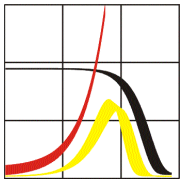

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Differences in Suicide between the Old and the Oldest Old

by

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ABSTRACT

Objectives. The purpose of our study is to examine the differences in trends of suicide mortality between the old (65-79) and the oldest old (80+).

Methods. All persons aged 50 or above who committed suicide in Denmark during 1972-1998 are included in the analysis. Suicide trends are analysed by sex, age, civil status and methods. Age, period, and cohort effects are examined graphically.

Results. In all, 17,729 (10,479 men and 7,250 women) committed suicide. During recent decades, the decreasing suicide trend of the middle aged and the old has been opposed by a more stable trend of the oldest old. The highest suicide rate is found among the oldest old men, and during the mid-1990's, also among women. Marriage has a preventive effect on suicide, however this effect decreases among the oldest old. Oldest old tend to use more determined suicide methods.

Discussion. Distinct differences in the suicide mortality of the old and the oldest old were found. The suicide trend of the oldest old did not follow the decreasing trend of younger age groups. The suicide patterns among the old have more in common with the patterns of the middle-aged than with the oldest old.

KEYWORDS:

suicide, elderly, oldest old.

Differences in Suicide between the Old and the Oldest Old

INTRODUCTION

The highest risk of suicide is found among the elderly. Due to the increasing number of elderly persons, particularly of the oldest old aged 80 years or above, a future rise of suicides is expected (Bille-Brahe & Jessen, 1994). However there are considerable differences between the old and the oldest old. Today we find a generation of old who are relatively fit and a generation of oldest old who are more frail (Jeune, 2002a; Jeune, 2002b). It is therefore to be expected that the suicide trends of the old and oldest old differ in general as well as over time. In order to conceptualize preventive measures, it is highly important to identify the subgroups within the elderly with elevated risks of committing suicide.

The marked increase in the number of oldest old over recent decades is mainly due to a decline in the mortality of oldest old (Jeune & Skytthe, 2001; Kannisto, 1996; Vaupel & Jeune, 1995; Vaupel et al., 1998; Wilmoth & Horiuchi, 1999). The mortality decline is probably due to improvements in living standards, life style, medical treatment, and care-taking of the elderly (Jeune, 2002a; Jeune, 2002b). Although better functional abilities have been documented among the elderly, including the oldest old (Myers, Torrey, & Kinsella, 1995; Manton & Gu, 2001), oldest old are much more frail and dependent on care than the younger elderly.

The highest suicide rate of all age groups is generally found among the elderly aged 65 years or above (Bille-Brahe & Andersen, 2001; De Leo, Conforti & Carollo, 1997;

De Leo, Carollo, Dello Buono, Conforti & Mastinu, 1995; Dennis & Lindesay, 1996; McIntosh, 1992). Some studies have found a higher suicide risk among the oldest old men than among the younger men, while the same has not been found consistently for women (Coren & Hewitt, 1999; De Leo, 1988; De Leo, 1999; De Leo & Ormskerk, 1991; Kristensen and Nielsen, 1996; Manton, Blazer & Woodbury, 1987; Quan & Arboleda-Florez, 1999). Analysis of the differences between the old and the oldest old in the suicide trends over time and with regard to civil status and suicide methods has never been carried out.

It is not clear whether the improvements in life quality have a similar effect on all elderly age groups. Since the oldest old are more frail, it is possible that they are more prone to suicide. In order to be able to characterize the risk groups of elderly persons who are particularly susceptible to suicide, more information on the risk patterns is needed.

The purpose of this paper is to analyse the trends of suicide among the old (65 – 79 years) and the oldest old (80 years or above) in recent decades. Special attention is given to differences in the trends between the old and the oldest old with respect to sex, age, civil status, and suicide method. Age-period-cohort effects are examined graphically.

METHODS

Individual-level data on all suicides occurring in Denmark (not including Greenland and the Faroe Islands) for the period 1972-1998 was obtained from the Register of Suicide kept at the Centre for Suicide Research in Odense, Denmark. Data on

population size by age and civil status for each calendar year was obtained from Statistics Denmark (Statistic Denmark, 2000). For reasons of comparison, all persons aged 50 years and above are included in the study.

The suicide rate between ages *a* to *a*+*n* per 100,000 denoted by ${}_nM_a^s(t)$ for each calendar year is

$$ {}_nM_a^s(t) = \frac{\text{Number of suicides in the age range } a \text{ to } a+n \text{ during time } t}{\text{Number of person - years lived in the age range } a \text{ to } a+n \text{ during time } t}, $$

and it was calculated as

$$ {}_nM_a^s(t) = \frac{{}_nD_a^s(t)}{{}_nN_a(t)\, e^{\left(\ln\left(\frac{{}_nN_a(t+1)}{{}_nN_a(t)}\right)/2\right)}}. $$

The number of suicides in the age range *a* to *a* + *n* occurring within year *t* is denoted by ${}_nD_a^s(t)$, while ${}_nN_a(t)$ represents the number of persons in age group *a* to *a* + *n* at the 1st of January of year *t* and ${}_nN_a(t+1)$ the same group at the 1st of January of year *t* + 1. The number of suicides is divided by the mid-year population, which is used as an estimate of the person-years lived. The mid-year population is calculated by using the exponential growth rate (Preston, Heuveline & Guillot, 2001). Suicide rates were calculated for the middle-aged (50-64 years), the old (65-79 years), and the oldest old (80 years or above).

By applying a Lexis diagram, we have examined age, period, and cohort effects (A-P-C effects) graphically, see Vaupel, Zhenglian, Andreev & Yashin (1998) for a description of the method. A matrix of suicide rates is plotted by calendar year and age. Each square in the diagram denotes the suicide rate for one particular age and one

particular calendar year. An age effect would be found as a change along the horizontal lines; likewise period and cohort effects would be found as changes along the vertical and diagonal lines, respectively. This method avoids the general problem that the A-P-C effects implicate each other (A= C + P) - see for instance Snowdon & Hunt (2002).

RESULTS

During the period 1972 to 1998, 17,729 persons aged 50 years or older committed suicide in Denmark. Of these, 10,479 were males and 7,250 were females.

The annual suicide rates for men in the age groups 50-64, 65-79, and 80 years and above, are shown in Figure 1. Since the beginning of the 1980's, there has been a remarkable decline in the suicide rates for the two younger age groups. At present, these have a rate of approximately 30 suicides per 100,000. The suicide rate of the oldest old has remained at a fairly constant level of about 65 per 100,000 during the previous two decades. During the entire period, the highest suicide rate was found among the oldest old men. For women, we also observe a decreasing trend of the suicide rates among the two younger age groups: from a level between 30–40 per 100.000, the suicide rate has now decreased to about 15 per 100,000. During 1994 to 1997, the suicide rate among the oldest old women increased to a higher level than among younger age groups. A decreasing trend in the suicide frequency among the oldest old is found over recent years.

[Figure 1 about here]

In the Lexis diagram for men (Figure 2), an age effect for the oldest old (aged 80 years or above) is found. For men, there was no clear period or cohort effects for men; for women, neither age, period, nor cohort effects was observed (Figure 3).

[Figure 2 and Figure 3 about here]

Figure 4 shows that men in the age of 50-64 and 65-79 years approximately commit suicide twice as often as women, whereas the sex ratio among the oldest old is about 3-4. The suicide rate is analysed by civil status and age groups for the years 1994-1998 (Figure 5). In general, never married, divorced, and widowed men and women had a higher suicide rate. Among the married and the divorced, the suicide rate was increasing by age for both sexes, among males who had never married or were widowers we also find an increasing suicide rate with age.

[Figure 4 and Figure 5 about here]

The distribution of the suicide methods in per cent is shown in Figure 6 for 1994-1998. Among men, the most frequent suicide method was hanging, followed by self-poisoning, firearms, monoxide and gas. The most frequently used method among women was self-poisoning. About 35 per cent of the middle-aged men (50-64 years) who committed suicide did so by hanging. In the age groups 65-79 years and 80 years or above, 42 and 52 per cent, respectively, committed suicide by hanging. Hanging accounted for 27 per cent of the suicides among middle-aged women and for about

34 and 37 per cent, respectively, among the old and oldest old.

[Figure 6 about here]

When examining the time trends for the entire period 1972-1998 (figure not shown), we found that there has been a decreasing tendency for men to commit suicide by self-poisoning during more recent years, whereas the use of firearms has increased. The use of self-poisoning also declined among women, while hanging and jumping were applied more frequently.

DISCUSSION

The suicide rates among the middle-aged and the old decreased during the past decades. However this was not the case among the oldest old. The suicide trends for the middle aged and the old remained rather similar during the observation period, while the suicide trends for the oldest old were different. Furthermore, the general mortality decline among the oldest old is not reflected in their suicide trends. Thus, the factors who contributed to the prolonged life expectancy of the oldest old, such as better living standards, better care-taking and healthier life styles, do not seem to have an effect on the decision of committing suicide.

Our analysis of the suicide trends by civil status confirms the higher suicide rate among the divorced and widowed elderly found by a regional study carried out in Denmark (Kristensen et al., 1996). In addition, we also find an increased suicide risk for those who never married. When examining the age differences, our results suggest

that the preventive effect of marriage ceases with increasing age. The suicide rate of married women aged 80 years or above is even higher than the suicide rate of the never married women in the same age group.

It is a striking finding that one out of three women aged 80 years or above who commit suicide do so by hanging. For men too, we found that an increasing proportion of oldest old commits suicide by hanging. When dividing the methods into determined (hanging, firearms, jumping and moving objects) and undetermined (self-poisoning, drowning, monoxide and cutting) methods, as suggested by Retterstøl (1993), we find a clear tendency: with increasing age more people tend to use determined methods. For men, determined methods are used in 59 per cent of all suicides among the middle-aged; the proportion increases to 64 and 72 per cent respectively, for the old and the oldest old. For women, the percentage using determined methods is 38 per cent among the middle-aged; and 42 and 53 per cent respectively, for women in the old and the oldest old age groups. Although the oldest old are considered more frail this does not prevent persons in this age group to commit suicide by using highly lethal methods to a larger extend than younger age groups. This indicates that the suicide intention is higher among the oldest old than in the younger age groups.

When examining the suicide frequency it is of course of immense importance that the statistics are valid and reliable (Erlangsen, 1997). Generally, Danish suicide statistics are viewed to be reliable. Our findings show that the proportion of suicides by self-poisoning is decreasing with increasing age. One might suppose that this is due to the difficulty in determining whether an overdose among the oldest old was intentional or not. In case of the latter, the cause of death would then be registered as a cause of death other than suicide. Kolmos and Bach (1987) examined the registration of

suicides in Scandinavia by adding the rates of undetermined and accidental poisonings to the rate of suicidal poisonings. Still, they found a decreasing tendency of the rate with increasing age. The decreasing proportion of poisonings with increasing age does not, therefore, seem to be an artefact.

A particular strength of the present analysis is that the analysis is carried out using individual-level data on all suicides in Denmark, registered over a long period. Suicide trends can therefore be followed year by year, and for particular age groups, which makes the findings more reliable.

We did not find any clear cohort effect that could explain the differences in the suicide frequency between the old and the oldest old. Apparently, something is changing when the elderly is getting older that makes people more prone to committing suicide. Our findings indicate that the oldest old do not experience themselves this general increase in the quality of life.

Our findings support the hypothesis that there has not been any clear improvements in the general quality of life of the oldest old over recent decades. It is possible that severe physical illness or other factors have a larger effect on the suicide risks of the oldest old than of younger age groups. A future research project will examine the effects of physical illness and admission to general hospital on the suicide risks of the old and the oldest old.

CONCLUSION

Our findings underline that the elderly, above age 65, should not be considered as a homogeneous group when it comes to suicide. We find distinct differences in the

suicide mortality of the old and the oldest old. While the suicide rate among the old has been decreasing for both men and women over recent decades, the same tendency has not been found for the oldest old. Also the sex ratio of the oldest old remained at a higher level than the ratio of the old. Both men and women, being either never married, divorced, or widowed, have a higher suicide rate. However, marriage seems to be a less preventive factor among the oldest old. Furthermore, the oldest old tend to use more determined suicide methods than the old. The suicide trends of the old have more in common with the middle-aged than with the oldest old.

The improvements in medical treatment, care facilities and living standards of the elderly in recent decades do not seem to have had an impact on the decision of the oldest old of committing suicide. Our findings indicate that the general quality of life for the oldest old has not improved over the past decades.

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Figure 1. Age specific suicide rates per 100.000 by sex, 1972-1998.

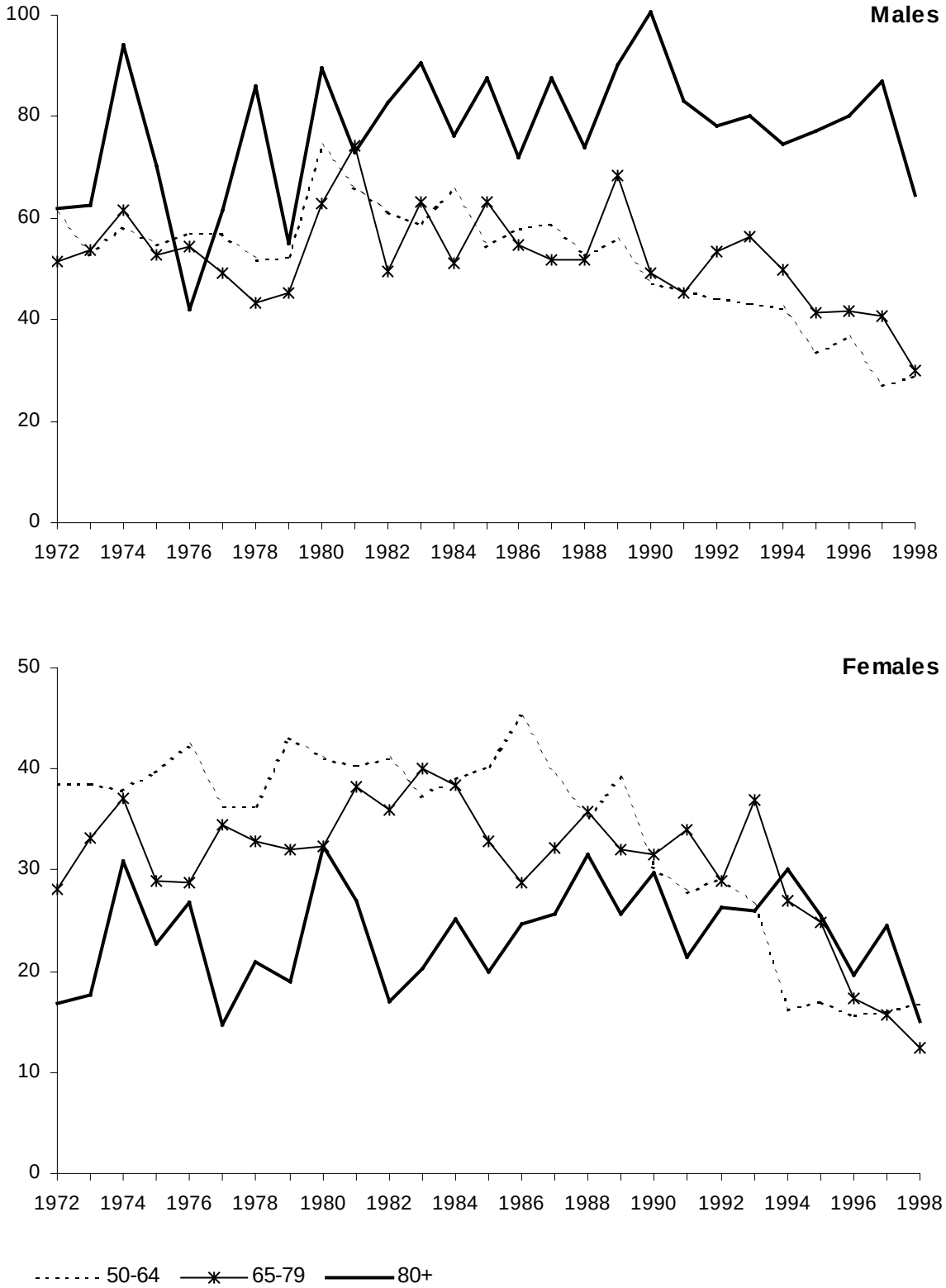

Figure 2. Lexis diagram of the suicide rate per 100.000 for men, 1972-1998.

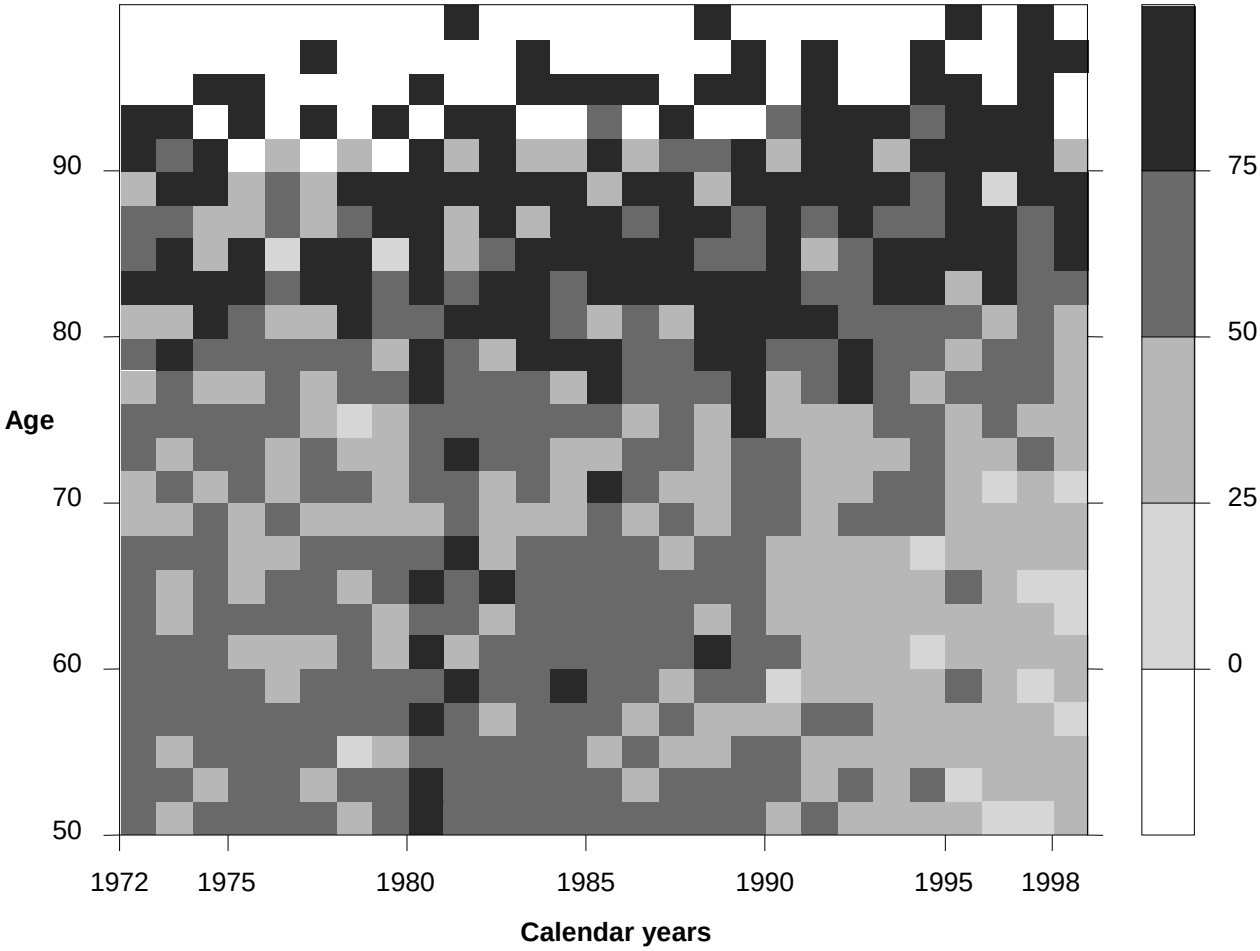

Figure 3. Lexis diagram of the suicide rate per 100.000 for women, 1972-1998.

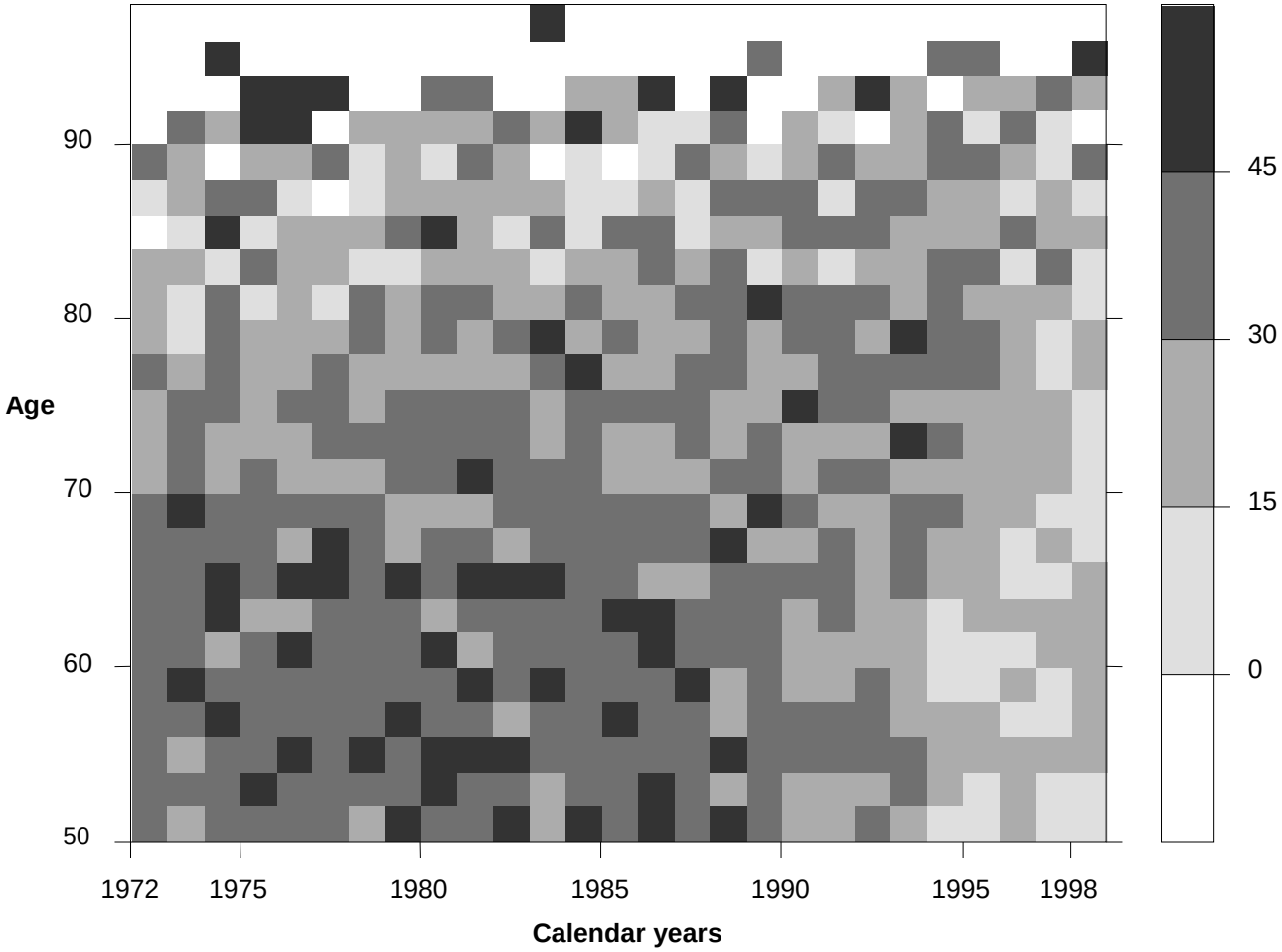

Figure 4. Sex ratio, 1972-1998.

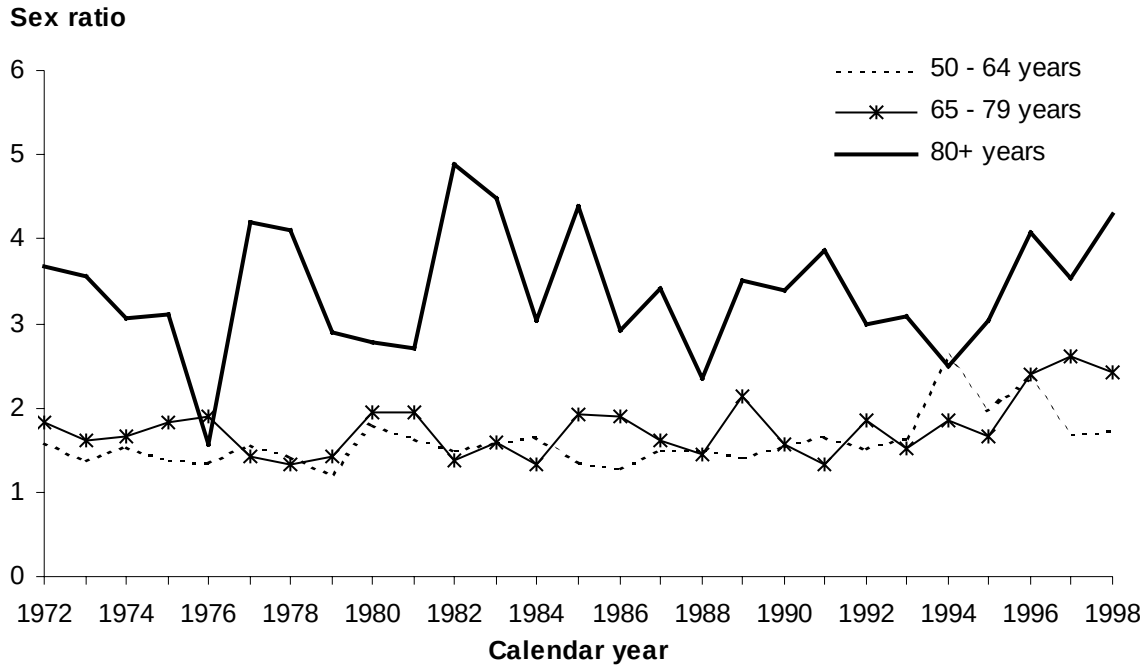

Figure 5. Suicide rate per 100.000 by sex, according to civil status and age group, 1994-1998. The horizontal line marks the average suicide rate for all aged 50 years or above (men: 39.7 per 100.000, women: 18.5 per 100.000).

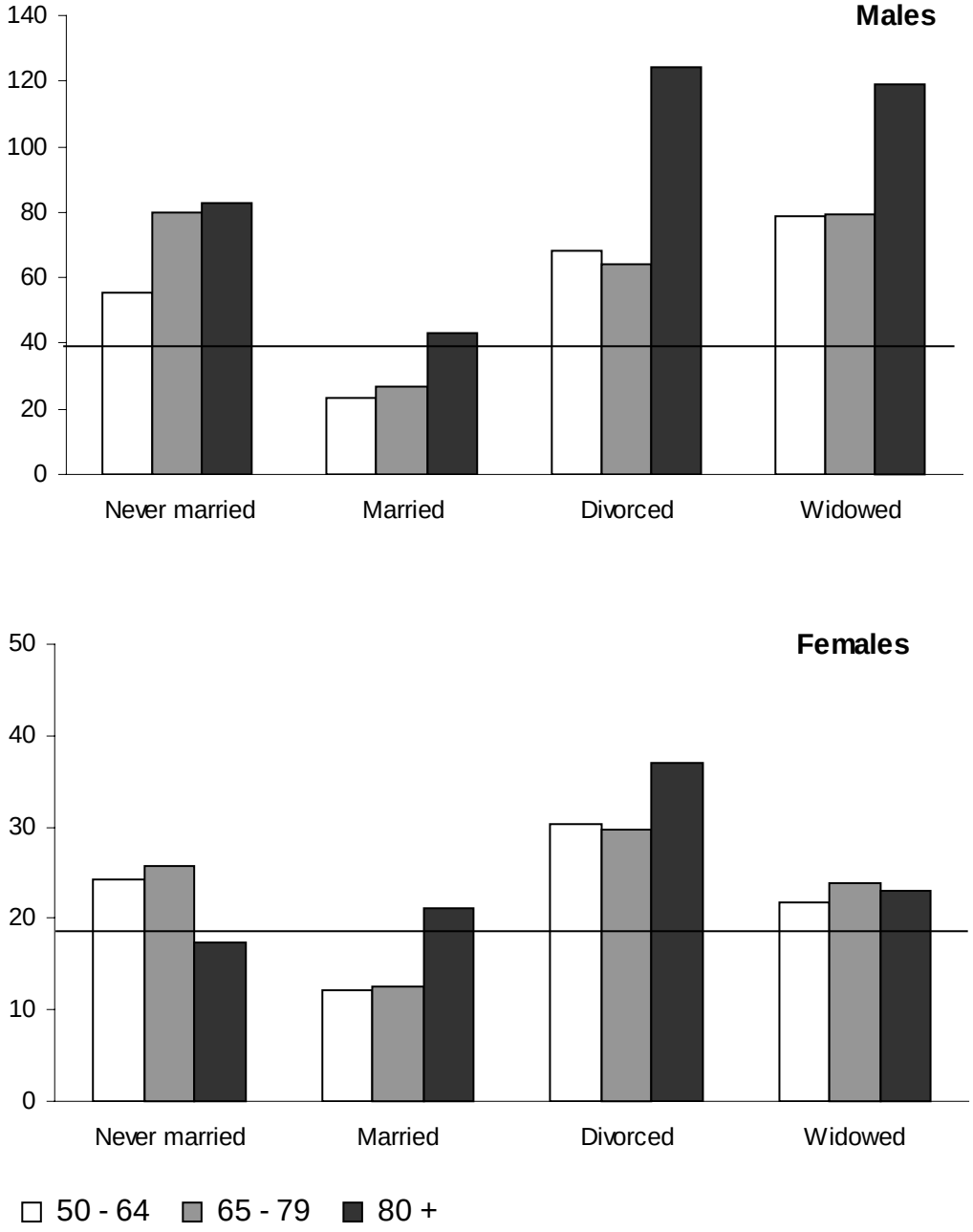

Figure 6. Distribution (in per cent) of suicide methods by sex and age groups, 1994-1998.