

Medico-legal autopsies in Denmark

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ABSTRACT

INTRODUCTION: At 2.7% in 1970, the Danish medico-legal autopsy frequency was lower than recent frequencies observed in the Nordic countries (4-24%). The aim of this study was to analyse trends in the number and frequency of Danish medico-legal autopsies.

MATERIAL AND METHODS: Data were collected from the computerized archives in the Danish departments of forensic medicine, Statistics Denmark and the Danish National Board of Health.

RESULTS: During the 1996-2005 study period, a total of 14,990 medico-legal autopsies were performed. This yielded a medico-legal autopsy frequency of between 2.4% and 2.8%. Our results revealed a certain constancy in the number of medico-legal autopsies and frequency of autopsy with regard to manner of death, sex and number, but we also observed changes in the age composition which involved a decrease in the proportion of young (20-39 years) and an increase in the proportion of middle-aged persons (40-59 years).

CONCLUSION: Denmark has a lower autopsy frequency than other Nordic countries and this may constitute a problem for quality of death-statistics and research based on autopsy results. If the patterns in medico-legal autopsy frequencies continue, a decrease in the number of medico-legal autopsies is to be expected. As a consequence, education and training of forensic pathologists may be impaired.

Medico-legal autopsies in Denmark are performed at three departments of forensic medicine located at the universities in Copenhagen, Aarhus and Odense. According to Danish law, a medico-legal autopsy must be performed if a punishable act has been carried out or is suspected, if the cause of death is not established and the death holds aspects of interest to the police, if the manner of death is unknown, or if an autopsy is considered necessary to prevent suspicion from arising at a later point in time.

Furthermore, the Ministry of Justice has decided that an autopsy shall be performed when a death is related to drug abuse [1]. A medico-legal autopsy is preceded by a medico-legal external examination performed by a forensic pathologist or a health medical officer in collaboration with the police. If the manner of death is determined with a sufficiently high measure of

certainty and if the death holds no interest to the police, the autopsy will be omitted. If an autopsy is requested, all costs are covered by the police.

The medico-legal autopsy frequency is defined as the number of medico-legal autopsies divided by the total number of deaths in a particular region over a defined period of time [2].

By using the medico-legal autopsy frequency, inter-country comparison can be made. Great differences exist between the Nordic countries as medico-legal autopsy frequencies vary from around 4% in Norway and 6% in Sweden to 24% in Finland [2-6]. The Danish medico-legal autopsy frequency was 2.3% in 1967 and 2.7% in 1970 [7]. To our knowledge, no studies have investigated recent frequencies and trends in Denmark.

The aim of this study was to analyse trends in the number and frequency of medico-legal autopsies as well as the distribution of autopsies by basic data such as age, sex and manner of death.

MATERIAL AND METHODS

This retrospective study was carried out by searching the computerized archives of the three Danish departments of forensic medicine. The study period chosen was 1 January 1996 to 31 December 2005, a total of ten years. The following data were registered for each year: the number of medico-legal autopsies, age, sex and manner of death (natural death, accidental death, suicide, homicide or unknown).

During this ten-year-period, a total of 15,028 medico-legal autopsies were performed. In 132 of these autopsies, no manner of death was registered due to errors in the computerized archives. These cases were investigated manually. The manner of death was either

ORIGINAL ARTICLE

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Dan Med Bul
2011;58(3):A4247



The clinical setting.

TABLE 1

The number of deaths and the number of medico-legal autopsies including subgroups according to age and calculated medico-legal autopsy frequencies, in Denmark 1996-2005.

| | Total number of deaths | Number of medico-legal autopsies | | | | Medico-legal autopsy frequencies, % | | | | | |
|------|------------------------|----------------------------------|------------|-------------|-------------|-------------------------------------|-----|------------|-------------|-------------|-----------|
| | | all | 0-19 years | 20-39 years | 40-59 years | 60+ years | all | 0-19 years | 20-39 years | 40-59 years | 60+ years |
| 1996 | 61,043 | 1,734 | 98 | 478 | 698 | 460 | 2.8 | 14.1 | 33.3 | 10.2 | 0.9 |
| 1997 | 59,898 | 1,650 | 108 | 483 | 689 | 370 | 2.8 | 16.5 | 35.5 | 10.2 | 0.7 |
| 1998 | 58,453 | 1,464 | 107 | 403 | 619 | 335 | 2.5 | 17.8 | 31.8 | 9.5 | 0.7 |
| 1999 | 59,179 | 1,426 | 128 | 377 | 585 | 336 | 2.4 | 23.2 | 29.6 | 8.8 | 0.7 |
| 2000 | 57,998 | 1,430 | 118 | 400 | 577 | 335 | 2.5 | 18.9 | 34.1 | 8.7 | 0.7 |
| 2001 | 58,355 | 1,459 | 114 | 403 | 595 | 347 | 2.5 | 19 | 34.5 | 8.9 | 0.7 |
| 2002 | 59,116 | 1,435 | 92 | 379 | 609 | 355 | 2.5 | 16.3 | 26.5 | 9 | 0.7 |
| 2003 | 58,054 | 1,501 | 92 | 392 | 662 | 355 | 2.6 | 17.4 | 31.2 | 9.8 | 0.7 |
| 2004 | 56,175 | 1,445 | 87 | 381 | 598 | 379 | 2.6 | 16 | 32.6 | 9.1 | 0.8 |
| 2005 | 55,144 | 1,446 | 87 | 338 | 648 | 373 | 2.6 | 17.1 | 34.6 | 10.6 | 0.8 |

TABLE 2

Sex distribution by manner of death described by number and percentage of Danish medico-legal autopsies.

| | Manner of death | | | | | Total |
|--------------|-----------------|------------|----------|----------|-------------|-------------|
| | natural | accidental | suicide | homicide | unknown | |
| Men, n (%) | 3,686 (67) | 4,199 (72) | 678 (63) | 374 (61) | 1,315 (65%) | 10,252 (68) |
| Women, n (%) | 1,794 (33) | 1,602 (28) | 400 (37) | 238 (39) | 704 (35%) | 4,738 (32) |

found to be registered in the autopsy report or, if not, the most likely manner of death was determined by the authors (in approximately 20% of the cases). A total of 38 cases were bone material or unidentified body parts and were excluded. This yielded a final total of 14,990. Among these, 10,252 (68%) were men and 4,738 (32%) women. Subgroups were made according to age (0-19 years, 20-39 years, 40-59 years and 60 years or more). Medico-legal autopsy frequencies were determined by calculations with available data on death statistics from Statistics Denmark and the Danish National Board of Health.

RESULTS

The number of deaths, medico-legal autopsies and the calculated medico-legal autopsy frequencies are shown in **Table 1** [8]. The medico-legal autopsy frequency of all deaths decreased between 1996 and 1999; this was followed by an increase throughout the rest of the study period to 2.6% in 2005. The overall variation was 0.4 percentage points. The medico-legal autopsy frequency according to age varied from 14.1% to 23.2% (n = 98-128) in the 0-19 years group and from 26.5% to 35.5% (n = 338-483) in the 20-39 years group. A total of 8.7%-10.6% (n = 577-648) of all deaths in the 40-59 years group were medico-legal autopsies. The lowest frequency was found in the eldest (60 years and up) where the medico-legal autopsy frequency was only 0.7-0.9% (n = 336-460).

Calculation of the age distribution from the number of medico-legal autopsies (**Table 1**) showed a decreasing trend in the 20-39 years subgroup from 28% (n = 478/1,734 × 100) in 1996 to 23% in 2005. A corresponding increase was found in the 40-59 years subgroup from 40% in 1996 to 45% in 2005. A much weaker decreasing tendency was noted in the young (0-19 years) group, with a corresponding increasing tendency in the elderly (60 years and above). Almost half of the medico-legal autopsies (n = 577-698) were performed on subjects between 40 and 59 years.

The sex distribution was investigated by year and manner of death (**Table 2**) and it remained relatively constant with a 2:1 male:female ratio.

The distribution by manner of death (natural death, accidental death, suicide, homicide or unknown) was relatively constant throughout the study period as shown in **Figure 1**. 35-38% of all medico-legal autopsies were natural, 37-41% accidental, 6-9% suicides, 3-5% homicides and 12-15% unknown.

DISCUSSION

The Danish medico-legal autopsy frequency varied between 2.4% and 2.8% of all deaths, which is lower than the corresponding frequency reported for other Nordic countries. While the Danish medico-legal autopsy frequency was relatively constant during the study period, trends have been found in other Nordic countries.

The Swedish medico-legal autopsy frequency decreased from around 12% in 1989 to 6% in the years after 1990-1991 [5, 6]. This was supposedly due to legislative changes which made it possible to convert a medico-legal autopsy into a clinical autopsy in supposedly natural outside-hospital deaths [6].

In Norway, the medico-legal autopsy frequency decreased from 6.9% in 1986 to 4% in 1993, supposedly due to the transfer of the costs of autopsy from the Ministry of Justice to the police districts in 1990 [2].

From 1970 to 2004, the Finish medico-legal autopsy frequency increased from 13.6% to 23.8% [3]. Finland is the only Nordic country with a recent increasing trend in the medico-legal autopsy frequency. This increase was especially marked after 1992, the year of the implementation of the National Authority for Medico-legal Affairs, whose objective is to maintain and promote patient security and to assure the quality of health-care services [4]. Possibly due to the lack of significant legislative changes during the study period, no trends were observed in Denmark. The lower medico-legal autopsy frequency in Denmark than in the other Nordic countries is primarily due to a lower autopsy frequency in deaths due to suicide and accidents. Comparing our data with death statistics from the Danish National Board of Health, the medico-legal autopsy frequency was 16% (116/728) in deaths due to suicide and 22% (561/2,560) in accidental deaths in 2000 [9].

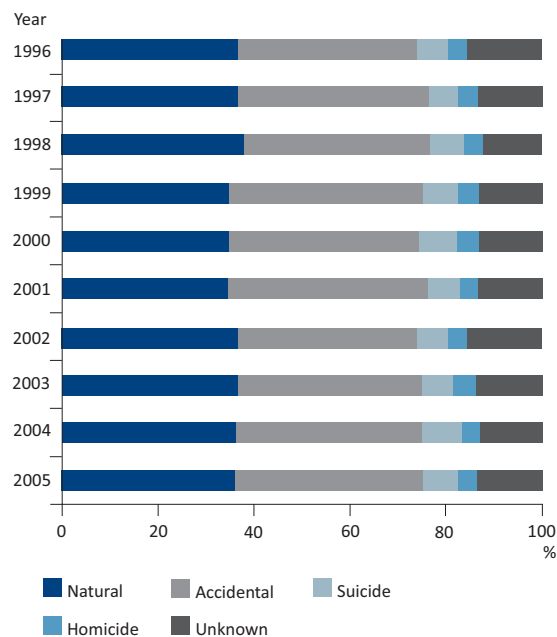
In a Norwegian study, the corresponding figures were approximately 66% and 58%, respectively [10]. In Sweden, the overall medico-legal autopsy frequency in unnatural deaths (suicide, homicide and accidental deaths) is 68% [11]. The Finish frequencies reach 99.5% in suicides and 87.2% in accidental deaths [3]. These divergent autopsy frequencies can be ascribed both to differences in legislation and in request behaviour among the police, and they may also be ascribed to differences in the assessment of the importance of performing an autopsy as well as to economic priorities [1-6, 12].

Economic and scientific conflicts of interest may exist between the forensic pathologist and the police when deciding whether or not an autopsy should be performed. It was previously argued that a low autopsy frequency decreases the accuracy of death certificates and hence death statistics [2, 5]. Errors in establishing the cause of death may reach approximately 35% when an autopsy is not performed following the medico-legal external examination [13]. Furthermore, medico-legal research is often based on knowledge obtained from autopsy results. These results will be limited to deaths with an interest to the police, and hence subject to a selection bias. When an autopsy is not performed, information on potential co-existing factors such as disease, medicine, alcohol and drugs are lost.

Across the study period a slight change was seen in the age distribution of the number of medico-legal autopsies performed. This reflects the changing age composition in society [8]. Several studies have shown autopsy frequency to decrease with increasing age, which is in concordance with our results [5, 10, 14, 15]. Continuing the present legislation and police request-behaviour a decline in the number and medico-legal autopsy frequency is to be expected over the next many years due to the changing age composition in society.

FIGURE 1

Distribution by manner of death in Danish medico-legal autopsies, 1996-2005.



Fewer autopsies may result in less practical training and experience for the forensic pathologists and may cause a decline in the quality of medico-legal autopsy.

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ACCEPTED: 6 January 2011

CONFLICTS OF INTEREST: one

ACKNOWLEDGEMENT: Special thanks go to the departments of forensic pathology at the universities of Aarhus and Southern Denmark for providing access to data in local computerized archives.

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