

ORIGINAL ARTICLE

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Use of the National Register of medico-legal autopsies in epidemiological suicide research

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Abstract Finnish forensic pathologists have been keeping their own National Register of medicolegal autopsies (NRMA) since 1985. The aims of this work were to determine the reliability of this register by comparing the data with the cause-of-death statistics published by the Central Statistical Office of Finland (CSO) and to assess its usefulness for epidemiological forensic research. The comprehensiveness of the register over the period 1986–1991 was studied in general terms and tested by checking the inclusion of known suicides by physicians during that period. Coverage of the NRMA concerning definite suicides was 97% as compared with the cause-of-death statistics of the CSO. The conclusion is that the NRMA is reliable enough to allow changes in causes and manners of death to be examined in the relatively small homogeneous population of Finland. One of the NRMA's advantages is its direct and rapid accessibility to different mortality data.

Key words Medico-legal autopsies · Suicides · Register · Forensic research

Introduction

Under-reporting of suicides in death statistics has frequently been demonstrated [1–3], due to deaths being classified as unclear when there is no convincing evidence of suicide. Often it is also difficult to reliably classify death

in cases of submersion, traffic accidents and poisonings. A medico-legal register is therefore useful in retrospect for evaluating the accuracy of the determination of the manner of death. The usefulness of the medical examiners' data in epidemiological forensic research has recently been reported e.g. in the USA [4, 5]. In Finland the mean medico-legal autopsy rate is 17.5%, the highest rate being in the northern part of Finland (mean 21.1%) and the lowest in the west coast (mean 13.1%). The mean medico-legal autopsy rate concerning definite suicides is 99% [6–11].

The Central Statistical Office of Finland (CSO) has usually been used as the source of mortality data in Fin-

Table 1 Information on the deceased contained in the National Register of Medico-legal Autopsies

1. Date of birth	17. Histopathological examinations
2. Place of residence (code)	18. Biochemical examinations (glucose, ketones, creatinine...)
3. Marital status	19. X-ray examination
4. Sex	20. Forensic odontology
5. Number of the autopsy (every institution has its own code)	21. Microbiology (additional bacteriological, virological examinations)
6. Place of death	22. Forensic serology
7. Date of death	23. Immediate cause of death
8. Age	24. Indirect cause of death
9. Profession	25. Underlying cause of death
10. Police district	26. First contributory cause of death
11. Name of person performing the autopsy	27. Second contributory cause of death
12. Reason for autopsy	28. Third contributory cause of death
13. Date and place of autopsy	29. Class of death
14. Blood alcohol	30. International E-classification by underlying cause of death
15. Urine alcohol	31. Other diseases or injuries clinically known or found at autopsy
16. Carbon monoxide haemoglobin	32. Short description of the event and circumstances

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land, linking information from the population census and the cause-of-death statistics in order to obtain quantitative data on mortality in different occupational groups [12–14]. However, little research has been done into factors contributing to suicides in such groups.

In Finland the number of forensic pathologists is 27 and they have been keeping their own autopsy register since 1985, the original purposes having been administrative, e.g. to help evaluate the quality of the determinations of causes of death. Between 1986 and 1991 50348 cases have been coded in the NRMA. The total number of deaths in Finland during this period was 291472 [6–11] and the population (mean) was 4.97 million [15–17]. The identity of the deceased is not indicated in the register. As far as we know, this register has only been used once for epidemiological purposes [18] although it includes valuable information about deceased persons, e.g. sociodemographic factors, traumas and illnesses, results of chemical analysis and some additional forensic tests, causes of death, contributing factors and classifications of death (Table 1). The small volume of research conducted so far may be due to the fact that the reliability of the register has not yet been tested.

Aims of the study

The first aim was to determine the reliability of the NRMA by comparing it with the cause-of-death statistics published by the CSO, the coverage of which is known to be 100% [6–11]. The Central Statistical Office of Finland is the bureau which is responsible for gathering Finnish death certificates and compiling Finnish mortality statistics. The second aim was to compare the age and sex distributions of the suicide victims in the NRMA and CSO statistics. The third aim was to determine the usefulness of the NRMA in the occupational mortality surveys.

Material and methods

All deaths in 7 specific classes during the years 1986–1991 ($n = 17412$) were collected (Table 2), and the reliability of the register was tested in 2 ways, firstly by counting how many cases in general exist in the register, i.e. how complete it is, and secondly by comparing the age and sex distributions between the NRMA and the cause-of-death statistics published by the CSO to make sure that the cases in them were the same. In practice this is the only way to link the data sources between the NRMA and CSO. The number of deaths registered in the Province of Åland were excluded from the CSO statistics before comparisons because the NRMA does not include the Province of Åland. Classes of death included in the current study are relevant in estimating possible and probable suicides in addition to definite suicides. In Finland implications of suicides have not been found among the homicide cases [1] and is the reason why homicides were not included in the study.

In addition to this general examination, we also studied how accurately suicides among physicians in 1986–1991 are included in the NRMA. The authors are currently engaged in studying the factors involved in suicides of Finnish physicians. Therefore an evaluation was made on how reliable the NRMA is concerning suicides of physicians. The reliability of the classification of profes-

Table 2 Classes of death investigated and codes in the International Classification of Diseases (ICD)*. (n = Number of cases in 1986–1991 in the National Register of Medico-legal Autopsies)

Class of death	ICD 8 (year 1986)	ICD 9 (years 1987–1991)
Suicide and other self-inflicted injury ($n = 8229$)	E950–959	E950–959
Injury undetermined whether accidentally or purposely inflicted ($n = 1186$)	E980–989	E970–979
Motor vehicle traffic accidents ($n = 3465$)	E810	E801
Motor vehicle non-traffic accidents ($n = 101$)	E820	E802
Submersion in water transport accident ($n = 526$)	E830, 832	E810
Accidental poisoning by drugs, medications and biological substances ($n = 2909$)	E850–877	E840–859
Accidental drowning and submersion ($n = 996$)	E910	E910

* Taking account of the change in codes in 1987 [20, 21]. The codes are based on the classifications used by forensic pathologists in Finland and the Central Statistical Office of Finland

sions in the NRMA is difficult to estimate because professions are not stated in the CSO cause-of-death statistics. We therefore set out to study the reliability of the data in 2 ways: firstly by checking whether professions are adequately indicated in the NRMA in general and secondly by assessing how reliably suicides committed by Finnish physicians in 1986–1991 are coded in the NRMA.

Reliable reference groups with respect to suicides among physicians were obtained from 2 sources: the National Suicide Prevention Project in Finland – all 7 of the physicians mentioned were also in the NRMA and the CSO data. During that project all suicides committed in Finland between 1.4.1987 and 31.3.1988 were carefully analyzed using the psychological autopsy method [19].

Results

Coverage of the NRMA

Some deaths seemed to be missing from the NRMA (Table 3), only in the class of accidental drowning and submersion (E910) more cases were registered than in the CSO cause-of-death statistics.

Equivalence in age and sex distributions

It is impossible to say from coverage estimates alone whether the cases in the NRMA and the CSO cause-of-death statistics are exactly the same, because the cases may be confused between the different classes of death. If this were so, the NRMA would give a false picture of the age and sex distributions of suicide victims, for example. This is not in fact the case, as can be seen from Fig. 1, in which the distributions are very similar.

Table 3 Number of deaths in the NRMA and CSO in seven classes of death

Class of Death:	Number of cases in the National Register of Medico-legal Autopsies (coverage % compared with the CSO)	Number of cases in the Central Statistical Office of Finland
Suicide and other self-inflicted injury (E950-959)	<i>n</i> = 8229 (97%)	<i>n</i> = 8464
Injury undetermined whether accidentally or purposely inflicted (E970-979)	<i>n</i> = 1186 (96%)	<i>n</i> = 1232
Motor vehicle traffic accidents (E801)	<i>n</i> = 3465 (94%)	<i>n</i> = 3665
Motor vehicle non-traffic accidents (E802)	<i>n</i> = 101 (73%)	<i>n</i> = 138
Submersion in water transport accident (E810)	<i>n</i> = 526 (83%)	<i>n</i> = 632
Accidental poisoning by drugs, medications and biologicals (E840-859)	<i>n</i> = 2909 (93%)	<i>n</i> = 3141
Accidental drowning and submersion (E910)	<i>n</i> = 996 (106%)	<i>n</i> = 935

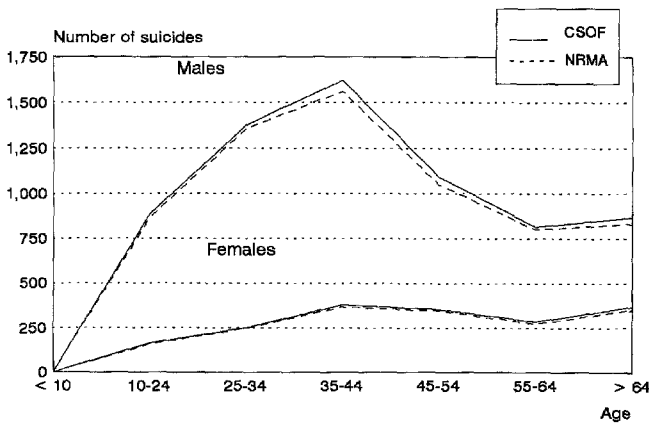


Fig. 1 Comparison of age and sex distributions in the NRMA and the CSO cause-of-death statistics concerning suicides in 1986-1991

Use of the NRMA for occupational mortality surveys

The equivalence between our own material and that of the CSO regarding suicides among Finnish physicians by age can be judged from Fig. 2 a (males) and 2 b (females). One male physician in the age group 45-49 years was missing from the NRMA, while the age group under 30 years contained one "extra" male physician and one female physician. These "over-representations" are due to the fact that CSO figures are based on the population census of 1985, when these "extra" cases were still medical students and

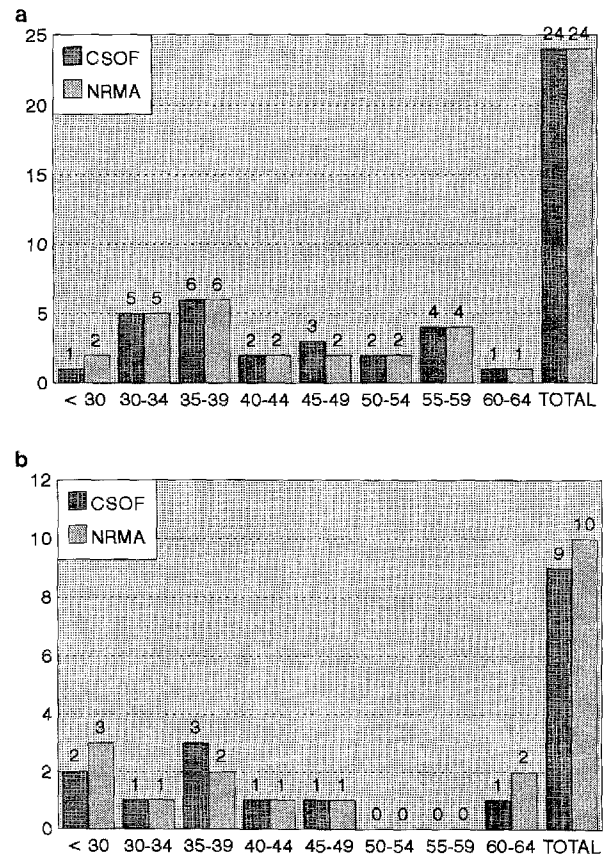


Fig. 2 (a) Comparison of age and sex distributions of suicides by male physicians (age groups up to 64) in the NRMA and the CSO statistics in 1986-1991. Age is based on the population census of 17.11.1985. (b) Comparison of age and sex distributions of suicides by female physicians (age groups up to 64) in the NRMA and the CSO statistics in 1986-1991. Age is based on the population census of 17.11.01985

not yet physicians. One female case in the age group 35-39 years was missing from the NRMA, while there was one more case in the age group 60-64 years.

The net result was that the National Register of medico-legal autopsies pointed to 34 certain cases of suicides committed by physicians (aged up to 64 years) in Finland in 1986-1991. This figure was verified by ordering comparative material from the CSO in 2 forms, defining physician according to either the profession or the education variable in the populations census. This proved that profession and education coincided well in the case of physicians.

The proportion of suicide cases not reported in the NRMA was 3% (see Table 3), and that in which the profession was not indicated an additional 7%, excluding those who can be assumed from their age not to have had a profession at all (16 years or younger) and those whose profession was mentioned as "unknown" or "none". Thus the total loss of suicide cases from the register was 10%. This must be borne in mind when using NRMA data to study mortality in relation to occupation.

Discussion

There are 2 possible causes for the differences presented in Table 3. First, it is possible that the same case which was classified as accidental drowning and submersion (E910) by the medico-legal expert was classified by the CSO as submersion in a water transport accident (E810), and secondly, it is possible that snowmobile accidents may have been placed in class E802 (off-road motor vehicle accidents) by the CSO while they are usually in class E910 in the NRMA.

Because the identity of the deceased is not indicated in the register, we could estimate the reliability of the NRMA in practice only at the general level using summary measures. In Finland the forensic pathologist, who keeps the NRMA writes the death certificate which is then sent to the CSO.

The inconsistencies in the designations of professions proved to be problematic. The original intention was to extract the cases from the NRMA by means of the keyword 'physician', but this did not work, as a variety of terms had been used for coding purposes, e.g. various abbreviations, also 'psychiatrist', 'ophthalmologist' etc. It was therefore necessary to go through all 8229 cases one by one. Apart from the definite cases of physicians, all possible physicians, including for example "assistant professor" and "professor", were investigated and the primary education was checked. It would thus be reasonable to at least add an education variable to the NRMA data base.

In conclusion, the NRMA was sufficiently reliable to be used for epidemiological purposes. It has many advantages such as easy, direct and rapid accessibility of different mortality data. The National Register of Medico-legal Autopsies allows changes in causes and manners of death to be examined in the relatively small, homogeneous population of Finland.

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