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REVIEW ARTICLE

Deliberate self-harm in older adults: a review of the literature from 1995 to 2004

Jenifer Chan[1], Brian Draper[2] and Sube Banerjee[3]*

[1]*South London & Maudsley NHS Trust, London, UK*
[2]*School of Psychiatry, University of New South Wales, Sydney, Australia*
[3]*Section of Mental Health and Ageing, Institute of Psychiatry, King's College London*

SUMMARY

Background   The prevention of suicide is a national and international policy priority. Old age is an important predictor of completed suicide. Suicide rates in old age differ markedly from country to country but there is a general trend towards increasing rates with increasing age. In 1996 Draper reviewed critically the evidence on attempted suicide in old age in the 10 years between 1985 and 1994. The review highlighted a need for prospective controlled studies in older people with more representative samples as well as studies examining the interaction of risk factors, precipitants, motivations, psychopathology and response to treatment. The aim of this paper is to update this review and to summarise the advances in our understanding of DSH in later life.
Method   We have critically reviewed relevant studies published between 1995 and 2004 to summarise the advances in our understanding of factors associated with deliberate self-harm in later life.
Results   The main advances in understanding have been to clarify the effect of personality and cultural factors, service utilisation pre and post attempt, and the (lesser) impact of socio-economic status and physical illness. Methodological weaknesses continue to include inadequate sample sizes performed on highly selected populations, inconsistent age criteria and lack of informant data on studies relating to role of personality.
Conclusions   Future studies should include prospective, cross-cultural research with adequate sample sizes and which are population-based. Such approaches might confirm or refute the results generated to date and improve knowledge on factors such as the biological correlates of deliberate self-harm, service utilisation, costs and barriers to health care, and the interaction of these factors. Intervention studies to elucidate the impact of modifying these factors and of specific treatment packages are also needed. Copyright © 2007 John Wiley & Sons, Ltd.

INTRODUCTION

The prevention of suicide is a national and international policy priority. Old age is an important predictor of completed suicide. Suicide rates in old age differ markedly from country to country but there is a general trend towards increasing rates with

increasing age (Australian Institute for Suicide Research and Prevention, 2003). In the UK the suicide rate in males aged 65 and over is 13.5 per 100,000 which is equivalent to that in young males (aged 15–24: 13.3 per 100,000) which has been deemed a national priority (Department of Health, 2002). Older women have rates higher than those aged 15–24 (5.8 per 100,000 compared with 3.7 per 100,000) (Office for National Statistics, 2002). The suicide rate in the oldest old (age 80+) has resisted the decline in suicide rates seen in recent years in other age groups (Shah *et al.*, 2001; Erlangsen *et al.*, 2003). Since the early

*Correspondence to: Prof. S. Banerjee, PO 26 Health Service Research Department, The Institute of Psychiatry, King's College London, De Crespigny Park, London SE5 8AF, UK.
E-mail: s.banerjee@iop.kcl.ac.uk

1990s the majority of countries and regions have shown a reduction in late life suicide (Australian Institute for Suicide Research and Prevention, 2003). However, data from a number of industrialised countries indicate that, at least up until the 1970 birth cohort, each successive post-war cohort of males has experienced a higher suicide rate than its predecessor (Gunnell *et al.*, 2003). If these cohorts carry their increased risk through into later life then suicide rates in older adults can be predicted to increase.

Deliberate self harm (DSH) is an important issue in itself in terms of the distress of those affected and service utilisation; it is also a predictor of completed suicide with a strong association between DSH and subsequent suicide (Owens *et al.*, 2002; Joiner *et al.*, 2005). It appears that older people are less likely to harm themselves but when they do they are much more likely to complete suicide. The ratio between episodes of DSH and completion in older adults has been estimated to be 4:1 compared with between 8:1 and 15:1 for the population as a whole, and 200:1 for young people (De Leo *et al.*, 2001). Therefore while DSH in older adults accounts for only about 5–10% of all DSH (Hawton and Fagg, 1990; Lawrence *et al.*, 2000), its consequences may be more serious, though this may be in part due to the increased physical vulnerability of older adults to trauma and toxins. Given that older adults are a particular high risk group for suicide and that DSH is powerful predictor of suicide in later life (Harwood *et al.*, 2000, 2001), understanding DSH in older adults would seem to be of potential value in generating strategies for prevention of suicide and DSH.

In 1996 Draper reviewed critically the evidence on attempted suicide in old age published in the 10 years between 1985 and 1994. The review highlighted a need for prospective controlled studies in older people with more representative samples as well as studies examining the interaction of risk factors, precipitants, motivations, psychopathology and response to treatment. The aim of this paper is to update this review and to summarise the advances in our understanding of DSH in later life by reviewing the literature on DSH in older adults published in the 10 years between 1995–2004. One limitation of the work reported here that should be made clear from the start is that this is a review and so can only comment where there is published work. From the most cursory assessment of the literature it is clear that there is relatively little DSH research from those countries where it appears that suicide is most common such as China and Eastern Europe. The data generated from other countries may or may not be generalisable to these countries. The review is therefore intended to identify gaps as well as the published data.

Without minimising their importance in older adults (Draper *et al.*, 2003), this review was limited to active DSH thus excluding a consideration of indirect self-destructive behaviour (Conwell *et al.*, 1996). Systematic techniques were used to generate the papers for review. These started with a search on Medline and Embase for papers published from 1995–2004 using keywords (e.g. suicide, deliberate self harm, attempted suicide, overdose, old, older adult, elderly, age), supplemented with further inspection of reference lists to locate papers for review. These papers are reviewed below considering data in the following areas: prevalence and incidence, demography, psychiatric history, diagnosis, method of attempts, physical health status, social status, and outcome.

PREVALENCE AND INCIDENCE

De Leo *et al.* (2001) in a World Health Organisation (WHO) multicentre study of Europe reported the incidence rate of DSH for the over 65-year old population to be 61.4/100,000, 57.7/100,000 for males and 64/100,000 for females. Rates varied between centres with Stockholm having the highest attempted suicide rate (116.9/100,000) and Guipuzcoa in Spain the lowest (32.3/100,000). Over the 5 years of the study these rates declined overall but the reduction was confined to females with an increase for males (+ 3.1%).

Using data from the WHO/EURO study to compare older and younger people attempting suicide, older adults made up 6.7% of all suicide attempts in Europe (Osvath *et al.*, 2002), while in Australia 4.1% of those who deliberately poisoned themselves were older adults (Ticehurst *et al.*, 2002). Older adults accounted for 7.9% of a sample of suicide attempters in Greece (Ierodia-konou *et al.*, 1998). In a sample of people with schizophrenia and schizoaffective disorders studied over a 10-year period, suicide attempts in those aged 60 were responsible for 4.6% of total psychiatric admissions (Barak *et al.*, 2004). In the majority of centres within the WHO study (Schmidtke *et al.*, 1996) those aged 55+ had a lower suicide attempt rate than younger adults. Over the study period (1989–1992) the younger age groups had suicide attempt rates that decreased but in the 55+ group there was an increase in rate by 11% in male and by 9% in female. During an 11-year period (1990–2000) a rise in DSH rates in males aged 55 years and over in Oxford has been reported (Hawton *et al.*, 2003). The attempted suicide-to-suicide ratio for older adults has been reported to vary between 2:1 (De Leo

et al., 2001) and 4:1 (Lawrence *et al.*, 2000). This is substantially higher than that observed in younger populations.

DEMOGRAPHICS

Age

Older people who deliberately harm themselves differ from younger people (Buckley *et al.*, 1996; Schmidtke *et al.*, 1996; Osvath *et al.*, 2002; Ticehurst *et al.*, 2002). Comparing the age distribution of prescriptions of psychotropic medication to those who died from or were treated in hospital for self-poisoning (Buckley *et al.*, 1996), the over 75 group had the lowest odds ratio for deliberate self-poisoning suicide with psychotropic drugs. This suggests that older adults prescribed psychotropics may be less likely to use them to poison themselves than working age adults. The WHO/EURO multicentre study examined factors across the age range and reported that methods used for suicide attempts did not differ significantly with age (Schmidtke *et al.*, l996). There was, however, between-country variation; in Hungary the older group included a higher proportion of: females, widowed persons, serious attempts, use of hypnotic drugs in overdoses and current affective disorder (Osvath *et al.*, 2002). Ticehurst *et al.* (2002) examined the effects of age on deliberate self-poisoning, compared with working age adults, older people were more likely to have: been married; had a major depressive disorder (MDD); a longer length of stay in hospital; been in a coma; been prescribed a benzodiazepine prior to the attempt; and a higher mortality. In a cohort study in the USA Iribarren *et al.* (2000) found that while the rate of suicide attempt was highest in the youngest age group among women, it was highest in the older age group among men and that being 65 years and older was an independent predictor of hospital admission following a suicide attempt for men. This contrasts with a prospective study in USA which found that younger age was significantly associated with the risk of attempted suicide (Kuo *et al.*, 2001). Ahrens *et al.* (1995) found no significant correlation between rates of suicide and age in a retrospective study based on outpatients with affective disorders in Germany.

Duberstein *et al.* (1999) used the Scale of Suicidal Ideation (SSI; Beck *et al.*, 1979) to examine the effects of age on the expression of suicidal and death ideation (wish to live; wish to die and extent to which one outweighs the other—SSI Questions #1–#3) on depressed suicide attempters and non-attempters aged 50 and over. Older age (successive 10 year age intervals) was associated with the relative absence of expressed suicidal ideation amongst attempters and non attempters, but had a minimal effect on death ideation amongst attempters which raises the possibility that death ideation may represent a more persistent desire to die in the attempter group.

Gender

The reported ratio of female to male attempters ranges from 2:3 (Lawrence *et al.*, 2000; De Leo *et al.*, 2002) to 5:2 (Pierce, 1996; Szanto *et al.*, 1998) with most around 3:2 (Takahashi *et al.*, 1995; Chiu *et al.*, 1996; Schmidtke *et al.*, 1996; Seidlitz *et al.*, 2001; Ticehurst *et al.*, 2002; Marriott *et al.*, 2003). These data are summarised in Tables 1 and 2. The trend is for the female and male suicide attempt rates to converge in the 70–74 and 75–79 age groups (female:male ratio 1.18 and 1.15 respectively, De Leo *et al.*, 2001). This equivalence in DSH rate is striking when set against the ratio of almost 4:1 male to female in suicide rate (Lawrence *et al.*, 2000). In a case control study of suicide and attempted suicide in those aged 55+ men were more likely to commit suicide but women were more likely to make medically serious but nonfatal attempts (Beautrais, 2002). Older men have been reported to use more violent methods of attempting suicide than older women (Osvath *et al.*, 2002).

Marital status

The distribution of marital status varies significantly between centres (De Leo *et al.*, 2001). Older adults attempting suicide are on the whole widowed or never married. In only two studies were those deliberately harming themselves more likely to be married than not and this may be explained by cultural variations in rates of divorce and separation of the populations studied (Chiu *et al.*, 1996; Beautrais, 2002). In terms of gender, female attempters have been reported to be more likely to be widows (53%) with male attempters more often married (50%) (De Leo *et al.*, 2001). Being widowed, divorced or separated were found to be significantly associated with suicide attempt in those who had had prior contact with mental health services (Lawrence *et al.*, 2000). No significant difference was reported with regard to marital status between suicide attempters and non-attempters in Japan (Takahashi *et al.*, 1995), and in New Zealand (Beautrais, 2002). Compared to those below age 60 elderly deliberate self-poisoners were significantly more likely to be married (Ticehurst *et al.*, 2002).

Table 1. Summary of subject characteristics from relevant studies of DSH in older adults 1995–2004

	Design	N	Age	Country	Population	F:M ratio	% Past attempt	% Past psych history
Takahashi et al. (1995)	Case control	50 cases 50 controls	65+	Japan	Inpatient	1.5	46	76
Buckley et al. (1996)	Cross sectional survey	72	65+	Australia	GP	–	–	–
Chiu et al. (1996)	Prospective	43	65+	Hong Kong	A + E referrals	1.6	21.8	23.6
Pierce (1996)	Retrospective	39	60+	UK	Hospital referrals	2.5	100	–
Schmidtke et al. (1996)	Ecological	Multiple	15+	Europe	Multicentre gen population	1.4	–	–
Hepple and Quinton (1997)	Prospective	100	65+	UK	Hospital referrals	1.78	31	55
Szanto et al. (1998)	Case control	17 cases 76 controls	Mean 67	USA	Outpatient research clinic	2.5	–	–
Duberstein et al. (1999)	Case control	69 cases 98 controls	50+	USA	Inpatient	1.38	–	–
Upadhyaya et al. (1999)	Data from ongoing case control	45	50+	USA	Inpatient	1.37	–	–
Duberstein et al. (2000)	Data from ongoing case control	81	50+	USA	Inpatient	–	13.6	–
Lawrence et al. (2000)	Retrospective	1590	60+	Australia	Inpatient and outpatient	0.71	–	–
De Leo et al. (2001)	Ecological	1518	65+	Europe	Multicentre gen population	1.87	11.9	–
Duberstein et al. (2001)	Data from ongoing case control	87	50+	USA	Inpatient	–	–	–
Seidlitz et al. (2001)	Case control	47 cases 38 controls	50+	USA	Inpatient	1.5	–	–
Beautrais et al. (2002)	Case control	53 cases 69 controls	55	New Zealand	Hospital/coroner/gen population	2.13	72.2	42.9
De Leo et al. (2002)	Prospective	63	60+	Europe	Multicentre gen population	1.74	–	–
Lykouras et al. (2002)	Case control	40 cases 64 controls	60+	Greece	Inpatient	–	–	–
Osvath et al. (2002)	Cross sectional survey	70	65+	Hungary	Gen population	4.2	38.9	–
Scocco and De Leo (2002)	Cross sectional survey	372	65+	Italy	Gen population	–	–	–
Ticehurst et al. (2002)	Prospective	110	65+	Australia	Poison unit	1.5	–	–
Marriott et al. (2003)	Cross sectional	141	15+/ 55+	UK	A+E referrals	1.5	–	–
Barak et al. (2004)	Case control	30 cases 60 controls	60+	Israel	In and outpatients	0.75	100	–
Suominen et al. (2004)	Cross sectional survey	81	<60, 60+	Finland	A + E referrals	1.31	40	–
Useda et al. (2004)	Cross sectional survey	110	50+	USA	Inpatient	1.33	61.1 multiple	–

Table 2. Psychiatric diagnosis from relevant studies of DSH in older adults 1995–2004

	Organic	Substance misuse	Schizophrenia/ schizoaffective	Affective	Adjustment	Anxiety	Personality disorder
Takahashi *et al.* (1995)	10	2	4	58	20	–	6
Buckley *et al.* (1996)	–	–	–	–	–	–	–
Chiu *et al.* (1996)	3.6	1.8	1.8	49.1	20	1.8	0
Pierce *et al.* (1996)	–	–	2.6	79.5	2.6	7.7	–
Schmiddtke *et al.* (1996)	–	–	–	–	–	–	–
Hepple and Quinton (1997)	7	9	3	49	1	6	5
Szanto *et al.* (1998)	–	28.6	–	100	–	–	–
Duberstein *et al.* (1999)	–	24.6	–	100	–	–	–
Upadhyaya *et al.* (1999)	0	17.7	–	100	–	17.7	–
Duberstein *et al.* (2000)	–	35.8	–	100	–	27.2	–
Lawrence *et al.* (2000)	5.6	13.8	5.1	40.6	2.9	15.6	2.5
De Leo *et al.* (2001)	5.6	2.8	3.2	53	8	9.3	3.6
Duberstein *et al.* (2001)	–	–	–	100	–	–	–
Seidlitz *et al.* (2001)	–	–	–	100	–	–	–
Beautrais (2002)	–	13.6	–	86.4	–	–	–
De Leo *et al.* (2002)	–	7.9	6.3	25.4	6.3	–	6.3
Lykouras *et al.* (2002)	–	–	–	100	–	–	–
Osvath *et al.* (2002)	38.5	–	–	–	–	–	–
Scocco and De Leo (2002)	–	–	–	–	–	–	–
Ticehurst *et al.* (2002)	–	11.8	–	–	–	–	–
Marriott *et al.* (2003)	–	–	–	–	–	–	–
Barak *et al.* (2004)	–	–	100	–	–	–	–
Suominen *et al.* (2004)	–	28	20	65	–	17	7
Useda *et al.* (2004)	–	–	–	100	–	–	–

Socioeconomic status

The effect of socioeconomic status was examined in only two papers (Hepple and Quinton, 1997; Lawrence *et al.*, 2000). Lawrence *et al.* (2000) reported no significant association between socioeconomic status and suicide attempts. In Hepple and Quinton's paper the majority of attempters were from the skilled manual laborer group (24%) and the professional group (21%), but the high degree of missing data (24%) makes these data unreliable.

Educational level

In one study, compared with suicide attempters below the age of 65, elderly suicide attempters had a lower level of education (Osvath *et al.*, 2002). However, this may well be a cohort effect of access to education. No such significant difference between attempters and non attempters has been observed in other studies (Takahashi *et al.*, 1995; Szanto *et al.*, 1998; Beautrais, 2002).

Religion

Differences in attempted suicide rates have been reported in different centres (De Leo *et al.*, 2001) and religion has been proposed as one possible explanatory factor. Southern European centres (Emilia, Padova, Guipuzcoa) had lower suicide attempt rates and were predominantly Catholic whereas northern European centres (Odense, Helsinki, Umea, Leiden, Stockholm, Sor-Trondelag) had higher attempt rates and were predominantly Protestant. It is also possible that cultural acceptability may influence reporting and recording of attempted suicide where suicide is seen as a 'sin'. However, there are other major cultural and social differences which separate the north and the south of Europe so that ascribing this difference to religion alone, either in terms of prevention of attempts or the reporting/recording attempts, is unlikely to be reasonable.

INDEX ATTEMPT

Method of DSH

There is considerable variation in the methods used for DSH reported in the studies reviewed. The study by Ticehurst *et al.* (2002) has a clear and acknowledged bias since the sample was taken from a poisons unit, but overall the most common method for DSH used by older adults appears to be self poisoning (De Leo *et al.*,

2001 [69.1%]; De Leo *et al.*, 2002 [79.3%]; Hepple and Quinton, 1997 [89%]; Upadhyaya *et al.*, 1999 [75%]; Lykouras *et al.*, 2002 [55%]; Marriot *et al.*, 2003 [86%]; Beautrais, 2002 [77.3%]). This is consistent with reports from the previous review (Draper, 1996). Psychotropic drugs were most commonly used, with benzodiazepines accounting for most of the overdoses (Chiu *et al.*, 1996; De Leo *et al.*, 2001; Ticehurst *et al.*, 2002). Compared to a younger age group (age <65) the elderly were significantly more likely to have been prescribed and ingested benzodiazepines (Ticehurst *et al.*, 2002), as well as other hypnotics such as barbiturates and 'modern sleeping pills' (Osvath *et al.*, 2002).

Women more frequently took an overdose while men had a higher rate of self-injury with sharp objects and tended to employ more 'hard' (violent) methods (De Leo *et al.*, 2001; Osvath *et al.*, 2002). Other commonly used methods include: jumping (Hepple and Quinton, 1997 [5%]; Lykouras *et al.*, 2002 [10%]; Chiu *et al.*, 1996 [16.3%]; Takahashi *et al.*, 1995 [20.6%]); self injury including cutting and stabbing (Hepple and Quinton, 1997 [2%];Upadhyaya *et al.*, 1999 [18%]; De Leo *et al.*, 2001 [11.2%]; De Leo *et al.*, 2002 [4.8%]; Lykouras *et al.*, 2002 [10%]; Marriott *et al.*, 2003 [12%]); and hanging (Lykouras *et al.*, 2002 [2.5%]; De Leo *et al.*, 2002 [4.8%]; Chiu *et al.*, 1996 [9.3%]; Takahashi *et al.*, 1995 [19.2%]). This contrasts results from previous studies where jumping and hanging were considered as uncommon methods (Draper, 1996). Drowning was infrequently reported in the studies but occurred in 7% (Chiu *et al.*, 1996) and 12.5% (Lykouras *et al.*, 2002) in two studies. Use of firearms was also rare (1.6–2.5%) and is likely to reflect ease of access and the likely lethality of this method if used, i.e. those who shoot themselves usually die and so become completed suicides. None of the studies reported on 'indirect life-threatening behaviours' such as refusal to eat or drink.

Cultural variation is well demonstrated by two studies, one from Japan (Takahashi *et al.*, 1995) and one from Hong Kong (Chiu *et al.*, 1996) which both reported a relatively low proportion of medication overdose (28.8% and 27.3% respectively). In both studies violent methods were more common, e.g. jumping from heights accounted for 16.3% and 20.6% respectively; hanging 9.3% and 19.2%; and self cutting or stabbing 11.6% and 17.8% respectively. Takahashi *et al.* (1995) also reported 6.8% whose method was rail related. This variation may reflect cultural differences in availability of means or perception of lethality of methods.

Suicide intent and lethality

There has been a growth in studies that have attempted to examine suicide intent and lethality (Pierce, 1996; Hepple and Quinton, 1997; Szanto *et al.*, 1998; Seidlitz *et al.*, 2001; Useda *et al.*, 2004). As mentioned above, men have been reported to use more 'hard' or violent methods (De Leo *et al.*, 2001). Hepple and Quinton (1997) used the Beck Suicide Intent Scale (Beck *et al.*, 1974b) and clinical impression to assess suicide intent, 40% of the sample was deemed to have a high intent, 23% medium and 28% low. Those with high intent scores were more likely to be admitted subsequently. A follow-up study looking at repetition of self harm (Pierce, 1996) found higher scores (using the Beck Suicide Intent Scale) for multiple repeaters although scores were no higher in those who later committed suicide, with a non significant trend for females to have higher scores. The Beck Suicide Intent Scale and a modified version of the Lethality Rating Scale (Beck *et al.*, 1975) were used in a study by Seidlitz *et al.* (2001) to investigate emotional traits associated with suicide attempts in later life. Higher suicidal intent was associated with lower anger/hostility subscores. Hostility and lower guilt were associated with greater lethality.

PSYCHIATRIC HISTORY

History of previous attempts

There was considerable variation in the proportion of the sample reported having committed past attempts, ranging from 11.9% to 61.7% [excluding the study by Pierce (1996) which is a study of repetition and therefore has a 100% past attempt rate]. These rates appear higher than those found in the studies published 10 years ago (7–45%; Draper, 1996). This variation may be due to the differences in population from which the samples were drawn. For example, as expected both the studies involving only psychiatric inpatients found high rates of past history of attempts (61.7%—Seidlitz *et al.*, 2001; 46%—Takahashi *et al.*, 1995). De Leo *et al.* (2002) reported a rate of 47.6% from a sample taken from multiple European centres that had been referred by health services. Those who had a past history of attempts were generally younger (De Leo *et al.*, 2001). A history of past attempts was strongly associated with completed suicide with the highest risk ratio for those with a range of psychiatric diagnoses (Lawrence *et al.*, 2000). The source of data is likely to influence the data obtained records and informants may record episodes that a subject may not divulge, also a subject may not

have disclosed an episode of DSH to the informant or services. Inconsistent recording of past history means that it is difficult to draw conclusive results from the data (Marriott *et al.*, 2003).

Past psychiatric history and contact with mental health services

Previous studies have reported a past psychiatric history and contact with mental health services in between 30–54% of older adults with DSH (Draper, 1996). The data from the last 10 years is consistent with this, again with variation between sites of study (23.6%—Chiu *et al.*, 1996; 55%—Hepple and Quinton, 1997; 76%—Takahashi *et al.*, 1995). Unsurprisingly, the rate of past psychiatric history was significantly higher in suicide attempters compared to those who had not attempted, with half of attempters having a history of prior psychiatric hospitalisation (Takahashi *et al.*, 1995). One study where there was a relatively low level reported (Chiu *et al.*, 1996) may be explained by under-reporting due to the stigma of reporting having had a past psychiatric history. Of admissions to hospital after a suicide attempt between 35% (Marriott *et al.*, 2003) and 44% (Lawrence *et al.*, 2000) had had contact with mental health services. Those with a prior history of contact with mental health service have DSH rates between 5–6 times higher than those without prior contact (33% of sample *vs* 6%; Suominen *et al.*, 2004). Only 24.7% of suicide attempters had received a diagnosis of mood disorder during the 12 months before the attempt, while 65.4% attracted this diagnosis after the attempt (Suominen *et al.*, 2004). Of those who had a history of psychiatric contact during the year prior 67% had a diagnosis of mood disorder. Only 4% had received a diagnosis of mood disorder in primary care during the year before the attempt (Suominen *et al.*, 2004).

In a case control study of suicide and near fatal suicide attempts of subjects aged 55 or more, lifetime history of mood disorder and substance misuse disorder were significantly elevated, as was lifetime hospital psychiatric admission and admission in the prior year (Beautrais, 2002). Depressed suicide attempters were found to have had significantly more depressive episodes than non-suicidal subjects and to have been significantly younger at the first episode (Szanto *et al.*, 1998).

Family history of suicide

There were two studies reporting family history. In elderly patients with remitted depression, there were no significant differences in having a family history of suicide between those who attempted or completed suicide, and those who were suicidal and those who were not suicidal (Szanto *et al.*, 1998). It may, however, be that the lack of statistically significant association in these studies is more a function of Type II error due to the small sample size of those with a past family history of suicide. Attempters have been presented as having a lower rate of family history of suicide (4% *vs* 6%) compared with a non-attempter group, but a higher rate of family history of psychiatric disorder (16% *vs* 10%). Neither of these findings reached statistical significance (Takahashi *et al.*, 1995).

PSYCHIATRIC DIAGNOSIS

Affective disorders

Diagnoses of affective psychosis and depression [RR 14; 95% Confidence Intervals (CI) 5.1–38.3] have been reported to be strongly associated with attempted suicide (Lawrence *et al.*, 2000). Consistent with the previous literature (Draper, 1996) levels of mood disorder (the majority being depression) in suicide attempters were high in several studies, ranging from 25.4–86.4% (excluding studies recruiting only subjects with an affective disorder, see Table 2). Even though a lower rate was found in Takahashi *et al.* (1995) mood disorders were still nearly three times more frequent compared with those who did not attempt suicide in this inpatient sample. The lower rate found in De Leo *et al.* (2002), a 1-year follow up study on outcome of suicide attempts, may be related to the high attrition rate (43/103), so that 41.3% did not have a structured psychiatric diagnosis completed. Beautrais (2002) estimated the population attributable risk for current mood disorder on serious suicidal behaviour. Assuming causal relation, the elimination of this risk factor (affective disorder) would result in up to 74% reduction in risk of serious suicidal behaviour in older adults. Lykouras *et al.* (2002) compared elderly suicide attempters with psychotic and non-psychotic depression. Although the psychotic patients had a more severe depression they did not differ significantly from the non-psychotic group in terms of DSH.

Organic disorders

The low rates of dementia found in previous studies (Pierce, 1987; Nowers, 1993) are mirrored in the more recent literature [3.6% Chiu *et al.* (1996) to 10%

Takahashi *et al*. (1995); Osvath *et al*. (2002)], although delirium was found to be more frequent in attempters than non attempters. Osvath *et al*. (2002) reported a high level of organic affective disorder (24.3%). Upadhyaya *et al*. (1999) examined the relationship between a structured measure of cognitive function [Mini-Mental State Examination (MMSE; Folstein *et al*., 1975)] and late-life suicidal behaviour. The MMSE score did not predict attempter status; in fact lower score was significantly associated with lower suicidal intent measured by the Suicide Intent Scale. MMSE score also had no significant association with either the lethality or violence of the suicide attempt. However, there is likely to be substantial selection bias given that this was explicitly a sample of depressed inpatients aged 50 or more where rates of dementia and delirium were likely to have been low. In addition, the MMSE is a poor measure of frontal cognitive function that may be relevant in impulsive suicide attempts. One study that compared the neuropsychological performance of 18 older inpatients with major depression who were admitted following a suicide attempt with that of 29 older depressed inpatients who had never attempted suicide found that on the Trail Making Test Part B, attempters showed greater performance declines with age. While this provides limited support for the role of frontal lobe dysfunction, no other differences in neuropsychological function were detected (King *et al*., 2000).

Schizophrenia and schizoaffective disorder

Apart from one study from Finland that found schizophrenia to be present in 20% of older suicide attempters (Suominen *et al*., 2004), the reviewed studies reported a range of 1.8–6.3%, similar to that previously reported by Draper (1996). In a 10-year case-control study of older people with schizophrenia comparing those who did or did not self harm, no significant differences were found on a range of factors including age, gender, and hospital admission (Barak *et al*., 2004).

Neurotic disorders

Somatisation levels have been reported to be significantly higher amongst suicide attempters than non-attempters (Takahashi *et al*., 1995). This may be a function of hypochondriacal complaints being more culturally acceptable than depressive symptoms and subject to less stigma (Takahashi, 1989). Adjustment disorders have also been reported as common (Takahashi *et al*., 1995; Chiu *et al*., 1996) and one

might speculate that depression is perceived to be less stigmatising when there is a specific precipitating factor associated with it.

Substance misuse

A low rate of alcohol abuse amongst both attempters and non-attempters were found by Takahashi *et al*. (1995) in Japan and amongst attempters in Hong Kong (Chiu *et al*., 1996). This may reflect a cultural difference in drinking habits. In contrast, lifetime alcohol use was significantly higher amongst elderly depressed patients who had a lifetime history of suicide attempts than the non-suicidal in the USA (Szanto *et al*., 1998). Beautrais (2002) has also reported higher rates of substance misuse disorders in those who completed suicide and attempters. In a multi-group case control study Conner *et al*. (2003) found that there was no significant interaction of age and alcohol dependence in medically serious suicide attempts despite an association of increased risk of suicide with increased age.

Personality disorder

In contrast to younger suicide attempters where personality disorder (in particular the borderline type) is commonly reported, in the elderly the prevalence reported was relatively low in recent studies (2.5–7%) (See Table 2). Slightly higher rates (8–20%) had been reported in earlier studies (Pierce, 1987; Hawton and Fagg, 1990; Nowers, 1993). Nonetheless, attempted suicide in those with prior contact with mental health services has been reported to be associated with a diagnosis of a personality disorder (RR 10.2; 95% CI 3.2–32) (Lawrence *et al*., 2000).

PSYCHOLOGICAL FACTORS

Personality factors, emotional traits and hopelessness

Hopelessness was investigated in a study by Rifai *et al*. (1994) who reported high levels of hopelessness in elderly patients with a history of suicide attempt. Factor analytic research has grouped personality attributes along five major dimensions: neuroticism, extraversion, openness, agreeableness, and conscientiousness (McCrae and Costa, 1997). Using this five-factor model to examine the influence of personality factors on lifetime suicide attempts, suicidal and death ideation in depressed inpatients aged 50 or more; low extraversion was a significant

predictor of lifetime suicide attempts (Duberstein *et al*., 2000). There was a non-significant trend for those higher in neuroticism to make more attempts. Low openness to experience predicted absence of suicidal ideation (Duberstein *et al*., 2000) but was found to be unrelated to hopelessness scores (Duberstein, 2001).

In a separate paper on the same sample, Duberstein *et al*. (2001) found high hopelessness scores as measured by the Beck Hopelessness Scale (Beck *et al*., 1974a). Hopelessness was associated with low extraversion score, in particular the low positive emotions facet of this personality trait domain. Hence, older people with lower preferences for social interaction and a lower tendency to experience positive emotion may be more likely to become hopeless during adversity and engage in suicidal behaviours if they are less able or less willing to recruit or benefit from help from those close to them. High impulsiveness and low self-consciousness, both domains of neuroticism, were also associated with high levels of hopelessness.

However, these findings need to be interpreted with caution due to the high percentage who refused to participate in this aspect of the research. In a more recent study, again using the five-factor model in depressed in-patients aged 50 or above, Useda *et al*. (2004) performed a facet level analysis of personality traits related to a life time history of suicide attempts, number of attempts and severity of suicidal ideation. Specific neuroticism traits (such as self-consciousness and vulnerability) were not found to be associated with suicidal behaviours or ideation after the level of depression was controlled for. Low positive emotion, a domain of extraversion, was significantly associated with a history of suicide attempts and low warmth with more severe suicidal ideation. A novel finding was the relation of high modesty (a domain of agreeableness) to both a history of attempt and suicidal ideation. It is possible that people who are self-effacing are at a higher risk if they are more prone to feelings of worthlessness.

Lifetime suicide attempts have been reported to be strongly associated with high levels of hopelessness following remission of depression with significantly raised hopelessness scores compared to the non suicidal (Szanto *et al*., 1998). On a trait level, lower positive emotions, higher anger/hostility, and higher guilt have been reported to be significantly associated with having made a greater number of lifetime suicide attempts in a study of inpatients aged 50 or above with major depressive disorder (Seidlitz *et al*., 2001). However, greater lethality and higher intent were

associated with lower anger/hostility, and lower guilt with greater lethality. They postulated that repeaters may be more intent on using an attempt to affect others rather than killing themselves, and those who make more determined attempts may have had a larger 'cathartic effect' from the attempt leading to lower anger/hostility scores.

Childhood adversity

This has been reported to be associated with both suicide attempts (Beautrais, 2002) and repetition behaviour (De Leo *et al*., 2002). Low paternal care, high paternal control and childhood sexual abuse were all significantly correlated with serious suicidal behaviour and may predispose the individual to the development of a mood disorder later in life (Talbot *et al*., 2004).

PSYCHOSOCIAL ISSUES

Physical health

Lower Cumulative Illness Rating Scale (Linn *et al*., 1968) and lower Karnofsky Physical Status Scale (Karnofsky and Burchenal, 1949) scores predicted absence of suicidal ideation on the SSI amongst those who attempted suicide in a sample of inpatients aged 50 or more (Duberstein *et al*., 1999). In contrast, serious physical illness, hospital admission and GP visits were common among people aged 55 or more and did not differ between those with suicidal behaviour from those randomly selected (Beautrais, 2002). Physical disability scores found in attempters indicated minimal physical disability (Hepple and Quinton, 1997). A previous diagnosis of cancer has been reported to be associated with a lower risk of attempted suicide and suicide (Lawrence *et al*., 2000). These data appear different from those completing suicide and warrant further investigation.

Living alone and social isolation

Beautrais (2002) reported lower levels of social contact and support and higher rates of recent stressful relationship problems in elderly completed suicide and suicide attempters, but living alone was not significantly associated with suicidal behaviour. In contrast, only 11% of elderly suicide attempters lived alone in the Pec study (Osvath *et al*., 2002). This may reflect differences in social structure between countries. Suicide attempters have been reported to

perceive that they have lower social support than non suicidal subjects (Szanto et al., 1998).

Bereavement

Szanto et al. (1997) examined factors associated with suicidal ideation in widowed elderly subjects. Patients with a history of depression and a past history of suicide attempts were more likely to have suicidal ideation than were other bereaved individuals.

PRIOR USE OF HEALTH SERVICES

Primary care

Significantly more suicide attempters than non attempters had visited their GP in the two weeks prior to the index attempt (Takahashi et al., 1995). A significantly higher number of consultations with GP in the year prior to the index attempt were made by eventual suicides compared with non-repeaters (De Leo et al., 2002). In the year prior to the attempt only 4% of elderly attempters in contact with primary care had been diagnosed with a mood disorder compared with 57% afterwards (Suominen et al., 2004).

Psychiatric service use

Suominen et al. (2004) found that 16% of elderly suicide attempters had contact with psychiatric care during the month before the attempt; the rest either had no contact or contact with primary care only. All those who had a history of a preceding attempt had a previous treatment contact and 61% had current psychiatric care. In Israel an intervention study looking at the effect of a psychiatric 'walk-in' clinic in an old age home found that 33.3% of those who use the clinic died in the 3-year period. Although half of these were diagnosed as suffering from a major depressive episode, none had attempted suicide (Swartz et al., 1999).

OUTCOME

Repetition

The 1-year repetition rate was previously reported to be between 9–18% (Draper, 1996). Chiu et al. (1996) have found a lower repetition rate (3.6%), although the authors noted that there may have been under-reporting since mental illness and suicide attempts are heavily stigmatised in Chinese societies. De Leo et al. (2002) found at 1-year follow-up that 12.7% had committed suicide and 11.1% had repeated self harm.

This was, however, a sample with a relatively high rate of past history of suicide attempts. Hepple and Quinton (1997) reported a repetition rate of 5.4% per year. Pierce (1996) studied a sample of elderly patients who repeated DSH between 1973–1993. He found a repetition rate of 15% over the course of 20 years with 25% of all old age repeaters engaged in multiple attempts (> 2).

Psychiatric service use

In a study of the management of suicide attempts in an accident and emergency department, 67% of those over the age of 55 were offered some kind of follow-up as opposed to 47% of those below the age of 55. More older people received a specialist psychosocial assessment before discharge and were more likely to be admitted to hospital (Marriott et al., 2003). Another study estimated that 64% of the suicide attempters surviving were still receiving psychiatric treatment at 1-year follow-up (Hepple and Quinton, 1997). In one study, the most powerful factor predicting aftercare contact was a diagnosed mood disorder (Suominen et al., 2004).

Mortality

Mortality from all causes was found to be 12% per year, 8.6% was due to natural causes in a UK study (Hepple and Quinton, 1997). A Canadian study evaluated the mortality experience in those hospitalised for a suicide attempt and found 10% of males over 60 committed suicide over a 10-year period and women over 60 had the highest 10-year cumulative mortality (17.5%) (Holley et al., 1998). In a prospective study in Sweden Skogman et al. (2004) found that advancing age (50+) was a risk factor for completed suicide in women.

DISCUSSION

Advances in understanding

In 1996 Draper concluded that there was a need for further research on the identification as well as the interaction of psychosocial precipitants, motivations, psychopathology and response to treatment using samples with good generalisability in prospective controlled studies. The studies published in the past decade have generally confirmed the findings of the studies published in the previous decade but have also expanded our knowledge of the factors associated with deliberate self harm in older adults. The female to

male ratio has remained similar with no further information on the reason for the difference in gender ratio in completed suicides. Consistent with previous findings more males attempt suicide with increasing age as the gender ratio converge to near parity. Being unmarried, having depression, substance misuse, having made a past attempt, and a high intent are all consistent factors associated with DSH. In addition, high intent has been found to be associated with multiple repeaters, lower anger/hostility scores and a higher likelihood of hospital admission. Hopelessness continues to be associated with DSH as well as bereavement although this association may well be mediated by depression. Childhood adversity, in particular lack of paternal care, has again been implicated.

The main advances in understanding in the past 10 years appear to have been to clarify the effect of personality and cultural factors in DSH in later life, although there are still limitations. There appears to have been little progress in the areas of treatment and prevention and there remain numerous methodological problems in the studies that we have. The importance of interaction of risk factors has also received only minimal attention.

In terms of service use, levels of psychiatric assessment remains at around 60–70% following an attempt and there appears to be a high level of missed psychiatric diagnosis and chances for treatment prior of DSH. There is new information that significantly more attempters see their GP prior to the attempt. Studies with a prospective design with structured diagnostic interviews have now been completed. The rates of DSH reported varied less (5–10%) and age seems not to affect the method used. In contrast older age was associated with less expressed suicidal ideation but with more violent methods used. Again there has been no study on 'intentional life threatening behaviour' and only sparse information on the effects of religion or accommodation. Socio-economic status and physical illness appear to have less impact than previously reported but the variation in rates of dementia has widened, these may suggest cultural factors in the prevention of DSH in later life or may be artifactual due to reporting and attribution. With the recruitment of broader and perhaps more representative groups of subjects for study there appears to be some lowering of the 1-year repetition rate reported.

Older adults who attempt suicide therefore appear to be different in important ways compared with younger attempters. The profile of those attempting suicide also appears to differ between countries, stressing the importance of social and cultural factors

in self harm and its reporting, e.g. being Catholic may confer some protection or may make reporting and attribution of self-harm less likely. However, being female, unmarried, having a psychiatric disorder (in particular depression) and having made a past attempt are all consistently associated with DSH in older adults. Physical health status does not appear to be strongly associated with DSH. Personality attributes, including specific domains of extraversion and neuroticism, have been found to be associated with both hopelessness and suicidal behaviour.

Methodological issues

Many of the studies published in the last decade continue to have a small sample size (Pierce, 1996; Hepple and Quinton, 1997; Szanto *et al.*, 1998; Duberstein *et al.*, 1999, 2000, 2001; De Leo *et al.*, 2002; Lykouras *et al.*, 2002; Osvath *et al.*, 2002). This makes negative results very difficult to interpret. The majority of studies have also continued to focus on highly selected populations meaning that the generalisability of the data generated is limited (Takahashi *et al.*, 1995; Duberstein *et al.*, 1999; Upadhyaya *et al.*, 1999; Duberstein *et al.*, 2000, 2001; Seidlitz *et al.*, 2001; Lykouras *et al.*, 2002). The large majority of studies have been completed with samples from psychiatric services (in and out patients); referrals from general hospital (e.g. from Accident and Emergency departments); or focus on specific diagnostic groups (e.g. depression and schizophrenia). Very few studies take a population approach (Scocco and De Leo, 2002).

There is a lack of informant data in those studies examining personality traits (Duberstein *et al.*, 2000, 2001; Seidlitz *et al.*, 2001), so the impact of mental illness on attitudes may have affected results. Almost all the data available on personality traits in this review derived from a single inpatient sample of depressed suicide attempters aged 50+.

The definition of what constitutes old age also varies markedly from sample to sample ranging with the lower limit from 50 to 65. This often seems to have been based on a desire to maximise the number of cases rather than for on any empirical reason. This makes studies difficult to compare. The reliance on retrospective data (Chiu *et al.*, 1996; Pierce, 1996; Beautrais, 2002) including the retrospective suicide intent scores (Upadhyaya *et al.*, 1999) continues and is also problematic. The majority of problems with the nature and quality of research identified by Draper (1996) therefore continue to be of concern.

Future directions

Suicide and DSH both differ from disease and illness in that a conscious decision is taken to pursue this act. Although research so far has highlighted broad risk factors we need well-designed population-based studies with adequate sample size to confirm these factors and increase generalisability. To disentangle direction of causality, prospective studies are needed with serial measures of these factors (e.g. psychiatric diagnoses, hopelessness). Such studies would shed light on the persistence and significance of these factors on repetition and completed suicide. There continues to be a lack of studies on the biological correlates of DSH in older adults.

Clearly there are differences between ethnic groups, e.g. in the methods employed in DSH. Our social and cultural background plays a part in structuring our cognitive patterns and problem solving mechanisms which may influence the expression of any of the risk factors identified, as well as defining the barriers to pathways in seeking help from support networks and professional organizations. We need better cross-cultural studies of DSH in the elderly that include the developing world as well.

There is a particular lack of both quantitative and qualitative studies examining the motivations and the interaction of biological, psychological and social factors within the 'suicidal process'. Further health service research on the utilisation, costs and barriers to general health and psychiatric care is also needed to target areas for improvement and to direct resources. Finally, intervention studies that focus on removing or reducing the impact of these risk factors (e.g. hopelessness) could be imagined but it may be that better basic data is needed before such trials can be designed.

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