped identify those with clinical needs, encouraged registration and entry into hospital or military programs, and developed strategies to enhance enrollment in community treatment	Trained soldier peer	Returning citizen soldier

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
				programs safe and acceptable. Peers supported adherence after starting treatment.		
	Auzoult & Abdellaoui, 2013[23]	Cross-sectional	Prisons	Inmates were trained to identify and support prisoners at risk of committing suicide.	Peer prisoner	Vulnerable prisoner
	Naidoo, Gathiram, & Schlebusch, 2014[24]	RCT	Primary care setting	Participants in the control and Buddy groups were subject to a one-hour session of education. Participants in the control group were followed-up by researchers. Those in the Buddy group were supported by participant-nominated persons called "buddies", who were empowered to provide basic counselling and facilitate specialized referral if required.	Researcher or participant-nominated person	Patient survived a suicide attempt
	Law et al., 2016[25]	Nonrandomized control study	Hospitals	Volunteers were coached to provide: screening for suicide risk; giving emotional support; providing information on medical and community resources; sharing problem-solving skills and referrals to professionals.	Trained volunteer	Young adult with self-harm

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	King et al., 2017[26]	RCT	Emergency department and associated urgent care clinic	Project staff matched youth to trained community mentor (CM). Prevention specialist, youth, and CM generated an action plan. Youth and CM engaged in activities progressing from building mentor–mentee relationships to participating in activities to help youth reach individual goals.	Trained volunteer	Youth screened at risk for suicide
	Graham et al., 2018[27]	Single group design	Hospital (workplace)	The Caregiver Support Team, consisting of colleagues serving in the role of peer supporter. All the people worked in the unit were asked to nominate colleagues who they would naturally go to for emotional help following a difficult situation. Nominated peer received education to help others deal with colleagues emotionally affected.	Trained peer	Clinician
Telephone	De Leo, Carollo, & Dello Buono, 1995[28]; De Leo, Dello Buono, & Dwyer, 2002[29]	One group	The tele-help/tele-check service center	The center contacted each client on an average of twice a week to monitor the client's condition through a short informal interview and to offer emotional support.	Service staff	Older adult
	Vaiva et al., 2006[30]	RCT	Emergency departments	The intervention consisted of contacting patients by telephone at one month or three months after discharge from an emergency department for attempted suicide.	Professional	Patient survived a suicide attempt

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Mousavi, Zohreh, Maracy, Ebrahimi, & Sharbafchi, 2014[31]	RCT	Intoxication emergency service	The BIC group were followed by seven follow up telephone contact after discharge at the second and fourth weeks, and at the second, third, fourth, fifth, and sixth months	Professional	Patient survived a suicide attempt
	Amadéo et al., 2015[32]	RCT	Emergency department	There was a one-hour information session, as close to the time of discharge as possible; and nine follow-up contacts after the intake (phone calls according to a specific agenda at 1, 2, 4, 7 and 11 week(s), and 4, 6, 12 and 18 months)	Professional	Patient survived intentional self-harm
	Normand, Colin, Gaboulaud, Baubet, & Taieb, 2018[33]	Single group cohort	A public hospital	They created a cohort and re-contacted them using personalized phone calls at one week, one month, six months and 1 year after discharge.	Professional	Adolescent and young adult survived a suicide attempt
	Chan, Wong, & Yip, 2018[34]	Single group design	Telephone helpline service	The service-initiated calls to users providing emotional support. Currently, when the users expressed emotional distress, the helpline will offer brief telephone-administered counselling by trained staff.	Trained service staff	Older adult
	Iqbal, Jahan, & Matin, 2019[35]	Cross-sectional	Helpline	Kaan Pete Roi followed the model of Befrienders Worldwide, a global authority on suicide prevention: the model espouses nonjudgmental, compassionate listening, provided by trained volunteers, as a method for suicide prevention.	Trained volunteer	Service user at risk of suicide

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Catanach et al., 2019[36]	Single group design	Emergency departments	Follow-up program consisted of a minimum of five phone calls after ED discharge. The goal of each call was to reassess risk, review or revise the ED discharge plan, identify obstacles to treatment, identify additional needed resources, and provide continued caring contact.	Professional	Patient evaluated for suicide risk
	Luci et al., 2020[37]	Single group design	VA medical centers	Participants were given scheduled follow-up to express care and concern for their wellbeing by telephone call.	Professional	Veteran screened positive for depression or at an elevated risk for suicide
	Gabet et al., 2020[38]	Mixed methods sequential explanatory design	Psychiatric emergency department	A family-peer staff member in the ED in conjunction with the community organization offered MH information, individual family or group support, respite services and outreach to families of patients with MD who presented directly at the ED.	Staff	Families of ED patients
	Martínez-Alés et al., 2020[39]	Observational study	Hospital and community mental healthcare centers	The intervention included an earlier appointment within 3 days after discharge, 12 months of outpatient visits at an intensified frequency with a specially devoted psychiatrist, and 15-minute-long follow-up telephone calls at months 1, 6, and 12.	psychiatrist	Suicide attempter following discharge

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Gehrmann et al., 2020[40]	Cross-sectional study	Not-for-profit organization	The StandBy service provided individuals with crisis support immediately after the loss of a loved one, after which clients were followed up via a phone call at 1 week, 3 months, and 12 months from their initial interaction with StandBy.	Service staff	People be reaved by suicide
	Malakouti et al., 2021[41]	RCT	Hospital	A brief educational intervention in hospital; and telephone follow-up for 12 months at weeks 1, 2, and 4, and then on a monthly basis.	Psychologist	Individual who had attempted suicide and their families
E-mail	Armson, 1997[42]	Column report	Samaritans	They provided e-mail befriending offering emotional support.	Trained volunteer	Service user at risk of suicide
	Luxton, Smolenski, Reger, Relova, & Skopp, 2019[43]	RCT	Military medical centers and VA hospitals	Participants were sent a total of 13 e-mails from site-specific e-mail addresses (monthly for 4 months, then every 2 months for 8 months, and then every 3 months); one additional e-mail were sent during the first week after hospital discharge.	Research staff	Psychiatric inpatient after discharge
Multiple	Termansen & Bywater, 1975[44]	Nonrandom control trial	General hospital emergency room	Follow-up was conducted by telephone and/or face to face contact. The minimum contact was daily for week I, every two days for week 2, twice a week for weeks 3 and 4, once a week for weeks 5 to 8, every two weeks for weeks 9 to 12.	Professional	Patients survived a suicide attempt

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Ratnayeke, 1996[45]	Column report	Community	The researchers visited surrounding villages, displaying posters, and offering open-air befriending; instituted a program of regular hospital visits to meet individuals recovering from suicide attempts. If the patient approved, a volunteer also visited his or her family at home. The volunteer also offered befriending to members of the family, who may themselves have suicidal feelings.	Trained volunteer	Individual survived a suicide attempt
	Fiske & Arbore, 2000-2001[46]	Single group design	Community	The Geriatric Outreach Program provided counseling via scheduled telephone calls and home visits to older adults who may be at risk of suicide. Scheduled calls ranged from daily to weekly, and include well-being checks as well as emotional support.	Trained volunteer	Older adult
	Fleischmann et al., 2008[47]; Bertolote et al., 2010[48]; Vijayakumar, Umamaheswari, Shujaath Ali, Devaraj, & Kesavan, 2011[49]	RCT	Emergency departments	A 1-hour individual information session as close to the time of discharge as possible and, after discharge, nine follow-up contacts (phone calls or visits, as appropriate) according to a specific time-line up to 18 months (at 1, 2, 4, 7 and 11 week(s), and 4, 6,12 and 18 months)	Professional	Patient survived a suicide attempt

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	Wyman et al., 2010[50]; Pickering et al., 2018[51]	RCT	High school	They trained 2 to 3 staff members as adult advisors who would guide the peer leaders; peer leaders carried out specific messaging steps with adult advisor mentoring: they engaged trusted adults, encouraged friends to identify their trusted adults, and disseminated messages about Sources of Strength through presentations, public service announcements, and video or text messages on Internet social network sites.	Peer leader and trusted adult	High school student
	Magee & Foster, 2011[52]	Single group design	Prisons	Under the Listening scheme, a peer support system developed by the prison service and the Samaritans, selected prisoners were trained to listen in confidence to fellow prisoners experiencing psychological and emotional distress which may lead to self-harm or suicide.	Peer prisoner	Vulnerable prisoner
	Perrin & Blagden, 2014[53]	Single group qualitative analysis	Prisons	The Listener scheme regulated by the Samaritans. Each prison Listener team was comprised of a group of inmate volunteers who provide face-to-face emotional support to their peers. Prisoners requiring emotional support can call-out Listeners anytime by asking staff or using a 'Listener phone' privately.	Peer prisoner	Vulnerable prisoner

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Hogan & Grumet, 2016[54]	Single group design	Suicidal patients	The programs included: leadership, training, screening and assessment, systematic suicide care protocol, evidence-based treatment of suicidality, provision of excellent support during care transitions, and measuring outcomes and conducting quality improvement.	Professional	Patient identified at risk for suicide
	Vaiva et al., 2018[55]	RCT	Emergency departments and psychiatry crisis centers	Patients were provided with a crisis card, which is a paper card displaying the emergency room phone number. A phone call was conducted between the 10th and 21st day after the suicide attempt. Postcards were sent to patients who were unreachable or in psychological difficulty (at months 2, 3, 4, and 5).	Professional	Patient survived a suicide attempt
	Riblet et al., 2019[56]	Single group design	VA medical centers	A brief educational intervention on suicide prevention that was personalized to each patient and delivered around the time of discharge, and contact visits after discharge to provide support, monitor symptoms, assess treatment adherence, review the safety plan, and assist with engaging in care, at 2 days, 2, 4, 6, 8, and 12 weeks after discharge.	Professional	Psychiatric inpatient at a risk of self-harm after discharge

Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Kuehl, 2019 (ClinicalTrias.gov NCT03014271)	RCT	High school	Sources of Strength is an evidence-based program for youth suicide that trains student key leaders to strengthen social connectedness and healthy norms school-wide.	Peer leader	High school student
	Fossi Djembi et al., 2020[57]	Single group design	Emergency departments and psychiatry crisis centers	Patients were provided with a crisis card displaying the emergency room phone number. A phone call was conducted between the 10th and 21st day. Postcards were sent to patients who were unreachable or in psychological difficulty (1 monthly for 4 months). A telephone call is scheduled at the end of the 6th month to perform a clinical check-up.	Professional	Patient survived a suicide attempt
	Plancke2020[58]	Nonrandomized control trial	Psychiatric ward	Patients were recontacted between 10 and 21 days after being discharged. If it was not possible to reach the patients by telephone, a postcard was sent to them every month (2nd, 3rd, 4th, and 5th months) to remind them of the team's presence at their side.	Professional team	Patient discharged from the hospital for SA

Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Conwell et al., 2020[59]	RCT	Primary care practice	Subjects were assigned to a Senior Companion. They established a consistent schedule of contacts. The target expectation was of interactions in person and/or by telephone at least once per week, with two per month being in person.	Peer volunteer	Older adult who endorsed low belongingness and/or perceived burdensomeness
	Stanton-Shaw et al., 2021[60]	Single group design	School	Students were nominated by teachers and trained to change the norms and behaviors of peers. Adult advisors provided support, mentor, and assisted peer leaders in spreading hope, help, and strength-based messages across their friendship networks.	peer leaders and adult advisors	Middle school student
Group						
Face to face	Eggert, Thompson, Herting, & Nicholas, 1995[61]; Thompson, Eggert, & Herting, 2000[62]	Nonrandomized control trial	High schools	A small-group work component characterized by social support and help exchanged in group leader-to-student and peer-to-peer relationships; weekly monitoring of activities targeting changes in mood management, school performance and attendance, and drug involvement; and life skills training.	School staff	Student at risk for depressive symptoms/suicide
	Houck, Darnell, & Lussman, 2002[63]	Single group design	High schools	They provided school-based support groups for adolescent girls. The support groups met weekly for 45 minutes during the school day for 14 weeks.	School staff	Student at risk for depressive symptoms/suicide

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Oyama et al., 2005[64]	Nonrandomized control trial	Community	The programs included: committee for suicide prevention, mental health workshop for the elderly, group activity program, and self-assessment of depression in the elderly.	Not mentioned	Older adult
	Oyama et al., 2006[65]	Nonrandomized control trial	Community	The programs included: two-stepped screening for depression; mental health workshop (psychoeducational program, providing the information regarding depression, 3–4 times a year); and a group activity program	Not mentioned	Older adult
	Sturm et al., 2012[66]	RCT	Mountain hiking group	Interventions consisted of a 9-week monitored hiking program. Three hikes were offered each week. Criteria were altitude differences of 300–500 m in elevation gain, a hiking period of 2–3 h, a simple to moderate level of difficulty, and a maximum traveling time of no more than 30–45 min to the hiking location, which was done as group by bus.	Not mentioned	Patient with a history of suicide attempt
	Hom, Davis, & Joiner, 2018[67]	Single group design	Suicide prevention center	The Survivors of Suicide Attempts (SOSA) program was an eight-session, weekly closed support group intervention that offers suicide attempt survivors the opportunity to engage with other survivors in a collaborative and nonjudgmental environment.	Professional and peer with lived experience	Individual with a history of suicide attempt

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Farrier, Baybutt, & Dooris, 2019[68]	Single group design	Prisons	GOOP provided opportunities for prisoners to participate in horticultural and environmentally focused programs: in prison horticulture and community-based environmental "outworking". Prisoners worked together in the prison gardens with the horticultural work.	Not mentioned	Prisoner
	Oh et al., 2020[69]	Pilot RCT	Community	The program comprised case management according to individual risk level; and group-based activities involving eight weekly sessions, which were mainly aimed at enhancing interpersonal networks and community cohesion.	Professional and committee member	Older adult
	Kaplan et al., 2020[70]	Single group design	Local NGO.	Six to seven sessions focusing on: Gender Affirmation; self-esteem and transphobia; safer sex work, safer dating, and pleasure; HIV and other sexually transmitted infections; family acceptance/rejection and violence; and working and skill building; one-on one assessments; and a shared hot meal.	Trans women peer	Trans women 18 years or older
	Vitale2020[71]	Single group design	Urban VA medical center	An intensive multimodal 4-week group intervention included mind–body, expressive arts, exercise and physical wellness, sleep hygiene, spirit and soul, nutrition, and life skills.	Medical staff and practitioner	Isolated Veteran

Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Kinsman2021[72]	Single group qualitative study	Community	Local men were involved in the planning and renovation of the program. A 13-week program ran sessions including healthy eating, exercise, etc.; a nine evidence-based strategies community-led approach was implemented to prevent suicide; a practical numeracy program aimed to enhance the employability.	Local expert	Retired, unemployed middle-aged man
Online	Barak, 2007[73]	Field project report	Sahar online service	Individually, personal online counseling was offered to anonymous users. For group communication, SAHAR provides free and open online support groups.	Professional	Online service user
	Gilat & Shahar, 2009[74]; Gilat, Tobin, & Shahar, 2011[75]	Single group design	Volunteer-based service	The online support group enables the users to participate in group processes of receiving and giving help by means of asynchronous communication.	Trained volunteer	Online service users
	Carli, 2016[76]	RCT	Website	The website offered users access to interactive services such as a real-time consultation and a discussion forum moderated by mental health professionals, as well as written information addressing various mental health problems.	Professional	Adolescents and young adults
	Mokkenstorm et al., 2019[77]	Cross-sectional study	Online forum	An online forum was offered as a peer support intervention service. On this forum, visitors can read and write posts on topics about suicidal thoughts, feelings, and experiences.	Psychologist	Forum visitors

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Bailey2020[78]; 2021[79]	Single group design	Youth mental health service	Affinity was an interactive, purpose-built online platform. Participants and moderators can post comments, information, upload pictures and videos, and reply to content posted by other users.	Clinician and peer	Depressed young people with past-four-week suicidal ideation
	Whiteside et al., 2021[80]	Single group design	Mobile app or website	The web-based intervention was supported by an interventionist or program coach, included caring messages outreach and support for the use of the DBT skills site.	Professional coach	Outpatient
	Andalibi et al., 2021[81]	Single group qualitative study	Digital peer support system	Participants were matched based on age difference and shared interests and connected using their social media accounts. There was currently no formal training offered to buddies.	Social media user	Social media user
	Carras eta al., 2021[82]	Case study	Virtual communities	Stack Up provides video game-related program and promotes an online community featuring several chat channels where veterans and others can connect through text or voice about games or any other topic. Weekly "Bored Room" meetings over voice chat keep members informed of the organization's events and allow for regular member input and feedback.	Trained volunteer peer	Veterans and active-duty military

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
Both one-to-one and group						
Face to face	Motohashi, Kaneko, Sasaki, & Yamaji, 2007[83]	Nonrandomized control trial	Community	The programs included: a resident-based survey on mental health; specialist training on suicide prevention; independent suicide prevention activities promoted; counseling centers distributed; and a community network was created (They offered opportunities to get together for meals, to take part in recreation activities, and increased the activities of mental welfare volunteers. In the snowy winter season, public health nurses regularly visited home-bound elderly persons living alone).	Professional	Older adult
	Ono et al., 2013[84]	Nonrandomized control trial	Community	The programs included: leadership involvement, education and awareness programs, gatekeeper training, and supporting individuals at high risk (home visiting and regional social gatherings aim to reinforce human relationships and connectedness in the community; screening aims to identify at-risk individuals and direct them to treatment).	Professional	Resident (general and at high risk of suicide)

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Classification	Study	Design	Setting	Intervention	Support Provider or Support Group Leader	Support Recipient or Other Group members
	Baker et al., 2021[85]	RCT	Military community	Curriculum-based education and information were provided by selected trained peer mentors as a group intervention. Encouragement and informal types of support were provided by peer mentors as a dyadic or one-to-one intervention.	Trained peer mentor	Military and civilian personnel
	Shue et al., 2020[86]	Single group qualitative study	Community-based clinic	RECLAIM was a community-based program that incorporated mindfulness strategies (i.e., imagery, yoga, meditation), comprised of 8 face-to-face group sessions and self-guided home assignments.	Professional researcher	Veteran
Face to face + online	Geraci, 2018[87]	Multi-arm RCT	Community	Pro Vetus program: The participants received mentorship from their matched and assigned mentor. TM RWB: They were able to access a large online community through social media and receive weekly e-mails providing lists of voluntary physical/social activities. Face-to-face engagement occurred mostly during structured physical fitness activities.	Volunteer peer	Recent Veteran

eTable 2 Detailed characteristics of each trial included in meta-analyses

Study	Participants	Population age range (years)	Mean age of participants (years)		Intervention condition		Sample size (n)[a]		Proportion of female (%)		Follow-up (years)	Outcomes[b]	
			IG	CG	IG	CG	IG	CG	IG	CG			
Motto, 1976[1]; Motto & Bostrom, 2001[2]	Persons hospitalized because of a depressive or suicidal state	Unspecified	34.4	32.8	Mail-Sending regular contact letters (a total of 5 years and 24 contacts)	No contact	389	454	58	54	5	Suicide	-
King et al., 2006[18]	Psychiatrically hospitalized adolescents with suicide attempt or significant suicidal ideation/intent	12-17	15.4	15.2	Face to face-TAU + Psychoeducation for youth-nominated support person (either adult or peer), and facilitating the supportive weekly contacts	TAU	151	138	68.9	67.4	0.5	Suicide attempt	-
Vaiva et al., 2006[30]	Suicide attempters	18-65	36.5[c]	35	Telephone-Contacting at one month or three months after discharge	TAU (no telephone contact)	293	312	75	71	1.1	Suicide attempt Suicide	- -
Fleischmann et al., 2008[47]; Bertolote et	Suicide attempters	Unspecified (over 12 clarified in	23	23	Telephone + face to face-TAU + A 1-hour	TAU (according to the norms	922	945	59.9	56.5	1.5	Suicide attempt Suicide	- +

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Supplemental material

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Evid Based Ment Health

Study	Population	Age range	Mean age	Mean age	Intervention	Control	N int	N ctrl	%F int	%F ctrl	Follow-up	Outcome	Effect
al., 2010[48]; Vijayakumar et al., 2011[49]	one study site[49]				individual information session and nine follow-up contacts after discharge	prevailing in the respective ED)					1/	Suicide attempt	-
King et al., 2009[20]; King et al., 2019[21]	Adolescents with significant suicidal ideation or suicide attempt	13-17	15.6	15.6	Face to face- TAU + Psychoeducation for youth-nominated adult, and encouraging support adult to have regular contact with adolescents	TAU	223	225	71	71	11.2-14.1[d]	Suicide	+
Hassanian-Moghaddam et al., 2011[5]; Hassanian-Moghaddam et al., 2015[6]	Suicide attempters	above 12	24.2	24.1	Mail- TAU + Sending regular postcards (a total of 9)	TAU	1150	1150	66.7	66	1	Suicide attempt	+
Robinson et al., 2012[7]	Young adults with a history of suicidal threats, ideation, attempts and/or DSH	15-24	18.6	18.6	Mail- TAU + Sending postcards one per month over 12 months	'Sources of help' interview +TAU, but no postcards	81	83	60.5	64.6	1.5	Suicide attempt / Perceived social support	- / -

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Study	Population	Age			Intervention	Control						Outcome	
Mousavi et al., 2014[31]	Suicide attempters	15 or older	24.8[c]	26.6[c]	Telephone- Seven follow up telephone contact after discharge	TAU (no phone contacts, routine treatments only)	69	70	72.5	54.3	0.5	Suicide attempt	-
Amadéo et al., 2015[32]	Suicide attempters	Unspecified	33	31.5	Telephone- TAU + A 1-hour information session and 9 follow-up contacts	TAU (one psychiatric assessment, and then either hospitalization, outpatient follow-up, or no care at all	100	100	64.4	64	1.5	Suicide attempt	-
												Suicide	-
King et al., 2017[26]	Youth screened at risk for suicide	12-15	13.5	13.5	Face to face- Matching youth to trained community mentor, and encouraging them to engage in activities together	Receipt of community resource information	106	112	66.5	66.5	0.5	Suicide attempt	-
												Social connectedness	+
												Community connectedness	-
												Thwarted belongingness	-
Vaiva et al., 2018[55]	Suicide attempters	18 or older	38.4	38.1	Mail + telephone- TAU + Providing a crisis card, a phone call, and postcards (to patients who were unreachable or in	TAU (an emergency follow-up appointment at 24–48 hours for discharged patients and a referral to a	520	520	63.3	63.6	1.1	Suicide attempt	-
												Suicide	-

Study	Population	Age criteria	Mean age (I)	Mean age (C)	Intervention	Control	n (I)	n (C)				Outcome	Direction
					psychological difficulty)	psychiatrist or physician consultation)							
Geraci, 2018[87]	Recent Veteran	Unspecified	31.2[c]	38.4[c]	Face to face + online- A large online community, weekly e-mails providing lists of activities, and physical fitness activities	Waitlist	10	30	30	20	0.3	Perceived availability of social support	+
Comtois et al., 2019[12]	Military service members identified with suicidal ideation or a suicide attempt	18 or older	25.6	24.8	Text message- Sending regular caring texts for 12 months	Standard care	329	329	16.4	19.5	1	Suicide attempt Suicide	+ -
Luxton et al., 2019[43]	Psychiatric inpatients after discharge	Unspecified	32.5	33.7	E-mail- Sending a total of 13 regular e-mails	TAU (no contact)	652	666	25.3	22.8	2	Suicide attempt Suicide Thwarted belongingness	- - -
Conwell et al., 2020[59]	Older adults who endorse low belongingness and/or perceived burdensomeness	60 or older	70.5	71.3	Telephone + face to face- Establishing scheduled contacts between subject and senior companion	TAU (Medical or psychiatric interventions, other informal social support or social services interventions)	190	179	54.2	55.9	1	Suicide attempt Suicide Thwarted belongingness	- - -

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| Malakouti et al., 2021[41] | Suicide attempters | Unspecified | 27.6[c] | 26.9[c] | Telephone- A brief educational intervention and telephone contacts for 12 months | were not restricted) TAU (no intervention or consultation, but available mental health services) | 153 | 152 | 68.6 | 65.1 | 1 | Suicide attempt | + |
| | | | | | | | | | | | | Suicide | - |

a: All the numbers listed were raw data rather than converted to person-year.

b: For the outcome on the left, when the intervention was significantly more effective than control in the study, we labeled it "+"; on the contrary, we labeled it "-".

c: Estimated from the data provided in the article.

d: The suicide attempt date was extracted in the 12-month follow-up period, while data for suicide was from 11.2-14.1 years follow up.

IG: Intervention group.

CG: Control group.

TAU: Treatment as usual.

ED: Emergency department.

eTable 3 Subgroup meta-analyses for suicide and suicide attempt

Subgroup		Suicide									Suicide attempt						
		Intervention		Control		RR, 95% CI	Z within (P)	I² within (P)	I² between (P)		Intervention		Control		RR, 95% CI	Z within (P)	I² within (P)	I² between (P)
	n	Events	Total	Events	Total					n	Events	Total	Events	Total				
Method																		
Mail/Text message/E-mail	3	20	3578	29	3931	0.78 [0.44, 1.39]	0.85 (0.40)	0% (0.51)	66% (0.05)	4	154	4055	209	4086	0.85 [0.54, 1.33]	0.71 (0.48)	67% (0.03*)	45% (0.16)
Telephone	4	4	1183	12	1203	0.37 [0.13, 1.10]	1.79 (0.07)	0% (0.88)		5	168	1218	214	1238	0.77 [0.57, 1.05]	1.66 (0.10)	49% (0.10)	
Face to face	3	3	4427	21	4477	0.16 [0.05, 0.53]	2.96 (<0.01*)	0% (0.43)		5	130	1925	118	1947	1.11 [0.88, 1.40]	0.86 (0.39)	0% (0.56)	
Participant																		
Suicide attempter	5	6	2566	30	2621	0.24 [0.10, 0.58]	3.18 (<0.01*)	0% (0.58)	77% (0.04*)	7	327	4901	420	4956	0.79 [0.62, 1.01]	1.88 (0.06)	60% (0.02*)	53% (0.15)
Others	5	21	6622	32	6990	0.74 [0.42,1.29]	1.05 (0.29)	0% (0.61)		7	125	2297	121	2315	1.06 [0.78, 1.43]	0.35 (0.73)	29% (0.21)	
Age																		
Adolescent	1	1	2854	3	2880	0.34 [0.04, 3.23]	0.94 (0.35)	NA	0% (0.77)	4	69	474	62	475	1.10 [0.81, 1.51]	0.62 (0.53)	0% (0.41)	29% (0.24)
Adult or unspecified	8	26	6144	59	6552	0.48 [0.25, 0.91]	2.24 (0.02*)	27% (0.22)		9	382	6534	479	6617	0.82 [0.65, 1.02]	1.75 (0.08)	61% (0.01*)	

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Older adult	1	0	190	0	179	NA	NA	NA		1	1	190	0	179	2.83 [0.12, 68.95]	0.64 (0.52)	NA	
Gender Ratio																		
Females/Males≥1	8	22	7555	54	7950	0.41 [0.20, 0.86]	2.36 (0.02*)	30% (0.21)	0% (0.53)	12	397	5565	482	5610	0.87 [0.71, 1.07]	1.28 (0.20)	50% (0.03*)	0% (0.89)
Females/Males<1	2	5	1633	8	1661	0.67 [0.18, 2.54]	0.59 (0.56)	15% (0.30)		2	55	1633	59	1661	0.93 [0.42, 2.05]	0.18 (0.85)	79% (0.01*)	
Total	10	27	9188	62	9611	0.48 [0.27, 0.85]	3.28 (<0.01*)	17% (0.30)		14	452	7198	541	7271	0.88 [0.73, 1.07]	1.25 (0.21)	52% (0.01*)	

*: p<0.05

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eFigure 1. Risk of bias (suicides)

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eFigure 2. Risk of bias (suicide attempts)

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