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

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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 ($n_{OBSERVED}$=6) occurred among elderly service users (standardised mortality ratio (SMR) 28.8%) than expected ($n_{EXPECTED}$=20.86; χ^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 ($n_{OBSERVED}$=2, SMR=16.6%, $n_{EXPECTED}$=12.03; χ^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).

The TeleHelp–TeleCheck service

An innovative programme for persons at risk (either somatic or psychological) was implemented in the Veneto region of northern Italy (De Leo *et al*, 1995). The government-sponsored and privately provided service was originally established in 1988 as the TeleHelp–TeleCheck service, a broad public health intervention providing twice-weekly telephone support and emergency response for up to 20 000 persons. Elderly people were typically offered the service because of their disability or social isolation, their psychiatric problems, their poor compliance with hospital outpatient regimes, or their wait for admission to public or private social and health care institutions. An apparent benefit of the TeleHelp–TeleCheck service was prevention of suicide among elderly persons (De Leo *et al*, 1995). A 4-year evaluation reported lower than expected suicide rates among TeleHelp–TeleCheck users than among comparable general community members, possibly because the service addresses suicide risk factors, giving older persons a sense of 'connectedness' (De Leo *et al*, 1995; De Leo & Scocco, 2000).

The benefit reported in earlier work can be questioned because of the small numbers involved; specifically, during the 4-year evaluation period only one user of the telephone support and assessment service committed suicide (De Leo *et al*, 1995). Replication of this seemingly unreliable result was therefore required, and this paper reports on the long-term impact of the same TeleHelp–TeleCheck service.

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

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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 (χ^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 ($n_{OBSERVED}$=6) of TeleHelp–TeleCheck users over the 11 years of the evaluation was significantly lower than the number expected ($n_{EXPECTED}$=20.86; χ^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 ($n_{OBSERVED}$=2) over the 11-year evaluation period than would be expected ($n_{EXPECTED}$=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 (χ^2=8.36, d.f.=1, $P<0.01$). In contrast, the difference between the observed number of male suicides ($n_{OBSERVED}$=4) and the expected number ($n_{EXPECTED}$=8.88) was not statistically significant (χ^2=2.68, d.f.=1, P=2.04).

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 1 Characteristics of clients of the TeleHelp–TeleCheck service for the elderly between 1 January 1988 and 31 December 1998

Characteristics	Total		Women		Men	
	n	(%)	*n*	(%)	*n*	(%)
Gender	18 641	(100.00)	15 658	(84.00)	2983	(16.00)
Marital status						
Widowed	12 754	(68.42)	11 445	(73.10)	1309	(43.88)
Single	2925	(15.69)	2631	(16.80)	294	(9.86)
Married	2628	(14.10)	1342	(8.57)	1286	(43.11)
Divorced	334	(1.79)	240	(1.53)	94	(3.15)
Self-sufficiency						
Complete	6271	(33.64)	5288	(33.77)	983	(32.95)
Partial loss	11 771	(63.15)	9883	(63.12)	1888	(63.29)
Total loss	599	(3.21)	487	(3.11)	112	(3.76)
Living situation						
With someone	5108	(27.40)	3924	(25.07)	1184	(39.69)
Alone	13 533	(72.60)	11 734	(74.93)	1799	(60.31)

Table 2 Indirect standardisation ratio of suicide mortality rates for marital status and gender for individuals older than 65 years for the period 1988–1998

Marital status	Mean number of service clients/year	Suicide mortality rate	Expected suicides (*n*)	Actual suicides (*n*)
Females				
Single	10 769	11.40	1.23	1
Widowed	46 864	12.82	6.01	0
Married	5635	10.23	0.58	1
Divorced	983	423.70	4.16	0
Total (females)			11.98	2
Males				
Single	1486	27.47	0.41	1
Widowed	6611	87.85	5.81	3
Married	6500	13.34	0.86	0
Divorced	475	380.22	1.80	0
Total (males)			8.88	4
Total			20.86	6

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suffocation. The two females chose hanging and jumping methods, and the oldest victim selected a drug overdose combined with self- suffocation.

DISCUSSION

This evaluation confirms a previous report on the apparent effectiveness of the TeleHelp–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 programme 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 disorders 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 variations 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 retained and therefore that a real difference between observed and expected suicides would be ascribed to chance. The robustness 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 telematic service. Gender could be an important 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, suggesting a greater willingness of high-risk older females to engage with primary health services compared with males. Canetto (1997) noted that women with personal 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), possibly 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 benefit. 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 prevalence than in the general Italian population over 65 years of age. Decline or loss of independence is a risk factor for suicide (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 service 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 deliberately 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 insufficient 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, insurance claim implications and a genuine misinterpretation of the circumstances of death, which can lead to overreporting of 'undetermined cause' deaths. In the light of the underreporting of suicide in the general population and the careful identification (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.

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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.

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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