Suicide among the elderly: the long-term impact of a telephone support and assessment intervention in northern Italy

DIEGO DE LEO, MARIROSA DELLO BUONO and JONATHAN DWYER

Background Previous short-term work reported fewer suicides among elderly users of a telephone helpline and emergency response service (the TeleHelp–TeleCheck Service).

Aims To examine long-term effects of the service on suicide in an elderly population of northern Italy.

Method The service provided twice-weekly support and needs assessment telephone calls and a 24 h emergency alarm service. Data from 1988 to 1998 allowed comparison of 18 641 service users with a comparable general population group of the Veneto region in Italy.

Results Significantly fewer suicide deaths (nOBSERVED=6) occurred among elderly service users (standardised mortality ratio (SMR) 28.8%) than expected (nEXPECTED=20.86; \( \chi^2 = 10.58 \), d.f.=1, \( P < 0.001 \)) despite an assumed overrepresentation of persons at increased risk. The service performed well for elderly females (nOBSERVED=2, SMR=16.6%, nEXPECTED=12.03; \( \chi^2 = 8.36 \), d.f.=1, \( P < 0.001 \)).

Conclusions The study confirms the initial promise of the TeleHelp–TeleCheck service over a much longer time period. Further research will clarify the apparent lack of benefit for elderly males.

Declaration of interest None.

The highest suicide rates in almost every country are among persons more than 75 years old (World Health Organization, 1999). A predicted increase in the worldwide population of elderly people is expected to produce a corresponding future increase in completed suicides (Conwell, 1992; Harwood & Jacoby, 2000). Community crisis-support agencies do not typically identify the elderly as major users; in fact, older people show reluctance to use those services because of a lack of awareness, a belief that the services are not for them or are too expensive, or a mistrust of the managing institution (McIntosh et al., 1994). Alternative preventive intervention to reduce suicide by the elderly must be developed and implemented (De Leo & Scocco, 2000).

METHOD

General practitioners (GPs) or social workers from local health services typically initiated the referrals to the TeleHelp–TeleCheck service. Following referral, clients were placed on a waiting list and subsequently contacted following regional government authorisation.

Service users received an alarm device to remotely trigger a pre-established response network (TeleHelp). Users also received welfare monitoring and emotional support from trained and paid staff, via short and informal twice-weekly telephone interviews; users were also able to initiate calls at any time, 24 h a day and 7 days a week (TeleCheck).

Participants were 18 641 individuals, 65 years of age or older, residing in the Veneto region in Italy, and connected to TeleHelp–TeleCheck between 1 January 1988 and 31 December 1998. Ages and education levels were recorded but educational level data were found to be incomplete for many TeleHelp–TeleCheck users. To estimate the educational level of the sample, data on a random subsample of 240 users were examined.

Observed and expected suicide rates among older TeleHelp–TeleCheck users were compared. Observed suicide rates were calculated from Veneto region mortality statistics from civilian and military police records published in the monthly Judicial and Criminal Statistics Book (Italian National Statistical Institute, 2000) and the Italian Statistics Year Book (Italian National Statistical Institute, 1998). These rates were then cross-checked against the cause of death on the death certificate records for TeleHelp–TeleCheck users published in the Health Statistics Yearly (Italian National Statistical Institute, 1999). Expected suicide rates were calculated using prevailing suicide rates in

\(^1\)See editorial, pp. 191–192, this issue.
the corresponding general population in the Veneto region. To test the ability of the data to support, or fail to support, the null hypothesis of no differences between TeleHelp–TeleCheck users and the general population, cause-specific mortality rates were compared using chi-squared after calculation of the standardised mortality ratio (SMR; Hennekens & Buring, 1987). Chi-squared examines the difference between two counts, whereas SMRs express the observed rate as a percentage of the expected rate, thus more clearly expressing the proportional relationship between those rates. Confidence intervals around SMRs were calculated assuming Poisson distributions (Breslow & Day, 1987).

The numbers of suicides were very low compared with the numbers of the evaluation group, so the case-selection aspect of experimental design was biased to over-report the statistically rare suicide events, thus ensuring robustness of results. This point is discussed more fully in the Discussion.

RESULTS

The mean age of the users at time of connection to TeleHelp–TeleCheck was 79.97 years (s.d. 6.8 years). Other characteristics of the sample are presented in Table 1, where it can be seen that the majority of participants were widowed (68%), females (84%) and living alone (73%) in partially self-sufficient (63%) circumstances.

A total of 67.4% of the general Veneto region population of >65-year-olds is female. Females were therefore significantly overrepresented in the sample ($\chi^2=2.379$, d.f.=1, $P<0.001$).

Only 15.57% of the sample was found to have progressed beyond primary school, which is, however, in line with what might be expected in comparable areas of northern Italy (De Leo et al, 1997).

During the overall evaluation period, 13% of TeleHelp–TeleCheck users on average stopped using the service. Almost two-thirds of these losses were caused by death (45%) or the admission of the user to an institution (21%), with the remainder due to events such as a move to another region or into a relative’s home.

Table 2 shows that the number of observed suicides ($n_{\text{OBSERVED}}=6$) of TeleHelp–TeleCheck users over the 11 years of the evaluation was significantly lower than the number expected ($n_{\text{EXPECTED}}=20.86; \chi^2=10.58$, d.f.=1, $P<0.001$), with an SMR for users of 28.8% (95% CI 11.5–62.5), indicating that only 28.8% of the expected mortality from suicide was observed to occur.

Examination of data in Table 2 also shows that there were significantly fewer suicides of older female TeleHelp–TeleCheck users ($n_{\text{OBSERVED}}=2$) over the 11-year evaluation period than would be expected ($n_{\text{EXPECTED}}=11.98$). The observed suicide rate for these TeleHelp–TeleCheck users was 5.99 times lower than the expected suicide rate, with an SMR of 16.7% (95% CI 2.0–59.9). This difference was also statistically significant ($\chi^2=8.36$, d.f.=1, $P<0.01$). In contrast, the difference between the observed number of male suicides ($n_{\text{OBSERVED}}=4$) and the expected number ($n_{\text{EXPECTED}}=8.88$) was not statistically significant ($\chi^2=2.68$, d.f.=1, $P=0.204$).

Two of the six suicides by TeleHelp–TeleCheck users in the 11-year evaluation period were performed by hanging, two by falling or jumping and one by each of firearm and drug overdose with

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Characteristics of clients of the TeleHelp–TeleCheck service for the elderly between 1 January 1988 and 31 December 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics</td>
<td>Total</td>
</tr>
<tr>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>18,641 (100.00)</td>
</tr>
<tr>
<td>Widowed</td>
<td>12,754 (68.42)</td>
</tr>
<tr>
<td>Single</td>
<td>2,925 (15.69)</td>
</tr>
<tr>
<td>Married</td>
<td>2,628 (14.10)</td>
</tr>
<tr>
<td>Divorced</td>
<td>334 (1.79)</td>
</tr>
<tr>
<td>Self-sufficiency</td>
<td></td>
</tr>
<tr>
<td>Complete</td>
<td>6,271 (33.64)</td>
</tr>
<tr>
<td>Partial loss</td>
<td>11,771 (63.15)</td>
</tr>
<tr>
<td>Total loss</td>
<td>599 (3.21)</td>
</tr>
<tr>
<td>Living situation</td>
<td></td>
</tr>
<tr>
<td>With someone</td>
<td>5,108 (27.40)</td>
</tr>
<tr>
<td>Alone</td>
<td>13,533 (72.60)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Indirect standardisation ratio of suicide mortality rates for marital status and gender for individuals older than 65 years for the period 1988–1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital status</td>
<td>Mean number of service clients/year</td>
</tr>
<tr>
<td>Females</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>10,769</td>
</tr>
<tr>
<td>Widowed</td>
<td>46,864</td>
</tr>
<tr>
<td>Married</td>
<td>5,635</td>
</tr>
<tr>
<td>Divorced</td>
<td>983</td>
</tr>
<tr>
<td>Total (females)</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>1,486</td>
</tr>
<tr>
<td>Widowed</td>
<td>6,611</td>
</tr>
<tr>
<td>Married</td>
<td>6,500</td>
</tr>
<tr>
<td>Divorced</td>
<td>475</td>
</tr>
<tr>
<td>Total (males)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>
suffocation. The two females chose hanging and jumping methods, and the oldest vic-
tim selected a drug overdose combined with self-
suffocation.

DISCUSSION

This evaluation confirms a previous report on the apparent effectiveness of the Tele-
Help–TeleCheck service in preventing suicide, especially by older females, in the
Veneto region of northern Italy.

Related benefits

This intervention has a positive impact on patients’ psychosocial functioning. De Leo
et al (1992) compared a random sample of 299 TeleHelp–TeleCheck users with
275 persons either on a waiting list, or newly connected to the service. Those using
the service for at least 6 months showed statistically significant reductions in
requests for home visits by GPs, hospital admissions and scores on Zung’s
Self-Rating Depression Scale (De Leo et al, 1992). De Leo et al (1992) also highlighted
the cost benefits of the TeleHelp–TeleCheck service. This is an important
point because the service was not originally developed as a suicide prevention pro-
gramme and reductions in resource demand were salient in decisions on establishing
and funding TeleHelp–TeleCheck style services.

The representativeness of the sample of
the service users and the experimental
design manipulations used in analysing the
statistically rare event of suicide occurring in
this relatively large sample are discussed
below.

Sample characteristics

The present sample is characterised by
higher than usual rates of psychiatric dis-
orders and a higher proportion of females.

Twenty-two per cent of the user sample
had clinical depression (as rated by their
GP), compared with 1.98% of the general
control population (De Leo et al, 1997).
Cognitive impairment, evidenced by Mini-
Mental State Examination (Folstein et al,
1975) scores below 24/30, was identified in
25% of the present sample, compared with
12% in a community-dwelling sample
(De Leo et al, 1997). These systematic var-
iations between the sample and the general
population would be expected to increase
the type II error rate, that is increase the
chance that a false null hypothesis is re-
tained and therefore that a real difference
between observed and expected suicides
would be ascribed to chance. The robust-
ness of the present results highlighted by
the rejection of the null hypothesis, despite
an expected increase in type II error rate, is
therefore noted.

Females were also overrepresented in
the evaluation sample, as well as being
found to benefit significantly from the tele-
matic service. Gender could be an import-
ant determinant of both an individual’s
connection with and response to the service
(De Leo et al, 1992). The higher proportion
of female service users is consistent with
previous research. Haste et al (1998) found
that elderly females consulted GPs more
frequently before committing suicide, sug-
gesting a greater willingness of high-risk
older females to engage with primary
health services compared with males.
Canetto (1997) noted that women with per-
sonal difficulties often use a self-reflective
coping style, rendering them receptive to
supportive counselling such as that offered
in the TeleHelp–TeleCheck service. Men
with personal difficulties are more likely
to seek distracting activities to deal with
personal difficulties (Canetto, 1997), possi-
ibly reducing their subjective experience of
support from counselling services.

These specific processes explain some
gender differences in individual TeleHelp–
TeleCheck service user outcomes, but De
Leo & Scocco (2000) have suggested that
the service is successful because referral
decision criteria closely match widely
known suicide risk factors. The service
was therefore offered differentially to
individuals in the community who were
most in need and thus most likely to bene-
fit. For example, the majority of the sample
lived alone, and widowhood and social
isolation are frequently reported risk
factors for suicide in the elderly (Miller,
1978; Harwood & Jacoby, 2000). The
service contact provides these individuals
with an important intervention (De Leo &
Scocco, 2000).

Almost two-thirds (64%) of the service
users reported having experienced at least
partial loss of autonomy, a far greater pre-
valence than in the general Italian popu-
lation over 65 years of age. Decline or
loss of independence is a risk factor for sui-
cide (Harwood & Jacoby, 2000); benefits
are therefore expected when individuals
with reduced independence are identified
and offered support. Finally, a high
prevalence of depression was observed
among the clients of the service and its role
in late-life suicide is probably the most
undisputed (Conwell, 1997; Shah & De,
1998).

The reduced observed suicide rate in the
service user sample, even with the higher
than usual levels of risk factors, adds
further support to the idea that such a ser-
vice is an effective suicide prevention
intervention.

Design bias

The present study uses small observed
variations in the statistically rare suicidal
event to promote the effectiveness of the
evaluated intervention. However, a
number of factors support the reported
conclusions.

The criteria for recording a death as
suicide in the present study were deliber-
ately lax to ensure a rigorous evaluation.
In one case the death was not legally
defined as a suicide. This was included
because the relevant caseworker believed
that suicide was the true cause of the death.
In another case the suicide occurred after
service use had ceased. After using the
service for 3 months the individual was
assessed as being incapable of independent
living. Although not under the care of the
service at the time of death, this suicide
was included in the evaluation because it
was possible that the service was in-
sufficient in meeting the needs of this
client (although institutionalisation might
represent the proximal precipitating
factor).

Underreporting of suicides in the
evaluation group was thus avoided, in
contrast to observed suicide rates in the
general population, which was often
underreported, particularly among older
persons. This could occur for such reasons
as relatives wishing to avoid stigma, insur-
ance claim implications and a genuine mis-
interpretation of the circumstances of
death, which can lead to underreporting of
‘undetermined cause’ deaths. In the light of
the underreporting of suicide in the
general population and the careful identifi-
cation (and perhaps overreporting) of
suicide in the present study, the present
data robustly support the hypothesis that
the TeleHelp–TeleCheck service resulted
in fewer than expected deaths from suicide.
This is especially remarkable in the light of
the long observation period of 11 years.
Summary
The present evaluation of the TeleHelp–TeleCheck service is unique in being a rare example of a long-term longitudinal naturalistic observation of an intervention to prevent suicide in older people.

The study corroborates previous findings that interventions fostering connectedness to support services—either formal or spontaneous—are effective (Motto et al., 1981; Morgan et al., 1993). Also in line with previous research, this study showed evidence that present models of intervention can benefit females but not males (Rutz et al., 1992, 1997; Linehan et al., 1993).

Overall, this body of research indicates the need for alternative and innovative interventions for preventing suicide in males. Suicide prevention in the older population remains problematic and the present results offer hope for the future.

ACKNOWLEDGEMENTS
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REFERENCES

CLINICAL IMPLICATIONS

- Suicide in people over 75 years of age is a frequent event.
- The observations reported here represent a rather rare example of long-term application of a suicide prevention strategy.
- Active outreach, continuity of care and increased level of emotional support seem to be key elements in providing protection against suicide, at least in females.

LIMITATIONS

- The studied group was compared with the general population and not a control group of people sharing the same characteristics as the clients of the service.
- Female subjects were overrepresented among the service users. In comparison, older males carry a much higher risk of suicide.
- Although depression, fear of dependence and institutionalisation are widely accepted as important risk factors for suicide in the elderly, this study does not directly examine other possible factors for which data might be available within the sample group, such as the possible suicide risk factor status of social isolation and mild cognitive impairment.

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